Content and Language Integrated Learning in Practice:

Exploring Pre-service EFL Teachers' Beliefs and Negotiation of Meaning of Subject-specific Language in Thai Secondary Classrooms

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ABSTRACT

The demand for English in Thailand has been increasing rapidly due to socio-political developments and the continuing growth of the economy. For Thai students, being proficient in English can enhance their education and career opportunities. To develop students' English proficiency, both state and private schools are allowed to operate different types of bilingual education, including content and language integrated learning (CLIL). However, despite CLIL being implemented in Thailand for a decade, teachers are still grappling with many challenges because of limited understandings of CLIL and a lack of support from stakeholders. One of the challenges is related to the specialist language required for CLIL, which differs from that used in daily communication or general English classes. Teachers' knowledge of the language and pedagogical approaches that may be used for CLIL could be developed through appropriate training and support, but there is a lack of CLIL research in the Thai context illuminating how teachers manage CLIL language and help students to learn effectively.

The present study aimed to gain an insight into pre-service EFL teachers' language-driven CLIL practices and beliefs about effective CLIL implementation. It adopted a multiple interpretive case study to investigate (1) how pre-service EFL teachers explain subject-specific terms and concepts to students; (2) negotiation of meaning (NoM) strategies that they adopt to address the difficulties in the explanation of subject-specific terms and concepts; and 3) their beliefs associated with effective CLIL implementation. Under these aims, two main research questions and one sub-research question were addressed:

1. How do Thai pre-service EFL teachers explain and negotiate the meaning of subject-specific terms and concepts in CLIL lessons?

    1.1 What are the NoM strategies that the pre-service EFL teachers adopted to address difficulties concerning the explanation and students' comprehension of the subject-specific terms and concepts?

2. What are Thai pre-service EFL teachers' beliefs regarding effective CLIL implementation?

The participants consisted of six pre-service EFL teachers teaching at two Thai secondary schools as part of a one-year teaching practicum for their Bachelor of Education programme. Data were gathered from June 2020 to December 2020 through semi-structured interviews, CLIL classroom

video observations, and stimulated recall interviews. The data were transcribed and then analysed following the grounded theory approach by Charmaz (2006) and Hadley (2017).

The study reveals five main NoM strategies that the teacher participants used in their CLIL lessons to explain subject-specific terms and concepts: students' schema activation, students' comprehension check, language and content modification, the use of visual supports, and the use of L1. When encountering teaching difficulties, the majority of the teacher participants used L1 to address the difficulties. However, despite their willingness to use L1 to negotiate meaning in the observed classes, the teacher participants expressed mixed beliefs regarding how and when L1 should be used.

Furthermore, the findings demonstrated three key factors that the teacher participants believed to be influential in effective CLIL instruction: adequate CLIL teacher education, support from schools and stakeholders, and teaching preparation. The teachers highlighted that subject-specific language and language for learning and instructional purposes were two essential areas of CLIL teachers' language proficiency.

Finally, the findings showed that the teacher participants played several roles in language-driven CLIL implementation, including being language teachers, content teachers, and learners. Context specificity and the shortage of CLIL materials required the teacher participants to be analysts of students' needs as well as materials evaluators and developers. The teachers' educational backgrounds, their experiences as teachers and learners, and their school contexts were important factors in shaping the teacher participants' professional identities and their roles as CLIL teachers.

This research has shed light on pre-service EFL teachers' NoM strategies in language-driven CLIL and their beliefs about effective CLIL implementation. It has contributed to the contextual, theoretical, and practical understandings of teachers' beliefs and language-driven CLIL practices. The findings of this research also offer practical implications for language-driven CLIL practice, professional development, and teacher training to prepare EFL teachers for language-driven CLIL both in Thailand and other similar contexts.

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On the final note, my research journey was profoundly challenging, but worthwhile. It certainly developed my research and academic skills. Beyond those skills, it taught me to be an autonomous researcher, while continuing to learn and work collaboratively with my supervisors and colleagues. I had learnt to be resilient and proactive in surmounting research challenges and be open to different research possibilities and perspectives. The knowledge and skills gained from the entire process of my PhD journey will surely be valuable for my teaching and teacher training profession.

LIST OF ABBREVIATIONS

Abbreviation	Long form
BICS	Basic Interpersonal Communication Skills
CALP	Cognitive Academic Language Proficiency
CBI	Content-Based Instruction
CEFR	Common European Framework of Reference for Language
CEIL	Content and English Integrated Learning
CLIL	Content and Language Integrated Learning
CLT	Communicative Language Teaching
EAP	English for Academic Purposes
EDU	Faculty of Education
EFL	English as a Foreign Language
EMI	English Medium Instruction
GAT	General Aptitude Test
NoM	Negotiation of Meaning
ONET	Ordinary National Educational Test
SLA	Second Language Acquisition
TEFL	Teaching English as a Foreign Language

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CHAPTER 1 INTRODUCTION

This chapter introduces the background of this research project beginning with a brief description of my personal experiences of learning and teaching English as a Foreign language (EFL) and Content and Language Integrated Learning (CLIL) pedagogies at a Thai university that led to my interest in researching CLIL (Section 1.1). It then provides a background of English language education in Thailand (Section 1.2). This is followed by an overview of the development of English-medium and bilingual education in Thailand (Section 1.3). The significance and objectives of the present study are presented in Section 1.4 and Section 1.5 respectively. Finally, the structure of this thesis is outlined in Section 1.6.

1.1 Personal experiences leading to my research interest

CLIL is defined as "a dual-focused educational approach in which an additional language is used for the learning and teaching of both content and language" (Coyle et al., 2010, p. 1). In Thailand, the language used as a medium of instruction in CLIL is English. In the programme of Bachelor of Education in English at my university, CLIL approach, particularly language-driven CLIL, is introduced to pre-service EFL teachers in a second language pedagogy course (see Section 1.4). The course aims to equip pre-service EFL teachers with the knowledge and skills in employing different approaches, including CLIL, to teach English at primary and secondary school levels.

As one of the lecturers of the course, I had an opportunity to observe my students implementing CLIL in their micro-teaching and teaching practicum. I became aware that CLIL was very challenging for them due to its differences from other second language teaching approaches. First of all, the pre-service EFL teachers were required to shift the focus of their lessons from teaching English to teaching both English and content from other curricular subjects, such as math and science. This shift entailed a change in their role. In other words, the pre-service EFL teachers needed to play the roles of both English and content teachers simultaneously. Secondly, subject content involved specialist terminology which meant that pre-service EFL teachers needed to know a different range of vocabulary than they might otherwise have needed when teaching English as a subject. Finally, accommodating the four essential components of the CLIL 4Cs Framework (Content, Communication, Cognition, Culture) (see Section 2.1) was complicated and could

influence the complexity and time needed for lesson planning. All of these salient factors appeared to affect the pre-service EFL teachers' CLIL practices.

Due to the observed challenges, I conducted my first small-scale CLIL research project in December 2017, aiming to get an insight into CLIL implementation and to improve CLIL education for pre-service EFL teachers at my university. The findings of my study showed that most of the pre-service EFL teachers had difficulties in explaining subject content as well as the subject-specific vocabulary in CLIL lessons (Tachaiyaphum & Sukying, 2017). In my experience, teachers' difficulties in conveying subject content and its terms can affect students' comprehension and the success of CLIL implementation. Wolff (2009) points out that language is considered essential for CLIL teaching and learning, especially when the emphasis is on understanding specific concepts. CLIL teachers need to be able to negotiate the meanings of subject content and subject-specific terms and make them accessible to students. Another influential factor in effective CLIL implementation is teachers' beliefs (Wiesemes, 2009). Teachers develop their beliefs through life and learning experiences, and from teacher education and professional development (Tsangaridou, 2006). Their beliefs concern what they know, believe, and think, which then affect how they teach (S. Borg (2006). According to Borg's (2006) definition, it can be assumed that CLIL teachers' beliefs can influence their CLIL practices, including how they negotiate the meaning of the subject-specific terms and concepts. Therefore, I decided to explore CLIL further with the emphasis on how pre-service EFL teachers negotiate the meaning of subject-specific terms and concepts and their beliefs about effective CLIL implementation to gain an insight into language-driven CLIL practices in a Thai context. Additionally, if teachers' beliefs are formed based on their received education and professional development as suggested by Tsangaridou (2006), exploring their beliefs may also help identify influential factors in effective CLIL implementation which may serve as a guide to the development of CLIL support and CLIL teacher professional learning and development.

1.2 Background of English language education in Thailand

English education in Thailand has been operating since the reign of King Rama III (1824–1851) (Trakulkasemsuk, 2018). During this period, the elite (e.g., royal children and officers) were encouraged to learn English (Sukamolson, 1998). Later, in 1909 – during the reign of King Rama V, English was taught as a compulsory subject at primary and secondary levels of education to

prepare all Thai people with language skills that would promote international trading (Kaur et al., 2016; Sukamolson, 1998). Moreover, English was seen as a crucial tool for the advancement of knowledge that could help develop the country (Trakulkasemsuk, 2018). Nowadays, English is used as a lingua franca between Thai and non-Thai people, while standard Thai is the national language used in formal settings, including, for example, education in which Thai is the medium of instruction in all curriculum subjects (Baker & Jarunthawatchai, 2017; Hengsadeekul et al., 2014).

Despite, its status as a foreign language, English is widely used in some other domains, for example, as the working language of international organisations, conferences, tourism, and internet communication (Baker, 2008; Foley, 2005; Kaur et al., 2016). Similar to many countries in the Asia Pacific, the demand for English in Thailand has been increasing rapidly because of economic globalisation. Moreover, English was recently established as the working language of the Association of Southeast Asian Nations (ASEAN), of which Thailand is a member state, reinforcing the importance of the language to Thai people (Baker & Jarunthawatchai, 2017; Nakornthap, 2018). Contemporarily, English proficiency is highly valued in Thailand (Trakulkasemsuk, 2012), and is linked to education and career opportunities. For students, developing proficiency in English increases their chances of obtaining a place at a respected university and a well-paid job after graduation (Keyuravong, 2010). Therefore, education in Thailand tries to promote students' English proficiency at all levels. English is a compulsory subject for primary and secondary school students (Hengsadeekul et al., 2014; Trakulkasemsuk, 2018). At the primary level, English is the only foreign language taught, while at the secondary level, it is taught alongside, Chinese, Japanese, French, and German (Punthumasen, 2007). At the tertiary level, students from all fields of study are required to enrol for 12 credits of English courses to establish a foundation in English four skills as well as English for academic or specific purposes (Draper, 2019; Wudthayagorn, 2022). University students are also required to take an English examination held by their university in the final year of study before they graduate (Hengsadeekul et al., 2014).

Although English is not specifically stated in either the National Education Act of 1999 or the National Education Standards (Darasawang & Todd, 2012), it is set by the current national curriculum as one of the eight core subjects for fundamental education (Grades 1–12) in state

schools across the country (Chumworatayee, 2019; Draper, 2012; Hengsadeekul et al., 2014; Kaur et al., 2016). The English curriculum, as outlined in the 2008 Basic Education Core Curriculum (BEC), focuses on four strands: language for communication, language and culture, language and relationship with other learning areas, and language and relationship with the community and the world (Ministry of Education, 2008). It aims at

> enabling learners to acquire a favourable attitude towards foreign languages, the ability to use foreign languages for communicating in various situations, seeking knowledge, engaging in a livelihood and pursuing further education at higher levels. Learners will thus have knowledge and understanding of diversified matters and events of the world community, and will be able to creatively convey the conceptions and cultures of Thainess to the global society (Ministry of Education, 2008, p. 267).

According to the English language teaching reform policy announced by the Thai MOE in 2014, the Common European Framework of Reference for Languages (CEFR) is suggested as a framework to establish proficiency while Communicative Language Teaching (CLT) is a recommended teaching method. Students are expected to demonstrate their English proficiency at A1 level when they finish Grade 6 (aged between 11 – 12), A2 level at Grade 9 (aged 14 – 15), and B1 level at Grade 12 (aged 17 – 18) (Wudthayagorn, 2022). In accordance with the announced policy and the BEC 2008, English teachers are required to shift their teaching approach from traditional teacher-centred approach with a focus on grammar to a CLT approach (Chumworatayee, 2019; Franz & Teo, 2018).

However, it is challenging for English language teachers to comply with the MOE's English language education policy (Chumworatayee, 2019) because Thai education is primarily driven by examinations (Kaur et al., 2016). Thai students undergo a series of school and national assessments, including language assessments, from the primary level until at least the undergraduate level (Wudthayagorn, 2022). Their performance on tests, such as school tests, the Ordinary National Educational Test (ONET) (national test for grades 6, 9, and 12), and the General Aptitude Test (GAT) are taken as indicators of students' achievements as well as schools' and teachers' quality (Franz & Teo, 2018). English language teachers in Thai schools, in most cases, continue to employ the traditional grammar-translation method with Thai as a medium of instruction, focusing more

on reading and writing skills than listening and speaking skills (Kaur et al., 2016; Noom-ura, 2013; Punthumasen, 2007). Students are taught to memorise grammar rules and vocabulary with the primary aim of scoring highly on the tests. Furthermore, test scores are normally used for admission to Thai universities.

As the emphases of the tests are generally on reading and writing skills and knowledge of English grammar, skills for English communication are largely overlooked in most language classrooms (Wongsothorn et al., 2002). According to Trakulkasemsuk (2018), most Thai English teachers want their students to be able to communicate in English. However, the curriculum, teaching materials, and tests focus predominantly on grammar, vocabulary, and other skills that might lessen the practice of English communication. Despite the fact that some teachers view CLT as a way to enhance students' English skills (Franz & Teo, 2018), the implementation of this teaching approach has been stymied by the examinations. This has been a problem hindering the improvement of Thai students' English skills for decades.

In addition to examinations, Kaur et al. (2016) explain that many Thai schools face a challenge in following the CLT approach because English teachers have a low level of English proficiency. To become an English teacher at Thai schools, student teachers have to complete a five-year teacher education programme which include four years of course work to develop knowledge and skills in language and pedagogy and a one-year teaching practicum at schools (Damnet, 2021). Once they become in-service teachers, there are opportunities to enhance and update their teaching skills, approaches, and strategies through teacher training programmes organised by schools and educational organisations around the country (Ulla & Winitkun, 2018). Despite the training and education, data from the EFL teacher language assessment revealed that the majority of teachers achieved only the A2 level of CEFR (Franz & Teo, 2018). Hengsadeekul et al. (2014) also report in their study that many teachers with an undergraduate degree in English did not feel that they were sufficiently prepared to teach in English; as a result, they largely used Thai in their classes.

Teachers' low level of English proficiency can be an indicator of a deficiency in English teacher education and professional development in Thailand. The MOE has been continually trying to seek solutions, for example, by funding primary and secondary school teachers to attend short-term courses in the UK, New Zealand, and Singapore (Foley, 2005). Furthermore, the MOE organised in-service teacher training called 'Boot Camp' which provided opportunities for teachers with

language assessment scores of B1 and higher to attend CLT microteaching workshops run by the British Council (Franz & Teo, 2018). However, it seems that as yet an effective approach has not been found and the problems in English language education in Thailand remain unsolved.

1.3 The development of bilingual education in Thailand

In addition to English being taught as a compulsory subject in Thai state schools, the Thai Ministry of Education (MOE) has also allowed public and private schools to operate international programmes in which English is used as the medium of instruction (Kaur et al., 2016) such as international schools and English-bilingual programmes. Students enrol in these programmes because they believe that the programmes will equip them with necessary twenty-first-century skills and prepare them for the global work market (Fry, 2018). According to Fry (2018), international schools in Thailand have increased in number from 91 schools in 2004 to 176 schools in 2018; however, more than a hundred of these schools are located in the capital city, Bangkok. English programmes were developed in 2003 with fee-paying schemes for both state and private schools (Draper, 2019). The types of bilingual education differ based on the degree of English integrated into the classrooms. Prominent types of bilingual education facilitated at all levels (from pre-primary to graduate) throughout the country are international schools and English programmes. CLIL has just recently gained attention and is new for many Thai educational institutions. The types of English-medium and bilingual education available in Thailand are summarised in Table 1.

International schools are western private schools in which English is used as the medium of instruction in all subjects, except the subjects related to Thai culture, Thai language, and social studies (Keyuravong, 2010). Fry (2018) explains that international schools are regarded as "high-quality schools" (p. 26) and the tuition fees are considerably higher than those of Thai public and private schools. The opportunities to attend the schools are limited to students from families with higher social status who can afford to pay the fees (Fry, 2018). A more widely available option is English or bilingual programmes which have been developed by several Thai private and public schools for students who choose or are qualified to enrol in the programmes instead of the schools' regular programmes which are taught in Thai (Fry, 2018). English programmes teach four core subjects: science, mathematics, English, and physical education through the medium of English (Kaur et al., 2016).

Table 1

Types of bilingual education in Thailand

Types of bilingual education	Types of schools providing the programmes	Responsible bodies	Subject(s) taught in English	Teachers
International schools	Private schools	Office of Private Education Commission (OPEC)	All subjects except Thai and social sciences	Native-English speakers and Thai teachers
English programmes	▪ State schools	▪ Office of Basic Education Commission (OBEC)	At least four core subjects	Native-English speakers and Thai teachers
	▪ Private schools	▪ Office of Private Education Commission (OPEC)		
	▪ Bangkok Metropolitan Administration schools	▪ Bangkok Metropolitan Administration		
	▪ Demonstration schools	▪ Universities with Faculty of Education		
CLIL	State schools	Office of Basic Education Commission (OBEC)	Math and Science	Thai teachers

Note. Adapted from "Insights from Thailand," by S. Keyuravong, 2010, in R. Johnstone (Ed.), *Learning through English: Policies, challenges and prospects: Insights from East Asia*, p. 80. Every effort has been made to trace copyright holders and to obtain their permission for the use of copyright material.

CLIL in Thailand was initiated in 2006 by the British Council in partnership with the Ministry of Education (Suwannoppharat & Chinokul, 2015a) to provide an English learning opportunity to students in regular Thai school programmes. According to (Keyuravong, 2010), both English programmes and CLIL are provided to students at pre-primary, primary, and secondary levels. The difference between the two is that English programmes are provided to students in state, private, and demonstration schools, while CLIL programmes are operated in state schools. Keyuravong (2010) further noted that English programmes aim to improve the students' English proficiency and confidence in using English for daily life communication. Many Thai students attend international schools or English programmes expecting to improve their English proficiency in order to gain more job opportunities (Lavankura, 2013). However, the education fees of the English programmes are considerably higher than a regular Thai school curriculum programme (Punthumasen, 2007). This means that students who come from poor to middle-class families have little opportunity to attend the programmes (Lavankura, 2013).

In addition to inequality of access to the English programmes and international schools, prominent challenges affecting English language teaching in Thailand include teachers' low English proficiency levels, students' lack of opportunity to use English in their daily lives, and the prevalence of lectures and rote-learning (OECD/UNESCO, 2016; Punthumasen, 2007). Noom-ura (2013) continues to add that "the student motivation, the curricula and textbooks, the assessment methods, and other supporting factors such as teaching aids, class sizes, and time allocation are often said to exacerbate the English language teaching problems in Thailand" (p. 141). Despite the significant investment in education reforms and the educational programmes with English as the medium of instruction, it appears that Thai students' English proficiency remains relatively low (Kaur et al., 2016). CLIL has been foregrounded as a teaching approach with the potential to address current challenges. If it were provided across all Thai schools, students from all backgrounds would get equal access to English education. More importantly, CLIL may help promote Thai students' English proficiency because, through CLIL, students can use English as a tool to learn subject content and, at the same time, subject-content allows students to learn new vocabulary and practice English skills in context.

1.4 Significance of the study

Reviewing the relevant literature on negotiation of meaning (NoM) practices, I found that NoM research has been conducted based largely on NoM strategies suggested in second language acquisition (SLA) work which appear to be insufficient to characterise NoM practices in CLIL classrooms. Moreover, no research has been conducted to explore EFL teachers' NoM practices to facilitate students' comprehension of subject-specific language in language-driven CLIL classrooms in the Thai context. There has also been a lack of research on EFL teachers' beliefs concerning effective CLIL implementation in the Thai context.

To address this gap, the present study investigated EFL teachers' NoM practices and their beliefs about effective CLIL implementation using a multiple-case study under the interpretive paradigm. Data gathered from semi-structured interviews, classroom observations, and stimulated recall interviews were analysed following the grounded theory approach which provided a rich, thick description to develop conceptual categories, as well as theoretical and practical understandings of EFL teachers' NoM strategies in CLIL secondary classrooms and their beliefs regarding effective CLIL implementation.

The outcomes of this study, I believed, would illuminate how pre-service EFL teachers manage CLIL language and content to effectively facilitate language-driven CLIL learning and instruction. The findings would also provide practical implications which could be beneficial for CLIL professional development and CLIL practitioners. It is hoped that the present study will contribute to knowledge and understanding of how teachers scaffold students' comprehension of subject-specific terms or concepts. It is also hoped that the outcomes of this study will broaden understandings of CLIL classroom practice and contribute to developing CLIL support, pre-service teacher education, teacher training programmes as well as other forms of professional development to prepare teachers for CLIL implementation in Thailand and similar contexts.

1.5 Objectives of the study

This thesis reports a multiple-case study conducted in two secondary schools in Thailand. The central foci of this study are pre-service EFL teachers' language-driven CLIL practices and their beliefs about effective CLIL implementation. The specific objectives of the study are as follows:

- To gain insight into how pre-service EFL teachers explain subject-specific terms and concepts in language-driven CLIL lessons;
- To identify NoM strategies that the pre-service EFL teachers use to scaffold students' comprehension of the subject-specific terms and concepts;
- To investigate the NoM strategies that the pre-service EFL teachers find effective in addressing difficulties in the explanation of subject-specific terms and concepts;
- To explore the factors in effective CLIL implementation in a Thai secondary school context; and,
- To develop an understanding of language-driven CLIL practices in a Thai secondary school context through the pre-service EFL teachers' beliefs and practices.

Under these objectives, two main research questions and one sub-research question were addressed:

RQ1: How do Thai pre-service EFL teachers explain and negotiate the meaning of subject-specific terms and concepts in CLIL lessons?

RQ1.1: What are the NoM strategies that the pre-service EFL teachers adopted to address difficulties concerning the explanation and students' comprehension of the subject-specific terms and concepts?

RQ2: What are Thai pre-service EFL teachers' beliefs regarding effective CLIL implementation?

1.6 Structure of the thesis

This thesis consists of six chapters, including this introductory chapter. The remaining five chapters are organised as follows:

Chapter 2 provides a comprehensive review of relevant literature. It describes the theoretical foundation of the CLIL approach, including the 4Cs Framework and the Language Triptych, and summarises CLIL research undertaken in European and Thai contexts. It also examines language and communication in CLIL, specifically, the key characteristics of the language in CLIL lessons, the use of L1, and NoM strategies for facilitating comprehension. An overview of teachers' beliefs in relation to effective CLIL implementation is provided. This chapter concludes by highlighting the research gap and the research questions which are addressed through this study.

Chapter 3 discusses the research methodology used in this study. It explains and justifies the research paradigm, methodology, and design, including research instruments for data collection, data collection procedures, data organisation and preparation, and the form of data analysis. The chapter also deals with the validity and trustworthiness of the research instruments and ethical considerations in carrying out data collection.

Chapter 4 presents the findings associated with pre-service EFL teachers' NoM of subject-specific terms and concepts in language-driven CLIL and their beliefs regarding effective CLIL implementation. Firstly, it presents five major NoM strategies that the pre-service EFL teachers utilised in their CLIL lessons to negotiate the meanings of subject-specific terms and concepts. Secondly, the chapter discusses teachers' NoM strategies adopted to address the difficulties in the explanation of subject-specific terms. Finally, it presents three principal aspects of teachers' beliefs regarding effective CLIL implementation.

Chapter 5 discusses the key findings of the study with related literature and empirical studies to shed light on teachers' NoM practices in language-driven CLIL classes and their beliefs about effective CLIL implementation. It discusses the teachers' NoM practices to facilitate students' comprehension of subject-specific terms and concepts. It then discusses the roles of L1 in language-driven CLIL and a contradiction between teachers' beliefs about the use of L1 in language-driven CLIL and their practices. Subsequently, the chapter highlights CLIL professional development needs that the pre-service EFL teachers believed to be essential to effective CLIL implementation. Lastly, EFL teachers' roles and identities are discussed.

Chapter 6 concludes the research reported in this thesis. It begins with a summary of the principal findings, followed by the limitations of this study. Then, the chapter explains the potential contributions and implications of this study. The chapter also provides suggestions for further research.

CHAPTER 2 LITERATURE REVIEW

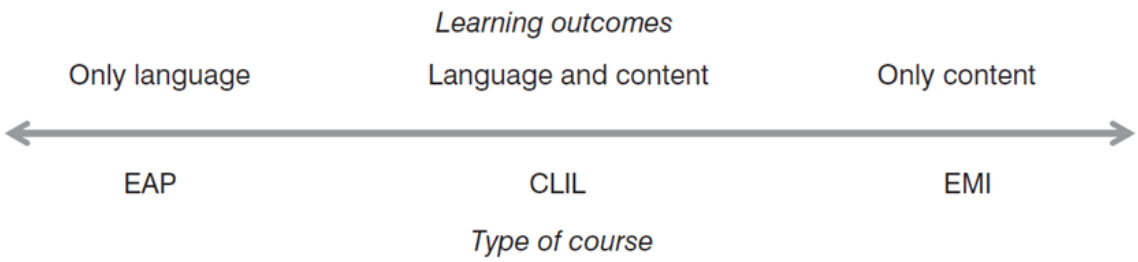
This chapter reviews relevant theoretical and empirical literature concerning CLIL practices. It identifies and justifies the gaps that this study seeks to fill. This chapter consists of eight main sections. Section 2.1 provides an overview of the CLIL approach and its theoretical foundation. This is followed by a review of CLIL research conducted in European (Section 2.2) and Thai contexts (Section 2.3). The chapter then turns the focus to language and communication in CLIL classrooms, which demonstrates the characteristics of the language in CLIL lessons (Section 2.4), the use of L1 (Section 2.5), and NoM as teachers' strategies to scaffold students' comprehension (Section 2.6). Section 2.7 reviews the concept of teachers' beliefs with an emphasis on how a belief is defined, the relationship between teachers' beliefs and their practices, and research on teachers' beliefs about effective CLIL implementation. Finally, the chapter provides a summary of the literature review (Section 2.8) and outlines the research questions that this study explores (Section 2.9).

2.1 Content and language integrated learning (CLIL): A theoretical foundation

CLIL is a teaching approach that has spread in and beyond Europe since the early 1990s. It is defined as a dual-focused teaching approach in which an additional language is used as a medium of instruction for the learning and teaching of both content subjects and language for mainstream students (Coyle et al., 2010; Nikula et al., 2013). CLIL is often offered in a small number of subjects of the curriculum by secondary schools and primary schools (P. Ball et al., 2015). CLIL shares many characteristics with other bilingual teaching approaches, for example, Content-Based Instruction (CBI), English medium instruction (EMI), and English for Academic Purposes (EAP). However, when considering the practice and emphasis of CLIL compared to other bilingual teaching approaches, some differences can be identified. Airey (2016) explains that the learning outcomes of EAP, EMI, and CLIL are different. While EAP focuses mainly on students' language, and EMI emphasises the content of the subject, CLIL puts comparable emphasis on both language and content.

Figure 1

The language/ content continuum



Note. from "EAP, EMI or CLIL?," by J. Airey, 2016, in K. Hyland & P. Shaw (Eds.), The Routledge handbook of English for academic purposes, p. 73. Reprint with permission.

When looking at the language used in the classroom, Dalton-Puffer et al. (2010) claimed that in CLIL, a foreign language, rather than a second language, is used. In other words, the language used as a medium of instruction is a language that is not widely used in the local context. In many contexts, including in Thailand, this means that the teachers implementing CLIL are most likely users of English as an additional language.

Considering the language and content continuum (see Figure 1) proposed by Airey (2016), it should be noted that CLIL is neither exclusively a language teaching approach nor a content teaching approach. In CLIL classrooms, lessons address both language and content simultaneously (Wolff, 2009). As such when implementing CLIL, teachers have to understand that a CLIL lesson is not exclusively a language lesson, but it is a lesson in which an additional language is used to learn content (San Isidro, 2018).

There is neither one CLIL approach nor one CLIL model. CLIL is implemented differently depending on contextual and situational factors (Coyle, 2007, 2008). In some contexts, CLIL is implemented as an educational approach, while in others, it is implemented as a language learning approach (Banegas & Tavella, 2021; Hemmi & Banegas, 2021). CLIL as an educational approach – often referred to as *'content-driven'* or '*hard CLIL'* – involves a content teacher teaching a curriculum subject through the medium of an additional language (P. Ball et al., 2015; Banegas & Tavella, 2021). As a language learning approach, also known as *'language-driven'* or *'soft CLIL'*, it is taught in a language class where a language teacher teaches a topic from a curriculum subject,

aiming to promote language learning through curriculum content (Banegas & Tavella, 2021). In Thailand, both types of CLIL implementation are prevalent.

Positioned in CLIL as a language learning approach, CLIL in the present study is language-driven CLIL, which is defined as "a language learning approach with heavy reliance on content where students develop their language proficiency and subject-matter understandings" (Ikeda et al., 2022, p. 16). It is implemented by EFL teachers, who take different topics from the content subjects (e.g., mathematics, chemistry, biology) to "create a structure or focus which allows for meaningful interactions to take place" (Ikeda et al., 2022, p. 113) in their English classes. English is taught through and with the content (Prasetianto, 2014). The EFL teachers in the present study receive CLIL education (see Section 3.3.3), but they are not equipped with knowledge of curriculum content. This means that the EFL teachers rely on their own prior knowledge of academic concepts that they had learnt during their own high school experience.

Although CLIL has been implemented differently based on the contexts, the 4Cs Framework has been recommended as the core principle that all CLIL teachers can use for guiding CLIL activities and designing CLIL lessons. The 4Cs Framework consists of four core components: content, communication, cognition, and culture. The framework takes into account the integration of content and language learning in specific contexts, and equally focuses on the four key aspects of learning with content being considered inseparable from the other Cs (Hemmi & Banegas, 2021). In other words, the 4Cs Framework emphasises the interrelationship between the learning and development of content, communication, cognition, and culture (Coyle, 2007). According to Coyle (2008), content can be the subject matter or a CLIL theme, for example, history, geography, and mathematics. In CLIL settings, content is a primary guide to the whole lesson planning (Coyle et al., 2010) because the content of the lesson will help the teacher decide on the language focus of the lesson (e.g., vocabulary, expressions, skills) and learning activities which link to the other Cs.

The second component of the 4Cs Framework is communication (language learning and language use). The Language Triptych (see Coyle et al., 2010, p. 36) suggests three essential language aspects for CLIL, which are helpful to scaffold students' understanding of subject contents and communication in CLIL (Meier, 2020). These are language of learning, language for learning, and language through learning (Coyle, 2008). Language of learning concerns the language and skills needed for learners to understand new knowledge and concepts, for instance, key vocabulary and

phrases related to the content of the lesson. Language for learning is related to the language needed to communicate during learning activities, such as the language used for presenting work, describing a process, and expressing ideas. Language through learning concerns the new language acquired in the process of learners' using language to learn, including articulation, thinking skills, and scaffolding learning (Coyle, 2008; Coyle et al., 2010).

Mehisto et al. (2008) use a different term – *content-obligatory language* – to describe a similar idea about the essential language for CLIL. Content-obligatory language refers to the language that students must know to learn the content. This includes technical vocabulary, special expressions, words with multiple meanings, syntactical features, and language functions for a specific content (e.g., defining, classifying, predicting, justifying) (Mehisto et al., 2008). The language demands of a lesson are normally dependent on the content of the lesson, which can be prepared for learners in advance. However, language through learning can be less predictable at the lesson planning stage since, as mentioned earlier, it happens in the learning process (Bower et al., 2020). Thus, teachers should be aware of techniques, strategies, and scaffolding to support learners' use of language to learn and do activities in the classroom. In Section 2.4, I will look more closely at the characteristics of language embedded in CLIL lessons.

Cognition is mainly about thinking skills. Mehisto et al. (2008) claim that thinking is the foundation of learning, meaning that by improving students' thinking skills, teachers improve their learning. One thinking skill model widely used among educators is Bloom's revised taxonomy (see Krathwohl, 2002). In CLIL, teachers need to design learning activities that are challenging to the learners to encourage them to establish new knowledge and develop both lower-order thinking skills (remembering, understanding and applying) and higher-order thinking skills (analysing, evaluating, creating) (Coyle et al., 2010). Bloom's revised taxonomy can be used as a guide to planning learning activities.

Finally, culture is associated with cultural awareness and knowledge about different cultures, which are fundamental to promoting students' local and global citizenship (Coyle et al., 2010; Hemmi & Banegas, 2021; Mehisto et al., 2008). Culture can be promoted throughout the learning process both in and beyond classrooms. Teachers can design tasks that promote meaningful interaction and engagement with peers, allowing students to exchange knowledge and work collaboratively through the target language while the task may be extended to applying the learnt

knowledge to a global context (Coyle et al., 2010; Nawrot-Lis, 2019). To provide an example, Coyle et al. (2010) suggest that:

> In CLIL, culture can include extending the content - for example, the bicycle as a means of transport across the world as a topic in a technology class; setting the context of the content in different cultures - for example, investigating patterns in Asian and European architecture in a mathematics or design class; discussing how learners in different cultures might approach the same content topic - for example, attitudes to recycling; or exploring and interpreting the curriculum as a global citizen. (p. 55)

Embedding cultural aspects in CLIL lessons in this way helps develop students' self-confidence and skills to actively work with others in the classroom, and in local and global communities (Mehisto et al., 2008).

The integration of the 4Cs in the CLIL lesson helps promote meaningful learning (Wiesemes, 2009). However, applying all four components can be complicated and time-consuming for teachers. To contextualise this within the present study, CLIL is particularly challenging for Thai pre-service EFL teachers due to its dual focus and 4Cs which require the teachers to have a different area of knowledge and skills than they might have needed when teaching English as a subject. Moreover, as discussed in Section 1.1, CLIL is different from other teaching approaches that these teachers may have implemented. Therefore, in addition to careful lesson planning, teachers should take into account possible learning and teaching difficulties that might occur in the class, and prepare possible responses to the difficulties (Halbach, 2014). In what follows, CLIL is contextualised within European contexts (Section 2.2) and Thai contexts (Section 2.3) to provide a grounded view of how it has been practised in different sociolinguistic and educational settings.

2.2 Development of research on CLIL across Europe

CLIL, as a pedagogical approach, was developed in Europe (Wolff, 2009). One of the key driving forces underlying the development and implementation of CLIL is the demand from parents for their children to have more exposure to meaningful language learning (Llinares, 2015; Navés, 2009; Nikula et al., 2013). Among European countries, Spain and Finland are the two countries with the largest amount of CLIL implementation, followed by Germany and Sweden (Sylvén,

2013), while Belgium, Luxembourg, and Malta are the only European countries that provide CLIL in all schools (Cinganotto, 2016). The most common language of instruction in CLIL classrooms in Europe is English (Coyle, 2008; Evnitskaya & Morton, 2011). European CLIL teachers, in most cases, are subject teachers for whom the language of instruction is an additional language (Nikula et al., 2013).

CLIL has been popular among European countries for decades. This has led to an increasing amount of research on different aspects of CLIL classroom practices, for instance, the effects of CLIL on teachers' and students' language (Nikula, 2010; Pérez Cañado & Lancaster, 2017), teachers' beliefs and perceptions towards CLIL implementation (Guillamón-Suesta & Renau Renau, 2015; Hüttner et al., 2013; Skinnari & Bovellan, 2016), CLIL teacher qualifications (Mattheoudakis & Alexiou, 2017), and CLIL teacher training (Pérez Cañado, 2016). Positive outcomes of CLIL have been reported (Moreno De Diezmas, 2016), especially in terms of language development. Research suggests that CLIL helps promote students' language proficiency. Evidence of the positive impact of CLIL is demonstrated in Pérez Cañado and Lancaster's (2017) study on the effects of CLIL on oral comprehension and production of 24 fourth-grade compulsory secondary education students in Spain. English language competency post-tests were used to measure the impact of CLIL on students' oral comprehension and production after participating in a one-year CLIL programme (first post-test), and to examine whether its effects permeated after a six-month period following the one-year programme (second post-test). The results of the first test showed that the CLIL group performed more highly overall in oral comprehension and oral production than the non-CLIL group. When considering specific aspects of oral production (grammatical, lexical, fluency, pronunciation, task fulfilment), it was found that CLIL group outperformed the non-CLIL group in all aspects of oral production except pronunciation. However, in a second test, the CLIL group's performance in oral production was superior in all aspects, including pronunciation. It was argued that the development of pronunciation evidenced in the second test could be due to longer exposure to the CLIL programme (Pérez Cañado & Lancaster, 2017).

Furthermore, Paschalidou's (2019) study of 32 students' language fluency and quantity gained through the teaching of CLIL art history modules in Greek lower secondary education shows the positive effects of CLIL. The findings revealed that the fluency and quantity of students' oral

output increased as the CLIL intervention progressed (Paschalidou, 2019). A recent study by Martínez Agudo (2019) also confirmed the positive effects of CLIL on 318 fourth and sixth-grade Spanish students' language competence. This investigation of the impact of CLIL on English language attainment at different educational stages in Spain demonstrated that, at the end of compulsory secondary education, CLIL students' English language competence in terms of English vocabulary and receptive skills (listening and reading skills) were higher than non-CLIL students. This indicated that the CLIL students were likely to gain better language competence, especially at the end of secondary education.

Despite its benefits, many challenges regarding CLIL implementation have been widely discussed among CLIL experts. The challenges which have often been addressed include teachers' inadequate subject matter and language knowledge, and the lack of CLIL teacher training (e.g., Brüning & Purrmann, 2014; Pérez Cañado, 2016, 2018; Skinnari & Bovellan, 2016). Many studies conclude that teachers' lack of language competence and content knowledge can be challenges and limitations for CLIL implementation. Guillamón-Suesta and Renau Renau (2015) interviewed 35 English and content teachers in the province of Castellón in the Valencian Community, Spain, to explore their impressions of and beliefs towards CLIL. The interviews suggested that both English and subject teachers had similar difficulties regarding CLIL implementation, which related to the technical terms used to teach the subject, and the structures and terms needed to explain, summarise and solve queries. In addition, a case study of CLIL implementation by six English teachers of very young learners at a Greek private school by Iskos et al. (2017) shows that teachers' content knowledge was one of the limitations to CLIL implementation. However, the eight teachers who participated in the study by Mattheoudakis and Alexiou (2017) revealed different views towards CLIL implementation in Greece. The English teachers noted that having less competence in subject matter was not an obstacle to successful CLIL implementation. Furthermore, the teachers did not seem to have a problem with subject-specific vocabulary explanations because using visual supports helped students comprehend new vocabulary more easily (Mattheoudakis & Alexiou, 2017). The diversity of CLIL contexts can be a possible explanation for the different and sometimes contradictory findings of the research into teacher beliefs concerning CLIL teaching; as Nikula et al. (2013) point out, research outcomes can be affected by contextual factors.

The provision of appropriate CLIL teacher education and teacher training has been proposed as a possible solution to address teachers' knowledge of the target language and subject areas (Pérez Cañado, 2016; Tachaiyaphum & Sukying, 2017). Contextualised to the present study, CLIL education refers to a CLIL module provided as part of an EFL teacher preparation programme in an undergraduate degree (see Section 3.3.3). CLIL teacher training refers to a minor concept regarding instructional practice (in this case CLIL instructional practice) for teacher professional development which is not a part of teacher preparation programmes in an undergraduate degree (O'Neill, 1986).

As CLIL implementation has been growing rapidly, teachers have frequently been required to teach with insufficient preparation (Pérez Cañado, 2018). Coyle (2008) argued that teachers play an important role in CLIL classroom practice. If the teachers do not obtain CLIL training or education, CLIL implementation may be compromised. This challenge has motivated CLIL experts to attempt to develop pre-service CLIL teacher education and training. The teachers themselves have also expressed the need for CLIL training to improve their abilities in CLIL implementation. In questionnaires carried out with 260 pre-service teachers, 241 in-service teachers, and 197 teacher trainers across Europe by Pérez Cañado (2016), teachers expressed the need for teacher training, especially in terms of language competence, methodological aspects, and materials development.

CLIL educators in Europe have been working to develop CLIL teacher education. Similar to Finland, Germany has been providing CLIL training in the general German teacher training system (Brüning & Purrmann, 2014). German CLIL teachers are required to achieve a language proficiency at the C1 level to become qualified (Sylvén, 2013). Furthermore, in Italy, the characteristics of CLIL teachers were established by the MOE, based on guidance from the Framework for CLIL Teacher Education by Marsh et al. (2010) to provide an overview of the skills and competencies that teachers should develop in order to be qualified for CLIL (Cinganotto, 2016). The key competencies needed for CLIL teachers in Italy include language competence, subject content knowledge, and CLIL teaching methodology (Cinganotto, 2016; Hillyard, 2011). However, according to Brüning and Purrmann (2014), it is not a simple task to prepare CLIL teachers since, in most cases, they have different areas of expertise with different needs. There is no specific model of teacher education and training that is appropriate for all educational contexts.

To develop an appropriate training programme, CLIL teacher trainers and educators, therefore, need to determine the practical needs of the teachers in their own contexts (Brüning & Purrmann, 2014).

2.3 An overview of CLIL in Thailand

As established earlier, socio-political development and the rapid growth of the economy, which requires an English-proficient workforce (Coyle et al., 2010), have been incentives to implement CLIL in Thai education. CLIL, in Thai contexts, means CEIL (Content and English Integrated Learning) (Suwannoppharat & Chinokul, 2015a) since English is always used as a medium of instruction. As explained in the previous chapter, the CLIL approach was initiated in Thailand in 2006 by the Thai MOE, in cooperation with the British Council. A small-scale CLIL project was launched in six schools to assess early outcomes (Prasongporn, 2009). Summary reports from the participating schools revealed a positive attitude towards CLIL among students and teachers: students enjoyed learning and were more confident to share content and language knowledge with their peers in CLIL classes, and both language and content teachers gained more knowledge of content subjects and English from the teamwork (Prasongporn, 2009).

Despite having been introduced in 2006, CLIL research in Thailand is limited compared to the countries in Europe. A few CLIL studies carried out in Thai contexts have explored a similar but less varied range of topics to those conducted in European contexts, such as the effects of CLIL on students' English language development, teachers' perceptions of CLIL, and CLIL classroom practice. The effectiveness of CLIL on the development of students' English communicative skills and students' opinions towards CLIL were reported in the study by Suwannoppharat and Chinokul (2015b). Twenty-four Thai undergraduate students enrolled in a Chinese International Programme at the Faculty of Liberal Arts, Prince of Songkla University, participated in the study. The findings from a post-test showed that the students' English oral communication ability improved after participating in a CLIL course. Questionnaires and interviews also revealed the students' positive opinions toward the CLIL course. In addition to the improvement in English oral communication, Chansri and Wasanasomsithi (2016) reported the development of English writing skills among 27 university students. Writing post-tests suggested that after attending the CLIL course, 27 students made positive progress in their writing compared to their pre-test scores. The students could produce a better-organised writing task with more grammatically correct sentences and fewer

spelling errors. However, there was no comparison made to students in a non-CLIL programme in these two studies.

In contrast to the uniformly positive outcomes in student learning, the findings of research on teachers' perspectives about CLIL are varied. In Kwangsawad's (2018) study of 19 pre-service EFL teachers' strategies and challenges faced during CLIL microteaching at a university in Thailand, the teacher participants reported that students' lack of English vocabulary was an obstacle in their science teaching and it affected students' comprehension of CLIL lessons. As regards CLIL teaching strategies, the teacher participants explained that a short demonstration was an effective strategy to help students understand class instructions and lesson explanations. Kwangsawad (2018) suggested that if the English grammar or subject-specific vocabulary could be explained in Thai, rather than in English, problems in students' comprehension could be lessened. In addition to students' comprehension problems, teachers' time and effort required for CLIL implementation was another challenge. The teacher participants explained that their effort in planning the lesson was twice that of planning a language lesson alone as they had to master subject content which was not their area of expertise.

Even with pre-service teacher education programmes, CLIL teachers may still experience challenges in planning and teaching. In Tachaiyaphum and Sukying's (2017) study of the perceptions of 139 pre-service EFL teachers studying in the Faculty of Education at a Thai university, the teacher participants reported that they found CLIL challenging to put into practice although they received CLIL education before implementing CLIL. In line with Kwangsawad (2018), the teacher participants in the study by Tachaiyaphum and Sukying (2017) pointed out that planning a CLIL lesson was time-consuming. The participants emphasised that the difficulties they faced were a result of their lack of content knowledge, their students' low level of English proficiency, unfamiliar subject-specific vocabulary, and the complexity of the 4Cs Framework (Tachaiyaphum & Sukying, 2017). Although subject-specific language and content were factors hindering CLIL implementation noted by the participants, they did not seem to have a problem with using English to communicate with students in the classes. This could be because they had been trained to use English as a medium of instruction, and thus, they were confident to communicate with their students in the language. However, according to research by Kewara and Prabjandee (2018), language for communication in the classroom seemed to be a barrier to CLIL

implementation by content teachers. Fifteen content teachers at secondary schools in the east of Thailand who participated in Kewara and Prabjandee's (2018) study elaborated that they were not familiar with the integration of content and language concepts and they were under high pressure because schools expected them to have high levels of English proficiency.

The empirical studies discussed earlier suggest that CLIL has a positive effect on students' language development. However, teachers face many challenges in implementing CLIL, including teachers' and students' low English proficiency, teachers' lack of knowledge of subject content, and teachers' lack of understanding of the CLIL approach. It seems that there are insufficient qualified teachers for CLIL in Thailand as CLIL teacher education is rarely provided (Kewara & Prabjandee, 2018). Most of the content subject teachers in the reviewed studies were not proficient in English. Therefore, it is the language teachers who are expected to take responsibility for CLIL as they have fewer problems using English as a medium of instruction. A similar situation was found in one of Thailand's neighbouring countries, Vietnam. Nguyen's study (2016) of nine teachers' perceptions of CLIL-related issues in Quoc Hoc Upper-Secondary School in Hue City revealed that teaching staff might not be adequately prepared for CLIL during their teacher education. Furthermore, Nguyen (2016) asserted that supplying a qualified CLIL teacher who is competent in both the subject matter and English language was considerably challenging. In the same vein, the survey and group interviews of 85 university students in Taiwan conducted by Yang and Gosling (2014) revealed that a shortage of qualified CLIL teachers was one of the issues causing unsuccessful CLIL programmes.

My colleague and I have been providing CLIL education as part of a second language pedagogy course in the Faculty of Education at a Thai university to prepare the pre-service EFL teachers for CLIL implementation. CLIL education is provided to the third-year pre-service teachers and covers CLIL theory and implementation. The pre-service teachers have opportunities to practice designing CLIL lesson plans and using their lesson plans in micro-teaching throughout the course. In the final year of their course of study (fifth year), all of the pre-service teachers are required to do a school-based internship for one academic year. This is where the pre-service teachers implement CLIL and other teaching methodologies with real students in real classrooms. Despite receiving CLIL education, research has shown that the EFL pre-service teachers are still not confident to implement CLIL and they are aware of the difficulties of conveying the content

subject in English (Kwangsawad, 2018). Therefore, it is important to take into account CLIL support when developing CLIL education and training for EFL teachers so that they will be able to deal with challenges they may encounter when they are out in school. For EFL teachers, the challenges in CLIL implementation may not be the language for communication in general, but the language used in subject-specific content (Skinnari & Bovellan, 2016). In Section 2.4, key characteristics of language used in CLIL classrooms and an impact they may have on CLIL implementation are explored.

2.4 Characterising language in CLIL

In Section 2.1, the key components of the CLIL approach, including the language in CLIL (communication), are discussed. In this section, the concepts of Basic Interpersonal Communication Skills (BICS) and Cognitive Academic Language Proficiency (CALP) by Cummins (2008), and three layers of classroom discourse by P. Ball et al. (2015) are discussed to explore the important features of language used in CLIL classrooms that can be influential in effective CLIL implementation.

The English language comprises many areas of language and skills. Two essential language areas are the language used for daily communication and the language used for specific purposes, for example, in professional and academic disciplines (Dale & Cuevas, 1987). Linguistically, the language used within different contexts of social situations is referred to as 'register' (Gottlieb & Ernst-Slavit, 2014; Llinares et al., 2012). In school contexts, a variety of registers are used (Gottlieb & Ernst-Slavit, 2014). In mathematics, for example, teachers and students are required to use mathematics registers, which include mathematics terms (Dale & Cuevas, 1987). The same applies to other subject areas, all of which have their own terminology (Mehisto et al., 2008; Nikula, 2012). Contextualised in a CLIL context, the language in CLIL can be different from that used in language classes and in everyday communication (Llinares et al., 2012). Making the content accessible is complicated because of the fact that many English words carry different meanings when the context changes (Mortimer & Scott, 2003).

To help students learn content through the target language (Lyster, 2007; Mehisto et al., 2008), CLIL teachers need to be able to determine what language is necessary for students and know how to support language learning in CLIL lessons. To this end, it is useful to explore Cummins' (2008) conceptual distinction of language proficiency to understand the different dimensions of the

language in the classrooms. According to Cummins (2008), "BICS refers to conversational fluency in a language while CALP refers to students' ability to understand and express, in both oral and written modes, concepts and ideas that are relevant to success in school" (p.71). BICS is the language used in everyday interactions, for example, a conversation between friends at lunch, whereas CALP is closely related to the kind of language which is crucial for students to master their knowledge and skills in school (Gottlieb & Ernst-Slavit, 2014; Llinares et al., 2012). In the CLIL classroom, the language for everyday interactions is insufficient for students to participate in learning activities. Spratt (2017) points out that formal academic language is required for students to understand a lecture, read a textbook, or complete speaking and writing tasks.

P. Ball et al. (2015) come to similar conclusions when explaining the important features of language in CLIL lessons. They divide the language in CLIL into three layers: layer 1 subject-specific language, layer 2 general academic language, and layer 3 peripheral language. According to P. Ball et al. (2015), subject-specific language is obligatory vocabulary needed for students to master their content learning, and general academic language is a cross-curricular language that can be found in any subject, while peripheral language involves the language from the classroom interaction which can occasionally coexist with general academic language. Comparing the three layers of classroom discourse to BICS and CALP, subject-specific language and general academic language are much the same as CALP, while peripheral language and BICS are identical (P. Ball et al., 2015). These categories have much in common with the Language Triptych by Coyle et al. (2010) which displays how a target language can be used for learning in CLIL classrooms.

In the study presented in this thesis, the terms subject-specific language, general academic language, and peripheral language are used to refer to the types of language that EFL teachers tend to encounter when implementing language-driven CLIL. Although all types of language can be found and used in any curriculum subject, the emphasis of this study is more on subject-specific language; as Ball et al. (2015) argue, CLIL instruction depends on students' knowledge of CALP (subject-specific and general academic language). Moreover, research shows that the lack of knowledge of the subject-specific language is one of the obstacles to CLIL implementation (Kwangsawad, 2018; Skinnari & Bovellan, 2016; Tachaiyaphum & Sukying, 2017). Yet, this does not mean that general academic and peripheral language can be neglected.

While research highlights that subject-specific language knowledge has an impact on successful CLIL implementation and that CLIL teachers' language awareness should not be overlooked (Nikula, 2015), empirical research on CLIL classroom practice does not seem to pay much attention to subject-specific aspects of language use for learning and teaching (Nikula, 2012). Nikula (2012) investigated subject-specific language use in students' peer discussion in group work situations in Finnish secondary level CLIL history classrooms. The findings revealed that students showed awareness that history required a special kind of language different from everyday language use which encouraged students to negotiate the meaning of history vocabulary when participating in the discussion. Nikula (2012) claimed that the students' language use was dependent on the emphasis the teacher put on the subject-specific language. That teachers' language use and subject-specific language can affect students' learning was also reported in Hellekjær's (2010) research on comprehension problems experienced by Norwegian students in lectures where English was used as a medium of instruction. Self-assessment questionnaires completed by 391 students at the University of Oslo, BI Norwegian School of Management, and Oslo University College, revealed that the factors that caused the students' comprehension problems were teachers' unclear pronunciation and students' unfamiliarity with subject-specific terms. Hellekjær (2010) suggested that well-made visual supports and the introduction of key terms and key concepts prior to lectures could be a useful support to students' comprehension.

In a context where students' target language proficiency is low, it is likely that, in addition to subject-specific terms, non-technical terms can cause difficulties in comprehension for students. This is reported in An et al.'s (2021) study on fifteen science teachers' language focus episodes in an EMI secondary school in China. Their lesson observations reveal that the teachers' main language focus was non-technical terms. According to An et al. (2021), students in an EFL context, such as China, did not use the target language in their everyday lives. They had a limited target language vocabulary repertoire and thus required explanations of non-technical terms to understand the lessons. An et al. (2021) also emphasises that a non-technical term that appears in the science explanations or definition of subject-specific terms can cause EMI students' difficulties in understanding science content. As shown in one of their observed lessons, students asked for the meaning of the term 'anchor' in an explanation of the science concept 'root' in order to make sense of the concept.

Apart from the effects of subject-specific language on students' learning, it is evident in the study by Guillamón-Suesta and Renau Renau (2015) that subject-specific language is considered a dilemma for CLIL instruction. Their interviews with 35 English and content teachers in the province of Castellón in the Valencian Community, Spain, showed that both English and subject teachers had similar difficulties related to the subject-specific vocabulary and technical terms needed to explain, summarise and solve queries. In a similar vein, Skinnari and Bovellan's (2016) research on teachers' experiences and opinions about CLIL integration and the role of language in CLIL using semi-structured interviews with 12 secondary school CLIL teachers from Austria, Finland, and Spain showed that the teachers were aware of the differences between the academic language of their subject and that of other subjects. The teachers explained that the difference between subjects is their technical terms, and teaching and learning the technical terms were challenging (Skinnari & Bovellan, 2016). Skinnari and Nikula (2017) come to similar conclusions when examining the viewpoint of seven mainstream and CLIL content teachers in Finland about the role of language in education. The teacher participants pointed out that knowledge of subject-specific language was essential when teaching a subject in a foreign language. They explained that subject-specific language made a lesson difficult for students; as a physics teacher put it, scientific terms sometimes carried different meanings when used in everyday contexts. Furthermore, the difficult terms seemed to affect the teachers' language use in delivering the lesson. As noted by a maths teacher, to support students' learning, everyday language was used when explaining the contents to lower-proficiency students (Skinnari & Nikula, 2017).

Earlier research has shown that dealing with subject-specific terms for CLIL teachers is an important aspect of CLIL implementation. Teachers' target language competence and their ability to make subject-specific terms comprehensible to students affect successful CLIL implementation. P. Ball et al. (2015) argue that CLIL teachers will not be able to integrate content and language effectively if they lack confidence and sufficient competence in L2. Effective CLIL implementation requires ways to access subject matter content and the language features essential to learning the content (Llinares et al., 2012). Thus, CLIL teachers not only have to understand the importance and effects of academic language on students' learning, but they also need to be able to decide how to make the content and language accessible for students (Bárcena-Toyos, 2020; Pavón Vázquez, 2018). In addition, CLIL teachers need to be able to reflect on whether or not their

language use is appropriate for students' language proficiency levels, and be able to make suitable language modifications when needed (Spratt, 2017).

Dealing with subject-specific language can be a huge challenge for CLIL teachers. Contextualised to the study presented in this thesis, EFL teachers are not trained to manage subject-specific language and they may be uncertain of their ability to teach other curriculum subjects (Ball, et al., 2015). Lopriore (2020) highlights that language teachers who implement CLIL in their English classrooms encounter challenges regarding unfamiliarity with content and the language required for imparting the lessons. Therefore, it is beneficial to explore language-driven CLIL classroom practices by paying attention to how EFL teachers convey and make subject-specific language comprehensible to students when they have difficulties in explaining subject-specific terms and concepts. Taking into account the knowledge and understanding of the language to be learnt in a CLIL lesson, laying emphasis on subject-specific language (Dalton-Puffer, 2017) and how it can be made comprehensible to students may help raise EFL teachers' language awareness which facilitates CLIL lesson planning and enables the teachers to determine appropriate scaffolding. In addition to the target language, much research has suggested different views on the use of L1 in CLIL. The next section provides a comprehensive review of potential roles of L1 and the impacts it may have on CLIL learning and instruction.

2.5 The use of L1 in CLIL

As mentioned in Section 2.1, an additional language or the target language is a tool for learning and teaching both content subjects and language in CLIL. However, research on teachers' language practices in CLIL and EMI contexts has observed that L1 can also be a useful tool to support CLIL learning and instruction (An et al., 2021; Macaro, 2009). Different terms have been used to refer to the use of L1 in classrooms where an additional language is used as a medium of instruction, including codeswitching (Macaro, 2005) and translanguaging (García & Wei, 2015). As the present research has no aim to distinguish L1 practices based on the differently defined terms, the term 'the use of L1' is used throughout this thesis.

In recent years, there has been a volume of research suggesting the potential role of L1 in facilitating the meaning-making process of subject content learning through an additional language. Particularly, L1 is commonly used to explain difficult terms and/or concepts (Domalewska, 2017; Gierlinger, 2015; Lasagabaster, 2013; Macaro et al., 2020; Mahan et al.,

2021; Martínez Agudo, 2017; Milán-Maillo & Pladevall-Ballester, 2019) and for classroom and task management (Gierlinger, 2015; Lasagabaster, 2013; Martínez Agudo, 2017; Milán-Maillo & Pladevall-Ballester, 2019). In the study by Lasagabaster (2013), 35 CLIL teachers teaching at Colombian education institutions were invited to reflect on their use of L1 (Spanish) in their CLIL classroom. According to the CLIL teachers' reflections, L1 was used in various situations, including when explaining abstract terms and concepts, clarifying task instructions, and connecting with low English proficiency students. The teacher participants in Lasagabaster's (2013) study also highlighted that the most important role of L1 was to support the explanation of key terms and concepts and students' comprehension. An et al. (2021) also found that EMI students needed teachers' L1 explanation, not only of technical terms but also very often the non-technical terms. An et al. (2021) emphasise that providing L1 equivalents could help to clarify the meaning of a target term. Similar findings were found in a study on German teachers' L1 use in CLIL by Gierlinger (2015). Gierlinger (2015) categorises teachers' use of L1 into regulative codeswitching and instructive codeswitching. The former involves the use of L1 for classroom and task management such as establishing learning activities, while the latter concerns the explanation of subject content and vocabulary to ensure students' comprehension. Interestingly, the teachers in Gierlinger's (2015) study used L1 not only to support students' comprehension but also to deal with their own linguistic gaps.

That L1 was employed in response to teachers' and students' language command is also evident in the study by Martínez Agudo (2017) which investigated 42 Spanish pre-service EFL teachers' beliefs concerning the role and pedagogical value of codeswitching in EFL classrooms. Data from questionnaires reveal that the reasons for the teachers to switch to L1 included explaining and facilitating students' comprehension of difficult concepts, unfamiliar terms, and task instructions. In accordance with Lasagabaster (2013) and Gierlinger (2015), Martínez Agudo (2017) asserts that the teachers' use of L1 largely concerns students' comprehension problems. This is in line with Macaro's (2005) account that "L1 is almost entirely a comprehension issue, not an acquisition issue" (p. 68). Furthermore, Martínez Agudo (2017) points out that the teachers' language proficiency had an influence on their use of L1, which echoes the idea that "self-perceived L2 competence determines or influences their language choice" (p. 90).

Studies by Moncada-Comas and Block (2019) and Pun and Thomas (2020) lend support to the assumption that the use of L1 can be influenced by teachers' views on their own and students' language proficiency. The analysis of two CLIL lessons at Catalan university, Spain, by Moncada-Comas and Block (2019) identified 25 unsolicited translations by the participating teacher which suggests that the teacher might think that students' English proficiency was not high enough to grasp the lesson in English. Additionally, the teacher explained in his interview that his L1 use was also influenced by his perception that he was not a native English speaker (Moncada-Comas & Block, 2019). In the same vein, Pun and Thomas (2020) employed questionnaires and interviews to explore challenges and coping strategies used by secondary school EMI science teachers in Hong Kong. The findings show that L1 was the most commonly used strategy to facilitate students' comprehension. The different amounts of L1 used were dependent on teachers' perceptions of their own and students' English proficiency. The teachers with low self-perceived English competence reported using L1 in their teaching, whereas the teachers with higher English abilities used less L1 in their science classes (Pun & Thomas, 2020).

Observations of the language used by five EMI teachers in a Chinese university by Macaro et al. (2020) also provide an explanation that seems to corroborate the previously discussed studies. The findings in Macaro et al.'s (2020) study reveal very little L1 use by the participating teachers in the observed lessons with the function limited to explaining the language such as technical terms. According to Macaro et al. (2020), a possible explanation for the little use of L1 is that the participating teachers felt that their students' English competence was sufficient to understand the lesson in English. Moreover, unlike the teachers in the previous studies, the EMI teachers in Macaro et al.'s (2020) study hardly employed L1 to compensate for their language competence. Four of the five teachers gained a doctoral degree abroad (Canada, UK, USA), while one of them was a visiting lecturer overseas for a few years (Macaro et al., 2020). The teachers reported being confident in their high level of English proficiency.

While some CLIL teachers may prefer to keep the target language as the sole medium of instruction, others may consider L1 as a beneficial resource. To provide an example, the teachers in the study by Lasagabaster (2013) thought positively about using L1 in their classroom and regarded L1 as an essential teaching resource for L2 teaching and learning. On the other hand, the teachers in the study by Martínez Agudo (2017) reported that despite L1 being useful, their use of

L1 was discouraged by the beliefs about "the need and importance of learners' maximum exposure to L2 input" (p. 91). The issue regarding L1/L2 use has been widely debated both in the second language and bilingual education (Lin, 2012; Macaro, 2005; Mahboob & Lin, 2016; Martínez Agudo, 2017). Macaro (2009) describes two perspectives on L1 use in a second language classroom: maximal position and optimal position. The former is the belief that L2 can be learned only through L2, thus learners have to use as much L2 as possible (Macaro, 2009). The latter refers to the belief that L1 may have the potential to promote the learning of L2 at some point during the learning process (Macaro, 2009). These major beliefs have been reported to be influential on teachers' language practices (Karabassova & San Isidro, 2020; Lasagabaster, 2017; Lin, 2012; Mahboob & Lin, 2016; Pun & Thomas, 2020).

Group discussions with eight Spanish CLIL teachers by Lasagabaster (2017) reveal that more experienced CLIL teachers used only English in their classes because of their beliefs about the need to maximise L2 input. However, the teachers admitted that in some situations L1 was unavoidable and beneficial to the learning of CLIL. Lasagabaster (2017) explains that two principal beliefs embedded in English-only language policies, namely the interference of L1 in L2 learning and the need to maximise L2 to enhance learners' proficiency, have a considerable impact on teachers' L1 beliefs and practices. Classroom observations in Karabassova and San Isidro's (2020) study on eleven teachers' perceptions of translanguaging practices in CLIL in Kazakhstan CLIL trilingual education also demonstrate that the participating teachers exclusively used the target language in their classes and also encouraged their students to use it throughout the learning process. According to the interviews, the teachers' L1 use was discouraged by the school policy which required them to use only the target language for teaching although most of them considered L1 as a scaffolding tool that facilitated students' comprehension (Karabassova & San Isidro, 2020). In line with Lasagabaster (2017), the teachers' L1 practices in the study by Karabassova and San Isidro (2020) were affected by their beliefs about learning L2 through L2 exposure or the maximal position as described by Macaro (2009). The teachers viewed students' use of L1 as undesirable and their own L1 use as "a bad model" (Karabassova & San Isidro, 2020, p. 13). They believed that allowing students to use L1 in class would make it a habit, so exposure to the target language should be promoted (Karabassova & San Isidro, 2020).

In their research on two teachers' L1 use in Canadian French immersion classes, McMillan and Turnbull (2009) found opposing beliefs and practices between the two participating teachers which corroborate Macaro's (2009) two perspectives of L1. One teacher held a strong belief about target language maximisation, leading to his avoidance of L1 in class. He believed that teachers' L1 use affected the amount of L1 students used in the class. On the other hand, another teacher placed importance on maximising students' comprehension, and thus L1 was used to scaffold students' learning where needed. Interestingly, the classroom observations by McMillan and Turnbull (2009) did not lend support to the first teacher's beliefs. McMillan and Turnbull (2009) explain that the teacher's use of L1 did not lessen students' effort to interact in the target language, which means "teachers can use the first language judiciously without it becoming excessive" (p. 33). In accordance with McMillan and Turnbull (2009), Macaro (2009) affirms that teachers' use of L1 does not always result in students' use of L1, and neither does the teachers' use of L2. Moreover, Wannagat (2007) analysed 10 CLIL history lesson observations in a Hong Kong EMI programme and a CLIL class in Germany. The analysis shows that the Hong Kong EMI programme was less successful than the German CLIL although students in the Hong Kong EMI were exposed to the target language more than those in the German CLIL class (Wannagat, 2007). The inference made from the findings can be that exposure to the target language only may be inadequate to promote language development (Wannagat, 2007). Therefore, making the input comprehensible through the use of different resources, including L1, might be more useful than focusing only on maximising L2 input (Lin, 2015; Martínez Agudo, 2017).

Given the advantages of using L1 and the teachers' beliefs influencing their language practices, the literature suggests that CLIL teacher education programmes should develop teachers' understanding of L1 use and train them on the pedagogic use of L1, highlighting its potential roles in promoting students' content and target language learning (Martínez Agudo, 2017; Nikula & Moore, 2019). Moreover, schools should be more open to teachers' use of L1 to enhance content and language learning (Pun & Thomas, 2020). In Section 2.6, I explore literature related to NoM strategies in SLA and how they are applied to address students' comprehension problems in CLIL contexts.

2.6 Negotiation of meaning in CLIL contexts

In content-based classrooms, teachers need different teaching strategies, for example, modifying and underlying key vocabulary, to facilitate students' comprehension of lessons delivered through the target language (Lyster, 2007). The process of communication in which interlocutors, including learners and teachers, modify their messages in terms of form, structure, and content to make them understandable is recognised as negotiation of meaning (NoM) (Long, 1996). In educational contexts, NoM is defined as "a process where students and teachers work to pass on information, thoughts, and opinions to one another in a manner that leads them to a common understanding of what is being communicated" (Mehisto et al., 2008, p. 199). Van den Branden (1997) maintains that the function of NoM is to maintain mutual understanding by modifying or restructuring an incomprehensible message by the interlocutor when comprehension problems occur. Given its functions, García Mayo and Basterrechea (2017) explain that NoM may prompt students' incidental learning.

In SLA research, strategies such as repetition, confirmations, reformulations, comprehension checks, confirmation checks, and clarification requests, are employed to avoid and deal with communication breakdowns (Long, 1996). These NoM strategies can facilitate the comprehension of unfamiliar L2 input and modified output which are crucial processes of second language acquisition and language learning (Foster, 1998; Pica, 1988, 1996). Pica (1988) examined the interaction between native and non-native English speakers to identify how non-native speakers modified their utterances when the native speaker signalled difficulty in understanding their output. It is evident from Pica's findings that NoM is an important component of communication that facilitates comprehension. Comprehension problems signalled through confirmation and comprehension checks, and clarification requests encouraged the non-native speakers to modify their messages (Pica, 1988).

NoM is often found in conversation between all kinds of speakers, including highly proficient ones, on unfamiliar content (Long, 1996). However, it is argued that NoM occurs less frequently in classroom settings than in interactions outside the classroom (Pica, 1987; Van den Branden, 1997). Pica's (1987) study on the absence of NoM features of interactional modification within twenty ESL classrooms reveals that restructuring of utterances, such as confirmation and comprehension checks, and clarification requests, by both students and teachers during the

conversation promotes students' comprehension of the target language. Despite its vital role in supporting comprehension, Pica (1987) highlighted that communication in the classroom was not equally shared between the teacher and students. Classroom interaction was normally initiated by the teacher to elicit and evaluate students' responses regarding the lesson learned rather than to restructure the conversation to reach mutual comprehension. As a consequence, students' opportunities to modify and restructure their interaction were limited (Pica, 1987; Van den Branden, 1997).

Nevertheless, CLIL research comes to different conclusions when comparing NoM used by CLIL- and non-CLIL classrooms. Mesquida and Juan-Garau (2013), for example, analysed video-recorded role-plays performed by 21 CLIL students and 21 non-CLIL students at different secondary schools on the island of Majorca to see the effects of CLIL on the development of NoM. The findings indicate that CLIL can potentially positively affect the development of NoM skills when compared to the development of NoM skills developed in a non-CLIL classroom. Both CLIL and non-CLIL students employed repair strategies, for example, self-repairs and reformulations, to overcome comprehension difficulties that involved content and function words (Mesquida & Juan-Garau, 2013). In addition, the study by Mariotti (2006) emphasises both the teachers' and students' use of NoM and repairs patterns in 22 high-school CLIL classrooms in Italy. The study showed that NoM and repair patterns were frequently used especially by students. Similar to Mesquida and Juan-Garau (2013), Mariotti (2006) found that the factor which brought about the use of NoM was communication difficulty at the word level. The inference drawn from the earlier findings can be that CLIL lessons can promote the development and use of teachers' and students' NoM and that the major factor causing them to negotiate meaning is lexical difficulties (Nikula et al., 2013).

It should be noted that previous research investigated NoM in CLIL classrooms based on the NoM framework in SLA; however, Mortimer and Scott (2003) argue that the process of NoM in a content-based classroom, including CLIL is more complicated due to polysemy of words in a particular subject. Additionally, learning L2 terms in CLIL is different from that in an English language class because CLIL aims to construct "conceptual knowledge rather than building L2 vocabulary" (Kääntä et al., 2018, p. 697). Students are required to make sense of the concept through a teacher's explanation which may involve subject-specific or general academic terms.

Thus, in addition to problems understanding the concept itself, An et al. (2021) point out that students may encounter comprehension problems caused by the terms and phrases that appeared in the explanations. To facilitate students' comprehension of CLIL lessons, it is argued that verbal or written explanations alone are insufficient. Meaning-making in CLIL draws on a variety of resources including body language, pictures, artefacts, paralinguistic elements, and the use of L1 (Gottlieb & Ernst-Slavit, 2014; King et al., 1987; Lyster, 2007). Accordingly, unlike NoM in the early SLA research, which primarily involves verbal language, research on NoM in bilingual classroom contexts should advocate NoM strategies to support learning in a broader sense.

A few researchers have suggested NoM strategies to make meaning of subject-specific terms or concepts in CLIL. To provide an example, Navés (2009) suggests that to successfully deliver new information, appropriate techniques, for example, demonstrating, using visuals, rephrasing, and scaffolding, should be used. Mehisto et al. (2008) also recommend NoM strategies for CLIL teachers in helping students achieve comprehension. These include:

- Asking for summaries of key points;
- Encouraging students to ask for clarification;
- Inviting personal interpretation;
- Using free association to bring out personal opinions/ understanding;
- Appreciating risk-taking;
- Providing definition;
- Using synonyms;
- Paraphrasing;
- Writing key words on the board;
- Using gestures and mime;
- Slowing down speech;
- Using pictures, realia, and demonstrations;
- Having students perform actions in direct relation to words;
- Presenting one instruction at a time and ensuring it has been followed before presenting the next one;
- Taking an experiment or project one step further;
- Having students draw schemes or pictures to summarise points;

- Analysing student drawings and schemes;
- Looking at a topic from a different perspective. (p. 200)

However, research exploring how these strategies are used in the CLIL classroom is still limited. Relevant to the focus of the present study is Morton's (2015) study on the interactional management of vocabulary explanation by four subject teachers through the lens of lexical Focus on Form (FonF). The conversation analysis of 12 biology, technology, history, and geography lessons delivered in English in a Spanish secondary school revealed two concurrent modes of the teachers' vocabulary explanation: analytic (verbal and textual resources) and animated (engage a range of multimodal resources) modes (Morton, 2015). In other words, teachers used a combination of various verbal and non-verbal resources to explain vocabulary in CLIL. They tried to draw students' attention to the vocabulary by repeating or showing them on the board, while code-switching and L2 synonyms were used to ensure students' comprehension. It was also highlighted that the teachers considered the vocabulary important to the learning of subject content and at the same time, the content allowed for meaning-making of the vocabulary in its context (Morton, 2015). Also drawing on FonF, Morton and Jakonen (2016) investigated interactional negotiation of language knowledge among secondary students in a CLIL history lesson in Finland focusing particularly on what was perceived as the language problem and how the problem was dealt with when it occurred. In accordance with Morton (2015), the analysis showed that students used a wide variety of resources to deal with language-related problems such as using L1 and L2 and using a dictionary to look for the unknown word in English.

Similar strategies are found in the study by Mahan (2020) which investigated how three Norwegian CLIL teachers scaffold learning for their students in English L2. The observations of 12 video-recorded lessons from one CLIL classroom in which science, geography, and social science were taught, reveal the use of comprehension scaffolding strategies, including connecting to students' prior knowledge, using supportive materials (e.g., video clips, animations, body language, pictures), translating L2 academic language into L1, and asking students to interpret abstract concepts. In Bárcena-Toyos's (2020) study of four teachers' CLIL practices in four primary schools in Spain, it was found that teachers' beliefs about students' language proficiency had an impact on their CLIL practices. The teachers believed that students could not learn an appropriate level of subject content because they had a low level of language proficiency. Accordingly, the

teachers chose less demanding content and used L1 to explain the content. The teachers also used PowerPoint slides, videos, visuals, and gestures to make subject content accessible (Bárcena-Toyos, 2020).

There is a body of research that discusses NoM practices in CLIL contexts; however, NoM strategies in such contexts have been vaguely conceptualised. Most research has emphasised NoM used by students in content-driven CLIL contexts (Azkarai & Imaz Agirre, 2016; García Mayo & Lázaro Ibarrola, 2015). Teachers' use of NoM to facilitate students' comprehension of subject-specific language in language-driven CLIL settings has not gained much attention. Morton (2019) suggests that skills for teaching new subject-specific terms are an important aspect of professional development. In the CLIL classroom context, NoM helps learners and teachers achieve comprehension and meet learning goals. For Thai pre-service EFL teachers who are going to implement language-driven CLIL in their classrooms, knowing how to convey unfamiliar content and new subject-specific language and make them comprehensible to students are key skills in delivering effective CLIL lessons. Therefore, the present study sought to fill these gaps by examining how pre-service EFL teachers explain subject-specific terms and concepts to students and what NoM strategies they adopt when facing difficulties regarding the explanation of subject-specific terms and concepts. Pre-service EFL teachers' beliefs about effective CLIL implementation are also explored as it is believed that they are one of the main factors influencing teachers' CLIL practices (Kewara & Prabjandee, 2018). Teachers' beliefs and their effects on CLIL teaching practice will be discussed in Section 2.7.

2.7 CLIL teachers' beliefs and effective CLIL implementation

In addition to EFL teachers' NoM practices, this research explores EFL teachers' beliefs regarding effective CLIL implementation to understand a holistic view of effective CLIL teaching practices. Section 2.7.1 defines a belief and discusses the empirical studies on teachers' beliefs in educational contexts. Then, a review of research on teachers' beliefs about effective CLIL implementation is provided in Section 2.7.2.

2.7.1 Teachers' beliefs and practices

The term 'belief' has been defined differently. One of the widely cited definitions is Pajares' (1992), which describes a belief as "an individual's judgment of the truth or falsity of a proposition, a judgment that can only be inferred from a collective understanding of what human beings say,

intend, and do" (p. 316). M. Borg (2001) adds that a belief "serves as a guide to thought and behaviour" (p. 186). Teachers hold beliefs about many different issues, for example, pedagogy, students and learning, and their subject matter (S. Borg, 2018; Levin, 2015; Schutz et al., 2020). The beliefs they hold influence their attitudes and judgements which have an impact on their behaviours and teaching practices (M. Borg, 2001; Doğruer et al., 2010; Tsangaridou, 2006).

Teachers develop and form their beliefs through their life experiences, learning experiences from schools, and teacher education and professional development (Tsangaridou, 2006). A review of 64 studies on language teachers' cognition published between 1976 to 2002 by S. Borg (2003) indicates the influence of teachers' past experiences in language learning on the development of their beliefs, serving as a foundation to conceptualise language teaching. Additionally, S. Borg (2003) points out that teacher training programmes play a crucial role in shaping teachers' beliefs. In line with his review, Borg's (2011) investigation of the impacts of in-service teacher education on six British teachers working in a private language teaching organisation using questionnaires and semi-structured interviews shows that teachers' beliefs can be enhanced and extended through teacher education. Through in-service teacher education, the teachers could also develop new beliefs and learn how they could transfer their beliefs to classroom practices (S. Borg, 2011). A study of Colombian pre-service EFL teachers' beliefs on teaching English by Suárez Flórez and Basto Basto (2017) shows that the pre-service teachers' beliefs were influenced by their experiences as language learners. However, Suárez Flórez and Basto Basto (2017) note that the pre-service teachers' beliefs were open to change during practicum. That is, teachers' beliefs may change after teachers gain experience in classroom practices (Buehl & Beck, 2015).

The relationship between teachers' beliefs and practices is complex (S. Borg, 2018) and nonlinear (Schutz et al., 2020). While some suggest that teachers' stated beliefs are inconsistent with their actual teaching, and the others reveal a consistent relationship, there is evidence suggesting a partial relationship between the two (Nagatomo, 2012). Xu (2012) found that what teachers did and the teaching approaches they employed in the classroom were determined by their beliefs. Teachers adjusted their ways of teaching according to their students' abilities and what they felt was helpful to the students (Xu, 2012). Similar to Xu (2012), Li and Walsh (2011) compared two EFL teachers' stated beliefs to their classroom interactions by means of classroom observations followed by semi-structured interviews. The findings reveal a complicated and nonlinear

relationship between the teachers' stated beliefs and their practices, which was explained in reference to contextual factors such as students' attitudes, teachers' experiences and understanding of language learning, and teachers' observations of students' learning.

Reviewing 257 empirical studies on teachers' beliefs and practices conducted from 2008 to 2012, Buehl and Beck (2015) identify four possible forms of relationships between teachers' beliefs and their practices: 1) beliefs influence practice; 2) practice influences beliefs; 3) beliefs are disconnected from practices; and, 4) beliefs and practices influence one another. Buehl and Beck (2015) explain that whether teachers' beliefs are enacted in their practices is dependent on several internal factors (e.g., other beliefs, teachers' experience and knowledge, their self-reflection, and self-awareness) and external factors (e.g., class size, students' abilities, teaching resources, curriculum, school policies). In accordance with Buehl and Beck (2015), the analysis of research on teachers' beliefs and practices relationship by S. Borg (2018) found that many studies identified the inconsistent relationship influenced by external factors such as curriculum, which limited teachers to enact their beliefs. In addition, teachers' knowledge of subject matter and pedagogy were also influential (S. Borg, 2018). In other words, some teachers do not act on their beliefs because they lack subject content or pedagogical knowledge which aligns with their beliefs (Buehl & Beck, 2015). As teachers' beliefs and practice relationships can be complex and involve many different factors, S. Borg (2003) emphasises that "behavioural change does not imply cognitive change, and the latter does not guarantee changes in behaviour either" (p. 91). Therefore, research should be carried out with caution. In the case of pre-service teachers, their teaching practices during teaching practicum may not always be the result of their beliefs, but an influence of the assessment by their institutions (S. Borg, 2006).

2.7.2 Research on teachers' beliefs and effective CLIL implementation

Many different aspects of teachers' beliefs in CLIL contexts have been explored, for example, a relationship between teachers' beliefs and practices (Kim & Lee, 2020; Tan, 2011), changes in teachers' beliefs (Lo, 2019), and teachers' beliefs about content and language integration (Lazarević, 2019). Some research reveals key factors in effective CLIL implementation, including, for example, teachers' proficiency (Bárcena-Toyos, 2020; Cammarata & Tedick, 2012; Karabassova, 2020; Kim & Lee, 2020; Lazarević, 2019; Pérez Agustín, 2019; Soler et al., 2017), teacher training and professional development (Cammarata & Tedick, 2012; Lo, 2019; Pérez

Agustín, 2019; Soler et al., 2017), and administrative support (Bárcena-Toyos, 2020; Cammarata & Tedick, 2012; Karabassova, 2018; Kim & Lee, 2020; Lazarević, 2019; Soler et al., 2017).

Teachers' target language proficiency is important for effective CLIL implementation. Karabassova (2020) explored 21 Kazakhstani science teachers' experiences with a focus on challenges and supporting factors in CLIL teaching using semi-structured interviews. The findings suggest that teachers' English competence was the major challenge in implementing CLIL. The science teachers in Karabassova's (2020) study were not equipped with English language proficiency, thus they lacked confidence in teaching content using English, which affected effective CLIL implementation (Karabassova, 2020; Kewara & Prabjandee, 2018; Lazarević, 2019; Lo, 2020; Lopriore, 2020; Pham & Unaldi, 2021; Tachaiyaphum & Sukying, 2017). In a similar vein, the study by Bárcena-Toyos (2020) found that content CLIL teachers' low language competence and awareness resulted in the teachers prioritising content over language, limiting language learning to only subject-specific vocabulary teaching while other aspects of language were overlooked. Consistently, Skinnari and Bovellan's (2016) study of 12 teachers' beliefs about CLIL integration in Austrian, Finnish, and Spanish contexts revealed that all teachers placed themselves primarily as content experts, thus language was considered the minor focus of the lessons. Considering subject-specific language, the history and science teachers indicated that subject-specific concepts and technical, abstract terms were challenging to teach and learn. To facilitate students' content learning in CLIL, teachers used language scaffolding which was limited to basic strategies, for example, decreasing the speed of their explanations, providing short definitions of subject-specific terms (Pham & Unaldi, 2021), using L1 and L2, and using mind maps (Skinnari & Bovellan, 2016). Furthermore, the study by Cammarata and Tedick (2012) demonstrates that identifying language focus, integrating language into content teaching, and assessing language learning are the difficulties that concern the immersion teachers most due to their lack of language awareness, particularly "the content of language teaching" (p. 262). Given the linguistic demands of CLIL implementation, it is suggested that CLIL teachers need to adapt and learn how to teach content through a foreign language effectively, otherwise lessons may be meaningless for the students (Halbach, 2014). Professional development in terms of target language training, especially English for instructional and learning purposes (Lorenzo, 2008), is necessary, especially for content teachers (Aiello et al., 2017; Kewara, 2017; Lazarević, 2019; Pavón Vázquez et al., 2020).

Furthermore, research suggests that administrative support from schools plays a crucial role in successful CLIL implementation. In their study of English language teachers' beliefs and practices about CLIL at a Korean university through interviews and classroom observations, Kim and Lee (2020) found that the teachers did not fully understand the direction of the new programme because of the lack of communication between administrators and the teachers before the transition to CLIL programme, which negatively affected their teaching practices at the initial stage of the transition to the programme. In the Kazakhstan context, Karabassova (2018) also highlights the importance of communication between schools and teachers, especially in terms of rationale, theory, and purposes of CLIL implementation as she found that teachers' low awareness of CLIL rationale led to practices which overlooked the students' language development.

Curriculum requirements also influence the implementation of CLIL. Studies indicate that, in addition to teachers' language awareness, curriculum requirements, examinations, and time constraints are possible explanations for practices such as making content the priority, resulting in students' limited language learning opportunities (Tan, 2011). Lazarević (2019) reports in her study on Serbian content teachers' views of teaching science in a CLIL class that content was the teachers' main concern because of the number of topics that the curriculum requires them to cover which left inadequate time for language practice. The studies by Karabassova (2018) and Bárcena-Toyos (2020) corroborate Lazarević's (2019) as it was found that teachers exclusively placed importance on content teaching due to the school curriculum requiring students in both CLIL and non-CLIL programmes to learn the same number of lessons in the same amount of class time to pass an assessment. Similarly, Cammarata and Tedick's (2012) study on teachers' practice in balancing content and language teaching in an immersion classroom in the United State demonstrates that balancing content and language teaching is a demanding task for teachers given that there was a lack of planning and teaching time, but high expectations in terms of learning outcomes and content coverage. Moreover, there is evidence that the lack of teaching resources and materials affected teachers' time and effort in teaching and planning effective CLIL instruction (Bárcena-Toyos, 2020; Cammarata & Tedick, 2012). Cammarata and Tedick (2012) suggest that for content and language integration to be successful, teachers need support such as allocating experts to develop curriculum, increasing planning and teaching time, publishing materials and textbooks for content and language integration, and promoting teacher collaboration.

A study by Soler et al. (2017), which explored stakeholders' beliefs about successful CLIL programmes in schools in Catalonia, Spain using online surveys, semi-structured interviews, and classroom observations, demonstrates that CLIL collaboration could promote teachers' learning and help them deal with challenges in integrating content and language. Lo (2014), using questionnaires and semi-structured interviews to explore language and content teachers' beliefs and attitudes regarding their roles in CBI and cross-curricular collaboration, found that both groups of teachers believed that teacher collaboration could help promote students' learning of content and language. However, there were concerns regarding the increase in teachers' workload and a conflict arising from the differences in teachers' professional backgrounds. Therefore, collaboration between language and content teachers should be undertaken in CLIL contexts, taking into account teachers' beliefs, school policy, interpersonal relationships (Lo, 2020), characteristics of the teachers, and students' language abilities (Pavón Vázquez, 2014).

Finally, as demonstrated throughout the chapter, because teachers encounter many challenges in CLIL implementation, several studies highlight the need for teacher training and professional development (Banegas, 2019; Bárcena-Toyos, 2020; Karabassova, 2018; Lo, 2019; López-Medina, 2016; Pavón Vázquez & Ellison, 2013; Pérez Agustín, 2019; Pham & Unaldi, 2021; Soler et al., 2017). The participants in the study on Thai pre-service EFL teachers' perceptions of CLIL by Tachaiyaphum and Sukying (2017) suggested that they needed CLIL education to be included as part of a pre-service teachers education programme to prepared teachers for CLIL. The teacher participants added that they felt that CLIL education provided at a university as part of an undergraduate degree could be more comprehensive and effective than in-service teacher training conducted by the MOE. Tachaiyaphum and Sukying (2017) explain that training at the university can be a good preparation for prospective CLIL teachers to deal with any circumstances they might experience at their prospective educational institutions.

Different areas of teachers' competence for CLIL implementation have been suggested. The content CLIL teachers in the study by Lazarević (2019), for example, expressed their need for additional language training which is in line with Pavón Vázquez and Ellison (2013) who suggest that in a context where CLIL is taught by content teachers whose language competence is low, schools should provide professional development to improve the teachers' language competence. On the other hand, Karabassova (2020) emphasises the importance of CLIL pedagogy as it is

evident in her study that teachers' low awareness of CLIL fundamentals led to teachers' beliefs that content subjects should not be taught in an additional language. Bárcena-Toyos (2020) also asserts that content and language integration can be compromised if teachers lack knowledge of the CLIL approach. P. Ball et al. (2015) add that teachers who are trained in CLIL pedagogy will be able to address problems concerning the lack of language competence as they know how to make subject content accessible. Reviewing research on CLIL teacher training in Europe and Spain in particular, Pérez Agustín (2019) outlines key competence that CLIL teachers should have, including linguistic competence (e.g., BICS and CALPS), pedagogical competence, classroom management, and collaborative competence. Pérez Agustín (2019) argues that if teachers are well-trained, they will be able to put CLIL into practice, develop their own teaching materials, and feel confident to integrate the roles of content and language teachers. In addition to the knowledge and skills for CLIL teaching, López-Medina (2016) regards textbook evaluation and development as another important aspect of CLIL teacher training due to the issues concerning CLIL materials in a Spanish context. López-Medina (2016) notes that CLIL teachers need to be trained to identify quality textbooks and adapt the available resources to suit their contexts.

Because CLIL implementation varies based on the context in which it is implemented, CLIL teacher education and professional development may need to be designed in accordance with school contexts, teachers' professional backgrounds, and teachers' experiences (Banegas, 2021; Lo, 2019). A professional development programme should take into consideration the teachers' specific needs (Cammarata & Tedick, 2012; Pavón Vázquez & Ellison, 2013). To illustrate, if CLIL education is to be provided to content teachers, one of the main characteristics can be teachers' language development (Pavón Vázquez & Ellison, 2013). Furthermore, Lo (2019) suggests that teachers' beliefs are one of the important parts of CLIL professional development. Therefore, teachers' beliefs should also be incorporated into the programmes (Banegas, 2019).

2.8 Summary of the literature review

This review of the literature indicates that in the CLIL classroom context, NoM helps learners and teachers achieve comprehension and meet learning goals. For Thai pre-service EFL teachers who are going to implement language-driven CLIL in their classrooms, knowing how to make subject-specific content and vocabulary comprehensible is a key skill in delivering effective CLIL lessons. Although there is evidence indicating teachers' use of NoM strategies, the empirical research has

been focused more on students' use of NoM strategies in content-driven CLIL settings (Azkarai & Imaz Agirre, 2016; García Mayo & Lázaro Ibarrola, 2015; Mesquida & Juan-Garau, 2013). Research that explores EFL teachers' NoM in a language-driven CLIL context is scarce. Moreover, teachers' beliefs are an integral aspect of understanding their classroom practices; as Li and Walsh (2011) put it, "good practice lies at the heart of most teachers' beliefs" (p. 42). Exploring teachers' beliefs can provide an insight into their practices which will help develop a CLIL education programme to support teacher professional learning and development (S. Borg, 2018). In CLIL contexts, teachers' beliefs about integration have an impact on how they integrate content and language teaching in the classroom, their roles as well as their decision-making (Skinnari & Bovellan, 2016). However, there has been a lack of research on EFL teachers' beliefs concerning effective CLIL implementation, especially in Asian contexts. Therefore, this study aims to investigate pre-service EFL teachers' NoM practices and their beliefs about effective CLIL implementation within the Thai EFL context.

2.9 Statement of research questions

This study aimed to investigate CLIL practices in Thai secondary classrooms with an emphasis on Thai pre-service EFL teachers' NoM practices to facilitate students' comprehension of subject-specific terms and concepts and their beliefs concerning effective CLIL implementation. The study explored two main research questions and one sub-research question as follows:

RQ1: How do Thai pre-service EFL teachers explain and negotiate the meaning of subject-specific terms and concepts in CLIL lessons?

RQ1.1: What are the NoM strategies that the pre-service EFL teachers adopted to address difficulties concerning the explanation and students' comprehension of the subject-specific terms and concepts?

RQ2: What are Thai pre-service EFL teachers' beliefs regarding effective CLIL implementation?

In the next chapter, I describe the research methodology adopted to address the research questions, research participants, research instruments for data collection, and data collection procedures. Data organisation, the form of data analysis, validity and trustworthiness, as well as ethical considerations, are also discussed.

CHAPTER 3 RESEARCH METHODOLOGY

This chapter introduces the research methodology used to address the research questions. It consists of eight sections. Firstly, I discuss the interpretive paradigm (Section 3.1) and multiple case studies (Section 3.2) along with my justification for using the approach to explore my research questions. This is followed by a description of the participants (Section 3.3). The next section deals with the research instruments for data collection (Section 3.4). I then outline data collection procedures (Section 3.5). Subsequently, data organisation and preparation (Section 3.6), the form of data analysis (Section 3.7), validity and trustworthiness of the research instruments (Section 3.8), as well as ethical considerations (Section 3.9) are discussed. Finally, a summary of the chapter is provided in Section 3.10.

3.1 Interpretive paradigm

The purposes of this research are to examine (1) how pre-service EFL teachers explain and negotiate the meaning of subject-specific terms and concepts to students; (2) NoM strategies that they adopt to address the difficulties in the explanation of subject-specific terms and concepts; and (3) their beliefs associated with effective CLIL implementation. I sought to create an in-depth description of language-driven CLIL practices from the view of Thai pre-service EFL teachers with an assumption that an understanding of language-driven CLIL and how it is put into practice are dependent on its context and individual teachers' interpretation. This steered me to the interpretive research paradigm which is characterised by a view of humans as individuals (Cohen et al., 2018). Its purpose is to understand the world from a subjective perspective and to seek an explanation to offer insights into human behaviour in particular contexts (Atkins & Wallace, 2012; Cohen et al., 2018; Ponelis, 2015). In other words, researchers investigate participants' behaviours, reflections, and conceptions in a particular context, try to understand and interpret the meaning they are making, and then build theory from research data (Cohen et al., 2018). The social world is discovered through the eyes of the participants rather than being shaped by theory (Norman & Priest, 2017). Emphasising research methodology, the analysis of 25 research publications on language teachers' cognition by S. Borg (2012) demonstrated the usefulness of employing the interpretive paradigm to carry out research in this area. S. Borg (2012) suggests that research in language teacher cognition is robustly oriented by the interpretive paradigm in 15 of the 25

publications analysed. He took Werbinska's (2011) study as an example to explain the reason for using the paradigm:

> Representing an interpretive research paradigm, the study makes hardly any claim to be generalizable to other contexts. Instead, its value lies in attention to significant details as seen through the eyes of the subjects themselves, in highlighting and sensitizing to clues that might have been lost in numbers and statistics.
>
> (Werbinska, 2011, as cited in S. Borg (2012), p. 18)

To address the research purposes mentioned earlier, the interpretive paradigm was employed because, as S. Borg (2012) has concluded above, it was a highly suitable approach.

3.2 Multiple-case study approach

Deciding on my methodology according to my research purposes and the interpretive paradigm, I considered the suggestion by Yin (2018) that if research seeks to address 'how' or 'why' questions, and aims to gain an in-depth explanation of the phenomenon under investigation, a relevant research method is a case study. A case study approach is extensively used among researchers in the field of education (Merriam, 1998). It explores the case in a specific context in detail and may use multiple methods for collecting data related to a situation under study (Chmiliar, 2010). A case study allows researchers "to focus in-depth on a 'case' and to retain a holistic and real-world perspective" (Yin, 2018, p. 36). As a result, the in-depth insight from the real-world perspectives yields practical implications, which can be applied to professional practice in comparable contexts (Holley & Harris, 2019).

Although a case can either be a single individual or *unit*, such as a student, teacher, or programme (Merriam, 1998) or multiple cases within a bounded system (Creswell, 2013), I considered a multiple-case study a thorough approach to address my research purposes because it allows interpretation of the investigated issues from different perspectives. Díaz Andrade (2009) suggests that insight from one participant can be inadequate to create a convincing explanation of a phenomenon, and thus interpretive research should seek accounts from different participants. The usefulness of a multiple-case study approach to educational research was discussed by Li and Walsh (2011). They employed an interpretive multiple-case study approach to examine the pedagogical beliefs and classroom interactions of two secondary school EFL teachers. In their

study, data were collected by means of classroom observation, followed by a semi-structured interview. Li and Walsh (2011) explained that the interpretive multiple-case study was regarded as the most appropriate approach to exploring teachers' beliefs and the relationship between pedagogical beliefs and classroom interactions because it allows different ways to get an insightful understanding of the cases. They asserted that these case studies can provide a comprehensive understanding of the relationship between teachers' beliefs and their teaching practices.

Given the advantages of this approach, along with the objectives of this research, conducting a multiple-case study under the interpretive paradigm was considered highly suitable. Therefore, my research adopted a multiple interpretive case study approach to investigate pre-service EFL teachers' beliefs and their language-driven CLIL practices within the Thai EFL context. The multiple-case study consisted of six cases – six pre-service EFL teachers teaching at two Thai secondary schools as part of their one-year teaching practicum (see Section 3.3). Following interpretive notions, the nature of these case studies was subjective because I aimed to explore and explain the cases (Cohen et al., 2018) through the pre-service EFL teachers' as well as my own perspectives. By using the interpretive paradigm, it was possible to gain a rich, thick description to develop conceptual categories, and to gain theoretical and practical understandings of EFL teachers' NoM practices in CLIL secondary classrooms and their beliefs regarding effective CLIL implementation.

3.3 Participants

This section presents details of the participants of this study. It describes purposive sampling and selection criteria utilised to select individual participants, followed by the participant recruitment process (Section 3.3.1), the summary of participants' information (Section 3.3.2), and the CLIL module provided as part of a second language pedagogy course (Section 3.3.3).

Participant selection in qualitative research tends to be purposeful and aims to select those who will provide the richest data related to the research inquiry (Yin, 2011). In this study, purposive sampling (Merriam, 1998) was employed to recruit participants based on the following three selection criteria: (1) they were fifth-year pre-service EFL teachers studying in the Faculty of Education (EDU) at their university; (2) they had completed the CLIL module taught in one of the second language pedagogy courses; and (3) they implemented language-driven CLIL in their

English classes at a Thai secondary school in the first semester of 2020 as part of their one-year teaching practicum.

3.3.1 Participant recruitment

As this research project was undertaken while I was living in New Zealand, I utilised e-mail as a primary means of communication with the authorities and potential participants because it saved time and cost. After receiving research ethics approval (see Appendix 1), I emailed a formal letter describing my research project and a consent form to the Dean of EDU and the pre-service EFL teachers' Academic Advisor to inform them about the nature of the research project and to ask for their permission to recruit the fifth-year pre-service EFL teachers to participate in my research project. After the Dean granted permission, I was requested to schedule an informal virtual meeting with the Academic Advisor to discuss in detail my research project.

The Academic Advisor volunteered to introduce my research project, distribute an information letter and consent form to the pre-service teachers, and invite them to participate in my research project in their monthly meeting. After receiving a signed consent form from the Academic Advisor, I emailed an information letter and consent form, which were written in English, to her in order for her to distribute them to the pre-service teachers (see Appendix 9, 10).

After one month, eight pre-service teachers contacted me expressing their interest in participating in my research project. To ensure that they clearly understood the nature of my research project, I convened a meeting via Zoom to discuss the purposes of the research, how data would be collected, activities they would be required to do, and the duration of the data collection process. After the meeting, six pre-service EFL teachers volunteered to take part in the research.

The six participants had each been accepted to do a teaching practicum at two secondary schools in northeast Thailand. Accordingly, a letter introducing my research project and a consent form were emailed to the two school principals to ask for permission to collect data from the pre-service EFL teachers. When I contacted the school principals, schools in Thailand were closed due to the Covid-19 pandemic so a delay in reply to my request was expected. Nonetheless, I found that emailing was not an effective way to contact the school principals since no replies were made after several months. This could be due to the fact that Thai schools, in general, rely mostly on physical rather than electronic documents. To deal with this matter, I contacted pre-service EFL teacher alumni who were working at the schools to approach the school principals and distribute the

physical information letter and consent form to them. The signed consent forms from the two school principals were emailed to me the following week.

Due to the nationwide travel restriction as a result of the pandemic, planned data collection methods were adjusted. I had intended to travel to Thailand to conduct the interviews and observations in person. I changed my data collection plans to a digital approach which involved video conferencing for the interviews and video recording for the observations. Once the extension to my data collection methods received ethical approval (see Appendix 2), I emailed updated information letters to the Dean, Academic Advisor, and the six participants to inform them of the changes to my data collection and to ensure that they were still willing to participate in my research project, according to the changes set out in the letters. The updated information letters for the school principals were distributed by the alumni. They were all aware that the impacts of the pandemic were unavoidable, and the changes made to data collection seemed reasonable to them. As a result, their acceptance was gained after a short time. Finally, a Zoom meeting with each of the six participants was hosted primarily for a detailed discussion about the changes to data collection and to provide an opportunity for questions and answers. This was also to avoid misunderstanding and confusion. Once the participants fully understood the nature of the research project and procedures of data collection, and the content of the consent form, they signed and emailed an informed consent form to me.

3.3.2 Demographic profile of the participants

The participants were six pre-service EFL teachers studying in EDU at their university and doing teaching practicum in the final year of their course of study. They were all native Thais who used English as a foreign language. Among the six participants, there were three males and three females. Their age range was between 23 and 24. All of the participants taught English to secondary school students at School A and School B, which are located in northeast Thailand. They adopted a wide range of second language teaching approaches in their English classes as required by the university, for example, CLT, CBI, and CLIL. They were required to manage their classes by themselves, but each of them had a teacher mentor who supported them throughout the academic year. The teacher mentors' roles normally involved checking and assessing lesson plans and teaching materials, occasionally observing lessons, and providing advice on the participants'

teaching practice. The participants' demographic profiles are presented in Table 2 below. The participants' names are pseudonyms.

Table 2

Demographic profile of the participants

Participants	Gender	Age	School	Level of students
Alpha	male	24	School A	Grade 11 (Aged 16 – 17)
Sorbet	male	23	School A	Grade 9 (Aged 14 – 15)
Roguefort	female	24	School A	Grade 10 (Aged 15-16)
Daisy	female	24	School B	Grade 9 (Aged 14 – 15)
Tawan	male	23	School B	Grade 10 (Aged 15-16)
Kiya	female	24	School B	Grade 10 (Aged 15-16)

Prior to their teaching practicum, the six participants had received CLIL education from the CLIL module in their teacher education programme. Regarding their teaching experience in school settings, all participants had completed compulsory teaching profession courses where they gained field experience through planning and implementing their lessons in actual classrooms. That is, all participants had experience teaching English using different teaching approaches, including CLIL, to students at different levels from primary to secondary. However, they had no experience teaching individually because all teaching practices were done in a team. A teaching practicum was where they worked in a school as an actual teacher under the supervision of school teachers.

3.3.3 The CLIL module in the participants' second language pedagogy course

At the time of data collection, the participants were completing a Bachelor of Education in English, which was a five-year programme preparing students to be school English teachers (OECD/UNESCO, 2016). The programme encompassed four years of coursework in academic disciplines and pedagogy, and one year of teaching practicum at a local school. At the participants' university, a CLIL module was provided in one of the second language pedagogy courses for the third-year students. The second language pedagogy course consisted of various modules concerning second language pedagogies, including, for example, the principles of SLA and their implications in teaching, grammar translation approach, CLT, CBI, task-based language teaching (TBLT), and CLIL. Each module comprised three main parts: 1) a lecture on a teaching theory; 2)

practice planning a lesson; and 3) microteaching, in which the participants applied theoretical knowledge and principles of teaching to practice.

The CLIL module took up four weeks of the course. The first week of the module was a three-hour lecture on the key principles of CLIL such as its dual focus, the 4Cs framework, and the Language Triptych. Following the theory, the participants were given approximately two weeks to plan a language-driven CLIL lesson based on the 4Cs framework and the Thai basic education core curriculum, and prepare CLIL materials for microteaching. Then, in the final week of the module, they were required to use the planned lesson in microteaching where their classmates played the role of students. After the microteaching, the lesson plan was revised according to feedback from their peers and the course instructor. They then had an opportunity to apply the revised lesson plan to teach students at school as part of a teacher professional experience course. English was the required medium of instruction for all teaching practices, including teaching practicum.

3.4 Research instruments for data collection

The interpretive paradigm is described in relation to qualitative methodology (Creswell, 1994). According to Radnor (2001), "qualitative information is the essence of interpretive research, and observing the research participants in their social world and talking to them are the ways in which the majority of the data which shape the research interpretation are collected" (p.29). This section deals with the research instruments – a semi-structured interviews, classroom observations, and a follow-up interview – used to gather qualitative data aligned with the interpretive paradigm. It describes how the first semi-structured interview schedule (Section 3.4.1), the classroom observation schedule (Section 3.4.2), and the follow-up stimulated recall interview schedule (Section 3.4.3) were designed. A pilot study is discussed in Section 3.4.4.

3.4.1 Semi-structured interview schedule

The interview is considered one of the essential tools for a case study (Yin, 2014), especially when the source of evidence such as behaviour, feelings, and opinions is unobservable (Merriam, 1998; Stake, 2010). In this multiple-case study, a semi-structured interview was utilised because its loose structure provided room for a researcher to explore considerable rich and in-depth information from participants (Scott & Morrison, 2007). It was used at the initial stage of data collection to gain the pre-service EFL teachers' background and to elicit a holistic view of unobservable

teaching aspects, namely their knowledge of the CLIL approach, their CLIL experiences, and their beliefs regarding effective CLIL implementation.

Prior to data collection, I reviewed research and literature related to CLIL classroom practice, CLIL teachers' beliefs, and NoM strategies in CLIL to get a deeper understanding of methods of data collection and to evaluate the research instruments utilised for investigating the research questions. I then designed a semi-structured interview schedule that served to address RQ2 regarding teachers' beliefs about effective CLIL implementation and to gain information about the participants' backgrounds. The interview schedule consisted of two parts: (1) teachers' background; and (2) teachers' experiences and beliefs about CLIL implementation (see Appendix 12). All questions were open-ended, which allowed participants to provide their responses based on their points of view (Rolland et al., 2020). The questions were generated based on the topics which I had identified through research and literature reviews as well as from my experiences as an EFL and CLIL teacher educator. The questions were written in English as the participants were pre-service EFL teachers. The interview questions were subsequently piloted (see Section 3.4.4).

3.4.2 Classroom observation schedule

Classroom observation has been commonly used in educational settings for lesson evaluation and professional development (Wragg, 2012). It is extensively used as an instrument for data collection in language teacher education research as it provides a concrete descriptive basis concerning teachers' knowledge, thoughts, and beliefs (S. Borg, 2006). Classroom observations also allow researchers to study participants' actions or behaviours and compare the actions to the information provided in interviews (Scott & Morrison, 2007), provide reference information regarding specific incidents or behaviours for subsequent interviews (Merriam, 1998), and may allow researchers to gain information of a participant who finds it difficult to share ideas verbally (Creswell, 2008). Because of its advantages for studying human actions and behaviours, the classroom observation was used to explore the participants' CLIL practice in these case studies.

A classroom observation schedule was designed to examine teachers' NoM strategies during a language-driven CLIL lesson delivery. Since literature regarding NoM in language-driven CLIL was limited, I created the observation schedule based on NoM strategies identified in both SLA and CLIL research (see Foster, 1998; Mehisto et al., 2008; Pica, 1987, 1988). The observation schedule was produced in a form of a table with two columns, one identifying teaching procedures

and the other NoM strategies, and two blank columns allowing room for notetaking of details and other NoM strategies discovered during the observations (see Appendix 14).

3.4.3 Stimulated recall interview schedule

The stimulated recall interview has been widely used in educational and qualitative research to explore teacher's thinking and decision-making processes from their own perspective (Vesterinen et al., 2010). It has also become an essential tool for gathering data about teacher development for both pre-service and in-service teachers (Denley & Bishop, 2010). The stimulated recall interview yields data in relation to the thought processes of participants which might not be accessible by means of observation (Gass & Mackey, 2000). Furthermore, it provides participants with specific topics to reflect on and contextualises the general questions asked in the semi-structured interviews within particular classroom moments.

The stimulated recall interview was employed in the final phase of data collection in this multiple-case study to cross-check against and complement observational data. Its aim was to elicit the pre-service EFL teachers' thoughts and rationale behind their CLIL practice in the observed CLIL lessons. In other words, stimulated recall interviews were primarily used to address RQ1 and RQ1.1 which emphasised the pre-service EFL teachers' explanation of subject-specific terms and concepts as well as the NoM strategies adopted to deal with difficulties in the explanation of the terms and concepts. Data from stimulated recall interviews also helped expand the accounts of teachers' beliefs regarding effective CLIL implementation, which served to address RQ2.

I outlined stimulated recall interview questions to be asked following the classroom observations. As the stimulated recall interview would be primarily used to explore the teachers' thoughts and rationale behind their practices in the two CLIL lessons, the questions were generated after all classroom observations were completed. I reviewed the observation field notes and the filmed lessons, selected the key episodes, and then generated the questions accordingly. The selected key episodes involved a situation when the teacher participants negotiated the meaning of subject-specific terms and concepts to address comprehension problems. Questions regarding teachers' beliefs about effective CLIL implementation outlined in the semi-structured interview were also included to explore their views after implementing CLIL at school.

After constructing all research instruments, I sent them to my supervisors for evaluation and feedback. The instruments were then piloted and developed according to my supervisors' feedback

and the pilot testing results (see Section 3.4.4). A summary of the research instruments used in this multiple-case study is presented in Table 3 below.

Table 3

A summary of research instruments for data collection

Research instruments	Purpose(s)	Research question(s)
Semi-structured interviews	To gain the participants' profiles To elicit the participants' knowledge of the CLIL approach, their CLIL experiences, and their beliefs regarding effective CLIL implementation	**RQ2:** What are Thai pre-service EFL teachers' beliefs regarding effective CLIL implementation?
Classroom observations	To explore how the participants explained subject-specific terms and concepts to students To investigate and map the NoM strategies the participants adopted to address difficulties in the explanation of subject-specific terms and concepts	**RQ1:** How do Thai pre-service EFL teachers explain and negotiate the meaning of subject-specific terms and concepts in CLIL lessons? **RQ1.1:** What are the NoM strategies that the pre-service EFL teachers adopted to address difficulties concerning the explanation and students' comprehension of the subject-specific terms and concepts?
Stimulated recall interviews	To elicit the participants' thoughts and rationale behind their classroom practice in the observed CLIL lessons	**RQ1:** How do Thai pre-service EFL teachers explain and negotiate the meaning of subject-specific terms and concepts in CLIL lessons?

Research instruments	Purpose(s)	Research question(s)
	To gain an in-depth account of the participants' practices regarding the explanation of subject-specific terms and concepts, and the NoM strategies used to address the difficulties in the explanation of the terms or concepts	**RQ1.1:** What are the NoM strategies that the pre-service EFL teachers adopted to address difficulties concerning the explanation and students' comprehension of the subject-specific terms and concepts?
	To explore the participants' beliefs about effective CLIL implementation	**RQ2:** What are Thai pre-service EFL teachers' beliefs regarding effective CLIL implementation?

3.4.4 Pilot study

A pilot study is "an important means of assessing the feasibility and usefulness of the data sampling and collection methods and revising them before they are used with the research participants" (Gass & Mackey, 2007, p. 3). In this research, the semi-structured interview and classroom observation schedules were piloted. The purposes of piloting the semi-structured interview were primarily to evaluate the wording and sequence of the questions (Atkins & Wallace, 2012), and to find out whether the questions were likely to elicit useful information to answer research questions. The pilot study also allowed me to practise utilising research instruments, which helped me gain competence with the instruments, recording equipment, and digital fieldwork (Holley & Harris, 2019). Hamilton and Corbett-Whittier (2013) suggest that if available, pilot instruments be trialled with a volunteer who is similar to those of the research participants. I conducted a pilot semi-structured interview with a pre-service EFL teacher who was in the same class as the participants and was going to do a teaching practicum at a Thai secondary school. The pilot interviewee was selected because she was willing to volunteer and she shared similar CLIL experiences with the participants which were likely to provide useful information to my pilot study.

The pilot interview was carried out via Zoom because it was a user-friendly software that both the pilot interviewee and I were familiar with. Thai was used as the medium of communication

according to the interviewee's preference. The interview was recorded using Zoom recording and OBS Studio recording software in order to try out the effectiveness of the recording equipment before using it in actual data collection. I recorded the interview using two tools to ensure that I would have backup data if one failed. During the interview, the interviewee was occasionally confused due to the ambiguity of the questions and English jargon which were not translated into Thai before the pilot study. As a native Thai, I was confident that I could interview in Thai using an English interview schedule. However, some academic jargon needed careful and accurate translation as well as simplification. After the pilot interview, the semi-structured interview questions in English were revised according to the pilot interviewee's comments, my own evaluation, and my supervisors' suggestions. In addition, I translated the English version into Thai focusing primarily on the translation of jargon, and I cross-checked the accuracy of the translation with terms used in Thai educational documents (see Appendix 12).

The classroom observation schedule was piloted twice in two different classroom contexts. The first classroom observation pilot was conducted in person with two EAP classes at the University of Waikato, where all students in the classes were international students, for example, from China and Japan, while the two teachers were native English speakers. Although the first classroom observation pilot yielded useful information, I was aware that the classroom context was different from the CLIL classroom context in Thailand, and that the data might not be fully applicable to the context of my study. Therefore, I carried out a second classroom observation pilot by employing a video-recorded CLIL lesson taught by a former pre-service EFL teacher. The lesson was shared with me when I was advising the pre-service EFL teacher during her teaching internship. I decided to test my observation schedule with the video recording of the CLIL lesson for three reasons: the classroom context was identical to that of my participants, access to a research site was not required, and permission to utilise the lesson for a pilot study was granted by the EFL teacher. The pilot observations focused on ensuring that the NoM strategies identified in the observation schedule were appropriate, unambiguous, and served the research purposes. I developed the classroom observation schedule by revising the NoM strategies identified in the schedule according to the pilot data (see Appendix 14).

I did not pilot the stimulated recall interview schedule because the questions were dependent on observational data. However, I took into account the issues encountered in the semi-structured

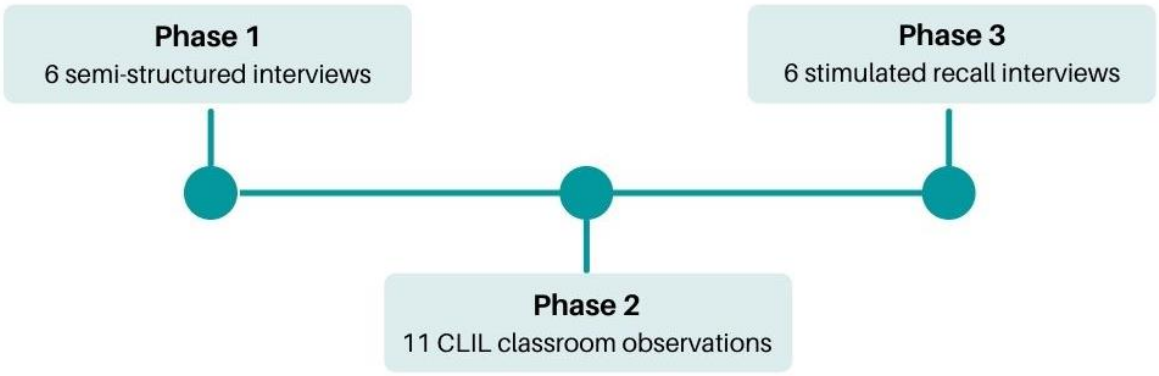
interview pilot study, for example, wording, jargon, and judgemental questions, for a careful design. The stimulated recall questions were evaluated by my supervisors and developed accordingly prior to carrying out the interviews with the participants.

3.5 Data collection procedures

The multiple-case study consisted of three phases of data collection. The first phase involved six semi-structured interviews, followed by eleven CLIL classroom observations (Phase 2), and lastly (Phase 3) six stimulated recall interviews (Figure 2).

Figure 2

A summary of data collection procedures



I discuss in detail the data collection procedures in the following sections: Section 3.5.1 semi-structured interviews, Section 3.5.2 classroom observations, and Section 3.5.3 stimulated recall interviews.

3.5.1 Semi-structured interviews

All of the interviews were conducted via Zoom because it provided useful features, for example, video meetings, content sharing, and chat. Furthermore, interviewing by video meeting allowed the researcher to communicate with the participants and synchronously see their non-verbal responses (Deakin & Wakefield, 2014). All participants had access to the internet as well as the technological expertise to use Zoom. They were also comfortable and familiar with Zoom as they had already used it for studying some of the courses at their university.

Conducting an online interview involved some challenges because it largely depended on technological tools, for example, internet connection, video-conferencing application, and

recording equipment. In my case, the complexity was compounded because of the different time zones between New Zealand and Thailand. To avoid problems, following the advice of Salmons (2015); I made careful preparations, including confirming the time frame and online tools for the interview, testing the technological equipment and reviewing the features that would be used in the interview, and scheduling the interview. As the participants had already started their teaching practicums, I was aware that their schedules were likely to depend largely on their school activities. Therefore, to avoid possible scheduling problems, including confusion associated with time zone, overlapping interview times, and miscommunication between the participants and researcher, I made an interview timetable using Google Sheets and shared it with all participants (See Appendix 13). The interview times identified in the timetable were converted to Thailand time. This allowed all participants to view the proposed interview timetable as well as the booked interviews, and to decide on available times that suited them. The participants were asked to insert their names on the time slot to schedule the interview. If they were not able to make it as scheduled, they could inform me by message chat, or email to rearrange the interview.

The six semi-structured interviews were conducted in June 2020. Prior to the interviews, I shared the themes and purposes of the semi-structured interview with the participants (Cohen et al., 2018) so that they knew what topics of discussion were involved in the interview. The participants could choose to be interviewed in Thai or English. Of the six participants, one preferred to be interviewed in English, while the remaining five participants preferred Thai. I employed the semi-structured interview protocol (see Appendix 12) as a guide to ensure that all of the important topics were covered (Winwood, 2019). The interviews consisted of two sets of questions. The first set of questions aimed to build rapport and elicit the participants' general background, including their experiences as EFL learners and users of English. The questions in the second set concerned the participants' CLIL experiences and beliefs regarding effective CLIL implementation. The six participants were invited to respond to the series of questions associated with CLIL based on their experiences gained from a second language pedagogy course at their university. Additional follow-up questions were asked depending on the information that each participant provided. The interviews were recorded using two tools: Zoom recording and OBS Studio recording software, to ensure that I had backup data if one of the tools failed. The duration of the interviews varied from 40 minutes to one hour. After the interviews, the video recordings of the interviews were

transcribed and the interview transcripts were sent to the six participants for validation (see Section 3.6.2).

3.5.2 Classroom observations

The classroom observation was conducted after the semi-structured interviews. The purposes of the classroom observation were: 1) to investigate how Thai pre-service EFL teachers convey and negotiate the meaning of subject-specific terms and concepts to students; and, 2) to explore the NoM strategies that the pre-service EFL teachers adopted to address the difficulties in the explanation of subject-specific terms or concepts (see Table 3). Due to the travel restriction, I arranged classroom video observations for which the lessons were recorded by the participants. I decided to utilise video observation since a video was able to capture both verbal and non-verbal communication in the classroom, which allowed for an investigation of the participants' CLIL practice in context (Jewitt, 2011).

I was aware that recording a video for research purposes needs careful ethical and technical considerations. Where participants handle the recording themselves, training may be needed (Jewitt, 2012). Although the participants were not formally trained to film their lessons for research, they had experience recording videos of their lessons for learning and assessment within the second language pedagogy courses. They also had video-recording equipment ready for use, including a video and/or digital camera, a tripod, and a smartphone camera. Moreover, filming the lessons was not an extra work commitment as the participants were already filming certain classes for a university assessment. Therefore, I asked the participants to share two unedited videos of their CLIL lessons with me. They were invited to choose whichever of the recorded lessons they wanted to share. They also had the option to share edited videos made for university assessments if they were not willing to share unedited videos.

I convened to discuss with the participants the guidance and instructions for recording their CLIL lessons (Jewitt, 2012) to ensure that the filmed lessons provided sufficient details and served the research purposes. To gain data relevant to the research purposes, Otrel-Cass et al. (2010) suggest that theoretical framework and research questions be considered as a guide for recording a video. I outlined the guideline for filming the CLIL lessons according to the research purpose, which aimed to study the teachers' NoM practices in the teacher-fronted talk mode (see Appendix 15).

Each participant was invited to film two CLIL lessons taught in their normal English classes according to the outlined guidance:

1) The interactions to be recorded must focus primarily on the teacher's actions and talks;

2) The teacher's practice at the presentation stage (teacher-fronted talk) must be fully presented;

3) Other stages of teaching in which the primary focus was on students' participation in the lesson activities are required to present the holistic accounts of classroom interactions. Students who did not wish to be captured should be kept outside the camera's scope at all times.

4) The students might appear in the videos, but no data from students would be used in the thesis as the focus of the research is only on the teachers' teaching practice.

Students' participation in the classroom activities was recorded because classroom interactions were not one-way communication. For instance, teachers' actions could be a response to students' reactions or silences. Recording students' participation helped ensure that the videos provided an insightful picture of what happened in the classroom. Ethical issues were also discussed (see Section 3.9). The six participants were advised to share the filmed CLIL lessons with me via Google Drive. This allowed the participants to upload a large video file and manage access to their videos, which were particularly granted to my supervisors and me for research purposes only.

The participants taught different CLIL lessons depending on the grade level of their students as presented in Table 4. The subjects taught included science, mathematics, geography, and health education. Each lesson consisted of two main stages of teaching: presentation – the participants taught new vocabulary and content of the lesson (teacher-fronted talk), and 4Cs activities – students applied the newly learned concepts in content, communication, cognition, and culture activities. Each lesson lasted four to five hours; this meant that one lesson took at least four periods of English classes, while one learning period lasted 50 to 60 minutes. Initially, I intended to observe twelve CLIL lessons, but one participant (Tawan) was unable to teach his second CLIL lesson due to his time constraints. Therefore, the total of the observed CLIL lessons for the six participants was eleven lessons. A summary of the observed CLIL lessons was shown in Table 4.

Table 4

A summary of the observed CLIL lessons

Participants	Level	Lesson 1	Lesson 2
Alpha	Grade 11 (Aged 16 –17)	Biology: Transport in plants	Biology: Defence against disease
Sorbet	Grade 9 (Aged 14 –15)	Science: Acids and bases	Health education: Health care
Roguefort	Grade 10 (Aged 15 – 16)	Science: Climate change	Science: People and resources use
Daisy	Grade 9 (Aged 14 –15)	Science: The water cycle	Maths: The surface area and volume of the prism
Tawan	Grade 10 (Aged 15 – 16)	Maths: Ratio and fraction	-
Kiya	Grade 10 (Aged 15 – 16)	Geography: Parts of the map	Chemistry: Acids and bases in daily life

All stages of teaching were observed with special attention to the presentation stage in which the participants explained the subject-specific terms and concepts to students. The 4Cs activities stages, when NoM practices occurred, were also captured. While watching the videos, I used field notes and the observation schedule to keep a record of the participants' NoM practices. Field notes were selected for recording observational data because they provided "thick description which shapes the major body of observation data" (Mirhosseini, 2020, p. 77). Both descriptive and reflective field notes were employed in this multiple-case study. Descriptive field notes were used to describe the situations and activities in the lessons while reflective field notes were used to record my thoughts and ideas related to my insights and hunches that came up during the observations (Creswell, 2008). After the observations, I reviewed the filmed lessons and selected the key events related to the teachers' NoM practices. These key events included the incidents in which the teachers introduced subject-specific terms and concepts to students, and when they dealt with difficulties regarding the explanation of subject-specific terms and concepts. Subsequently, the selected events were written up as observation transcripts for analysis. The filmed lessons were also used for stimulated recall interviews in the final phase of data collection (see Section 3.5.3).

3.5.3 Stimulated recall interviews

The participants were invited to schedule these interviews using the same method as they did for the semi-structured interviews (see Section 3.5.1) because of its effectiveness for time arrangement (see Appendix 17). Prior to the interviews, I discussed with all participants the nature of the stimulated recall interview, brief information about the aims of the interview, how it would be conducted, and the overall topics of discussion to ensure their understanding of the process.

The stimulated recall interviews were conducted via Zoom since its content sharing feature facilitated the showing of a stimulus. According to Gass and Mackey (2017), in stimulated recall interviews, the stimulus can be audio or video records of the investigated situations, a record of field notes, or a transcription of a conversation. In this multiple-case study, the key events from the filmed lessons were the main stimuli employed to prompt the participants' memories of what they were thinking while performing actions (Gass & Mackey, 2000; Ryan & Gass, 2012). The semi-structured interview transcripts were also used as a stimulus when referring to teachers' beliefs about effective CLIL implementation discussed in the semi-structured interviews. These stimuli helped elicit the participants' accounts of their CLIL practice, which allowed me to develop an understanding of the participants' perspectives on their teaching practices (Jewitt, 2012).

During the interviews, I was the only person in control of replaying the CLIL video recordings for comments and questions; however, the participants were invited to interrupt where they wanted me to stop the videos for them to explain their actions. In addition to questions related to the key episodes, information concerning the participants' experiences and beliefs about effective CLIL implementation discussed in the semi-structured interviews was revisited to explore their views after implementing CLIL at school (see Appendix 16).

An appropriate time for carrying out stimulated recall should be taken into account because time can have a potential impact on participants' memories of past events. Generally, stimulated recall interviews should be conducted as soon as possible after the event to avoid an impact of memory decay (Denley & Bishop, 2010; Ryan & Gass, 2012). My original plan was to interview each participant after observing their two CLIL lessons. However, this was not possible due to time differences between New Zealand and Thailand. I decided to carry out the stimulated recall interview after all eleven lessons were observed. While there was an approximate gap of one week between the second lesson observations and the stimulated recall interviews, the first lesson

observations were conducted approximately two months before the interviews. Despite the gap between the lesson observations and the stimulated recall interviews, with the video stimuli, all participants easily recalled the displayed classroom events and their own practice. The participants were interviewed individually for approximately one and a half to two hours. The interview with Tawan who was able to teach only one CLIL lesson lasted 57 minutes. The variation in the length of the interviews was due to the number of the selected key episodes and time spent on the discussion on the episodes. All of the participants were interviewed in Thai according to their preferences. I recorded the stimulated recall interviews using Zoom and OBS recording software. The video recordings of the interviews were transcribed for further analysis (see Section 3.6.2).

3.6 Data organisation and preparation

This research consists of three primary sets of data: semi-structured interviews, classroom observations, and stimulated recall interviews. All data were collected digitally by video recording and transcribed for analysis. That is, two forms of data were generated: video recordings and written transcripts. The storage systems of both types of data are discussed in Section 3.6.1. This is followed by the transcription of the recorded interviews and the filmed lessons (Section 3.6.2).

3.6.1 Storage systems

The data were securely stored in the University of Waikato computer, my personal laptop, and the cloud. Google Drive File Stream for desktop allowed me to stream all drive files directly from the cloud to my personal laptop and the University's computer. I could access the data offline because the files synchronised back when the internet connection was available. All research data and files were automatically updated to the latest version. This application facilitated data management and organisation at all stages of my research. It was also a secure means of data storage as passwords are required in order to access the University's computer, my personal laptop, and the cloud.

I created a data collection folder consisting of three sub-folders, which were named according to the three phases of data collection (see Figure 3). The video recordings of the semi-structured and the stimulated recall interviews, the transcripts, and classroom observation field notes were named after the participants' pseudonyms and stored in the folders (see Figure 4). The videos of the CLIL lessons were shared by the participants via Google Drive because it allowed unlimited space for uploading and sharing large video files. Access to the shared lesson videos was granted to the researcher and supervisors only.

Figure 3

Data collection folders

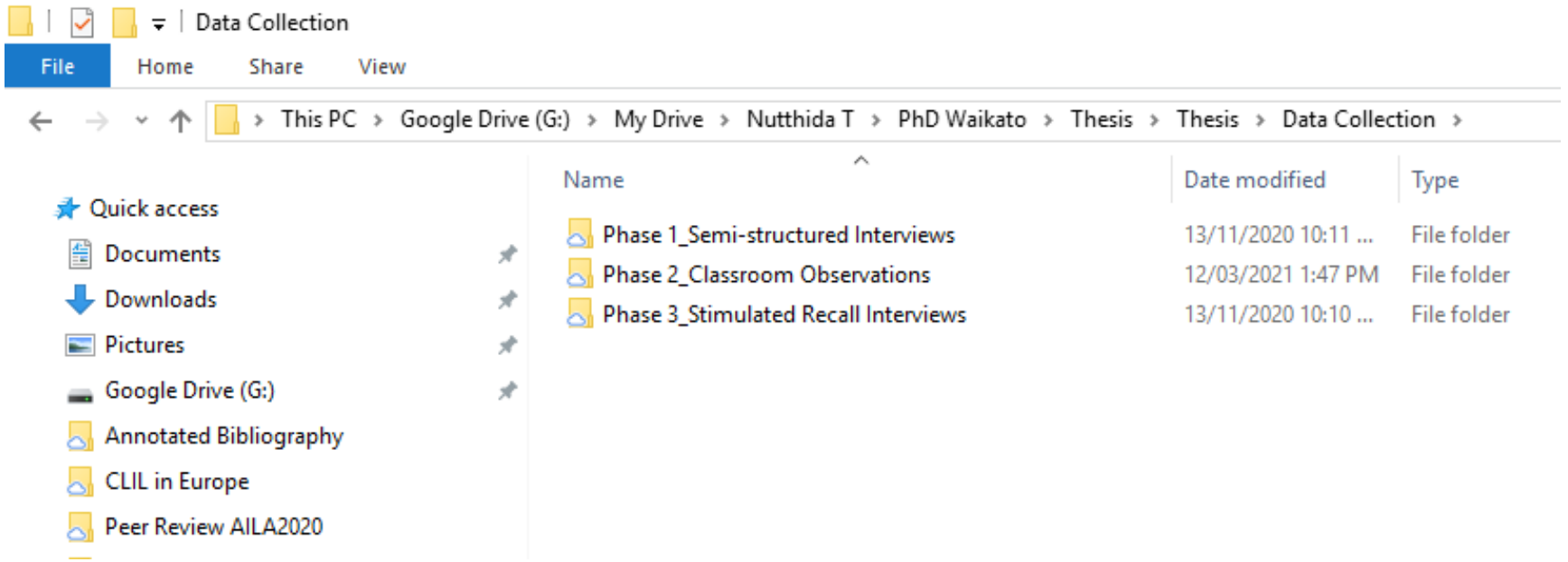
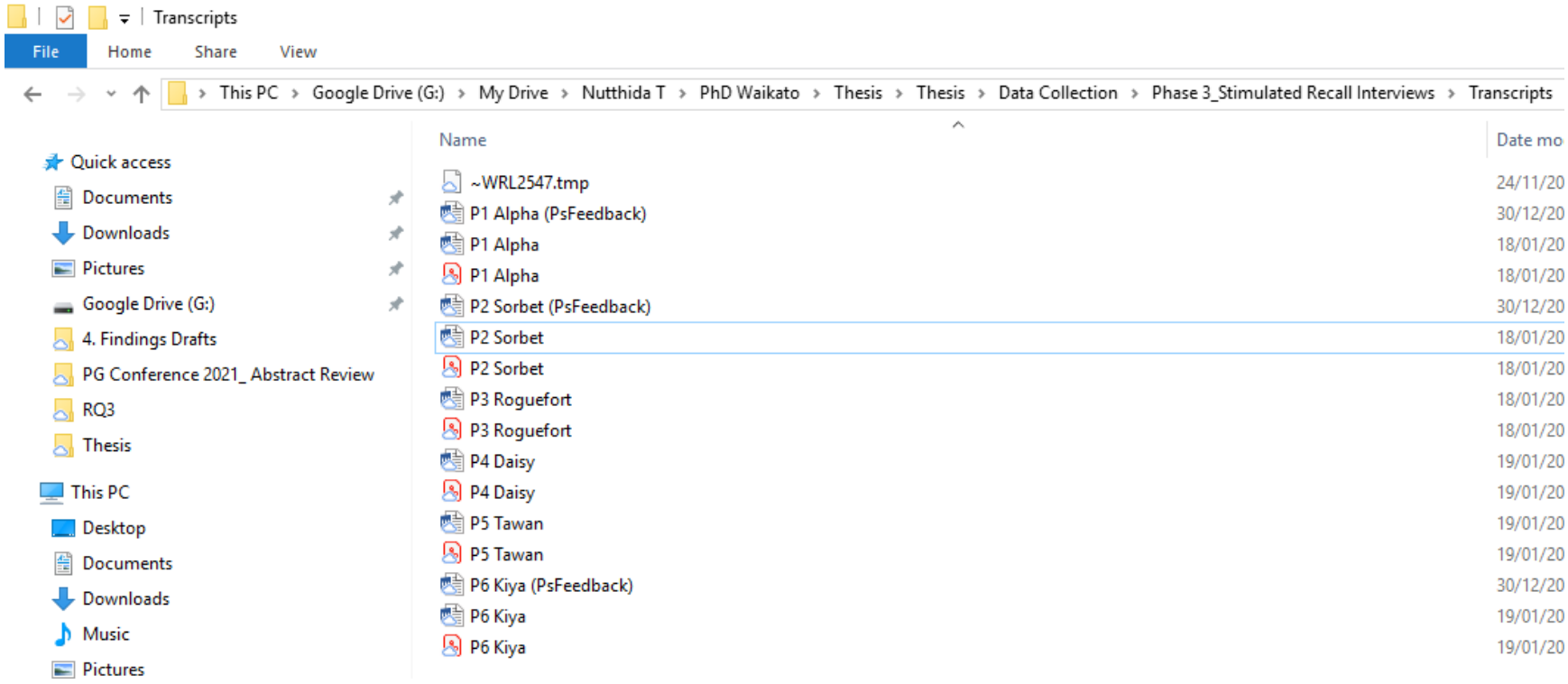


Figure 4

Electronic files of stimulated recall interview transcripts



3.6.2 Transcriptions

Transcribing was the initial stage of analysing the pre-service EFL teachers' spoken accounts. It involves, as Hammersley (2010) puts it, producing verbal data in a written form with descriptions for interpretation, for example, interlocutors and their relevant non-verbal actions appearing during the talks. Hammersley (2010) suggests that researchers take into account the key considerations for transcription: what and how much data from the electronic recordings to transcribe, how to present the spoken accounts, and what to include in the transcript. This is primarily oriented by the research questions.

In this research, the raw data were transcribed verbatim. To begin with, I carefully listened to the entire video recordings to recall and familiarise myself with the collected data. The next process involved listening, transcribing, and reflecting on the transcribed information (Widodo, 2014). I listened to the recordings and transcribed the spoken accounts by drawing on research questions to help me focus on the related information. Small talks, including the introduction of the interviews at the beginning of the interviews, and personal details irrelevant to the research were not transcribed. As for the filmed CLIL lessons, I reviewed the filmed lessons according to the events recorded in the observation field notes, which identified where in the videos they occurred, to select the key moments for transcription. Then, I transcribed only the key episodes associated with teachers' explanation of subject-specific terms and concepts of the lessons to the class.

To check the accuracy of the transcribed information, I played back the recordings while reading the transcripts, and the content was revised accordingly. After that, I replayed the recordings and reread the transcripts to confirm the accuracy of the information. To confirm respondent validity, a copy of the semi-structured and stimulated recall interview transcripts was sent to the participants to review and confirm the accuracy of the information (Hamilton & Corbett-Whittier, 2013; Radnor, 2001). This allowed the participants to comment and confirm the accuracy of my transcription of their spoken accounts. All participants agreed with the transcribed information. The feedback from the participants involved their clarifications of some of their accounts, some changes in word use, and typos. I revised the transcripts according to the participants' feedback prior to analysis. As for the language of transcription, the transcripts of semi-structured and stimulated recall interviews were in Thai, except for Alpha's semi-structured interview transcript as the interview was conducted in English. Classroom observation transcripts included both

English and Thai based on the teacher participants' language practices in their classes. Excerpts selected from the transcripts were translated into English for presentation of the findings in this thesis.

Regarding the layout of the transcripts, data identity, namely data collection methods, participants' pseudonyms, dates and durations of data collection, as well as transcription conventions were provided in the transcripts (see Section 4.1). The participants were indicated in the transcripts by a number with pseudonyms (e.g., P1 Alpha). This numbering system was utilised to maintain consistency of data organisation in storing system and analysis. As for the classroom observation transcripts, transcription conventions by Sidnell (2010) were employed to identify non-verbal elements and contextual information accompanying the explanation. My nonverbal transcription conventions consist of three main features: intervals within and between turns (e.g., pauses and overlaps), inaudible or unclear utterances, and descriptions of events (e.g., whispers, laughs, and gestures). The transcripts were numbered by physical line units. Timing of where in the videos the key events occurred was provided to facilitate data coding and analysis.

3.7 Form of analysis and interpretation

This research employed a grounded theory approach as a strategy for analysing data from the semi-structured interviews, CLIL classroom observations, and stimulated recall interviews. In Section 3.7.1, I discuss my application of the grounded theory approach to data analysis with an emphasis on demonstrating data analysis procedures from initial coding to theoretical coding.

3.7.1 Applying the grounded theory approach to data analysis

The grounded theory approach is a form of data collection and data analysis (Holloway, 1997). Charmaz (2015) defines it as "an inductive, iterative, interactive, and comparative method that provides systematic guidelines for gathering, synthesising, analysing, and conceptualising qualitative data for the purpose of theory construction" (p. 402). It is a tool for researchers to employ adaptively in response to their topic of investigation (Charmaz, 2015) and is used to explore the interactions, behaviours, experiences, and perceptions of participants (Holloway, 1997). Its purpose is to develop a theory according to an analysis of the data (Atkins & Wallace, 2012; Cohen et al., 2018), which, as Charmaz (2015) puts it, stems from "researchers' interpretive frames as well as what happens during their research and what they learn about their topics" (p. 404).

In the analysis of qualitative data, the process involves coding and categorising the data to form main concepts (Holloway, 1997). Coding involves labelling the data with conceptual ideas related to research problems (Urquhart, 2013). In grounded theory, the coding process includes at least two stages, namely *initial coding* and *focused coding* (Charmaz, 2006). Initial coding entails a close reading of the data (Charmaz, 2006). In this phase, researchers read through the data to understand the participants' points of view and the situations coding the data by paying close attention to the participants' actions (Charmaz, 2006). Focused coding involves categorising similar initial codes together (Hadley, 2017) with the aim "to determine the adequacy of those codes" (Charmaz, 2006, p. 57). Another common stage of coding in grounded theory is theoretical coding. This stage entails developing the categories and establishing the relationship between them (Hadley, 2017) leading to constructing or identifying a theory that explains the investigated phenomenon (Urquhart, 2013). Charmaz and Bryant (2010) highlight that utilising the grounded theory in educational research provides analytic and in-depth data, which establishes strong evidence in the analysis. Given the advantages of grounded theory, it was considered suitable for data analysis for the present study. The analysis yielded insightful information leading to the generation of theories (Creswell, 1994) that helped explain the teachers' NoM strategies in CLIL and their beliefs regarding effective CLIL implementation.

Drawing on Charmaz (2006) and (Hadley, 2017), I first analysed the data with an initial coding system followed by focused coding, and finally theoretical coding as follows:

Step 1: Initial coding

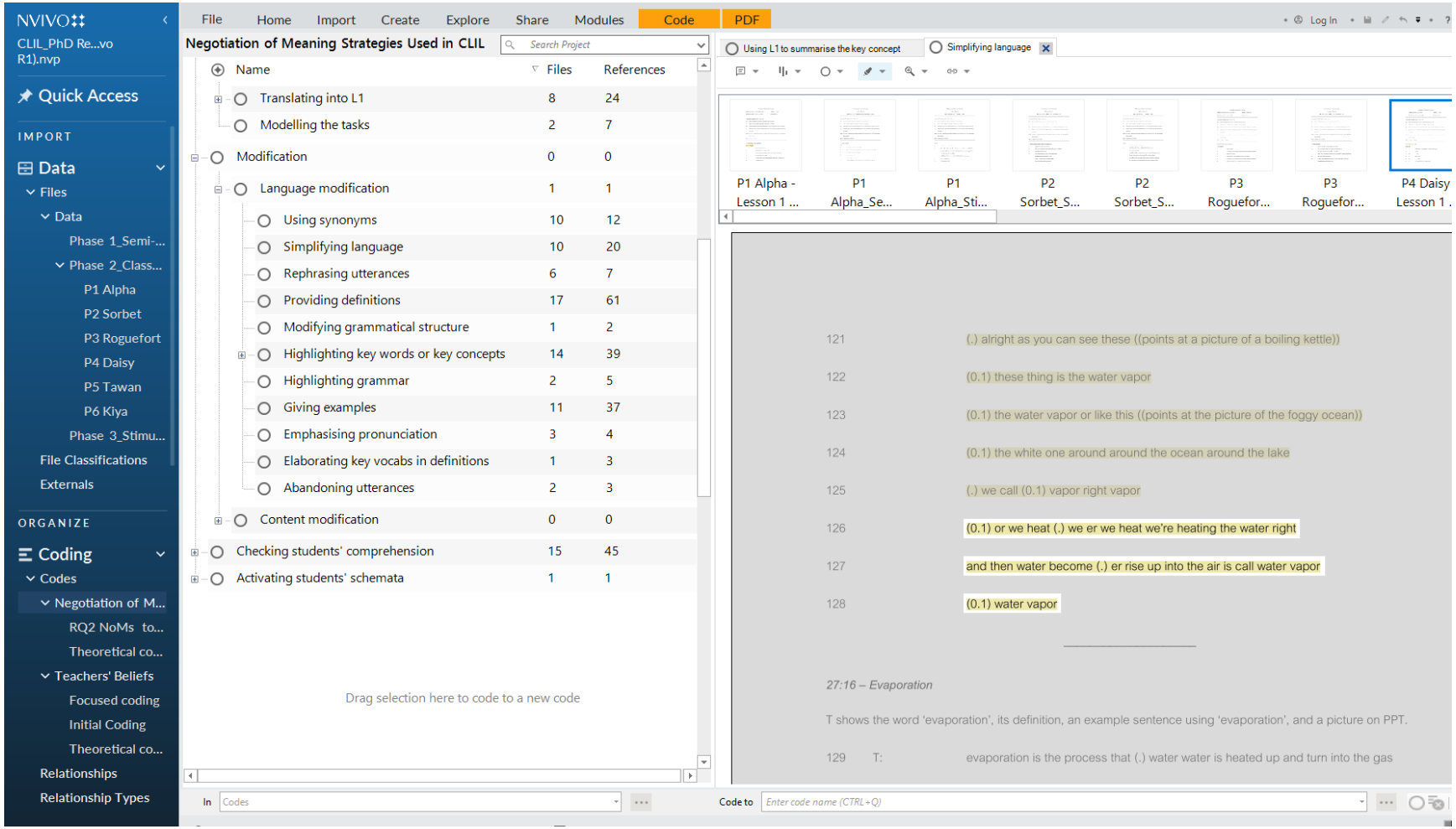
Prior to coding the transcripts, I read through the entire transcripts on paper. I then coded the transcripts for initial themes and sub-themes which were mostly descriptive and highlighted key ideas and emerging findings related to my research questions. The purposes of this process were to obtain a holistic view of collected data and explore how the data might relate to my research questions. This initial stage of coding also assisted me to select key events for in-depth analysis as data irrelevant to the research questions were ruled out. For example, the semi-structured interview and stimulated recall interview data related to the participants' background and their personal information were excluded from analysis because the data was elicited for me to learn about individual participants. Guided by RQ1 and RQ1.1 (see Table 3), only the key episodes from the observation transcripts associated with teachers' explanation of subject-specific terms and

concepts were selected for analysis. This was primarily done by: 1) drawing on the key episodes discussed in the stimulated recall interviews; and, 2) reading and coding the remaining key episodes in the transcripts to explore the strategies used for negotiating meaning by the teacher participants. If the key episodes in the same transcripts presented identical patterns of explanation and strategies, I selected only one of those key episodes. This decision was made as the purpose of this study is to understand how subject-specific terms and concepts were conveyed rather than the frequency of the strategies used.

Subsequently, the selected data from CLIL classroom observations, semi-structured interviews, and stimulated recall interviews were coded using NVivo as a tool. NVivo was utilised because it facilitated systematic data management and allowed for quick retrieval of all codes with the reference data coded (Urquhart, 2013). I began by coding the observational data from one participant, employing the line-by-line coding strategy described by Charmaz (2006) to capture the fundamental ideas appearing in the data. Working with one participant's data at a time, I highlighted and assigned codes to key segments line-by-line and segment-by-segment using gerunds to specify the actions related to research questions, for instance, simplifying language, modifying grammatical structures, and translating into L1 (see Figure 5). Simply speaking, the primary actions identified in the semi-structured interviews were related to teachers' beliefs regarding effective CLIL implementation, while those labelled in the CLIL observations were associated with teacher's NoM of subject-specific terms and new concepts. The stimulated recall interview transcripts were coded for teachers' beliefs and their teaching practice associated with NoM strategies in CLIL. I used the set of the codes generated from the first participant's data to code the remaining five participants' data and added new codes as they emerged from the data to the set. This allowed me to compare the similarities and differences of the codes generated from each dataset. The same coding method was also applied to coding interview data.

Figure 5

Initial coding of the observational data



Step 2: Focused coding

In this stage, I reviewed each code with reference to the coded phrases and/or statements from all six cases scrutinising the coded phases to see whether they represented similar ideas and appropriately related to the assigned code. This involved occasionally re-coding phrases and statements, assigning them to a new existing code with related ideas, or generating new codes. Subsequently, I compared all codes within teachers' NoM strategies in CLIL and merged some codes with similar names or ideas into one code. In the event that the coded phrases and/or statements were ambiguous, I referred to my memos (see Figure 6) and the participants' accounts of the events in the stimulated recall interview data to crosscheck their interpretation as well as my interpretations (Charmaz, 2006).

After sorting the codes, I grouped the codes that shared a similar quality or action under the same category (Hadley, 2017) and assigned a label to each category that encapsulated the characteristics of categorised codes. Then, I created a coding map using NVivo to visually organise codes and categories. This technique allowed me to relate the emerging codes, connecting them by drawing lines to show the relationships between codes as well as categories (Kennedy-Lewis, 2014). Figure 7 illustrates the total of 64 NoM codes grouped into four provisional categories: simplifying language, using visual support, checking students' comprehension, and using L1. As the boundaries and relationship of the codes at this stage were undefined, many of the codes stood on their own or in pairs. Following Hadley's (2017) suggestion, I decided to keep them at this stage because of the compelling evidence shown in the coded data. These initial categorisations were then used to develop "the most salient categories in large batches of data" (Charmaz, 2006, p. 46) at the theoretical coding stage. After that, I performed the same practice of naming and categorising the codes moving from teachers' NoM strategies in CLIL to teachers' beliefs regarding effective CLIL implementation.

Figure 6

Coding memos

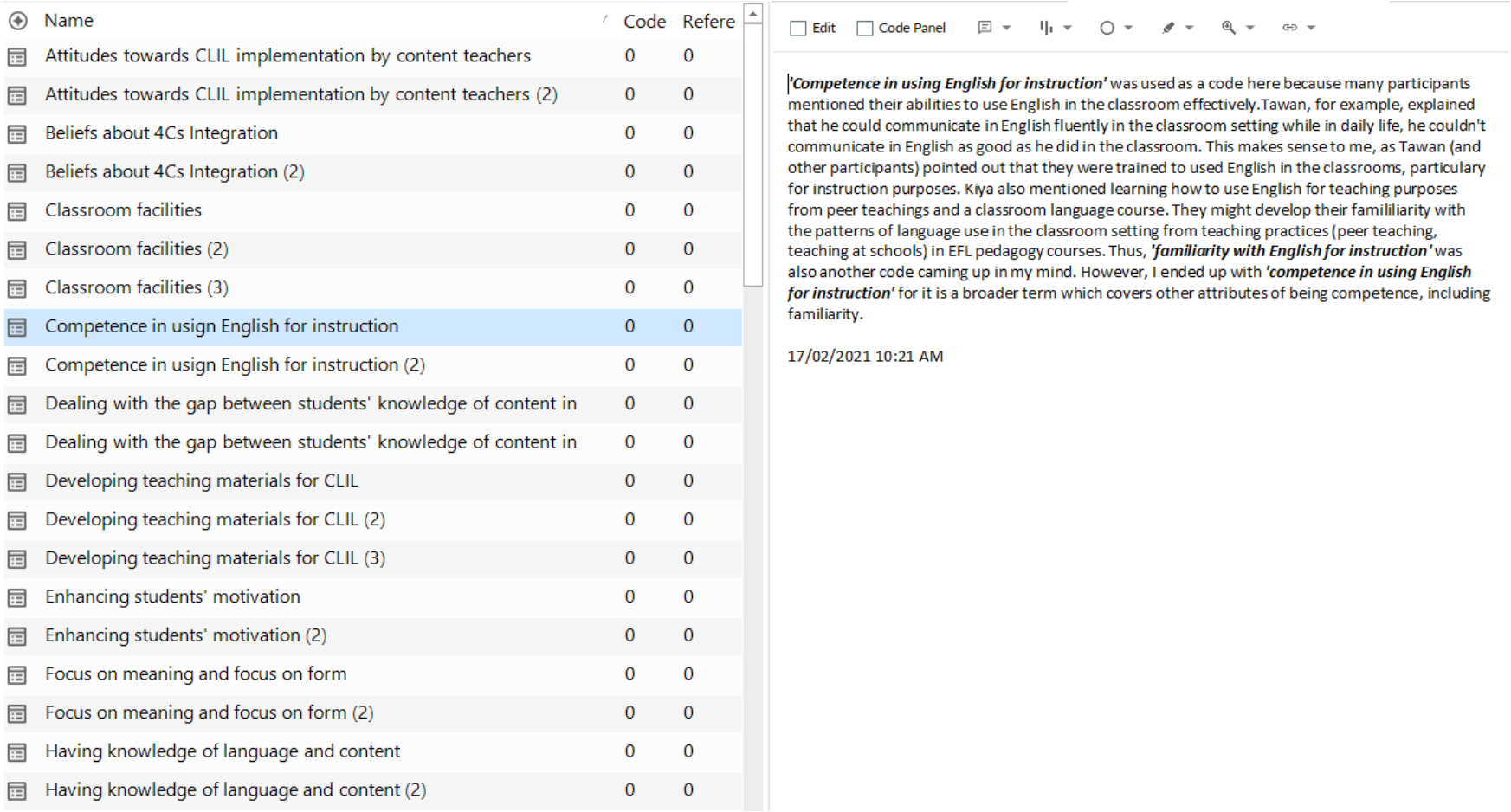
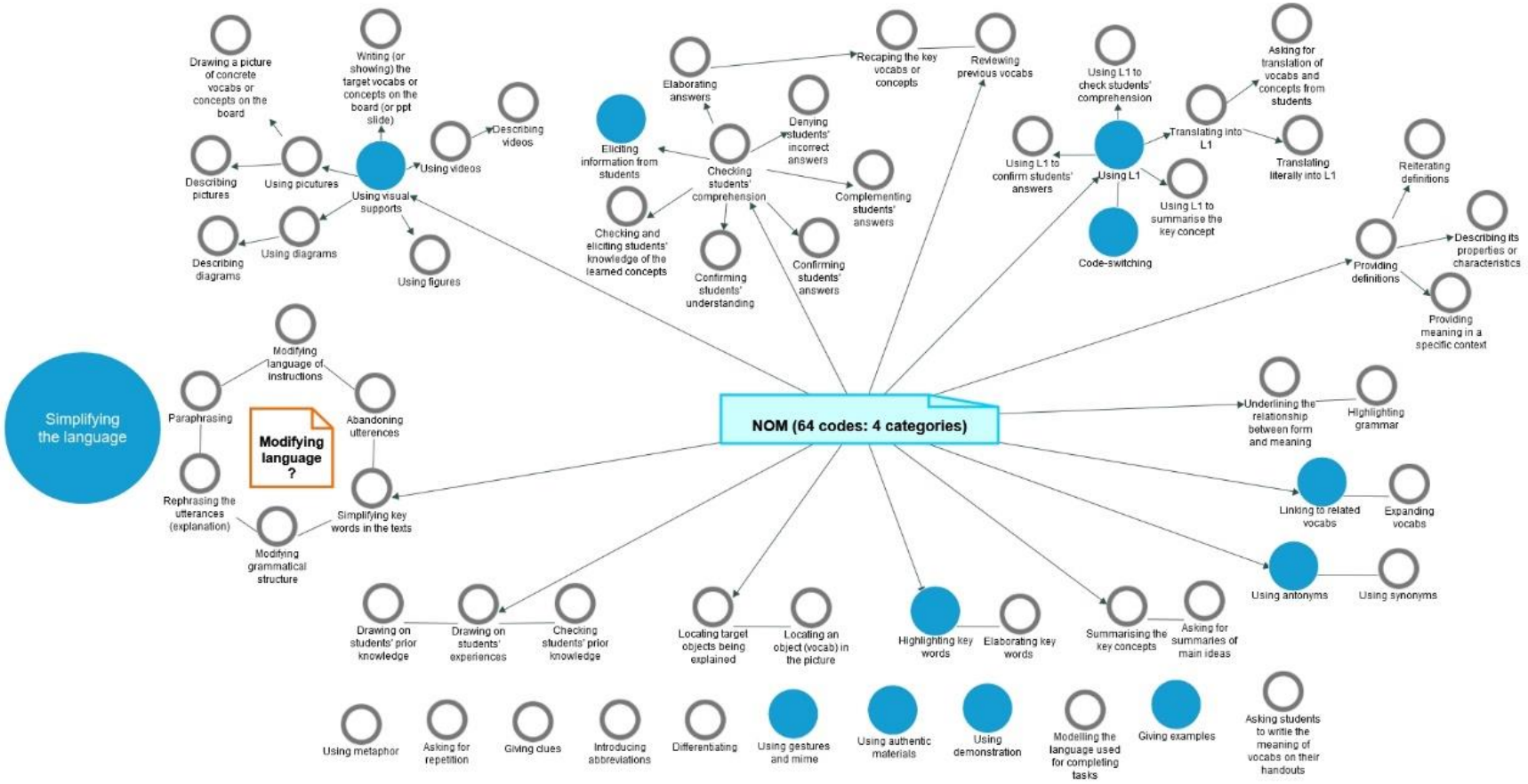


Figure 7

NoM focused-coding map

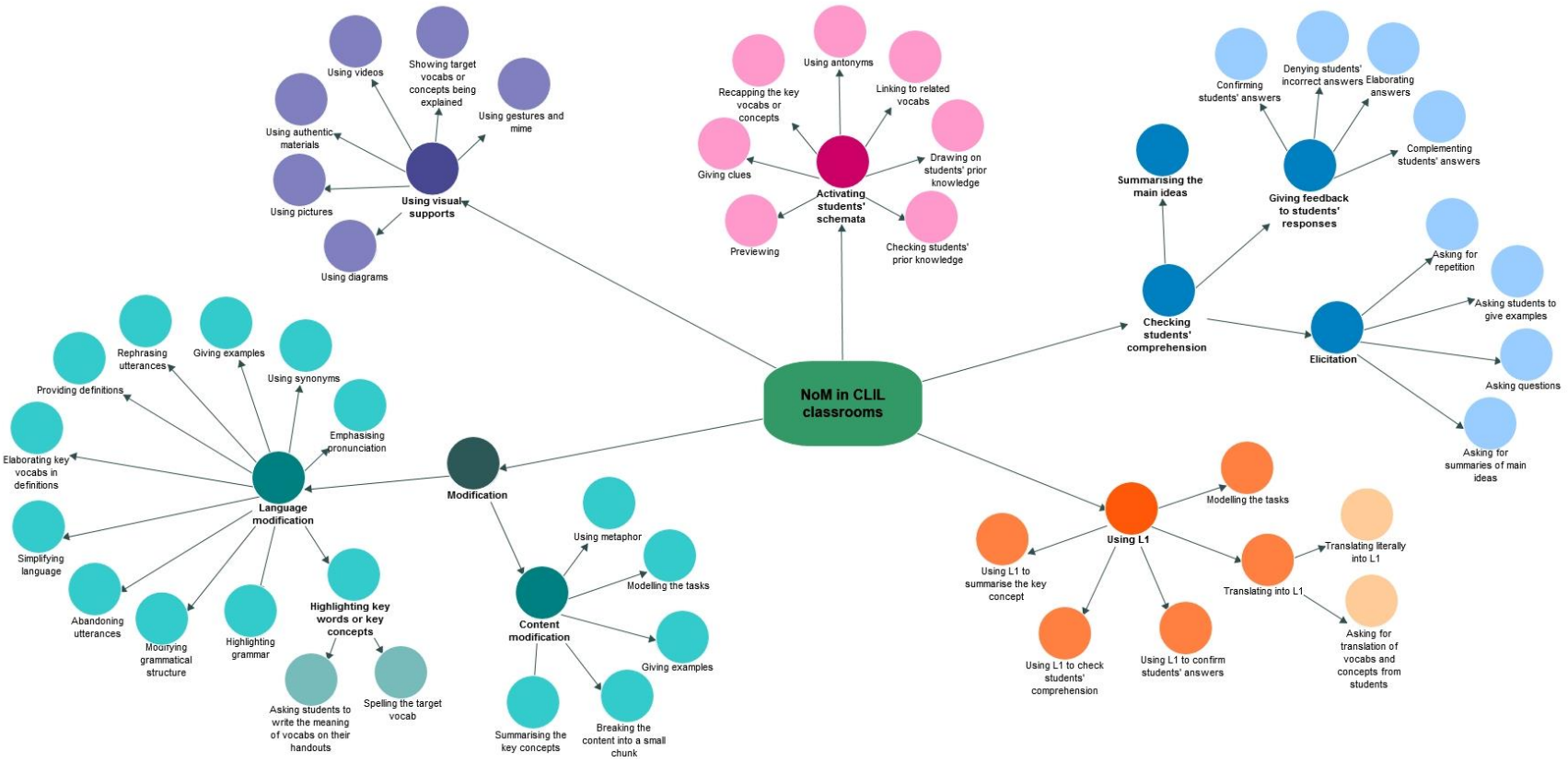


Step 3: Theoretical coding

The primary objective of this phase was to develop conceptual categories. Hadley (2020) suggests focusing on 10 to 15 focused codes that are most representative of the investigated phenomenon. Drawing on the focused coding map, I refined the codes and reorganised them into categories according to my conceptual interpretation as well as the participants' interpretations of their NoM practices and beliefs associated with effective CLIL implementation. These processes of developing conceptual categories involved returning to the entire dataset from observational and interview transcripts to check the accuracy and appropriateness of the codes and categories. Furthermore, as Hadley (2020) suggests, I searched for the related literature to seek information that describes the codes, categories, and relationships between them. Subsequently, I confirmed the codes and categories which yielded rich supporting data related to NoM and teachers' beliefs regarding effective CLIL implementation (Hadley, 2017). Then, I renamed and defined the confirmed codes and categories. At this phase, defining referred to the interpretation of what the codes and categories were about (Braun & Clarke, 2006). This helped identify what aspects of NoM and teachers' beliefs each conceptual category revealed. The codes with similar definitions, for example, paraphrasing and simplifying which were defined as 'to make the conveyed messages simpler', were combined and renamed. Then, the developed codes were re-categorised. Finally, I created conceptual maps derived from the confirmed codes and categories to illustrate the pre-service EFL teachers' NoM in CLIL (see Figure 8) and their beliefs regarding effective CLIL implementation.

Figure 8

NoM conceptual map



3.8 Validity and trustworthiness

Conducted under the interpretive paradigm, this multiple-case study aimed to seek an in-depth description of CLIL practice in Thailand from the perspectives of Thai pre-service EFL teachers. The quality of qualitative research based on trustworthiness encompassing credibility, transferability, dependability, and confirmability (Buchbinder, 2010) was taken into account to ensure the quality of this multiple-case study. Mirhosseini (2020) suggests that researchers ensure "the theoretical depth of researcher's understandings, the contextual rootedness and relevance of findings, and the meaningful inclusion of the subjectivities of researchers and participants in the process of research" (p. 180). To maximise the trustworthiness of this multiple-case study, I employed member checking and triangulation and provided sufficient contextual description of my research. I also sought feedback and approvals to undertake the research project from the proposal confirmation panel and research ethics committee to gain the credibility of the research.

Member checking is the practice of returning collected data, including interview transcripts and research manuscripts, to the participants of the study (Schwartz-Shea & Yanow, 2012) for them to check the accuracy of the transcribed data (Cho & Trent, 2006). Widodo (2014) suggests that employing member checking in research can increase the rigorousness and credibility of data analysis and interpretation. After transcribing the raw data from semi-structured and stimulated recall interviews, I sent a copy of both interview transcripts to the six participants asking them to review the transcribed data for respondent verification. This allowed the participants to comment on and confirm whether their articulated words accurately aligned with their actual intention (Shenton, 2004), as well as to validate the accuracy of my transcription of their spoken accounts. I received the participants' comments suggesting minor revisions, including adding clarification of some of the participants' accounts, changing word choices, and correcting typos. I subsequently revised the transcripts according to the participants' comments prior to data analysis.

Furthermore, triangulation was applied in this multiple-case study to develop the accuracy of my interpretation and to avoid misconceptions (Mirhosseini, 2020). In qualitative language education research, the most widely applied form of triangulation is the use of multiple methods of data collection and multiple sources of data (Mirhosseini, 2020). I employed multiple data collection techniques to generate different types of data. Both observational and interview data were used to cross-check against and complement one another. I also triangulated via data sources; in other

words, data from individual cases were checked against other cases (Shenton, 2004). These comparisons helped minimise bias and enhance the accuracy of data interpretation and analysis. Another form of triangulation is researcher triangulation. Mirhosseini (2020) claims that researcher triangulation can be carried out via supervisor involvement, either throughout or at certain phases of research. I met with my supervisors to discuss research activities, including data collection and analysis, my developing ideas, as well as my interpretations of the data throughout my research project. By doing so, the appropriateness and quality of research methods for data collection, data analysis and interpretation, and presentation of the research were maximised.

Generalising the findings of a case study can be challenging because it is context-based (Timmons & Cairns, 2010) and thus transferability is used as an indicator of generalisability in qualitative research (Nowell et al., 2017). Contextuality is central to interpretive research (Schwartz-Shea & Yanow, 2012), and "preserving such contextual relevance at all stages of research" (Mirhosseini, 2020, p. 183) is one way to address transferability. Shenton (2004) suggests that researchers provide sufficient contextual description of the phenomenon under study, including the research site, to enable readers to make a comparison between the phenomenon in the provided context and other contexts. In reporting this multiple-case study, the description of the research context, including the background of CLIL and EMI in Thailand, participants' profiles together with their CLIL background, and the observed lessons, were provided in an attempt to ensure transferability.

Finally, approvals to carry out the research project can promote the credibility of the research (Shenton, 2004). Prior to undertaking fieldwork, I received approval and constructive feedback associated with my research design from the proposal confirmation panel. The ethics application for my research project was approved by the Ethics committee (see Appendix 1). I also conducted a pilot study to ensure that the data collection methods were feasible and that they would yield data related to the research questions. All changes made to research methods during data collection were also approved by the Ethics committee before applying to the fieldwork (see Appendix 2).

3.9 Ethical considerations

As this multiple-case study involved teachers as participants, "to preserve their dignity as human beings" (Cohen et al., 2018, p. 112), ethical issues associated with human research were taken into account, and I adhered to the regulations on ethical conduct in human research and related activities set out by the University of Waikato. Research ethics approval from the Division of Education

Ethics Committee was received prior to conducting this research (see Appendix 1). The ethical considerations addressed in this multiple-case study include: informed consent (Section 3.9.1), anonymity and confidentiality (Section 3.9.2), harm to participants (Section 3.9.3), and the right of withdrawal (Section 3.9.4).

3.9.1 Informed consent

At the initial stage of the research, researchers need to seek official permission to conduct the research in the target institution (Cohen et al., 2018). Thai organisational structure is generally hierarchical. Approval of any activities needs to be gained firstly from the top of the organisation (Cohen et al., 2018). Initially, I sent information letters and consent forms to the key stakeholders, namely the Dean of EDU at the participants' university (see Appendix 3), the participants' Academic Advisor (see Appendix 5), and school principals (see Appendix 7) to inform them about the research and ask for their permission before approaching participants to show respect for their social roles and maintain a good relationship with them.

As this research was conducted during the participants' teaching practicum, I clearly informed the participants that their involvement in this research had no relationship to the evaluation and completion of their practicum. I also assured them that their involvement in the research was voluntary and that there would be no negative outcomes if they chose not to participate in the study. Contact information of the research team, including postal, email, and phone contact details was provided in the information letter to ensure that all lines of communication were open for the participants when they had any concerns associated with the research. The information in the letter also included the purposes of this research, the activities the participants would be involved in, the rights of the participants, anonymity, and confidentiality, use of the data, and data storage (see Appendix 9). This information was discussed in a virtual meeting to allow for questions and answers. The participants were given time to study the information outlined in the information letter until they fully understood what participation in this research entailed (Bell & Waters, 2014; Cohen et al., 2018). Then, the participants who wished to be involved signed and sent the informed consent form to me by email (see Appendix 10).

3.9.2 Anonymity and confidentiality

This multiple-case study involved collecting data by filming the participants' classrooms and digitally sharing the filmed lessons with the researcher. This could increase ethical issues

associated with anonymity (Jewitt, 2012). To ensure the participants' anonymity and confidentiality, identifying information was excluded from the interview and observation transcripts, and in the reporting of data. The names of the participants presented in the reporting of data were pseudonyms. Identifying features in the photos from the filmed lessons included in my thesis were removed and obscured. To ensure the confidentiality of digital data, the participants' information and all sets of raw data from video recordings, observation schedules, and field notes were kept private and shared via Google Drive where access was limited to the researcher and supervisors only. As for the online interviews, I assured the participants that all conversations in the interviews were kept confidential. No records in any forms were kept when the participants did not wish their conversations to be recorded.

3.9.3 Harm

My research was undertaken in two settings: the online setting in which the interviews were conducted, and the classroom setting in which the CLIL lessons were filmed for observations. There was no physical, legal, or financial harm to participants which could result from their participation in the research in either setting. The classroom was a safe environment for the participants and the lessons did not involve activities with the risk of injury. However, I was aware that my former role as a lecturer at the participants' university might create a feeling of unease or fear of judgement of their teaching practice. Although they had not been students in my classes at any stage, they were aware of my association with the university, and they might be worried that their observed lessons would be reported to their academic advisor and/or their teacher supervisor which could affect the assessment of their teaching practicum. To mitigate this potential harm to participants, before data collection, I explicitly communicated with them that the purpose of classroom observations was to explore CLIL teaching practices in Thai school settings and to learn from them. In addition, I informed the participants that I had absolutely no authority to judge their teaching practice and that all data collected were kept confidential. In other words, while undertaking my doctoral research at the University of Waikato, I was not involved in any teaching, assessment, or supervision at the participants' university.

3.9.4 The right to withdrawal

I assured participants that their participation was voluntary and ensured that they were comfortable in declining to participate. Participants were advised prior to signing the informed consent form

that they could withdraw their participation at any time by sending the signed withdrawal form to me, and that there would be no negative repercussions for doing so. I also informed them that if they chose to withdraw their participation in the middle of the data collection, no further data would be collected from them. However, data collected until that time might continue to be processed if they consented to this. This was declared explicitly in the information letter (see Appendix 9) and the withdrawal form (see Appendix 11). In this study, there was one participant, who was unable to participate in the second lesson observation due to his time constraints. Before carrying out the stimulated recall interview with the participant, I reminded him of his option to withdraw. However, the participant decided to participate until the final stage of data collection, and he allowed me to use his data collected up to that point.

3.10 Chapter summary

In this chapter, I have described the multiple interpretive case study approach adopted to investigate EFL teachers' NoM practices in CLIL secondary classrooms and their beliefs regarding effective CLIL implementation within the Thai EFL context. Using an interpretive research paradigm, this multiple-case study aimed to understand language-driven CLIL practices through the pre-service EFL teachers' as well as my own perspectives. Six pre-service EFL teachers were selected to participate by purposive sampling. Three research instruments, namely a semi-structured interview schedule, a classroom observation schedule, and a stimulated recall interview schedule were constructed, piloted, and utilised in three phases of data collection, which were carried out digitally from New Zealand. The two forms of generated data, namely video recordings and written transcripts, were systematically organised and securely stored. A grounded theory approach was employed as a strategy for analysing data following Charmaz (2006) and Hadley (2017), which encompassed three stages of analysis: initial coding, focused coding, and theoretical coding. Finally, to ensure the quality of these case studies and ethics in research, trustworthiness in qualitative research and ethical issues concerning human research were taken into account.

In the next chapter, I present the findings of the three research questions regarding Thai pre-service EFL teachers' NoM strategies in language-driven CLIL and their beliefs associated with effective CLIL implementation.

CHAPTER 4 FINDINGS

This chapter presents the findings associated with pre-service EFL teachers' NoM of subject-specific terms and concepts in language-driven CLIL, and their beliefs regarding effective CLIL implementation. It deals with the findings of eleven CLIL lesson observations, six semi-structured interviews, and six stimulated recall interviews to address the following research questions:

RQ1: How do Thai pre-service EFL teachers explain and negotiate the meaning of subject-specific terms and concepts in CLIL lessons?

RQ1.1: What are the NoM strategies that the pre-service EFL teachers adopted to address difficulties concerning the explanation and students' comprehension of the subject-specific terms and concepts?

RQ2: What are Thai pre-service EFL teachers' beliefs regarding effective CLIL implementation?

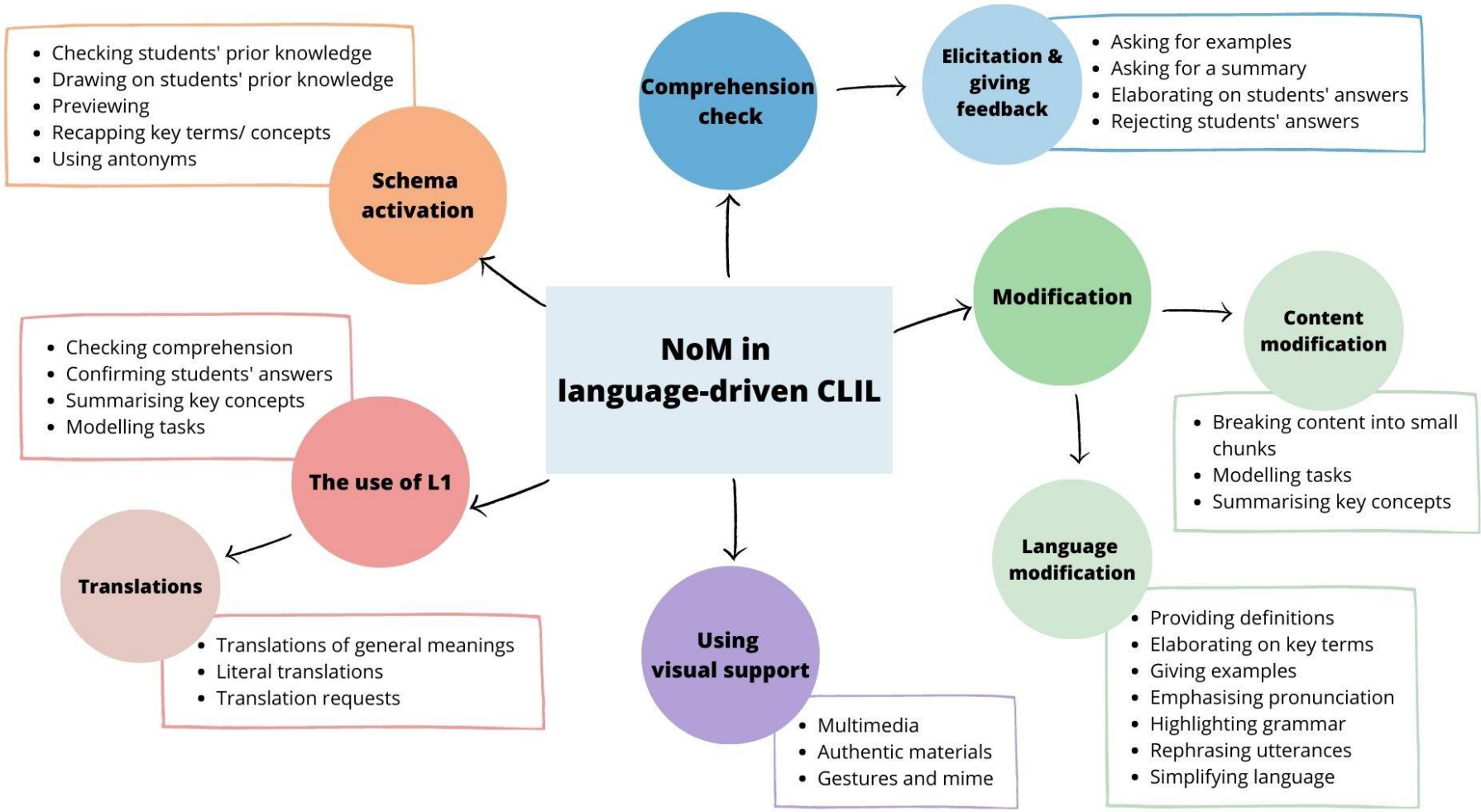
This chapter is divided into four main sections. Section 4.1 discusses the findings of RQ1 according to the principal categories that emerged from the observational data, supplemented with data from the stimulated recall interviews. Section 4.2 deals with the findings of RQ1.1. It delves into the data from the stimulated recall interviews as well as classroom observations to explore the difficulties in explaining subject-specific terms or concepts encountered by the participants and the NoM strategies they adopted to address the difficulties. Section 4.3 presents the findings of semi-structured interviews and stimulated recall interviews aiming to address RQ2. Finally, a summary of this chapter is presented in Section 4.4.

4.1 EFL Teachers' NoM strategies of subject-specific terms and concepts

This section presents five major NoM strategies that the pre-service EFL teachers utilised in their language-driven CLIL lessons to negotiate the meanings of subject-specific terms and concepts. These were: 1) students' schema activation (Section 4.1.1); 2) students' comprehension check (Section 4.1.2); 3) modification (Section 4.1.3); 4) the use of visual supports (Section 4.1.4); and, 5) the use of L1 (Section 4.1.5). The summary of the teachers' NoM strategies in language-driven CLIL is presented in Figure 9.

Figure 9

Summary of NoM strategies in language-driven CLIL



In the following sections, I discuss each strategy in detail. Excerpts from the CLIL lesson transcripts along with teachers' accounts of their NoM practices from the stimulated recall interviews are provided as illustrations. The translated data from Thai to English presented in this chapter are presented in italics while the direct quotations are presented in quotation marks. The acronyms and transcripts conventions (Sidnell, 2010) used to present observational data are presented in Figure 10.

Figure 10

Transcript conventions

(0.5)	silence, represented in tenths of a second
(.)	a 'micro-pause' of less than 0.2 of a second
((word))	descriptions of events, e.g. ((whisper)), ((pause)), and the like
( )	an indistinct utterance
[	a point of overlap onset
(word)	An utterance which indicates uncertainty on the transcriber's part but represents a likely possibility.

Note: S = student, *word* = Thai word written in English

4.1.1 Students' schema activation

To activate schema, teachers drew on or referred to students' prior knowledge to help them build up and make sense of new knowledge. In this thesis, prior knowledge refers to that which students had acquired within or beyond school before the present time. The teachers used different strategies to activate students' schemata, namely: 1) checking students' prior knowledge; 2) drawing on students' prior knowledge; 3) previewing; 4) recapping key terms or concepts; and, 5) using antonyms.

4.1.1.1 Checking students' prior knowledge

Checking students' prior knowledge involved elicitation of information related to the lesson. It helped teachers decide on how to proceed in response to students' reactions. Extract 1 illustrates how the strategy was adopted by Alpha to teach the term 'antitoxin'.

Extract 1

185	Alpha:	when you step on the nails
186		(0.2) in the nails there can be tetanus virus
187		(0.2) the tetanus can kill you in just 14 days ah 14 days
188		(0.1) it can kill you so we should use antitoxin (.) do you know antitoxin?
189	SS:	yes
190	Alpha:	what is that?
191	S1:	ยาบาดทะยัก *ya baad ta yak* ((translation: tetanus medicine))
192	S2:	ยาต้านเชื้อโรค *ya taan chuea rok* ((translation: antibiotic))
193	S3:	(0.3) ก็ฉีดให้ไม่เป็น ((translation: It is injected to prevent us from getting tetanus.))
194	Alpha:	(0.3) okay ah when you sick for example this boy ((shows a picture of a sick boy))
195		got a tetanus
196		(0.1) he's gonna die so
197		(0.1) the way he got the antitoxin is very very simple

Alpha introduced the term by providing an example of the cause of tetanus and its effect on the human body (lines 185-187). After that, he started to check students' prior knowledge of antitoxin asking "do you know antitoxin?" (line 188). This was followed by an exchange of students' opinions about 'antitoxin', for example, "ยาบาดทะยัก" (line 191), and "ยาต้านเชื้อโรค" (line 192). After the brief exchange of students' ideas, Alpha took the responses as the starting point of his explanation of antitoxin as shown in lines 194 to 197, where he carried on by showing an example of how antitoxin was used to stop tetanus.

4.1.1.2 Drawing on students' prior knowledge

Drawing on students' prior knowledge concerns an event when teachers link students' existing knowledge to the taught lesson to help them construct new knowledge. This is illustrated in Extract 2. Kiya drew on students' prior knowledge of famous places to help them learn the term 'landmark'.

Extract 2

108	Kiya:	landmark is a building or place that is easily recognised
109		((reads the definition on the screen))
110		(0.1) okay I want you guys to give me an example about landmark (.) ah which is
111		(0.1) place in Thailand
112		(0.1)
113	SS:	temple ((whisper very softly))
114	Kiya:	Phra Kaew temple ((the Temple of Emerald Buddha))
115		ah what about in New York?
116		(0.10)
117	SS:	((mumble something inaudible))
118	Kiya:	ah what about what about Paris?
119	SS:	Eiffel Tower
120	Kiya:	very good
121		(0.2) what about in Mahsarakham province?
122	SS:	(0.3) ((laugh))
123	S:	**พระธาตุนาดูน** ((*Phra Tat Nadoon* – A Buddhist stupa in Mahasarakham))
124	Kiya:	Phra Tat Nadoon very good okay

After providing a definition of 'landmark', Kiya asked students to name landmarks in Thailand (lines 110 – 111). In line 113, students replied "temple" which was a broad answer. Thus, Kiya responded by supplying a proper noun "Pha Kaew temple" (line 114). She carried on by asking students to name a landmark in New York (line 115), but she received silence as a response. In line 118, Kiya shifted to another famous city, Paris. This time, students demonstrated that they were more familiar with Paris than they were with New York, as shown in line 119 when they gave the Eiffel Tower as a reply. In line 121, Kiya localised her question by inviting students to name a landmark in their hometown. Following her question, a student articulated "พระธาตุนาดูน" (line 123), which was followed up by Kiya's confirmation of the answer (line 124).

In the stimulated recall interview, Kiya pointed out that since this map lesson involved locations and places, drawing on students' knowledge of familiar places was a helpful strategy. Kiya believed this made the lesson more authentic than using foreign places, and students appeared to be more engaged in the lesson. This is in line with Daisy's reflection in her interview that a CLIL

lesson should be localised so that it was meaningful for students. Daisy emphasised that a meaningful lesson could promote students' engagement.

> *The important thing that we should take into account is that the lesson should be linked to students' lives. I think that it is a good idea to relate a lesson to students' lives and experiences. One of the objectives of the EFL teachers is to develop students' knowledge of foreign countries' cultures. They select content from commercial textbooks which are packed with information about famous places in foreign countries and their cultures. The language that students learn from those contents is not related to their life experiences and it makes students struggle to learn the lessons. My point is when a lesson is irrelevant to their experiences, students will feel that it is not meaningful for them to learn. Conversely, students are more engaged in the lesson when they feel connected to it.*

4.1.1.3 Previewing

When previewing, teachers familiarise students with the content before teaching it. This was done by having students watch a video related to the content, listen to an audio of the content, or read the content (passage) aloud. An example is shown in Extract 3 below.

Extract 3

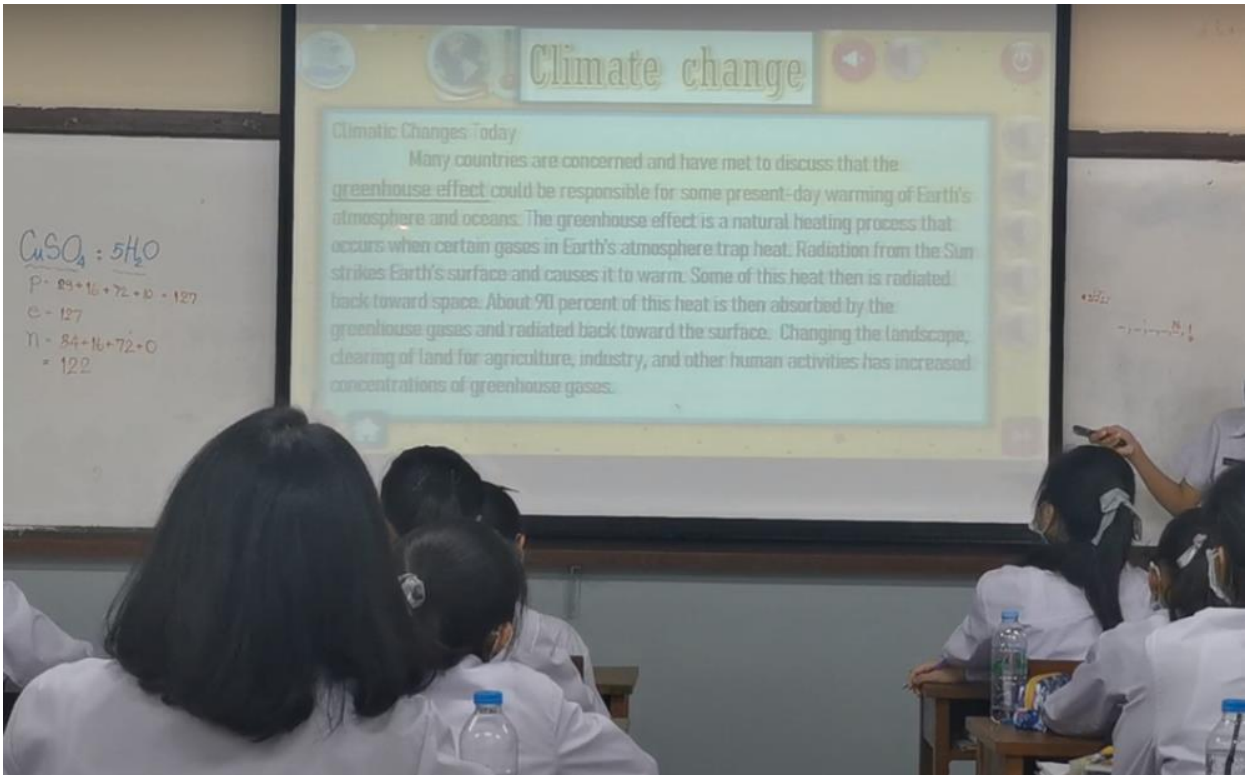
340	Roguefort:	(0.2) ah now but this time
341		(0.1) but this time I would like you to (0.1) read all the passage
342		(.) all of you (.) sentence by sentence together alright
343		(0.1) start from the first one (.) after the sound
344		(0.4) ((plays the audio of the first sentence in the passage))
345	audio:	many countries are concerned and have met to discuss that the greenhouse
346		effect could be responsible for some present-day warming of Earth's
347		atmosphere and oceans
348	Roguefort:	okay everyone together one two three
349	SS:	((read the sentence monotonously))

Extract 3 presents the previewing strategy employed by Roguefort before teaching the content of the lesson on climate change. In lines 340 to 343, students were asked to listen to the audio of the passage sentence by sentence and repeat after the audio. In lines 344 and 345, Roguefort had

students listen to the first sentence of the passage, and then she asked students to read the sentence aloud. In line 349, students read the sentence in a monotonous voice. This activity continued until all sentences in the passage were read (see Figure 11).

Figure 11

Students listening to the audio and reading the passage sentence by sentence



In her interview, Roguefort explained that the advantage of having students listen to the passage was that it offered a glimpse of the lesson which helped students guess what they would find in the passage. In addition, Roguefort reasoned that having students read the passage sentence by sentence was her technique to ensure that all students read the passage.

Alpha also used a previewing strategy to introduce the content of a lesson. His reflection on his practice is congruent with Roguefort's, which was to familiarise students with the passage. He highlighted that:

> *I wanted them to practice listening to a native English speaker rather than listening to English spoken by a Thai teacher. They could also practice their pronunciation by repeating after the audio.*

Daisy and Tawan also employed previewing in their CLIL lessons, but they considered their practice as a way to allow students to practice listening and reading skills rather than to familiarise them with the content. For example, Tawan pointed out that:

> *I wanted students to practice listening and reading skills in my class because, in an EFL context, students did not have an opportunity to listen to native English speakers talking in their daily life.*

4.1.1.4 Recapping key terms or concepts

Recapping involves a teacher reviewing a key term or concept that has been previously taught in the same lesson. The aim of recapping was to review the terms or concepts when students struggled to recall them, which affected their comprehension of the lesson being taught. An illustrative incident in which Tawan utilised recapping is shown in Extract 4.

Extract 4

204	Tawan:	(.) alright we can find an X by dividing do you know dividing?
205	SS:	no ((mumble))
206	Tawan:	dividing divide
207		(0.2) alright divide this one ((shows a vocab 'divide' and '8÷2=4' on the slide))
208		this one divide (0.1) okay divide
209		(0.2) this one multiply right multiply ((shows 'multiply' and 3x2=6 on the slide))
210		(0.2) and this one subtract (.) subtract ((shows 'subtract' and 4-2=2 on the slide))
211		(0.1) and this one we call ((shows 'plus/added' and '3+2=5' on the slide))
212	S:	add
213	Tawan:	plus (.) plus and added to

In Extract 4, Tawan recapped key terms while he was teaching students how to solve a math problem. In line 204, Tawan read a step on how to solve the math problem, and then checked students' prior knowledge of 'dividing'. Although the term 'divide' had already been taught, students did not seem to remember its meaning as evidenced in their rejection in line 205. In response, Tawan recapped the key terms (lines 207 – 213). According to Tawan's reflection in his interview, students' failure to remember the term 'divide' prompted him to recap all of the key terms.

The procedures of solving the math problem that I was explaining involved dividing the equations which meant students needed to know what divide was. But when I asked if they knew what divide meant, students could not answer. That is the reason for the quick recap of all the key terms.

Furthermore, Tawan noted that recapping was a useful strategy that helped trigger students' memories of the previous lesson.

4.1.1.5 Using antonyms

Antonyms are words with an opposite meaning to the target term. They were used by the EFL teachers to help students learn a new term. The selected antonyms were typically simpler than the target terms. An illustrative example of how antonyms were used by Sorbet is presented in Extract 5.

Extract 5

30	Sorbet:	moist what does it mean by moist?
31	SS:	ชุ่มชื้น *chum cheun* ((translation: moist))
32	SS	[หน้าแตก *naa taek* ((translation: cracked skin on the face))
33	Sorbet:	no this is moist ((points at a picture of a woman with water splashing on her face))
34	S:	moisturiser
35	Sorbet:	ah moist (.) but this is dry ah
36		((points at a picture of a woman's cracked skin on the face))

Extract 5 illustrates Sorbet's use of an antonym to teach a target vocabulary 'moist'. Firstly, he checked students' prior knowledge of 'moist', and he then received both correct and incorrect answers from students. To follow up, Sorbet showed a picture of a woman with water splashing on her face (line 33) to represent the meaning of 'moist'. He then reiterated the term 'moist' and compared it with 'dry' to facilitate students' comprehension (line 35). Sorbet commented that using pictures was the easiest way to support students' comprehension of vocabulary, but it did not always work. Sometimes, he needed to use different strategies to teach a vocabulary item.

Although Alpha did not use antonyms in his lessons, he shared a similar opinion about an advantage of antonyms. He claimed that sometimes antonyms were the words that students already knew, and thus teachers could take advantage of this prior knowledge and select the simple antonyms that helped students learn a new term.

4.1.2 Students' comprehension check: Elicitation and giving feedback

Comprehension check refers to a situation when teachers initiated an interaction to elicit information about a taught lesson and provide feedback on students' response to ensure students' comprehension. It consists of two major strategies, namely elicitation and giving feedback. Elicitation is a teacher's strategy used to encourage students to provide information about the taught lesson to check their understanding. Elicitation strategies employed by the EFL teachers included: 1) asking students to give examples related to the taught terms or concepts; 2) asking for summaries of the main ideas; 3) asking for repetition; and, 4) asking questions. Students' responses to the teachers' elicitation were commonly followed up by: 1) teachers' feedback which was simply done by confirming students' answers when they were correct; 2) teachers' elaboration on the answers if they involved complex ideas or needed clarification; or 3) teachers' rejection of the answers when they were incorrect or irrelevant to the taught lesson. These strategies are discussed in combination with one another in the sections below.

4.1.2.1 Asking students to give examples

This section provides an illustrative example of how Kiya checked students' comprehension by asking them to give an example related to the taught vocabulary and confirming the student's answer as a means of giving feedback. This is shown in Extract 6.

Extract 6

13	Kiya:	(0.1) so I want you guys to
14		(0.2) give me an example about the surface
15		(0.3) how about er (.) the surface of fruits
16		(0.2) surface of (0.1) orange (.) surface of (.) strawberry like this
17		ah look at this picture ((points at a picture of the surface of the moon))
18		(0.1) here is the surface of
19		(0.2) of
20	S1:	(planet) ((whispers))
21	Kiya:	of
22	S2:	moon ((whispers))
23	Kiya:	ah the moon

In lines 13 and 14, Kiya asked students to give an example of the term 'surface' to check their comprehension. She paused for three seconds and then began to provide the example by herself as there was no response from the class (lines 15 – 16). She then used a picture to elicit information from them (lines 17 – 19). S1 did not answer correctly in her first attempt (line 20) so Kiya continued eliciting information from other students by repeating "of" (line 21) to allow students to supply the answer. S2 replied "moon" softly (line 22), which was then followed up by Kiya's confirmation of the answer (line 23).

In her stimulated recall interview, Kiya pointed out that when teaching vocabulary, she normally asked students to give examples to check their comprehension. Yet, she needed to find an alternative way because the strategy did not work successfully with this class.

> *According to my first attempt, I could tell that students did not understand what surface meant, and they would not be able to give me an example. So, I ended up providing examples by myself. Then I made a quick decision to ask questions instead of trying to get students to come up with their examples.*

In contrast, Tawan asked students to give examples related to the taught vocabulary and found the strategy helpful. He pointed out that:

> *When I taught the term 'proportion', I had no idea how to make the definition easy for students to understand. I had planned how to explain and I was sure that it would work. But when it came to the real class, students did not seem to understand. I thus asked them to give examples of proportion to check their comprehension and it turned out to be successful.*

However, Tawan noted that this strategy might not be effective when used with another group of his students who had very low English proficiency.

4.1.2.2 Asking for a summary of the main ideas

Extract 7 illustrates how Roguefort asked students for a summary of the main ideas to check their comprehension of climate change. It also demonstrates the use of asking questions, asking for repetition, and confirming students' answers as a response to students' reactions.

Extract 7

141	Roguefort:	(0.1) er can you (0.1) er can you conclude from the
142		(.) can you summarise from the passage and tell me
143		(0.1) the causes of climate change?
144		(0.1) okay could anyone can tell me?
145		(0.2) just one just one ah one by one or
146		(0.2) you can think about
147		(0.1) you can think about outside the passage
148		(0.2)
149		the causes of climate change
150		(0.2) อะไรทำให้โลกร้อนมีอะไรบ้าง ((translation: What causes global warming?))
151	S1:	( )
152	S2:	cut tree cut tree
153	Roguefort:	yes louder please
154	S1	cut tree
155	S2:	[cut tree
156	Roguefort:	cutting
157		(0.1)
158	S1:	cut tree
159	S2:	[cut tree
160	Roguefort:	trees very good anything else

Initially, Roguefort asked students to summarise the main idea of climate change that they had learnt from the passage (lines 141 – 144), but there was no reply. She then asked students to provide only one cause of climate change to make it easier to answer (line 145). However, her attempts were not successful; as can be seen, she used questions, rephrasing, and pauses to encourage students to talk (lines 146 – 149). Roguefort translated her questions into Thai (line 150), and students began to respond. In line 152, S2 replied "cut tree cut tree", which was followed up by Roguefort asking S2 for a repetition of his answer (line 153). In response to Roguefort's feedback, S1 and S2 repeated the answer together (lines 154 – 155). Rogefort repeated a part of the answer "cutting" (line 156) as a signal for the students to repeat their answer for the second time to confirm their answer, hence S1's and S2's repetition of the answer (lines 158 – 159). Finally, Roguefort confirmed with the class that the answer was correct by giving a compliment to both students and

continued eliciting more information from the class (line 160). In her stimulated recall interview, Roguefort commented on her decision to ask students to summarise the main idea of the passage as follows:

> *The students actively participated in the lesson because this class was science programme students. They had background knowledge in science and the taught lesson. Sometimes, students clarified a science concept for me and their peers. So, instead of summarising the lesson for them, I asked the class to summarise it.*

Roguefort also clarified that the students had learnt about climate change in Thai. In her class, they connected their knowledge in Thai to the same knowledge taught in English. Once the students decoded the concept in English, they began to express their ideas to the class.

4.1.2.3 Elaborating on students' answers

Another example from Roguefort's lesson is presented in Extract 8, which illustrates how she provided feedback on the students' responses by elaborating on their answers. In this extract, Roguefort was still checking students' comprehension of climate change, but the focus was on the 'greenhouse effect'.

Extract 8		
182	Roguefort:	anything else? ((points at 'greenhouse effect' in the passage))
183	SS:	greenhouse effect
184:	Roguefort:	yes very good
185		(0.1) when the carbon dioxide is cover cover our earth right and then
186		(.) the heat you see the heat
187		((shows a picture of solar radiation striking to the earth's surface))
188		(0.1) when it strike to the earth's surface and
189		(.) when the it cover with the carbon dioxide (do you think) it can radiate back
190		(0.1) or it stay here? ((points at the earth's surface))
191		(0.1)
192		look at the picture ((finds a picture to show to SS))
193		(0.30) okay can you see the the
194		((shows the picture of solar radiation striking to the earth's surface))
195		(0.1) มองเห็นไหมลูกวงแหวนตรงนี้มันจะเป็นแบบ เหมือนมีกรอบอะไรคลุมโลกไว้นะลูก
196		((translation: Can you see the ring of the heat? It's like there's something
197		covering the earth's surface.))
198		(.) these are the
199		(0.1) what does it called green
200		(0.1)
201	SS:	greenhouse effect
202	Roguefort:	[greenhouse effect

In line 182, Rogefort elicited information relating to climate change from students and pointed at the 'greenhouse effect' as a clue. Following the signal, students replied, "greenhouse effect" (line 183) which was then confirmed by Roguefort in line 184. Subsequently, Roguefort elaborated on the students' answer 'greenhouse effect' along with a picture to facilitate visualisation (lines 185 – 187). She asked students if the solar radiation was reflected into space or travelled through the earth's surface (lines 188 – 190) to check their comprehension of the concept. The class was quiet for a second (line 191) before Roguefort decided to find another picture to help students visualise the concept (lines 192 – 193). After approximately 30 seconds of seeking a picture, Roguefort projected an animated picture illustrating the solar radiation traveling to the earth's surface and

reflecting into space (line 194), drew students' attention to the picture, and continued elaborating on the 'greenhouse effect' (lines 195 – 197). Finally, she asked for a repetition of the answer from students again to highlight the term (line 199), which was then followed by students' repetition of the 'greenhouse effect' (line 201).

When asked why she showed the pictures and elaborated on the greenhouse effect to students, Roguefort explained that one of her reasons was to draw students' attention to the main focus of the lesson.

> *Students' answers, for example cutting the tree, were correct, but I want them to get to the main point of the lesson. That's why I pointed at the 'greenhouse effect'.*

Roguefort also reasoned that the concept of the greenhouse effect was complicated when taught in English and thus she needed to ensure that students understood the concept. She explained that:

> *I think the concept of the greenhouse effect was difficult because the concept involved a scientific theory and was written in scientific terms. Several of the terms were unfamiliar to me. Some students were not familiar with the terms at all. I was worried that students won't understand the concept.*

4.1.2.4 Rejecting students' answers

The final comprehension check strategy is teachers' rejection of students' answers as presented in Extract 9. It was used as feedback on students' inaccurate information.

Extract 9

192	SS:	we find an X by dividing both sides of the equation by ((read the sentence on the slide))
193	Tawan:	by (.) by ((points at the slide))
194		(0.3)
195	S1:	twenty-six over ten
196	Tawan:	by
197:	SS:	by (.) twenty-six over ten
198	Tawan:	no we divided both side by
199		(0.2) by
200	SS:	ten
201	Tawan:	ten okay

In Extract 9, Tawan was explaining to students how to find *X* in: $\frac{26}{10} = \frac{10x}{10}$. In line 192, students read the sentence shown on the projection screen. Then, Tawan repeated "by" to elicit the answer from the students (line 193). The class was quiet for three seconds (line 194) before S1 articulated an answer (line 195). After that, Tawan repeated "by" for the second time (line 196) to implicitly tell students that the answer provided by S1 was incorrect and that students should keep answering. The class might have interpreted Tawan's repetition of 'by' as the teacher's repetition request. Thus, in line 197, students repeated the answer as a response. Subsequently, Tawan explicitly denied the students' answer (line 198) so that they came up with a new answer. After a few seconds, students provided another answer "ten" (line 200) and followed by Tawan's repetition of their answer (line 201) to confirm with the class that their answer was correct.

4.1.3 Modification

Modification is a strategy utilised to simplify and clarify the target terms or concepts to facilitate students' comprehension. It is classified into two types: 1) content modification; and 2) language modification.

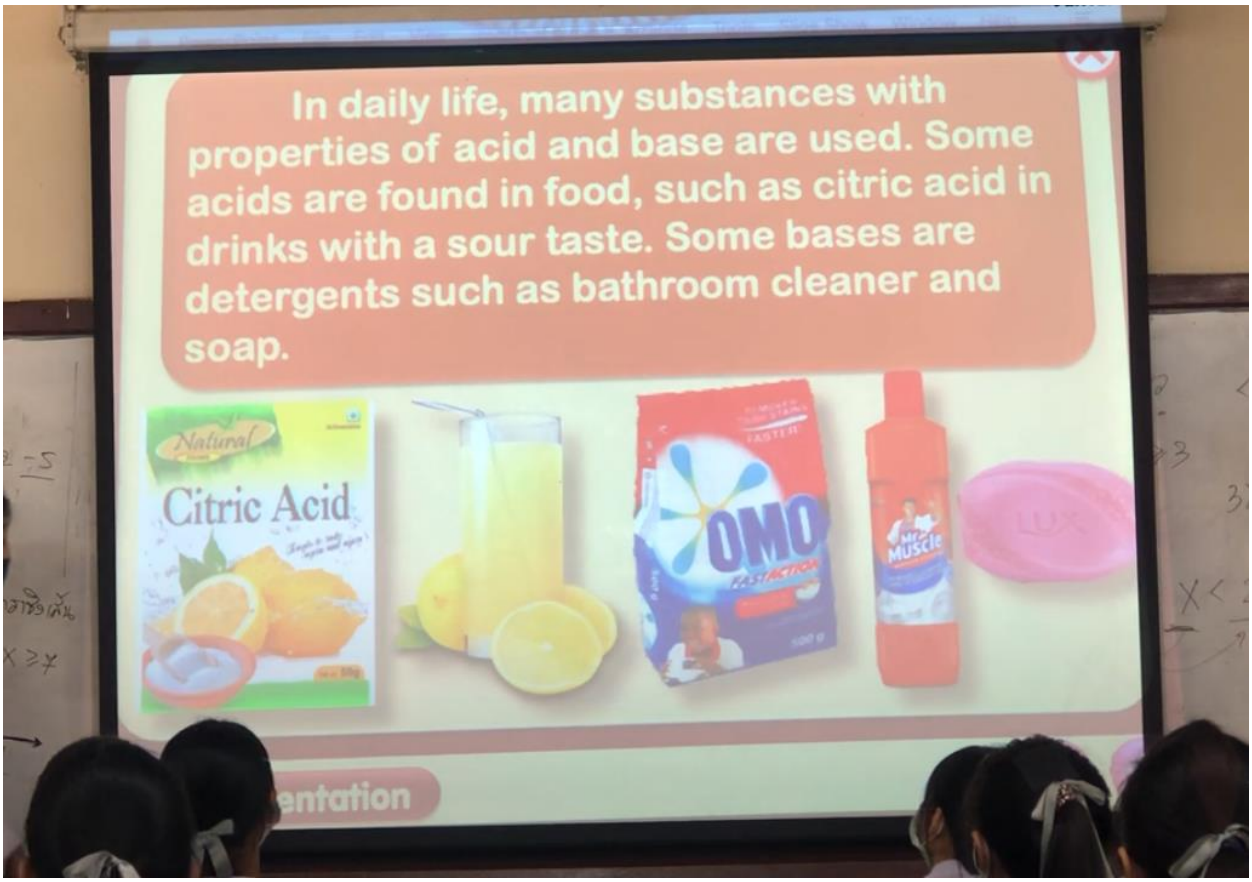
4.1.3.1 Content modification

Content modification aimed to make content more accessible to students. The EFL teachers modified the taught content by 1) breaking the content into small chunks; 2) modelling the tasks; and, 3) summarising the key concepts.

Breaking the content into small chunks. When teaching the content of the lesson, all EFL teachers split the content, which was normally a long passage, into small chunks, either at a sentence level or a paragraph level. During teachers' explanations, these chunks of texts were shown to students along with pictures or short video clips on a projection screen as shown in Figure 12 to facilitate students' understanding of the texts.

Figure 12

A slide showing a chunk of text along with pictures in Sorbet's class



In Extract 10, Sorbet was teaching a topic called 'acids and bases in daily life'. He explained one short paragraph of the content at a time. Each paragraph was shown on the projection screen along with pictures to facilitate students' comprehension (see Figure 12).

Extract 10

76	Sorbet:	((shows the second paragraph of the passage on the slide))
77		in the second paragraph
78		(0.2) it says that in your daily life you can see the acids and base okay for example
79		(0.1) citric acid (0.1) found in something (or the) drink that is very sour
80		(.) okay for example lemonade ((points at a picture of lemonade on the slide))
81		(0.1) and (0.1) some can be found in the detergent detergent (.) detergent okay
82		(0.1) such as ((grabs a bottle of bathroom cleaner and shows to SS))
83		(0.2) this one bathroom cleaner

In line 77, Sorbet introduced a second paragraph and explained it sentence by sentence (lines 78 – 79). In line 80, Sorbet took lemonade as an example of the drink with a sour taste, in which citric acid could be found, by showing a picture of a glass of lemonade. This was followed by his explanation of the last sentence in the paragraph in which he showed a picture of a pack of detergent (line 81) and held up a bottle of bathroom cleaner (line 82) as examples of bases. In his stimulated recall interview, Sorbet explained his purpose for explaining the content paragraph by paragraph was to prevent students from being lost in the long texts. He explained that:

> *I split the content into a short paragraph because showing all paragraphs at once made it difficult for students to follow the lesson. Explaining one paragraph at a time and asking a few questions helped ensure that students were following.*

Roguefort and Tawan also pointed out that they divided the content of their lesson into short paragraphs, and sometimes explained it sentence by sentence depending on students' level of English proficiency. Tawan explained that:

> *Students with a low level of English proficiency could be demotivated by a long English passage. To facilitate students' learning, I needed to split the passage into small chunks and explained each chunk of text with pictures.*

Alpha employed the same strategy when teaching the content of his first CLIL lesson. His aim was for students to learn the meaning of each sentence and key terms in the texts. He emphasised that:

> *In the first lesson, I explained the content to students sentence by sentence because I wanted students to understand what each sentence meant. By doing this, students learnt vocabulary and some key terms appeared in the sentences that might be ignored If explained in a larger chunk.*

Modelling tasks. Modelling tasks refers to a situation when teachers explain and/or demonstrate to students how to complete a task. It includes modelling essential language or expressions for completing tasks. Basically, prior to having students complete a task, all EFL teachers projected a PowerPoint slide of task instructions and explained it verbally in English. When tasks involved scientific experiments, the teachers demonstrated the experiments either by teachers themselves or by showing a ready-made animation or video.

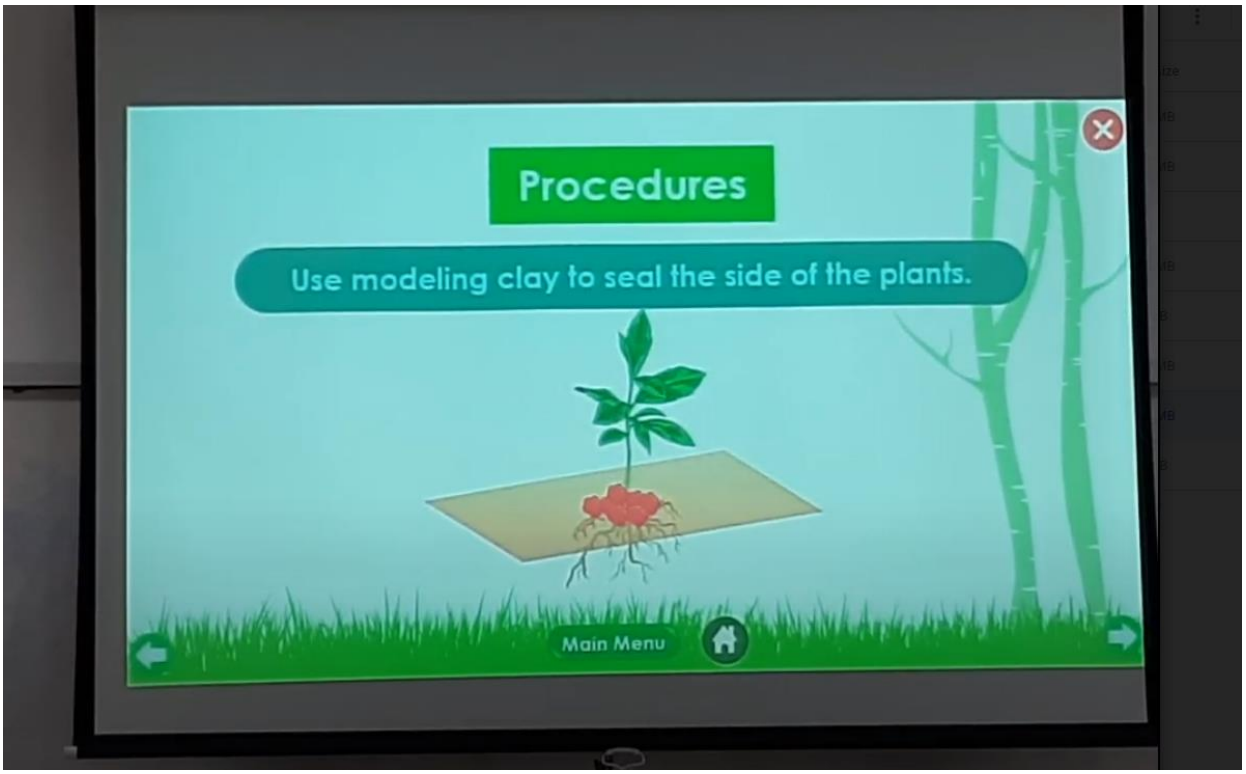
Extract 11 is an illustrative example of Alpha's combination of a ready-made animation and a teacher's demonstration to show the experiment procedures to the class. In lines 228 and 229, Alpha read the instructions and checked whether students knew the word 'seal' while an animation of the procedure was playing on the projection screen (see Figure 13).

Extract 11

228	Alpha:	and then you need to seal (.) seal you know the word seal?
229		((shows an animated picture on PPT))
230	SS:	ปิด *pid* ((translation: close/ cover)
231	Alpha:	yes ah seal the seal the
232		(0.1) the side here with ((holds the plant up and shows to SS))
233		(0.1) modelling clay (.) what is modelling clay?
234		((grabs a pack of modelling clay to SS)) this is modelling clay
235		(.) seal the side seal the side here
236		(.) make sure that the air cannot get in (.) ah the air
237		(0.2) and then you need to put ah (.) the cardboard into the bottle
238		(0.1) and make sure that
239		(.) the root here ((holds a plant in his hand and points at its roots))
240		(.) is in the water ( ) water (.) so that the root can get water ((puts the plant down))
241		(0.3) after that you need to (.) cover cover the plant with the
242		(0.1) plastic bag (.) cover the plant with the plastic bag and tie
243		((demonstrates to SS how to cover the plant with a plastic bag))

Figure 13

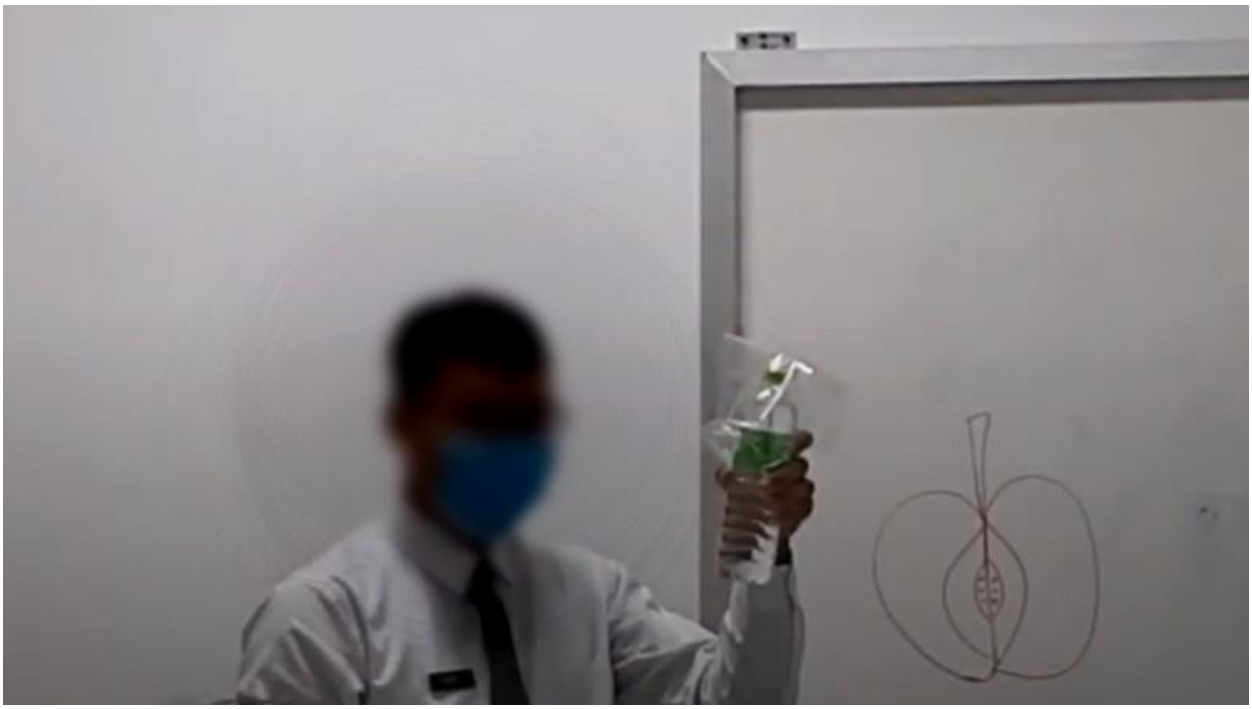
The animation of the experiment procedures



In line 232, Alpha carried on by locating ‘the side’ of the plant and then introduced the material ‘modelling clay’ used for sealing the side of the plant by showing a pack of modelling clay to the class (lines 233 – 234). Alpha continued explaining each procedure accompanied by a clarification of key terms or materials, for example, identifying the roots of the plant (line 239). Finally, he read the next procedure of the experiment (lines 241 -242), and demonstrated to the class how it was done (line 243), as shown in Figure 14. The demonstration carried on until the last procedure of the experiment.

Figure 14

Alpha's demonstration of how to cover the plant with a plastic bag



Alpha reflected that modelling the task helped students carry out the experiment according to the set procedures correctly. He explained that:

> *Before the experiment, I introduced all of the materials to the students to make sure that they knew what was involved in each procedure. Then, I displayed the animation of each procedure to the class so that they could see how it was done. I also demonstrated to the class myself using the materials they would use in the experiment. These made the procedures easy for students to follow as I observed that during the experiment, students could follow the procedures correctly.*

Daisy expressed similar opinions when discussing modelling tasks. She agreed that a demonstration was crucial when it came to assigning tasks, especially the tasks which involved an experiment. She highlighted that:

> *A demonstration was necessary, especially for a science experiment. Students would be able to use the equipment and follow the experiment procedures correctly if the teacher demonstrated how it was done step by step using the equipment and materials to be provided to the students.*

Summarising key concepts. In contrast to breaking the content into small chunks, which focuses on explaining the content at the sentence or paragraph level to support explicit language learning and content learning, summarising key concepts places an emphasis mainly on the key ideas of the passage. It was employed largely to facilitate students' comprehension of the main content of the lesson, rather than the language.

Figure 15

Alpha summarising the key concepts of vaccine and antitoxin

Extract 12 illustrates how Alpha explained his science lesson by summarising the key concepts of the lesson. In this lesson, Alpha used mind maps and pictures to show the processes and types of immunity, as illustrated in Figure 15.

Extract 12		
205	Alpha:	in vaccine there are a lot of pa (.) pathogen
206	SS:	[pathogen
207	Alpha:	ah in the vaccine we inject ah
208		(0.1) the vaccine to human or the horse and then we wait we wait until
209		(0.1) the horse and human produce antibody
210		and then we take the antibody from our body or from the horse body
211		(0.2) and then we inject (.) this is we call antitoxin
212		antitoxin is full of antibody
213		(.) but the vaccine is full of pathogens

In line 205, Alpha identified the key component of the vaccine. In lines 207 to 211, he continued by explaining how antitoxin was produced. Finally, Alpha summarised the key concept by highlighting the key characteristics of antitoxin (line 212) and vaccine (line 212). Alpha reflected on his teaching practice which was different from what he did in his first lesson. He explained that:

> *In this lesson, I summarised the key concepts because I wanted students to understand the concept of the lesson rather than the meaning of each sentence in the passage. Moreover, as the lesson was about four types of immunity, I think explaining the main ideas of each type and creating a mind map to summarise the key concepts of the lesson worked well to facilitate students' comprehension.*

While summarising the key concepts facilitated students' comprehension more effectively than breaking the content into small chunks, there was a drawback to doing it. Alpha pointed out that as its purpose was not to underline the meaning of words and sentences in the passage, students' language learning could be compromised.

In her lesson two, Kiya also paid attention to summarising the key concepts of the lesson, and she explained that the complexity of the content and time were two main factors affecting her practice.

> *One factor was that the content of the base was very complex and some information was not necessary for completing the task. Another factor was the time constraint. I could not cover all of the details within a limited time. Thus, I concentrated largely on the main ideas of the lesson.*

4.1.3.2 Language modification

Language modification refers to the strategies that the EFL teachers adopted to modify the target language, namely the key terms, sentence structures, and teachers' explanations, to make the lessons comprehensible. The EFL teachers modified the target language by: 1) providing definitions; 2) elaborating key terms or concepts; 3) giving examples; 4) emphasising pronunciation; 5) highlighting grammar; 6) rephrasing utterances; and, 7) simplifying language. These are demonstrated in the sections below.

Providing definitions. Definitions refer to statements describing key terms, namely characteristics, functions, and manners. In this study, the definitions were descriptions of the key terms, commonly retrieved from dictionaries rather than from teachers' own words. The examples of how definitions were used as a part of key terms teaching are demonstrated in the Extract 13.

Extract 13

1	Alpha:	what is pathogen (.) what is the pathogen?
2		(0.2) can anyone tell me what is a pathogen?
3		(0.2) ah I give you example ((shows a picture with vocab 'viruses'))
4		viruses are pathogen
5		(0.2) ((shows a picture with vocab 'bacteria')) bacteria are pathogens
6		(0.3) ((shows a picture with vocab 'fungi')) fungi are pathogens
8		(0.1) so what does the word pathogen mean?
9		(0.3) pathogen is a small thing a small thing (.) that when (come in) to your body ( )
10		into your body (0.1) you'll feel sick
11		(0.2) anything that make you sick we call
12		(0.2) ((points at the word 'pathogen' on the slide))
13		pathogen ah pathogen (.)
14		and it can be chemical chemical can be phatogens or viruses can be (.) pathogens
15		(0.1) bacteria can be pathogens (.) anything that make you sick we call pathogen

Extract 13 illustrates Alpha's use of a definition to explain 'pathogen' to the class. Firstly, he tried to elicit from students what pathogen was by asking questions and drawing on vocabulary related to pathogens, namely viruses (line 4), bacteria (line 5), and fungi (line 6). As Alpha received no response from the class, he began to explain the term to the class by providing its definition (lines 9 – 15).

As English definitions of key terms were commonly shown to the class when teaching the terms, the participants were asked to share the resources of the retrieved definitions. The resources that the six participants identified as their main resources were online dictionaries, namely the Cambridge dictionary, Oxford dictionary, and Longman dictionary. Alpha explained that:

> *Most definitions shown in my lessons were taken from the Cambridge dictionary and Longman dictionary. I compared the definitions from these two resources and selected the simpler ones. The Oxford dictionary was also one of my choices.*

Similar to Alpha, Roguefort suggested that she searched for definitions in the Oxford online dictionary together with other resources if the definitions provided in the Oxford dictionary were too complicated. Kiya pointed out that the length and the language used in the definition were her selection criteria. The chosen definitions needed to be short and simple because students with a low level of English proficiency might find it hard to understand the long definitions. Moreover, Sorbet and Daisy highlighted that they simplified the definitions retrieved from the primary sources before using them in their classes. Sorbet explained that:

> *I chose definitions from the Cambridge dictionary and the Oxford dictionary. Some definitions needed to be simplified if there were words that might be difficult for students to understand.*

When asked to what extent the definitions facilitate students' comprehension of the key terms, the participants asserted that the effective use of definitions was dependent on students' English proficiency. For students with a low level of English proficiency, providing definitions would be effective provided that there was support from other resources, for instance, pictures, examples, and the elaboration from teachers. Alpha commented:

> *For my class, advanced students could understand the meanings of key terms from the provided definitions, but students with an intermediate or low level of English proficiency found it difficult for them to make sense of the key terms by just only looking at the definitions. Oftentimes, I needed to elaborate more on the terms.*

Roguefort and Daisy pointed out that definitions did not directly support students' comprehension of the key terms, but a combination of different teaching resources helped develop their comprehension. Roguefort explained that:

> *Students might not grasp the meaning of the key term right after I showed them the definition. Their understanding developed when they saw the connection between the definition and the pictures I presented on the screen.*

Daisy also indicated that the benefit of definitions depended on the types of vocabulary. She elaborated that:

> *Students might be able to understand the meaning of the key terms from the definitions when the terms were abstract. Conversely, students grasped the meaning of the concrete terms by seeing pictures. That is, showing pictures and supplementing with the definitions could support students' comprehension better than relying on only definitions.*

While most of the participants agreed that providing definitions was useful when supplementing with other teaching resources, Tawan expressed the opposite opinion. He argued that:

> *Definitions did not effectively help my students learn the key terms because they had a low level of English proficiency. In my opinion, students required a good level of English proficiency to understand the definitions. My students did not have enough vocabulary repertoire to decode the definitions. Thus, I tried not to rely on definitions when teaching key terms.*

Elaborating on key terms. An elaboration of key terms refers to teachers' explanations of the non-target terms which are essential to the understanding of the taught key terms or concepts. It was used in two situations. Firstly, the EFL teachers elaborated on the key terms that appear during the explanation of the concept to review the terms previously taught. Secondly, the teachers elaborated difficult words in definitions, which sometimes appeared to be subject-specific terms, to support students' comprehension of the key terms.

An illustrative example of elaboration of a key term is presented in Extract 14 taken from Daisy's maths lesson. She taught key terms to the class before content teaching. This was to equip them with essential terms for comprehending the lesson. The key terms were taught by providing a definition supplemented with other teaching resources as shown in Extract 13. However, key terms appeared to be complicated to understand when definitions were written up using technical terms.

In this case, the elaboration of the difficult words in the definitions came to play a role to facilitate students' comprehension.

Extract 14

8	Daisy:	prism is a three (.) three dimension
9		(.) solid (.) figure with two parallel faces called bases and lateral flat face
10		((reads the definition on the slide))
11		(0.1) three dimension ((grabs a tall cardboard box on her desk))
12		(0.2) umm (0.8) ((draws a horizontal rectangle and cuboid))
13		(0.12) okay
14		(0.2) if okay the shape if the shape have only have only (.) width and length
15		((points at the long and the wide sides of the rectangle))
16		(0.1) we call two dimen er ((looks at the definition shown on the TV screen))
17		we call two dimensional solid
18		but (0.1) if it has but if it has
19		(0.1) width (.) length (.) and (.) height ((points at the picture of the cuboid))
20		(0.2) and height (0.1) width length height
21		((writes 'w, h, l' on each side of the box to represent width, length and height))
22		we call three dimensional solid

In Extract 14, Daisy was teaching the term 'prism' to the class. She provided a definition of 'prism' by projecting it on the screen and reading it aloud (lines 8 – 10). After that, she highlighted the key term 'three dimensions' in the definition, and collected a cardboard box planning to use it to elaborate on the term (line 11). Instead of using the box, she drew a picture of a horizontal rectangle and a cuboid (lines 12 – 13). Then, Daisy elaborated on 'three dimensions' by comparing the features of the horizontal rectangle and a cuboid shown on the board. In line 14, she drew students' attention to the drawing of the horizontal rectangle, identified its key features 'width and height', and introduced a word for a figure with width and height as 'two dimensional' (line 17). Subsequently, she moved to elaborate on the target term 'three dimensions' by highlighting the key features of the cuboid "width, length, and height" (lines 19 – 20) and told the class "we call three dimensional solid" (line 22). Daisy was asked to explain what strategies she used to help students understand the term 'prism'. Daisy explained that:

> *I provided a definition to them and highlighted that 'prism' was a three-dimensional, not a two-dimensional figure. Words used in the definition, such as three dimensions, were too hard so I needed to elaborate on the key terms in the definition, otherwise, students would not be able to understand what prism was.*

When asked how Daisy elaborated the terms in the definition, she clarified that:

> *I drew pictures of a horizontal rectangle and cuboid to help students visualise the differences between two and three-dimensional objects. The cardboard box was a good example of a three-dimensional object while the drawing of the rectangle could represent a clear concept of a two-dimensional figure.*

Daisy also pointed out that students needed background knowledge of the mathematical language to be able to understand the definitions.

> *Definitions used for describing mathematical terms were quite technical. If students did not have background knowledge of mathematics and the terms, they could struggle to learn the lesson. That is why I elaborated on every math term in the definition of the prism. It facilitated students' understanding of the term.*

Kiya also confirmed the need for elaboration of difficult words in definitions, especially when they were subject-specific terms. It played an important role in supporting students' comprehension of the target term.

Giving examples. Examples are divided into informative examples and language-related examples. Informative examples concern the information added to the teachers' explanation to represent the key terms. They were used mainly to develop students' understanding of the key terms. On the other hand, language-related examples refer to the example sentences, in which the key terms were used. The language-related examples served three main purposes: 1) to develop students' understanding of the key terms; 2) to help students grasp the contextual meaning of the key terms when used in subject-specific contexts; and, 3) to teach grammatical functions of the key terms. The first type of giving examples was illustrated in Extract 15.

Extract 15		
7	Roguefort:	(0.1) catastrophic (can) you think about it right
8		(.) ah when it's when the catas catastrophic happen
9		(.) it's (.) event catastrophic event happen it will cause like this
10		((points at the picture)) (.) the flood (.) you see the flood
11		(0.1) ah and the heavy rain heavy rain (.) and cause to like the disaster

Extract 15 shows an event when Roguefort was giving examples that involved a natural disaster to clarify 'catastrophic' to the class. Roguefort showed a picture of the flood (line 10) and 'the heavy rain' (line 11) to the class and then described the catastrophic events as 'disaster' (line 11). She explained that:

> *I showed the pictures of a natural disaster, such as a flood, because I thought the examples could help students visualise what 'catastrophic' entailed. In other words, they could guess from the examples that 'catastrophic' involved great harm or destruction.*

Another common way to modify key terms is to provide a language-related example. This is demonstrated in Extract 16.

Extract 16		
69	Roguefort:	(0.1) okay everyone let's see the example okay read it together one two three
70	SS:	a landfill is an area where garbage is deposited ((read the example sentence))
71	Roguefort:	is deposited right it's a passive (0.1) form ah is deposited a landfill right
72		you see nowadays
73		(0.1) many ah much of garbage and (.) rubbish are (.) around right
74		ah you can see it everywhere right
75		(.) ah it's call because it is deposited ah ((points at 'deposited' in the sentence))

Roguefort was teaching the term 'deposit' to the class. After teaching its meaning, she projected an example sentence in which 'deposit' was used and instructed students to read the sentence aloud (line 69). Students read the example (line 70). Subsequently, Roguefort highlighted 'deposited' and elaborated "it's a passive form" (line 71) to show how the term was used in the sentence. Roguefort linked the example sentence to students' everyday life (lines 73 – 74) to make it

relatable. Lastly, she underlined the key term in context "because it is deposited" (line 75). This helped students interpret the contextual meaning of deposit from the provided sentence, as Roguefort put it, the meaning of the term became clear when presented in context.

> *When the term was separately taught from its contexts, students only knew what it meant as a sole vocabulary, which was not quite a meaningful way of learning. Providing an example sentence allowed students to construct the meaning of the term according to the provided context, which was specific to the content of the lesson.*

Sorbet expressed similar opinions when discussing his teaching practice concerning giving examples. His primary aim for showing example sentences was to help students learn the key terms in contexts. He explained that:

> *The example sentences were used for teaching the functions of the key terms. Students could observe how the terms were used and where they were placed in the sentence. Moreover, because the sentences were taken from the passage, they helped develop students' familiarity with the terms when used in the content.*

Emphasising pronunciation. At times, the EFL teachers emphasised the pronunciation of the terms to model or improve students' pronunciation. The pronunciation of the terms was modelled either through audios of native English speakers or by the teachers themselves. Students would listen to the model pronunciation, repeat the terms, and teachers then gave feedback on students' pronunciation. Extract 17 exemplifies the emphasis of word pronunciation as a part of key term teaching in Tawan's maths lesson.

Extract 17

90	Tawan:	((plays an audio of divide twice))
91	audio:	divide (.) divide
92	Tawan:	it's your turn one two go
93	SS:	divide
94	Tawan:	louder
95	SS:	divide
96	Tawan:	divide
97	SS:	divide
98	Tawan:	divide
99	SS:	divide
100	Tawan:	divide
101	SS:	divide
102	Tawan:	divide
103	SS:	divide
104	Tawan:	divide
105	SS:	divide
106	Tawan:	divide
107	SS:	divide
108	Tawan:	could (.) could everyone spell the word together D
109	SS:	d-i-v-i-d-e ((spell the term))
110	Tawan:	okay all together
111	SS:	divide
112	Tawan:	divide okay the stress is on the second syllable
113		we don't say /ˈdɪvaɪd/ (.) no we say /dɪˈvaɪd/
114		(.) okay /dɪˈvaɪd/ (.) we don't say /ˈdɪvaɪd/ (.) no okay

In line 90, Tawan had students listen to an audio of the key term 'divide' twice, and then in line 92, he instructed the whole class to say the term aloud. Students pronounced the term aloud as a response to Tawan's instructions (line 93). Tawan modelled the term and got the whole class to repeat the term back to him (line 96) and then, the drill carried on (lines 97 – 107). After the drill, Tawan shifted students' attention to word spelling by having them spell and repeat the term (lines

108 – 111). Finally, Tawan emphasised the word stress to the class (line 112) and modelled the pronunciation of 'divide' when stressing on a different syllable followed by identifying the proper pronunciation of the term (lines 13 – 14).

The emphasis on the pronunciation of the key term was influenced by Tawan's personal experiences as an English learner, and the nature of 'divide', which could be easily understood by showing the math symbol. He explained that:

> *Based on my experiences, I didn't know which syllable the stress was on. Sometimes, I noticed some people stressed the first syllable. To avoid pronunciation mistakes, I made a clear statement that the stress was on the second syllable. In addition, the term 'divide' could be easily made understood by showing a divide symbol and thus I focused more on its pronunciation than the elaboration on its meaning.*

Emphasising pronunciation also occurred in Kiya's lesson. According to her reflections, the correct pronunciation was a part of the meaning-making process. She pointed out that:

> *In my view, meanings came after pronunciation. If students pronounced the term correctly, they would subsequently be able to understand the meaning of the term. Therefore, when teaching new key terms, I focused on teaching pronunciation in addition to their meanings.*

Highlighting grammar. Highlighting grammar is a situation when grammatical features in the content, for example, tenses, voices, and sentence structures, are made explicit to help students construct the meaning of the conveyed messages in the written texts. This was done by highlighting the target features in colours, underlining the features, examining the written texts for the target features, and elaborating on the meaning communicated through the target features. Extract 18 demonstrates how the strategy was adopted by Roguefort to communicate the meaning of the taught content.

Extract 18

104	Rogufort:	(0.2) ah you see some passive here (.) is there any passive voice here?
105		(0.3)
106		is there (.) yes or no?
107	SS:	yes
108	Roguefort:	one more time yes or no?
109	SS:	yes
110	Roguefort:	very good you see ((points at a passive voice sentence))
111		(0.1) gas oil and coal (0.1) are (0.1) burned
112	SS:	[burned
113	Roguefort:	are burned right because it's it cannot (0.1) does it by itself right
114		it need to be (.) burned by human right

Extract 18 presents Roguefort's lesson on climate change. She projected a paragraph concerning the impacts of human activities and had students search for passive sentences in the projected paragraph (lines 104 – 109). In line 110, she identified a passive sentence, and then in line 111, she read it aloud for the class. After that, Roguefort highlighted "are burned" and then she elaborated "it cannot does it by itself" (line 13). This helped students develop an understanding of the meaning embedded in those passive sentences which facilitated their comprehension of the key concepts. In line 144, Roguefort clarified "it need to be burned by human" to emphasise that humans caused climate change.

Roguefort's account of her practice reveals that the nature of the content was a factor in her decision to highlight grammar as a part of content teaching.

> *I paid attention to passive voice because it was used in the passage to communicate the causes of climate change. I wanted to emphasise the received actions which presented how the environment was treated by a human. For example, fossil fuel did not burn itself. It was a human's action. This was the key point that I wanted to deliver to the class. In addition, I intended to encourage students to draw on their prior knowledge when reading the passage because they had already learnt passive voice.*

Rephrasing utterances. In this research, rephrasing utterances refers to teachers' adjustment of their verbal explanation to avoid over-explaining, which may result in students' confusion. It was normally done by abandoning the unnecessary description to keep the explanation short and precise. Extract 19 illustrates how Daisy rephrased her explanation of the concept of triangular prism in an attempt to make it comprehensible for students. In line 95, she explained by describing the key features of a triangular prism, but she abandoned her explanation as can be seen that the turn was ended with an unfinished utterance "and then have". In line 96, instead of continuing to describe the detailed features, Daisy rephrased her explanation drawing on the key term 'three-dimensional', which had already been taught. This made the explanation concise. Finally, Daisy encouraged the class to say the term 'triangular prism' aloud (lines 97 – 100) to emphasise that 'three-dimensional' was a characteristic of 'triangular prism'.

Extract 19

95	Daisy:	okay it have the height (0.1) have a base (.) and then have
96		(0.1) er when it come to three dimensional (.) okay when it come to three dimensional
97		(0.1) we call (0.1) we call
98		(0.2) triangular
99		(0.1) ((points at 'triangular prism'))
100	SS:	prism

Reflecting on her decision to rephrase the utterance, Daisy indicated her concern of being out of topic or going beyond the topic being discussed as her reason for rephrasing the utterance. She explained that:

> *While I was explaining, I was conscious of giving too detailed a description than necessary. If I continued, I was afraid that students would get confused. So, I rephrased the utterance and started over.*

Furthermore, Daisy pointed out that verbal explanation was not always an effective strategy. Trying to verbally explain things by providing too much information to the class could increase students' confusion rather than helping them understand the concept. She clarified that:

> *Oftentimes, being informative got me out of or beyond the taught concept. I needed to keep monitoring my talk when delivering a lesson.*

Although rephrasing utterances was found only in Daisy's lesson, there were concurring accounts of the impacts of teachers' informative explanations on students' comprehension. Roguefort described the verbal explanation as one of the factors causing students' incomprehension of the lesson. She explained that:

> *Sometimes my explanation was not clear enough for students to understand. I made several attempts to explain the concept in different ways hoping that they would assist students to grasp the concept. It turned out that the more I explained, the more confused students got. The expansion of the information added another layer of complication to my explanation.*

Sorbet highlighted that teachers' word choices were a crucial factor in effective explanation. He pointed out that:

> *Normally, when students struggled to learn the key terms, I would try to explain the terms using all useful words that came up in my mind, not realising that some words were even more difficult than the key terms. As a result, students were overwhelmed with the wordy explanation, which made it more complicated for them to understand the terms.*

The teachers' accounts also suggested that when teaching students with a low level of English proficiency, it was important to keep the verbal explanation short and simple.

Simplifying language. Simplifying language concerns teachers' modification of the language in a way that makes the target terms or concepts simpler to understand. The simplified language was not necessarily subject-specific, but they were essential for comprehending the content. The EFL teachers simplified the language by using synonyms and paraphrasing. Both involved the use of words that were simpler than the key terms, and they were likely to be drawn from students' vocabulary repertoire. These are illustrated in Extract 20.

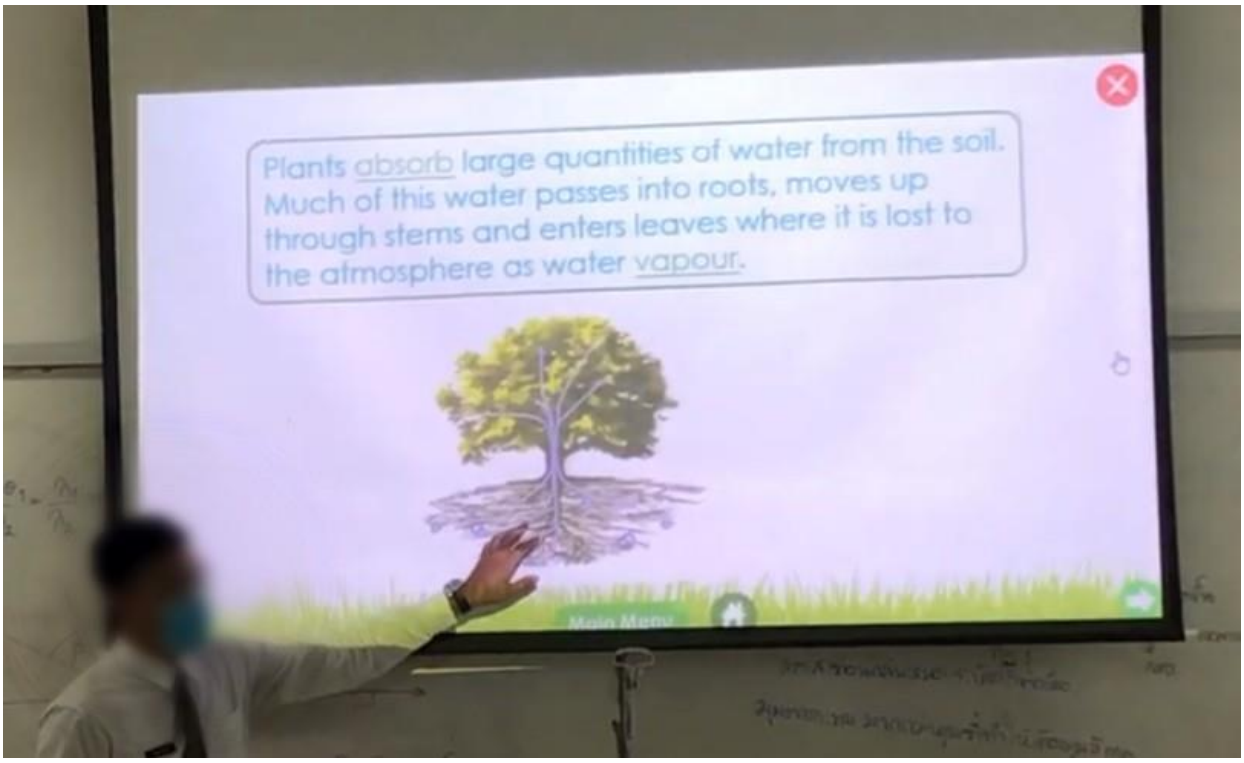
Extract 20

111	Alpha:	what does the word absorb mean?
112		(0.2) okay look at this one ah plant absorb the water from the soil ((points at the
113		diagram of the tree absorbing water shown on the projection screen))
114	SS:	ดูด *dood* ((translation: absorb))
115	Alpha:	very good absorb ( ) get water
116		(.) a lot of water or little of water?
117	SS:	a lot
118	Alpha:	a lot or little?
119	SS:	a lot
120	Alpha:	a lot because of the word (.) large ((points at 'large' in the passage on PPT))

Extract 20 illustrates the simplification of language during content teaching in Alpha's lesson on plant transpiration. Alpha was conveying the target message 'plants absorb large quantities of water from the soil' to the class. In line 111, he highlighted the key term 'absorb' in the sentence (see Figure 16) and asked students what it meant. In line 112, there was a pause for two seconds to allow students to respond before he continued by drawing students' attention to the projected diagram to elaborate on the term. Showing the diagram successfully helped students grasp the meaning of 'absorb' as they replied "ดูด" (line 114), which is a Thai word for absorb. In line 115, Alpha complimented students to confirm that they made the right guess, and then elaborated on 'absorb' by simplifying it as "get water". After that, he carried on by asking another question "a lot of water or a little of water?" (line 116), which was the simplification of 'large quantities of water'. Simplifying the target phrase by providing the synonym 'a lot' and the antonym 'a little' allowed students to decode the target phrase by considering a word with the closest meaning to 'large'. In line 117, students firmly answered "a lot" and then Alpha asked for a repetition of their answer to check their certainty (line 118). After students confirmed their answer (line 119), he highlighted the word 'large' to elaborate on the meaning of the target phrase.

Figure 16

The taught content projected on the screen



Alpha reflected that using synonyms helped students understand the key term easily, especially when the synonyms were drawn on students' vocabulary repertoire:

> *I used synonyms that were simpler than the key terms to facilitate students' understanding. Using the synonyms that the students had already known helped them link their prior knowledge to learn new terms.*

Furthermore, he emphasised that:

> *In addition to the key terms, there were many academic words, which could be difficult for students. As a teacher, it was important to simplify those difficult words while delivering the lesson. Otherwise, students would struggle to learn.*

Roguefort suggested that simplifying language was one of the skills that CLIL teachers required in order to deliver the lessons effectively. She explained that:

> *I think it was important for CLIL teachers to be able to simplify the language used in the written texts to make the content as comprehensible as possible. As for the*

key terms, they should not be simplified because the key terms were the core of the content subject. As a teacher, my job was to make the terms accessible to students and one of the useful strategies was to simplify the language of explanation, including definitions of the terms. I would say that this was another aspect of required knowledge and skills for CLIL teachers.

The reflections from the participants reveal that simplifying language, such as the difficult words in the contents, and the sophisticated definitions from dictionaries was a useful strategy for CLIL. It made the lessons more accessible to students.

4.1.4 The use of visual supports

Visual supports are teaching resources utilised to communicate key terms or concepts. They were employed as a supplement to and/or a substitution for the teacher's oral explanation. The visual supports that were commonly used consisted of: 1) multimedia; 2) authentic materials; and, 3) teachers' gestures and mimes. These were often presented in the classes in conjunction with one another. Three types of visual supports are discussed with illustrative examples in Section 4.1.4.1, Section 4.1.4.2, and Section 4.1.4.3 respectively.

4.1.4.1 Multimedia

The term multimedia refers to drawings, pictures, animations, and videos presented in the class to facilitate students' comprehension of key terms and concepts. These were commonly projected on a screen along with the target key terms or concepts being taught. They were used particularly when key terms were concrete and tangible, for example, mathematical symbols. Illustrative examples are provided in the extracts below. In Alpha's science lesson, he utilised an animation to help explain the term 'wilt'. This is presented in Extract 21.

Extract 21

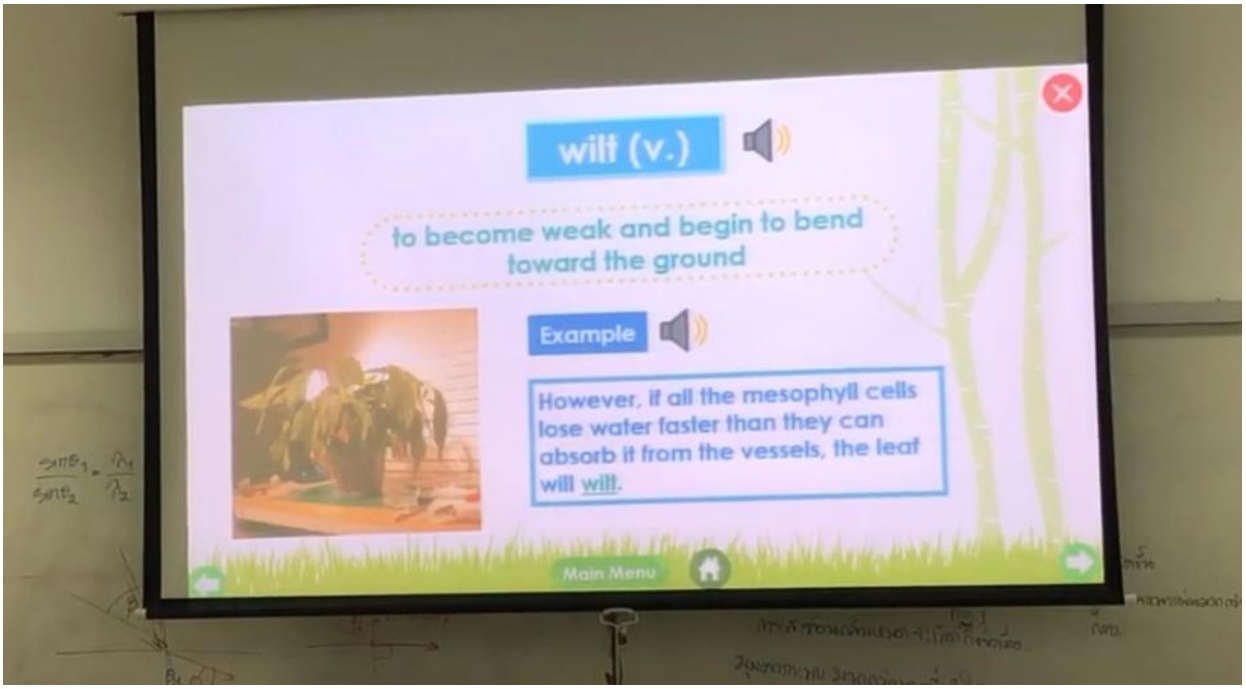
85	Alpha:	what does the word wilt mean okay look at the picture ((points at an animation of a
86		wilting plant))
87		(0.1) can you see what does the word wilt mean?
88		(.) it bend down (0.2)
89		we call it (0.1) wilt ah wilt

Similar to Sorbet, Alpha projected the key term 'wilt' along with an animation of a wilting plant as shown in Figure 17. In line 85, he introduced the term and showed the animation to the class.

He paused for a second to allow students to have a close look at the movement of the animation and then posed a question about what they thought ‘wilt’ meant (line 86). In line 87, Alpha described the movement of the plant and paused for two seconds to allow students to relate his description to the movement of the plant. After that, he concluded by naming the plant movement shown in the animation as ‘wilt’ (line 89).

Figure 17

The projected term ‘wilt’ with an animation of the wilting plant



Alpha reflected that he used the animation of the wilting plant because it was more explicit and simpler than a definition. Alpha emphasised that:

> *What made students understand the terms and concepts were pictures and animations. The students seemed to have no clues when I explained things in words. For students with a low level of English proficiency, providing only an English explanation could be overwhelming and confusing. So, I used lots of pictures and animations in my classes. However, I preferred animations to pictures because I found them more helpful, especially with key terms and concepts that involved processes or actions.*

Sorbet congruently commented that different key terms required different teaching strategies. For some key terms, pictures could be a more comprehensible explanation. He clarified that animations facilitated students' learning of science terms and concepts:

> *My first lesson was about the digestive system, which consisted of many difficult terms, for example, gastric juice. While I was explaining in English, I sensed that students did not fully understand because they sat quietly still. But when I showed an animation of gastric juice bubbling within the intestines, students started giving a relevant response to the term. In my opinion, animation greatly helped students to understand scientific terms and concepts.*

Similarly, Tawan's comments on his use of pictures to teach mathematical terms that pictures helped teach the terms relating to mathematical symbols, such as divide, subtract, and multiply. Roguefort came to a similar conclusion when discussing her use of pictures and animations. Her reflections suggested that pictures and animations were helpful when students struggled to comprehend the English explanation. She explained that:

> *I provided definitions and supplemented them with pictures when teaching key terms. I observed that students could easily understand the meaning of concrete terms by seeing the pictures. But when it came to abstract terms or adjectives, I found animations more helpful.*

In Daisy's maths lesson, a drawing was used to elaborate a key term 'two-dimensional' as illustrated in Extract 22.

Extract 22

12	Daisy:	(0.2) umm (0.8) ((draws a horizontal rectangle and a cuboid))
13		(0.12) okay
14		(0.2) if okay the shape if the shape have only have only (.) width and length
15		((points at the long and the wide sides of the rectangle))
16		(0.1) we call two dimen er ((looks at the definition shown on the TV screen))
17		we call two dimensional solid

In line 12, Daisy drew a horizontal rectangular and a cuboid on the whiteboard (Figure 18) to assist her explanation. Subsequently, she described the key features of the rectangle 'width and height'

(line 14) and located the width and height in the rectangle drawing (line 15). Finally, she specified that the key features referred to a two-dimensional object (lines 17 and 18).

Figure 18

Daisy's drawing of a horizontal rectangle

When asked why she drew the rectangular, Daisy reasoned that the drawing represented the concept of 'two-dimensional' more accurately than using an object. She clarified that:

> *I drew the rectangular because I wanted to show the students that a two-dimensional object has only length and width and that it had no thickness. I was thinking about using a piece of paper as an example, but then I thought although the paper was thin, it had thickness. In this case, the drawing was more accurate.*

Furthermore, Daisy reflected that using pictures and animations successfully supported students' comprehension. It explained some key terms, especially the concrete terms and concepts, more explicitly than words. She explained that:

> *I did not need to give a long explanation to help students understand what two and three-dimensional objects meant. I just pointed at the drawings and identified*

the key features, for example, the length and width was a two-dimensional object. It was simple and successfully helped students learn the term.

Kiya agreed that pictures and animations play an important role in helping her students learn key terms and new concepts. She pointed out that her students were beginners. It was difficult for them to learn new terms by listening to her English explanation. To support their learning, Kiya prepared visual support, including pictures and animations for use in her class. She noted that using visual supports, such as pictures and animations was her most used teaching strategy in CLIL lessons.

In Extract 23 Alpha utilised a ready-made video as a tool to clarify his verbal explanation of the term 'antibody'.

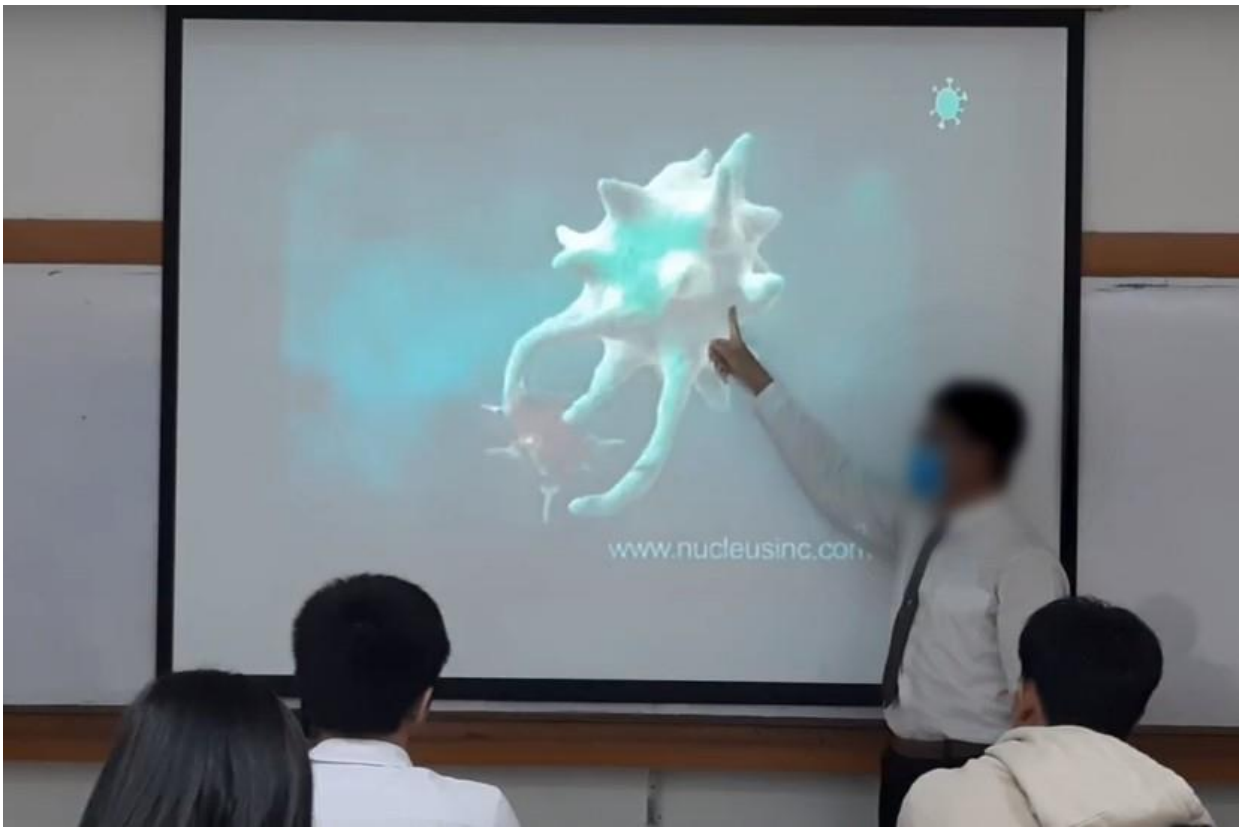
Extract 23

46	Alpha:	(0.1) the antigen here ((points at a spike)) send signal to our body
47		(0.1) so our body our body (0.1) send something
48		(0.1) send something to block the pathogen (.) we call
49		(0.2) anti
50	SS:	body
51	Alpha:	(0.2) antibody ah antibody this is antibody ((shows a picture on the slide))
52		(0.1) antibody doesn't kill (.) the virus or the bacteria it just block (0.1) ah just block
53		ah see the video ((plays a short video of pathogens flowing in a body))
54		(0.18) ((pauses the video)) this is what?
55	SS:	pathogen
56	SS:	[antigen
57	Alpha:	pathogen good pathogen
58		((continues playing the video))
59		(0.7) ((pauses the video)) and this is?
60		(0.2) our cells our cells our body cells and the pathogens try to get into our cells
61		and look at the antibody ((continues playing the video))
62		(0.18) look at this one ((pauses the video))
63	SS:	(0.3) antibody
64	Alpha:	this is antibody
65	SS:	[body
66	Alpha:	see antibody doesn't kill the pathogen
67		(.) it just block (0.1) it just block the pathogen

He explained to the class the functions of the antibody and what was involved in the processes (lines 46 – 51). Then, he summarised the main idea of the functions of the antibody (line 52), which was followed by showing a video of antibodies attacking pathogens (line 53). As the students were watching the video, he paused the video and asked them what the spiky substance was (line 54) to check if they could relate the concept previously taught to the video. He continued the video (line 58), paused it, and elicited students' prior knowledge (line 59). Because students could not identify what it was that they were seeing, Alpha described the scene to them (line 60) to ensure that they were following. In lines 61 to 65, he continued playing the video and drew students' attention to the scene when an antibody was attacking the pathogen (see Figure 19). After the scene ended, he reiterated the main idea to the class (lines 66 – 67).

Figure 19

Alpha showing a video of how antibody works



According to Alpha's reflections, he used the video because the process of how the antibody performed was not well depicted by the pictures. He explained that:

> *I described the functions of the antibody accompanying pictures to help students visualise antigens, pathogens, and antibodies. Then, I showed the video to the class because it provided a clearer picture of the ongoing process of the antibody eliminating pathogens. The video was more helpful than the pictures in developing students' understanding of the functions of the antibody.*

In reflecting on the use of a video to teach the content, Roguefort also mentioned that she made the video by herself for teaching a different part of the lesson. She reasoned that:

> *I made a video for teaching the lesson because the video was a teaching resource that was rich in visual and audio descriptions, which was more accessible than the written form. The visuals facilitated students' understanding of the taught concepts and key terms perceived in audio and the written forms.*

4.1.4.2 Authentic materials

Authentic materials are real objects that teachers bring to the class for teaching purposes. The EFL teachers utilised authentic materials in conjunction with the multimedia to help elaborate key terms and concepts and to demonstrate an experiment. These are discussed in Extract 24. Extract 24 demonstrates how a plant was used in Alpha's biology lesson to elaborate the content regarding plant transpiration. Alpha elaborated on the sentence: 'much of this water passes into roots, moves up through stems and enters leaves, where it is lost to the atmosphere as water vapour', which was in a paragraph projected on the screen.

Extract 24

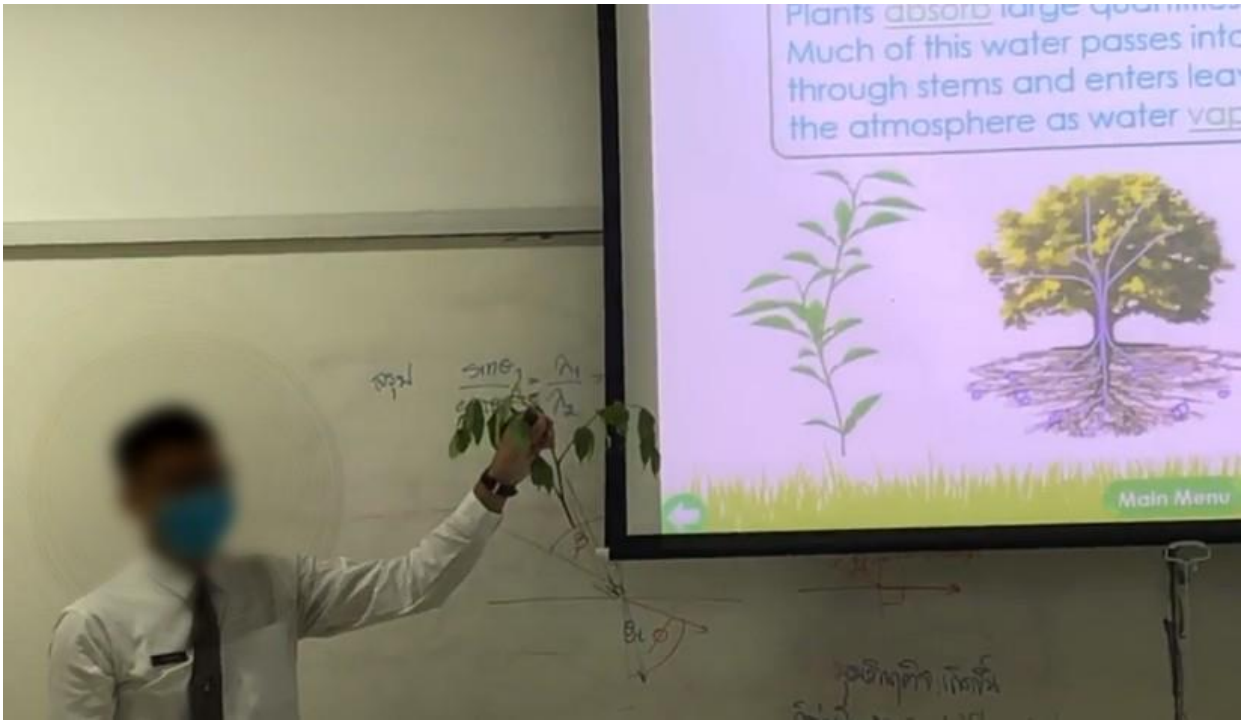
121	Alpha:	much of this water much of this water passes into (0.1) into roots
122		ah water pass into (.) roots and move up through stems
123	SS:	[roots
124	Alpha:	what does stem mean?
125		(0.1) ah which one is stem ((shows a leafy branch to the class))
126		(0.1) this or this ((points at a leaf and a stem))
127	S:	[ลำต้น *lam ton* ((translation: stem)) ((mumbles))
128	Alpha:	one or two? ((one =leaf, two = stem))
129	SS:	one
130	SS:	[two
131	Alpha:	one ((touches a leaf))
132		(.) what is stem stem stem?
133		(.) the word stem here ((uses a laser pointer to point at the word 'stem' on PPT))
134		(0.1) one ((touches the leaf)) or two? ((touches the stem))
135	SS:	one
136	SS:	[two
137	Alpha:	number (.) two
138		ah number one is (0.1) leaf ((touches a leaf))
139		number two is stem ((touches a stem))
140	SS:	[stem

Firstly, Alpha read the sentence to the class (lines 121 – 122). Then, he emphasised the key term 'stem' by asking the class what it meant (line 124). In line 125, he showed a leafy branch to the class (Figure 19), and asked students to identify its stem (line 126). A student guessed by mumbling a Thai word for 'stem', "ลำต้น" (line 127), but the message did not reach the classmates or the teacher. Alpha carried on eliciting a response from the class. He assigned 'one' for the leaf and 'two' for the stem (line 128) to make the options more specific. One group of students identified 'one' as the stem (line 129) while another group decided that the stem was 'two' (line 130). Accordingly, Alpha repeated his question (line 132) and emphasised the term again by locating the term in the sentence shown on the screen (line 133) to encourage students to reconsider. He explicitly reiterated the options by tapping his finger on the leaf and the stem (line 134). As

students' answers were still conflicted (lines 135 – 136), Alpha indicated 'number two' as the answer (line 137) and clarified the options to the class using the leafy branch (lines 138 – 139).

Figure 20

Alpha using a plant to help explain 'stem'



Using the plant to teach 'stem' was not part of Alpha's plans. He made a spontaneous decision to replace the prepared pictures with the plant because it was available and seemed more explicit than the pictures. Alpha explained that:

> *I had planned to use pictures to help explain the term, while the plants were prepared for students to do an experiment in the class. But I changed my mind right before the class because I thought why not use the authentic plant when it was available instead of the pictures. Moreover, as the plant was tangible, it provided a clearer concept regarding parts of plants than the pictures.*

He reflected that the plant helped students understand the term, however, some students might needed clarification. Additionally, Alpha indicated that authentic materials were useful for demonstrating an experiment. This was affirmed by Sorbet's reflections on his first lesson when authentic materials were used during his explanation of the experiment instructions. Sorbet reported that teaching a science lesson in English was challenging, especially when teaching

subject-specific terms. In his lesson, the key concepts were related to acids and bases in daily life, therefore it was convenient for him to find local products for teaching. The familiarity with the products made the lesson relatable and accessible for students. He clarified that:

> *I prepared local products, such as a pack of MSG, vinegar, and bathroom cleaner for an experiment in the class. They were used as examples of acids and bases. The products helped students to grasp the ideas of acids and bases easily due to their familiarity with the products.*

Sorbet pointed out that for the terms related to tangible ideas, using authentic materials could be a more practical option than explaining by words, such as definitions.

4.1.4.3 Teachers' gestures and mime

Gestures and mimes involve teachers' non-verbal explanation, for example, hand gestures, physical actions, and facial expressions performed to convey the meaning of the key terms. Gestures and mimes were used to support the verbal explanation and the multimedia when both were not successful in helping students to comprehend the terms. In Extract 25, Sorbet was explaining 'Gastroesophageal reflux disease' to the class. The pictures of a man having a stomach-ache, and of blue liquid in a stomach were shown on the projection screen (see Figure 21).

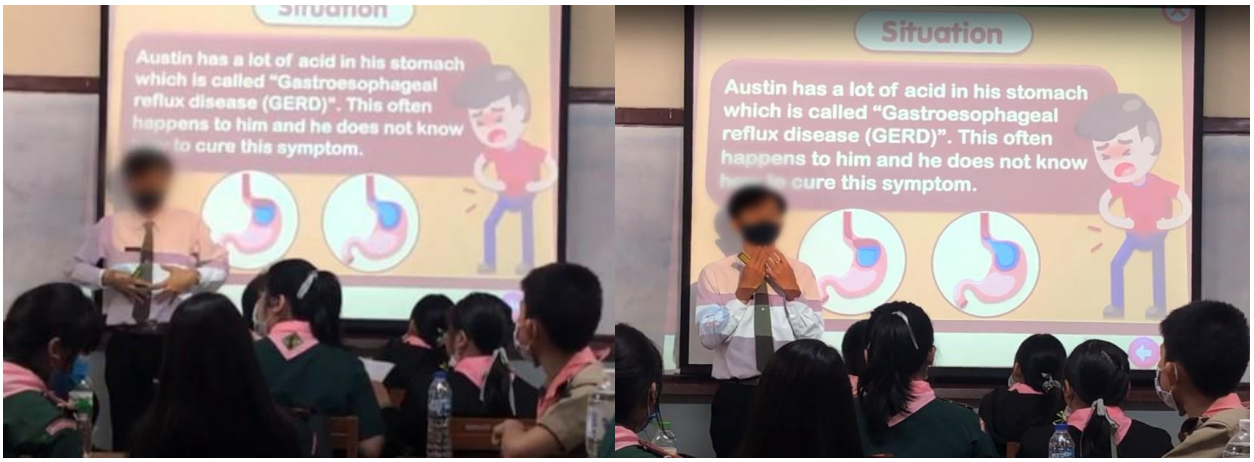
Extract 25

172	Sorbet:	do you know er Gastroesophageal reflux disease do you know?
173	SS:	(0.2)
174	Sorbet:	like this the acid in the stomach ((places his hands on his stomach))
175		(.) and it goes up to this ((moves his hands from his stomach to his neck))
176	SS:	ahh ( ) ((mumble a word in Thai))
177	Sorbet:	you know it what is it? what is it? (0.2)
178	SS:	**กรดไหลย้อน** *grode lai yon* ((translation: Gastroesophageal reflux disease))
179	Sorbet:	((nods)) ah what is it?
180	S1:	**ฮาก** *haak* ((translation: vomit))
182	Sorbet:	((laughs)) no it's not vomit okay
183		what is it what is it?
184	SS:	**กรดไหลย้อน** *grode lai yon* ((translation: Gastroesophageal reflux disease))
185	Sorbet:	ah okay ( ) it goes up to this ((moves his hands from his stomach to his neck))

In line 172, Sorbet checked students' prior knowledge of Gastroesophageal reflux disease. He received the second silence (line 173) as a response, which demonstrated students' unfamiliarity with the term. To facilitate students' comprehension, Sorbet explained the symptoms of the gas reflux accompanied by the slow movements of his hands from his stomach up to his neck (lines 174 – 175), as shown in Figure 20. Students responded "ahh" followed by a Thai word (line 176). Sorbet seemed to hear the students' guess, and he asked for a repetition (line 177). The students repeated the Thai word "กรดไหลย้อน" (line 178), which was then followed up by Sorbet's nod and repetition request to confirm that students understood correctly. S1 might have been mistaken that Sorbet's repetition request meant their answer was incorrect, so he made a new guess (line 180). Sorbet rejected his incorrect answer promptly (line 182) before asking the class to repeat the correct answer (line 183). Finally, the whole class confirmed the answer confidently (line 184). Then, Sorbet reiterated his explanation accompanied by the hand gesture to wrap up the main idea.

Figure 21

Sorbet gesturing the gas reflux



The use of gestures and mime was also found in Roguefort's lessons. Roguefort commented that many subject-specific terms were unfamiliar to her students. In addition to word explanations, they needed a variety of resources, for instance, pictures and mimes, to help them learn those terms. Similar to Sorbet, Roguefort reflected that her use of gestures and mime was an unplanned reaction. Moreover, Rogefort pointed out that when it came to class, she often made use of all available resources to make the content comprehensible. Using gestures and mimes was a strategy available for use at any stage of teaching, and it required no preparation.

4.1.5 The use of L1

In this research, teachers and students share the same L1 which is Thai. According to the observational data, L1 was employed in five modes: 1) modeling tasks; 2) checking students' comprehension; 3) confirming students' answers; 4) summarising key concepts; 5) and translating into L1. The main reason for the teachers' decisions to use L1 largely involved students' comprehension. Because the strategies commonly co-existed, they are discussed in conjunction with one another as appeared in the actual classes.

4.1.5.1 The use of L1 to check students' comprehension, confirm students' answers, and summarise key concepts

This section presents EFL teachers' use of L1 to check students' comprehension, confirm students' answers, and summarise key concepts. Checking students' comprehension refers to teachers' use of L1 to elicit information associated with the learned concepts from students in order to check their understanding. Confirming students' answers is a situation when students provide information as a response to teachers' questions or explanations, which is followed by teachers' affirmation of their answers. Three common ways of teachers' use of L1 to confirm students' responses are: 1) affirming students' answers, for example, by simply saying 'chai (yes)', or complimenting 'good'; 2) repeating students' responses in L1; and 3) combining one and two. Finally, summarising key concepts concerns teachers' use of L1 to describe the main idea of the concept previously taught in English to facilitate students' comprehension and their recollection of the lesson content. The three strategies could be found either during or after the teachers' L2 explanation of a lesson. The strategies are often concurrent and therefore are presented in the same section. Extract 26 shows Alpha's use of L1 to check students' comprehension of 'the functions of antitoxin and vaccine' which was taught in his CLIL lesson 2 – defence against disease.

Extract 26

215	Alpha:	(0.3) เข้าใจไหม ((translation: Do you understand?))
216	S:	[wow
217	SS:	เข้าใจ ((translation: Yes.))
218	Alpha:	antitoxin คืออะไรนะ ยา เขาเรียกว่ายา ต้าน *taan* ((translation: What is antitoxin? It is anti…))
219	S1:	serum
220:	S2:	ยาที่ใช้แบบฆ่า ((translation: a medicine used for killing))
221	Alpha:	อย่างเช่นสมมติว่าโดนงูกัด ((translation: For example, you are bitten by a snake.))
222	SS:	เซรุ่ม *se-room* ((translation: serum))
223	Alpha:	เราใช้เซรุ่มถูกไหมครับ อันนี้ก็เหมือนกัน
224		((translation: We use serum, right? This is the same.))
225		ตัววัคซีนจะประกอบไปด้วยอะไรนะ ((translation: What does the vaccine consist of?))
226	SS:	pathogen
227	Alpha:	pathogen (.) antitoxin ประกอบไปด้วย ((translation: Pathogen. Antitoxin consists of))
228	SS:	antibody
229	Alpha:	ซึ่งอ่า อันไหนใช้เวลานานกว่ากันในการผลิต
230		((translation: Which one takes more time to produce?))
231	SS:	( )
232	Alpha:	อันนี้ใช้เวลานานกว่าใช่ไหม เพราะว่ากว่าจะฉีดเข้าไปแล้วกว่าจะให้ร่างกายเราผลิตขึ้นมา
233		((translation: This one ((vaccine)) takes longer because our body needs to produce the
234		antibody.))
235		ในขณะที่อันนี้มี antibody อยู่แล้วฉีดเข้าไปก็ไปทำงานได้เลยนะครับ
236		((translation: While this one ((antitoxin)) can immediately work because it already contains
237		antibody.))

In line 215, Alpha switched to Thai to ask students if they understood the functions of antitoxin and vaccine, which was then promptly affirmed by students (line 216). To ascertain students' comprehension, Alpha invited students to share their understanding of antitoxin (line 218) and provided a Thai word "ต้าน" which means 'anti' as a clue. Two students provided two different answers "serum" (line 219) and "ยาที่ใช้แบบฆ่า" (line 220), but had not yet met Alpha's expectation. In line 221, instead of accepting or rejecting the students' answers, he continued by taking a snake bite as an example of a situation when antitoxin or vaccine could be used as treatment. This

prompted students to spontaneously respond "เซรุ่ม" (line 222). Alpha affirmed the students' answer and drew on the answer to help students grasp the key concept (line 223). Alpha continued asking a few questions to check students' comprehension, and students demonstrated their understanding adequately (lines 225 – 228). In line 231, students seemed to supply inadequate information to show their understanding. As a consequence, Alpha summarised the main ideas of how antitoxin and vaccines work for students.

Extract 27 is a part of Kiya's CLIL lesson 2, acids and bases in daily life, for tenth-graders. It shows how Kiya turned to L1 to confirm students' response to her English explanation, and to summarise the main idea of the concept previously explained in English.

Extract 27

89	Kiya:	alright very good and
90		(.) if it's neutral everyone if it's neutral ((points at 'neutral' on the slide))
91		(.) neutral litmus paper is purplish in colour
92		((reads and points at the sentence on the slide))
93		(.) purplish purplish here is purple (.) purple
94		(.) neutral neutral is like it's not
95		(0.1) it's not er both acid and base
96		(0.1) it's not both (.) acid and base but it's neutral yes
97	SS:	เป็นกลาง *pen glang* ((translation: neutral))
98	Kiya:	ใช่ *chai* เป็นกลางนะ neutral คือ เป็นกลาง *pen glang* ((translation: Yes, neutral means neutral.))
99		(.) ถ้ามันเปลี่ยนแสดงว่ามันเป็นกรดหรือเบสใช่ไหม
100		((translation: If litmus paper changes in colour, the substance is acid or base, right?))
101		แต่ว่าถ้ามันไม่เปลี่ยนแสดงว่ามันเป็น (.) กลาง
102		((translation: If litmus paper doesn't change in colour, the substance is neutral.)
103	SS:	[กลาง (translation: neutral))

Kiya was explaining how to tell whether a solution is acidic, basic, or neutral from the colours of litmus paper. After Kiya explained the concept in English, students responded to her last turn in Thai "เป็นกลาง" (line 97). According to Kiya's accounts of this event, students responded in Thai to her English explanation because they wanted confirmation from her that their understanding was correct. In line 98, Kiya confirmed students' comprehension by repeating "เป็นกลาง", and then

she summarised the main idea of the concept that she had explained in English to students in Thai (lines 99 – 102). Kiya explained that she switched into Thai to confirm with students that what they understood was correct.

The observational data suggest that students might have learned about acids and bases in their L1 from a science class. While Kiya was explaining the concept in English, the students were trying to make a connection between their prior knowledge in Thai with similar knowledge being taught in English. The teacher's use of L1 in this event was to help students use their prior knowledge of the content in L1 to support their learning of the equivalent content delivered in English. The practice of teachers' use of L1 to confirm students' answers will be revisited in the Translation request section when it was used as a response to students' translation of key terms.

4.1.5.2 Translations of L2 terms into L1

L1 translation was employed in three different manners, namely translating general meanings or ideas into L1, literally translating into L1, and asking for a translation of key terms or concepts from students. Translating into L1 concerns teachers' translation which focuses on conveying the meaning of the target messages. On the other hand, literally translating into L1 involves teachers' word-for-word translation of an English message into L1 which may or may not preserve its original meaning. Finally, asking for a translation from students is a situation in which teachers elicit L1 or L2 terms which are equivalent to the target terms from students instead of translating by him/herself. These are illustrated in the sections below.

Translations of general meanings or ideas. The use of L1 to translate a target term or concept was found in Daisy's maths lesson for ninth-graders. This is illustrated in extract 28. It demonstrates an event when she utilised the first type of translation, which focuses on communicating the meaning, to help students learn the term.

Extract 28

301	Daisy:	(0.1) we perform in parentheses first **คืออะไรคะ**
302		((translation: What does 'we perform in parentheses first' mean?))
303		(0.1) **เราต้องทำในไหนก่อน** ((translation: Which one do we perform first?))
304	SS:	**ในวงเล็บ** *nai wong leb* ((answer confidently)) ((translation: In parentheses.))
305	Daisy:	**อ้า ทำในวงเล็บก่อน** (.) **เราทำในวงเล็บก่อน**
306		((translation: Ah we perform in the parentheses first.))
307		((T points at '2(5×3) + 2(5×6) + 2(3×6)' and continues explaining))
308		(0.1) for example five multiply by
309		(0.2) five multiply by
310	SS:	three

In Extract 28, Daisy was teaching students how to find the surface area of the prism. In line 301, she explained to students the second step of finding the surface area of the prism by paraphrasing "second, perform operations inside parentheses", which was shown on the TV screen, as "we perform in the parentheses first" and switched to Thai to ask the students what it meant. Then, she asked another question in Thai (line 303). The question was a translation of a part of the statement "we perform first" which served as a clue to help students interpret the target message. Students replied to Daisy's question with confidence "ในวงเล็บ" (line 304) because they had just been taught what parentheses meant. Subsequently, Daisy confirmed the students' answer by translating the full statement into Thai (line 306). The students' reply indicated that they were able to grasp the key concept that Daisy was trying to convey. Thus, in the following turns, Daisy switched back to English and continued the lesson (line 308). Daisy reflected that her choices between English and Thai were dependent on students' comprehension. She elaborated that:

> *I could tell from students' facial expressions whether they understood the lesson or not. I would speak Thai If there was a sign of 'I am not following' showing on their faces. Once I sensed that students were with me, for example, they nodded or started to interact with me, I switched back to English.*

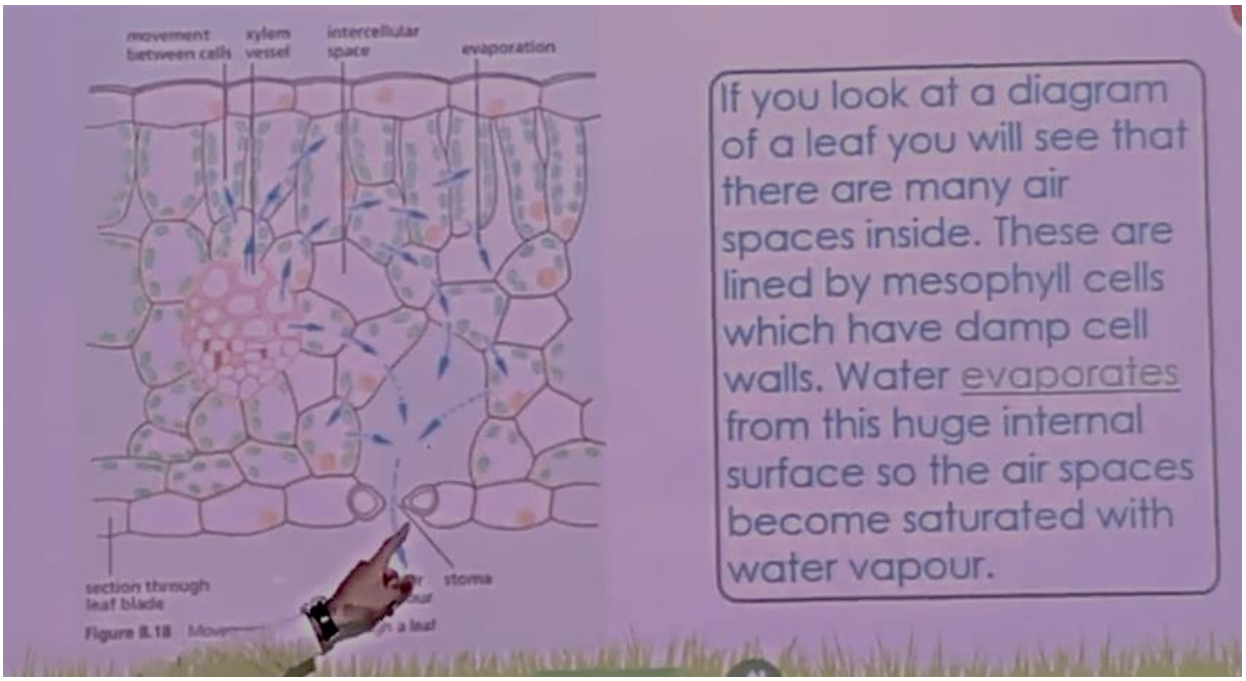
Literal translations. Although literal translation was less common than other L1 strategies, translating literally into L1 appeared to be helpful strategies. The evidence is demonstrated in Extract 29 which is taken from Alpha's CLIL lesson on transport in plants.

Extract 29		
173	Alpha:	(.) if the vapour outside the leaf is low
174		(0.1) the vapour here will come out
175		(0.1) will come out through what we call stoma ((points at stoma in the figure))
176		(0.1) what does the word stoma mean?
177	SS:	ปากใบ paak bai ((translation: stoma))
178	Alpha:	the mouth ((chuckles)) mouth mouth of leaf (we call it)

Alpha was explaining the concept of the movement of water through the leaf using English. In line 175, Alpha introduced 'stoma' by pointing at 'stoma' in the figure shown on the projected screen (see Figure 22). He then highlighted 'stoma' by explicitly asking students "what does the word stoma mean?" (line 176). A few students provided a Thai term for 'stoma', "ปากใบ" as a response (line 177) which was followed up by Alpha's literal translation of "ปากใบ" into English "the mouth of leaf" (line 178). Paak means mouth and bai means a leaf.

Figure 22

Alpha pointing at 'stoma' in the projected figure



According to Alpha's accounts of his practice, the projected figure used to support his explanation did not help all students to grasp the meaning of stoma. He pointed out that:

> *Drawing on the students' reply "ปากใบ", I literally translated the term into English to help students link their L1 to learn the new term in English. This strategy might not work well with all subject-specific terms, but it worked successfully in facilitating students' comprehension of 'stoma'.*

Translation requests. Translation requests are a situation in which teachers elicit a translation of key terms from students. This could be a translation from L2 into L1 and vice versa. This was normally followed by teachers' confirmation of students' answers. Extract 30 is a part of Daisy's CLIL lesson 2 – the surface area and volume of a prism, for ninth-graders. It illustrates how this strategy was used to ensure students' comprehension. In this extract, Daisy was elaborating 'square units' in the following statement: The surface area (S) is a total area of the surface of a three-dimensional object. It is measured in square units.

Extract 30

229	Daisy:	(.) square units **คำนี้นะคะ** square units ((points at 'square units' on the screen))
230		((translation: Square units. This word is square units.))
231		(.) **คำนี้คือ** (.) square **คืออะไร** ((points at 'square')) ((translation: This word is (.) What is square?))
232	SS:	**สีเหลี่ยม** *see liam* ((translation: square))
233	Daisy:	**ตาราง** *ta rang* **อ่า สี่เหลี่ยม** *see liam* **สี่เหลี่ยมจตุรัสใช่ไหม** square
234		((translation: Square ah square, right?))
235		(.) **แต่ทีนี้เวลามันเป็นยูนิตที่เราคำนวณหาอะไรออกมาแล้ว** square unit **คือ ตารางหน่วย** *ta rang nuay*
236		((translation: But in a measurement, square unit is square unit.))
237		(.) **ถ้าเป็นตารางเซนติเมตรจะเป็นอะไร** ((points at 'square'))
238		((translation: If the unit of measurement is square centimetre, what word do we use?))
239		(0.1) square (.) centimetre right
240	SS:	[square
241	Daisy:	**ถ้าเป็นตารางเมตรก็จะเป็น** ((translation: If the unit of measurement is square meter, it will be))
242		(0.1)
243	SS:	square
244	Daisy:	[square meter
245		(.) **ตารางนิ้ว** *tan rang new* (0.2) ((translation: square inches))
246	SS:	square finger
247	Daisy:	((laughs)) fingers which mean **นิ้ว** *new* **นิ้วแบบนิ้วมือ**
248		((translation: fingers which mean parts of your hands))
249		(.) **แต่ว่าถ้าเป็นนิ้ว นิ้วในตัววัดเราจะใช้คำว่า** inches
250		((translation: But in a measurement scale, we use inches.))
251		(0.7) ((writes 'inches' on the board))

In line 229, Daisy drew students' attention to the target term 'square units' by pointing at the screen and saying "this word is square units". She then asked students to give her a Thai word for 'square' (line 231). Students replied "สีเหลี่ยม" which refers to square, the shape (line 232). In Thai, there are two words which correspond with 'square', one of which is used in measurement and the other to describe shape. In line 233, Daisy responded "ตาราง", which is a Thai word for square used in measurement, and repeated students' answer "สีเหลี่ยม" to confirm students' answer and to implicitly show students that 'square' refers to two different words in Thai. Subsequently, she elaborated "But in a measurement" to highlight the context in which the target vocab was used, followed by a translation of 'square unit' into Thai "ตารางหน่วย" (line 235).

Daisy elicited from students' English terms for the other units of measurement which stem from 'square' (lines 237 – 245). Initially, it was Daisy who translated the Thai terms into 'square centimetre' and 'square metre' for students while students only replied 'square'. However, in line 246, students were likely to pick up the pattern of word formation as well as a similarity between the measurement units in English and Thai. Consequently, they confidently replied "square finger" (line 246) to Daisy's question of an English word for "ตารางนิ้ว" (line 245). Similar to English, many measurement terms in Thai derive from body parts, including "นิ้ว" (line 247) which means two things: 'fingers' and 'inches'. Students' answer in line 246 demonstrated how they drew on their prior knowledge of measurement in their L1 to make sense of the new measurement term in English. In line 247, Daisy noticed the connection that students made between "นิ้ว" and 'inches' so she pointed out that "fingers which mean parts of your hands". Again, she reiterated "But in a measurement" to highlight its context, and accompanied by a translation of "นิ้ว" into English (line 249). She then wrote 'inches' on the board for students as it was a new term (line 251).

In the stimulated recall interviews, the teachers emphasised that the primary factor in their decisions to use L1 was associated with students' comprehension. Daisy's account of her practice demonstrates that explicitly asking students to translate the subject-specific term into their L1 was a supporting technique to evaluate and facilitate students' comprehension. She suggested that:

> *My concern about teaching some key terms was that what students thought they understood might not be what the terms actually meant. Instead of accepting students' 'yes' to the question 'do you understand?' and move on, it is important to elicit from them how they understand the key terms. By doing this, both teachers and students can ensure the accuracy of students' comprehension.*

In addition, Kiya pointed out that:

> *When learning through a medium of English, students seemed uncertain about their understanding of the lesson. Most of them would rather keep quiet than taking risks responding to me for fear of making mistakes. So, I needed to observe students' gestures such as nodding to evaluate their comprehension. However, when I switched to Thai, students seemed comfortable to answer my questions.*

Roguefort provided similar accounts of the students' reactions in her CLIL classes. She interpreted students' quietness as a sign of incomprehension or being unconfident to interact with a teacher by using English. Thus, L1 was used to encourage students to talk during a comprehension check. She described her L1 practice as follows:

> *First of all, I tried to encourage students to answer my questions in English, but if they did not respond, I switched to Thai to help them make sense of what I have taught. Once I was confident that students were following, I switched back to English and checked if they could express their understanding in English.*

Finally, Daisy highlighted that the usefulness of using L1 in her CLIL class was that it helped avoid misunderstanding of subject-specific terms and concepts students may have due to a language barrier. However, she suggested that teachers use English as a primary teaching resource to allow students to make sense of lessons by drawing on the resources teachers provide, for example, pictures, English definitions, and gestures.

4.2 EFL Teachers' NoM strategies adopted to address difficulties in the explanation of subject-specific terms or concepts

In this section, I delve into the data from the stimulated recall interviews as well as classroom observations to explore the difficulties encountered by the participants in explaining the subject-specific terms or concepts, and the NoM strategies they adopted in order to overcome the difficulties (RQ 1.1). In the stimulated recall interviews, the six participants were asked to reflect on whether they faced difficulties in explaining the subject-specific terms or concepts, and how they addressed these. According to their reflections, when all attempts were unsuccessful in communicating the target terms or concepts, four participants were likely to turn to L1, which, as they put it, was their final resource. The other two participants tended to avoid L1 in their CLIL lessons. Instead, they adopted visual support and language modification as NoM strategies.

The participants' accounts from the stimulated recall interviews are presented along with the observational data from video-recordings of the lessons to illustrate their NoM practices. These are discussed in the following sections: Section 4.2.1 the use of L1 to model tasks; Section 4.2.2 translations of the target terms or concepts into L1; and Section 4.2.3 the use of visual supports and giving examples.

4.2.1 The use of L1 to model tasks

In this section, using L1 to model tasks is a strategy adopted by teachers to address students' comprehension problems. It concerns a situation when L1 is used to assist the teacher's explanation and/or demonstration of how to complete a task. For example, Alpha identified abstract terms and concepts involving processes or systems, such as 'immune response', as difficult terms to teach. Teaching the term 'immune response' required him to explain how it functioned in addition to what it meant. In other words, students needed understanding at the content level and the linguistic level to understand the term. Although Alpha used pictures and animations to support his explanation, he struggled to make it comprehensible to students. Consequently, L1 came to play a role in addressing the difficulties. In addition, Alpha pointed out that delivering CLIL lesson two, concerning human immunity, was a difficult task. He needed to explain to the class in Thai after his English explanation as students could not grasp the concept conveyed in English.

Extract 31 demonstrated Alpha's use of L1 to address students' comprehension problems during the task. Students were assigned to make a Venn diagram to compare active immunity with passive immunity based on the following features: antigen encounter, immune response, the time before antibodies appear in blood, and the length of protection.

Extract 31

365	Alpha:	ทุกคนยังงงกับวิธีการตอบอยู่นะครับ อ่ะอันแรก
366		((translation: You seem confused about how to complete the task.))
367		(0.2) ถ้ามันเจอเชื้อ ถ้าอันนี้เจอเชื้อเราบอกว่าอะไรครับ ((points at 'Antigen encountered'))
368		((translation: What do you say if this one encounters antigens?))
369		(0.1) it needs to encounter antigens
370		(0.1) it needs to encounter antigens (.) to produce antibodies
371		(0.2) this is your answer for the first topic if that one needs antigens
372		(0.2) เข้าใจไหม ((translation: Understood?))
373	SS:	ไม่ ((translation: No.))
374	Alpha:	อ่า ครูอยากรู้ว่า ((chuckles)) อันแรกเลยคือบอกว่าถ้าเกิดว่า ( ) ต้องการเชื้อก่อนเพื่อจะสร้าง
375		antibody เราก็เขียนว่า it needs to encounter แปลว่า พบ หรือ ปะทะ นะครับ encounter
376		((translation: I would like to know that the first one. If ( ) needs pathogens in order to
377		produce antibody, you write 'it needs to encounter'. Encounter means to meet or to
378		confront.))
378		it needs to encounter antigen to produce antibodies

In line 365, Alpha intervened with students during the task as they appeared to struggle to complete the task. Instead of giving the task instructions in English, Alpha modelled the task in Thai by eliciting information from students to check their comprehension (line 367). Then, he provided a possible answer to the question when there was no response from students (lines 369 – 370). The example answer served as a language model, "it needs to", which was a required expression for completing the task. In line 371, Alpha explicitly underlined the example answer and checked students' comprehension in Thai (line 372). Nonetheless, students' reply of "no" (line 373) suggested that Alpha did not succeed in his first attempt. In response to students' reactions, Alpha started over by elaborating on his former explanations (line 374), but he tried to be more explicit by saying "you write it needs to encounter" (line 375), following by a translation of 'encounter' into Thai (line 375). In line 378, Alpha proceeded to construct a full sentence using the modelled expression and the explanation continued until he covered all features for comparing the immunity.

Apart from students' lack of comprehension of the content, another aspect of the task that could be challenging for students might involve the knowledge of the required language needed for completing the task. The evidence of students' lack of knowledge of the required language is illustrated in Extract 32 below.

Extract 32

385	Alpha:	it doesn't have immune response or it (0.1) needs immune response
386	SS:	a-ha อะไรนะคะขอใหม่ ((translation: A-ha, pardon, could you please say it again?))
387	S1:	ถ้า it need มันแปลว่ามันต้องการใช่ไหมคะ ((translation: Dose 'it need' mean 'it has to'?))
388	Alpha:	อ่า เอาใหม่นะครับเอาใหม่นะครับ ((translation: Listen again.))
389		(0.3) อ่า ถ้าเราบอกว่ามันเกิดกระบวนการมันเกิดกระบวนการ
390		((translation: If you think there is a process))
391		(.) การ response คืออะไรครับ ((points at 'Immune response'))
392		((translation: What is 'response'?))
393	SS:	การตอบสนอง ((translation: response))
394	Alpha:	ตอบสนองต่อ (0.1) ภูมิคุ้มกันใช่ไหมครับ ((translation: Response to immunity, right?))
395		เราก็บอกว่า it has ก็ได้อ่ะ it has immune response จบนะครับ
396		((translation: So, you can say 'it has' 'it has immune response' period.))

Extract 32 demonstrates students' responses to Alpha's first attempt to address their comprehension problems. In line 386, students asked for a repetition of the modelled expressions. This was followed by S1's question of what 'it need' meant (line 387). The students' responses indicated that their lack of the essential language for expressing the knowledge of the key concepts was another factor hindering them to complete the task. In the stimulated recall interview, Alpha reflected that the main factor making the task challenging for students was the expansion of the required knowledge of the content and the language for completing the task. He explained that:

> *The concept of the immune response was not explained in detail, but was required to complete the task. Moreover, students were required to write a full sentence rather than a phrase as guided by the original task outlined in the textbook. As a result, none of them understood my English explanation. I needed to explain and model the task in Thai several times until students were able to do the task.*

Alpha recapped the key concepts in Thai (lines 388 – 394) and modified the grammatical structure of the modelled expression from 'it need' to 'it has' (line 395) because students were more accustomed to the latter expression. When asked whether he was thinking of any alternative plans to deal with the students' comprehension difficulties, Alpha expressed that he was considering changing the task, but he decided to turn to L1 because of a time constraint. Moreover, Alpha noted that he used L1 in lesson two more often than he did in lesson one. The main factor affecting his practice was the different levels of English proficiency between the students in class one and those in class two. The second class had a higher level of English proficiency than the students in the first class, hence the more difficult lesson. The complexity of lesson two required a greater effort to explain. Although the second group of students had better English skills than the first group, they struggled to understand some key terms. Alpha emphasised that when he struggled to convey the lesson in English, L1 was a useful resource that kept the lesson going.

4.2.2 Translations of the target terms or concepts into L1

In this section, I present the L1 translation strategies, namely translating the general meaning or ideas into L1, and requesting a translation from students, focusing on their roles in helping the teachers overcome the difficulties concerning the explanation of the subject-specific terms or concepts. According to the stimulated recall interviews, Kiya, Daisy, and Roguefort identified L1 translation strategies as their main NoM strategies adopted when they encountered difficulties.

Firstly, Kiya described subject-specific terms as the key factors in her difficulties in delivering her CLIL lessons. In line with Alpha's accounts, she found explaining the abstract and intangible terms and concepts difficult. Adjectives were also identified as difficult terms to explain. Translating the key terms into L1 was her strategy to address the urgent difficulties. Kiya explained that:

> *The content was the most challenging part to teach because it contained lots of subject-specific terms. In lesson two, 'property' was the term that I decided to translate into Thai because I was concerned that my explanation would make the terms complicated to learn.*

Extract 33 illustrates Kiya's translation of 'property' into L1 when she was uncertain about students' comprehension of the term. In line 16, Kiya translated 'property' into Thai "คุณสมบัติ" after explaining the meaning of the term in English. Then, in line 17, she checked students' comprehension of the term by asking the questions that were previously asked in English. The students' response in line 20 indicated that their understanding of the term was not in line with the message Kiya was attempting to convey. In response, Kiya reiterated her key message to the class in Thai (line 22) to emphasise the meaning of the key term in the subject-specific context.

Extract 33

16	Kiya:	(0.2) อันนี้คุณครูถามถึง (.) อันนี้มันแปลว่าคุณสมบัตินะ คุณสมบัติ *khun na som bat*
17		((translation: What I just asked was. This means property property.))
18		อันนี้คือคุณสมบัติของอะไรนะ เปรี้ยวคือคุณสมบัติของ ((translation: A sour taste is a
19		property of…))
20	SS:	มะนาว *ma nao* ((translation: lime))
21	Kiya:	มะนาวหรอ ((translation: lime?))
22		(.) กรด เปรี้ยวเป็นคุณสมบัติของกรด ((translation: Acid. A sour taste is a property of
23		acids.))

Kiya commented that the students' lack of comprehension of the conveyed meaning was the cause of her decision to translate the term into Thai:

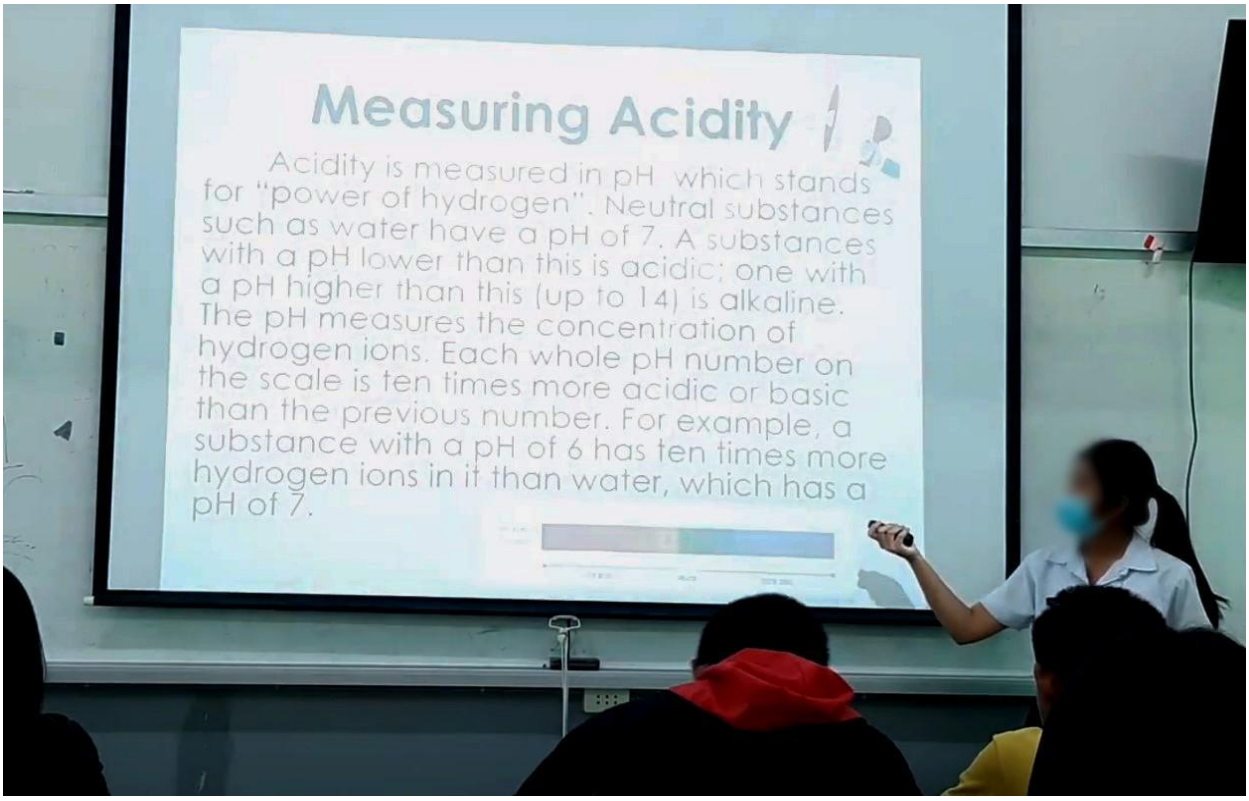
> *Property in a scientific sense was not familiar to students. When I checked their comprehension, I noticed that the students did not grasp the term in the same way as I was trying to communicate. They knew that lime was sour and sugar was*

sweet. It was general knowledge. But, they did not seem to link those to the ideas of the properties of acids and bases. When I asked what property meant, none of them could answer. So I needed to translate the term and its key concept into L1 to connect students' understanding to the subject-specific context.

Another example of the translation of a key concept into L1 is demonstrated in Extract 34. Kiya projected a picture of a pH scale and a short paragraph about 'measuring acidity' on the screen (see Figure 23). While Kiya identified no difficulties in the explanation of the first half of the paragraph regarding the pH values of neutral, acidic, and alkali substances, she revealed that communicating the concept in the second half, which involved the concentration of hydrogen ions in the substances, appeared to be a complicated task. The difficulties in helping students comprehend the concept were the primary trigger of her decision to use L1.

Figure 23

The projected information used for teaching the measurement of acidity



Extract 34

186	Kiya:	(0.5) here do you know ten times more hydrogen ions? ((points at 'ten times more
187		hydrogen ions'))
188		(0.2) look at this look at this bar look at this bar ((points at a picture of pH scale))
189		(0.1) ten times ten times more hydrogen makes more (.) makes more strength ah
190		(0.1) like like here for example here
191		(.) er a substance with a pH of six six is here six six ((points at six on the pH scale))
192		(.) has ten times more hydrogen ions than water
193		(0.1) we put hydrogen (0.1) (it's) six and then (0.2) it (put up) to seven
194		(0.1) is is it correct? (0.2) เพิ่มขึ้นไหม เพิ่มขึ้นเป็นเจ็ดไหม ((translation: Does it increase
195		to seven?))
196		(.) ah ก็คือเขาบอกว่าถ้ามีถ้าใส่ไฮโดรเจนสิบครั้งเข้าไปตรงใดตรงหนึ่งในนี้ มันก็จะเพิ่มขึ้นใช่
197		ไหม เพิ่มขึ้นอีกช่องหนึ่งนั่นแหละ ((points at a pH scale))
198		((translation: Ah that is, if we put ten times more hydrogen ions into somewhere
199		here, the pH value on the scale will increase to one more range.))

In line 186, Kiya paused for five seconds before underlining the main idea 'ten times more hydrogen ions' and asking if students knew what it meant. As the class kept quiet, she drew students' attention to the picture of the pH scale on the screen (line 188). After that, she elaborated on the main idea by simply reading the information to the class (lines 189 – 192) and then clarified "we put hydrogen it's six and then it put up to seven" (line 193). It can be seen from the extract that during the explanation, there were several pauses, word repetition 'six' (line 191), and fillers 'like' (line 190) and 'er' (line 191). Following the English explanation, Kiya switched to Thai to check students' comprehension (line 194), however, she received no reply from the class. According to Kiya's reflections, students' silence implied their incomprehension. She also noticed a blank on their faces while she was explaining in English. Thus, she moved on and translated the main idea into Thai (lines 196 – 197) to make the concept more easily accessible. Kiya commented that the main triggers of her decision to switch to Thai were the difficulties she had in explaining the concept in English and the students' comprehension problems. She explained that:

> *I was trying to explain to students that the more hydrogen ions present, the stronger the acids. It was very difficult to explain in English. Moreover, students*

did not understand what I was trying to communicate at all. The only way to deal with the difficulties that I could think of was to switch to Thai.

Another reason for her use of L1 concerned the nature of the scientific concepts, which she explained as intangible. These concepts could not be made accessible by visual supports, which had been her primary NoM resources. Kiya pointed out that:

The scientific terms and concepts, such as ions, were intangible. I had no idea how to explain the concept of the relationship between the hydrogen ions and the pH to the class. No picture could be applied to the explanation of this concept. In this case, explaining in Thai was more helpful than trying to explain in English or using such resources as pictures.

Daisy, although she did not mention any particular term or concept, maintained that the only difficult aspect of CLIL implementation was teaching the subject-specific terms. She clarified that to help students learn the new subject-specific terms, she required the knowledge of the target terms and of how to make them comprehensible. Teachers' knowledge essential for CLIL implementation will be discussed in Section 4.3.

Extract 35 is an example of Daisy's translation of a key term when she found her English explanation failed to help students understand the term. Daisy provided an example equation:

$$5x + 3y = 7$$
$$y = 4$$

and explained to the class that four should be substituted for 'y'. To help students learn what she meant by 'substitute'. Daisy explained the term by using a synonym and providing a definition in English, but she received no sign of comprehension. In response, Daisy translated the term into Thai.

Extract 35

200	Daisy:	then we substitute (0.1) four in (0.1) y (0.2) is the substitute
201		(0.1) คืออะไร substitute ((translation: What is substitute?))
202		(0.1) replace (.) replace
203		(0.1) put something instead of something
204		(0.2) okay when we put something instead of something (0.1) คือ อะไร ((translation:
205		What is it?))
206		(.) การแทน *karn taen* ((translation: substitution))
207	SS:	แทนค่า *taen kaa* ((translation: substitute))
208	Daisy:	การแทนค่าหรือการแทนที่นะ *karn taen kaa/ karn taen tee*
209		((translation: ah substitution or replacement))

In line 204, Daisy paused for two seconds and continued by asking students in Thai what it meant by 'put something instead of something'. After that, Daisy translated 'substitution' into Thai as "การแทน" (line 206). This was followed by students' reply "แทนค่า", which was a more accurate term for 'substitute', the verb (line 207). In line 208, Daisy acknowledged the students' answer by providing the two Thai nouns for substitution, which were used interchangeably.

In reflecting on her math lesson, Daisy emphasised her confidence in her background knowledge and skills in mathematics. She had no problems understanding the mathematical concepts, but found it difficult to convey the mathematical concepts in English. Consequently, L1 became increasingly apparent in her math lesson. She explained that:

> *Back in high school, I was a student representative participating in mathematics competitions. I would say that I had a strong background in maths. Thus, I did not find it difficult to understand maths concepts. However, it was difficult to explain maths terms and concepts in English. Despite all preparation and plans, I occasionally struggled to help students learn the terms. When I could not find ways to help students understand the terms in English, I translated the terms into Thai for them. That's why you saw me using Thai quite a lot in the maths lesson.*

Finally, when Roguefort was asked if there was any term or concept in the lessons that she found difficult to teach and how she dealt with the difficulties, she pointed out that teaching content was

the most challenging part of the lessons. As the content was the core of the CLIL lessons, it needed to be made comprehensible to the students. This was done through careful lesson planning, including the planned teaching strategies. However, Roguefort found that the plans could occasionally be inadequate because, to her, the CLIL classroom was an unpredictable setting. She explained that:

> *When it came to the classroom, it was common to receive unexpected reactions from students. What I thought would work did not work well. What I thought would be easily understood turned out to be complicated for students.*

Roguefort indicated that the greenhouse effect in her first lesson was a difficult concept to explain for two reasons: 1) it was a conceptual idea tied to a scientific theory; and 2) it consisted of unfamiliar terms to both the teacher and students. She explained during the stimulated recall interview that when an urgent problem occurred, she tended to adopt L1 to address the problems. Extract 8 is an example of Roguefort's use of L1 to elaborate on the greenhouse effect after explaining it in English. In line 194, she projected animation of the solar radiation traveling to the earth's surface and reflecting into space following by describing the animation in Thai (line 195). Extract 8 revealed that Roguefort required not only the L1 but also the visual supports to help students develop their understanding of the greenhouse effect. In the next section, I discuss the use of visual support and language modification, particularly giving examples, by two teachers to address their difficulties in the explanation of the subject-specific terms or concepts.

In addition to her difficulties in the explanation of the scientific concept, Roguefort identified two major factors affecting the use of L1 in her CLIL lessons, namely, time constraints and students' comprehension. She described her use of L1 to deal with the difficulties caused by both factors as her instinctive reaction. Roguefort highlighted that:

> *I studied the concept and I knew what the greenhouse effect entailed. The problem was how to convey the concept in a way that the students understood. When I found the students struggled to understand the concept. I translated the concept into Thai for them. It was quite an instinctive reaction.*

Extract 36 illustrates how Roguefort resorted to L1 as a response to students' silence and to accommodate students' comprehension of the taught concept.

Extract 36

256	Roguefort:	is it cause carbon dioxide?
257	S1:	no ((whispers))
258:	Roguefort:	เป็นเหตุทำให้เกิดเพิ่มคาร์บอนไดออกไซด์ไหมถ้าตัดไม้
259:		((translation: Does deforestation cause more carbon dioxide?))
260	SS:	เป็นครับ เป็น เป็น ((translation: Yes, it does.))
261:	Roguefort:	right?
262	S1:	เพราะว่าต้นไม้ไม่ดูดซับ ((translation: because the trees do not absorb))
263	Roguefort:	ah ฟังนะลูกคาร์บอนไดออกไซด์ it's มีอยู่ในอากาศอยู่แล้ว ((translation: Listen
264		everyone, carbon dioxide naturally occurs in the atmosphere.))
265		it's remain in the atmosphere but if you have more forest it will absorb
266		(.) right it doesn't cause ah carbon dioxide นะคะ
267		มันไม่ได้เป็นการตัวก่อคาร์บอนได้ออกไซด์นะ
368		((translation: It doesn't cause carbon dioxide.))
369		(.) มันแค่เป็นตัวดูดซับ ถ้ามันไม่มีมันก็จะคาร์บอนก็จะอยู่อย่างนั้นแหละแทนที่จะมีต้นไม้
370		ดูดซับ you know?
371		((translation: It absorbs (carbon dioxide). If there is no tree, carbon dioxide
372		will remain in the atmosphere. You know?))
373	SS:	yeah

In line 256, Roguefort checked students' comprehension of the causes of carbon dioxide by asking a question in English, but only one student replied quietly (line 257) while the whole class was silent. To encourage students to talk, Roguefort repeated the question in Thai. She explained in the stimulated recall interview that students' silence was a trigger for her use of L1. For Roguefort, receiving responses from students was crucial because their responses demonstrated the degree of their comprehension which guided her on how to proceed. She explained that:

> *I was not sure if being silent meant they didn't understand or they were shy to respond in English. I could not evaluate their comprehension. I wanted them to understand the lesson and to respond to my questions. I thus decided to use Thai as students tended to be less confident to interact with me when I used English.*

Switching to Thai worked well as students were more confident to respond to her question. This is evidenced in line 260 where most students began interacting with Roguefort in Thai. In line 262, S1 participated in the interaction with more confidence by giving her opinion to the teacher. Roguefort noticed from the students' replies that they might not fully understand the key concepts. Therefore, she summarised the main idea of the discussed topic in Thai accompanied by English sentence by sentence (lines 263 – 270). Students' acknowledgment in line 373 showed that Roguefort's decision to use Thai encouraged students to interact with her and helped them to understand the key concept of the discussed topic.

As the majority of the participants reported that they used L1 to address the difficulties, they were asked to share their thoughts about the use of L1. All participants expressed similar opinions which reflected the notion of maximum input in second language learning. Roguefort, for example, explained that L1 should not be used in CLIL although she found it difficult to refrain from using it. In the same vein, Kiya felt that ideally, L1 should be kept to a minimum. A common reason for not using L1 was the need to maximise students' exposure to the target language, as Tawan said:

> *In the EFL context, students did not have an opportunity to use or learn English outside the classroom, so I tried to use English as much as possible in my class.*

Similarly, Alpha expressed that:

> *I wanted students to be exposed to English as much as possible because CLIL was taught in an English class. L1 could be used to support learning, but my main goal was to expose students to English.*

The participants' accounts in the stimulated recall interviews were in agreement with their accounts in the semi-structured interviews. To provide an example, in his semi-structured interview, Alpha expressed his belief that the more exposure to English students get, the more they acquire the language. However, he admitted that for students with a low level of English proficiency, L1 could be a useful tool to facilitate learning. In accordance with Alpha, Sorbet said that he used 90 percent of English in his class while he only switched to L1 when students had a problem comprehending the lesson. This was also true for all participants as they explained that they tried to use 80 to 90 percent of English in their classes. Daisy described that:

It's a requirement of the second language courses that we have to use 100 percent of English in English classes or as much English as possible. Yet, when it came to the real classroom, I could only use 80 to 90 percent. In the end, I still needed to use L1if students did not understand.

4.2.3 The use of visual supports and giving examples

This section deals with the use of visual supports as the teachers' NoM strategies to address the difficulties regarding the explanation of the subject-specific terms or concepts. While four of the six participants considered L1 as the supporting resource, the other two participants were likely to rely on visual support when they struggled to make subject-specific terms or concepts accessible.

According to Sorbet's reflections, the scientific terms made the science lesson (lesson 1) more difficult to teach than the health education lesson (lesson 2). Sorbet highlighted that the visual supports such as pictures, animations, and gestures, were his supporting resources when encountering problems in explaining the scientific terms. For example, 'stomach ulcers' was one of the terms that Sorbet identified as a difficult term to explain. It was made comprehensible by the teacher's gestures and mime. This is illustrated in Extract 37. Sorbet was attempting to elaborate on the term by using a picture of an ulcer in a stomach, but it occurred to him that the picture did not adequately help students to make sense of the term. Therefore, he gave up the prepared pictures and conveyed the meaning of the term through miming as shown in Figure 24.

Extract 37

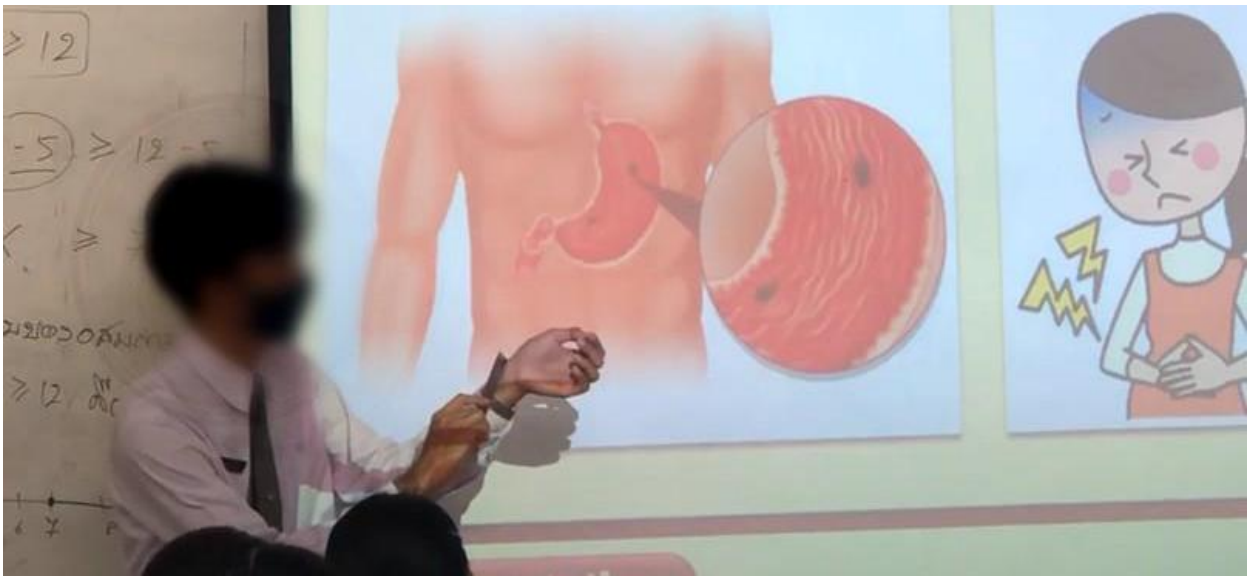
95	Sorbet:	stomach ulcer and stomach ache ((shows pictures of stomach ulcers and of a woman
96		having a stomach ache on the slide))
97		(0.1) stomach ulcer what is ulcer ulcer? ((points at the picture of stomach ulcers))
98		(0.2) ulcer
99		(0.1) like when you cut yourself ((pretending to cut his wrist by a ruler))
100	S:	แผล *plae*
101	Sorbet:	aha what is it?
102	SS:	แผล *plae* ((translation: wound))
103	Sorbet:	ah the ulcer in your stomach ((points at his stomach))

In line 95, Sorbet projected a picture of ulcers in the stomach and of a woman having a stomach ache to the class. Then, he highlighted 'stomach ulcers' by pointing at the picture, and checking

students' prior knowledge of the term (line 97). Because students did not respond, Sorbet thought for a second and decided to grab a ruler on a student's desk and act as if he was slitting his wrist (Figure 24) along with his verbal explanation (line 99). A student responded in Thai "แผล" (line 100), which was a general term used to refer to a damaged area of the body, such as a wound or a cut. In line 101, Sorbet encouraged the class to say the term as a sign of the acknowledgment of the student's reply. In line 102, students repeated the Thai word for ulcers. Finally, Sorbet linked the word to the context 'ulcer in your stomach' (line 103) to elaborate that the ulcers were similar to wounds or cuts, but they were 'in your stomach'.

Figure 24

Sorbet miming to his class



Sorbet was asked to reflect on his strategies employed to accommodate students' understanding of 'ulcers'. He indicated that 'ulcers' was a difficult term to teach and his decision to mime was a spontaneous response to students' reactions. Sorbet explained that:

> *I planned to use the pictures shown on the slide, but I noticed a blank on students' faces after seeing the picture of stomach ulcers. While I was trying to think of other ways to explain the term, I spotted a ruler on a student's desk. I grabbed the ruler all of a sudden and then started miming hoping that students would be able to guess from the mime. Fortunately, a student said a Thai word, which was comparable to ulcers. That helped the whole class to figure out what ulcers meant.*

Sorbet highlighted that miming and drawing on everyday terms which had a comparable meaning to the subject-specific term, for example, wounds or cuts as ulcers, helped students to develop their understanding of the term.

'Solution' was another term that Sorbet struggled to explain to the class. When encountering difficulties in teaching the term, Sorbet utilised authentic materials as his coping strategy as illustrated in Extract 38.

Extract 38

30	Sorbet:	what is solution
31		(0.1)
32	S:	( ) ((says a word in Thai))
33		(0.1)
34	Sorbet:	solution when you mix something together (.) it will be the solution
35		(0.2) you mix two chemicals together
36		(0.3) ah it will be (0.1) solution like this okay
37		((points at a picture of tests tubes filled with different colours of liquid))
38		for example um ((grabs a bottle of bathroom cleaner and shows to SS))
39		(0.2) this one (0.1) the bathroom cleaner it is a solution
40		(0.1) ah (.) it is (0.1)
41	SS:	((silent))
42	Sorbet:	solution so let's see the example ((plays an audio of an example sentence))

Sorbet was teaching the term initially by providing a definition along with a picture, but students did not seem to understand. In line 38, he grabbed the bottle of bathroom cleaner, which he prepared for the experiment activity. Without an informative explanation, Sorbet showed the bottle of bathroom cleaner to the class and told them "this one" "the bathroom cleaner is a solution" (line 39). Unlike the term 'ulcers', in reflecting on this episode, Sorbet seemed uncertain about the effectiveness of using authentic materials to address his explanation problems because, as he put it, there was no response from students. He explained that:

> *Solution was very difficult to teach. I had no clue how to make it understandable. It was so sudden that I could not think of any words to explain so I grabbed a*

bottle of bathroom cleaner hoping that it would help clarify the term. However, it did not seem to provide much help. I could not fully assure that it was successful.

Sorbet was then asked what made him think that students failed to understand the term. He pointed out that while students' responses in Thai related to the taught terms were the indicator of their comprehension, their complete silence could be a sign of incomprehension.

Although the students were quiet in nature, normally a few students were replying in Thai to show that they understood. But when I taught 'solution', the class was completely silent. To me, their silence might imply that they were not following.

Sorbet also mentioned using Thai but decided not to do so. He reasoned that it was his priority to use as much English as possible in the teacher fronted-talk stage. It allowed students to learn both the content and the language at the same time. In addition, using English functioned as a language model for the students, which facilitated their output in the latter stages of the lesson. Sorbet suggested that teachers might consider using L1 when all attempts were unsuccessful to help students learn the terms and concepts in English.

Tawan was another teacher who maintained the explanation in English despite his difficulties. In reflecting on the difficulties, Tawan discussed two groups of subject-specific terms in his maths lesson. The first group concerned terms represented by a mathematical symbol and used as everyday terms, for example, multiple, divide, and subtract. Tawan explained that these terms were not complicated to teach because they were familiar to students. The second group was the conceptual terms which could not simply be made accessible by showing pictures or mathematical symbols. This caused difficulty in Tawan's explanation of the terms because pictures and symbols were his primary meaning-making resources. Tawan identified 'equation' as a difficult term to teach. Using visual supports and giving examples were the NoM strategies that he employed to address the difficulties. He explained that:

I found 'equation' hard to explain as I was not specialised in maths. Also, the students' low level of English proficiency concerned me that they would struggle to understand the term. For example, if I explained that 'it contained an algebra', students would be more confused because of the term 'algebra'. So I showed an example of an equation and indicated the equals symbol as a sign of the equation.

Tawan's explanation of 'equation' is illustrated in Extract 39. He projected an equation on the screen and identified the key features of algebra (line 64) and the equals sign (line 67). He then proceeded to project an equation $\frac{x}{3} = \frac{3}{4}$ and encouraged students to decide if they thought the example was an equation (line 68). Tawan wrote another example on the board and asked the students if it was an equation (lines 74 – 75). In line 79, he elaborated on students' response pointing at not equals sign. He subsequently replaced the not equal symbol with the equal symbol (line 80) and emphasised that the statement with the equal symbol was called "equation" (line 81). This helped students make meaning of the term by differentiating between the two examples.

Extract 39

62	Tawan:	okay ((points at on the slide)) this one we call an (.) an equation
63		(0.1) we have one (.) ah one x
64		x is ah (.) the the quantity that we don't know ((shakes his head))
65		(.) we don't know it (.) we call it an what
66		(0.2) an (0.1) an equation okay with this sign ((points at the equals sign))
67		this sign equal right (.) we call it equation okay and
68		(0.3) is this one an equation yes or no ((shows on the screen))
69	SS:	yes ((answer softly))
70	Tawan:	(0.2) yes or no
71	SS:	yes ((answer softly))
72	Tawan:	is this one an equation
73	SS:	yes
74	Tawan:	yes okay what about this one ((writes 2+X ≠ 10 on the board))
75		(0.19) is this one an equation (0.1)
76	SS:	no
77	Tawan:	is this one an equation yes or no
78	SS:	no
79	Tawan:	no because of (.) this one right ((points at ≠))
80		it should be this one ((replaces ≠ with =))
81		(.) we will call it an (0.1) equation
82	SS:	[equation
83	Tawan:	okay alright equation

Tawan reflected that he decided to write the example on the board because students' facial expressions showed a sense of confusion. Moreover, the students seemed unconfident when they were asked to identify if the first example was an equation. He explained that:

> *It was unexpected. If I was aware that there would be difficulty in teaching this term, I would have prepared more examples.*

Tawan commented that the use of visual supports and giving examples were adopted not only as his coping strategies but also as his main NoM strategies to facilitate his CLIL lesson delivery. He described both strategies as 'teacher-friendly', but might require a large amount of time for preparation. Tawan emphasised that:

> *I largely used visual support and provided examples because my students were beginners. They did not know much English. Showing pictures and examples along with asking questions related to the examples could help the students to make sense of the terms.*

In addition, Tawan explained that he had an option to translate the term into L1, which could have been more explicit and time-saving, but that he avoided doing so. One reason for not using the L1 was to familiarise students with learning through English. He believed that students could understand the conveyed messages in English by examining the visual supports and other resources accompanying the messages. It could be challenging in the beginning; however, as their familiarity developed, the students would have fewer struggles in learning. Tawan concluded that it was important that teachers benefit from the resources, for example, pictures, videos, and gestures. His reflections echoed Sorbet's that L1 could be considered an option if all attempts in helping students to learn through English were unsuccessful.

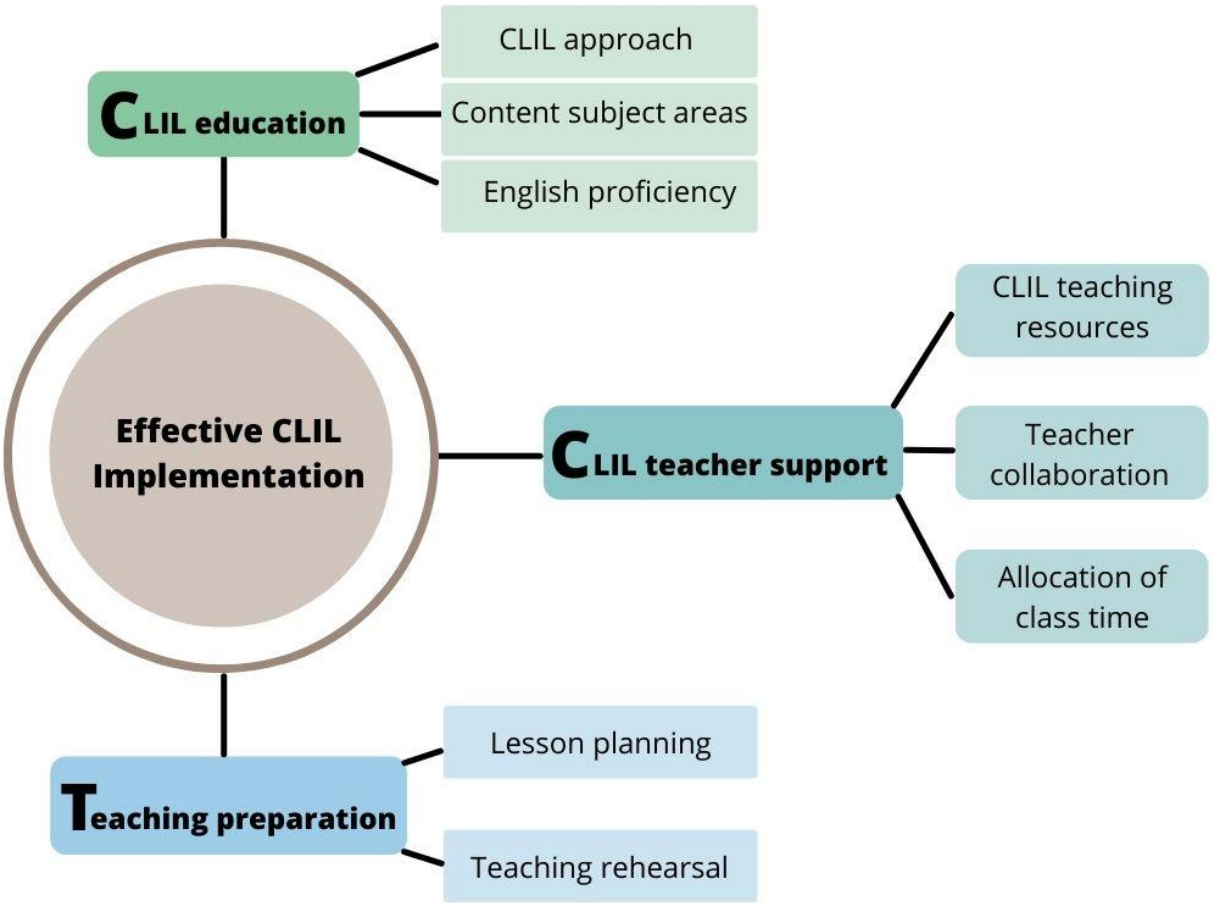
4.3 EFL Teachers' beliefs regarding effective CLIL implementation

This section discusses EFL teachers' beliefs regarding effective CLIL implementation. It presents the findings of semi-structured interviews and stimulated recall interviews aiming to address RQ2 – What are Thai pre-service EFL teachers' beliefs regarding effective CLIL implementation? In the semi-structured interviews, the six participants were invited to respond to a series of questions, including questions associated with effective CLIL implementation, based on their CLIL experiences gained from their university. As for the stimulated recall interviews, the discussions

depended on the participants' experiences from teaching practicum at schools. Three principal aspects of EFL teachers' beliefs regarding effective CLIL implementation emerged from the interview data: CLIL teacher education, CLIL teacher support, and CLIL teaching preparation (Figure 25).

Figure 25

A summary of EFL teachers' beliefs regarding effective CLIL implementation



This section consists of three main sub-sections addressing EFL teachers' beliefs. Section 4.3.1 discusses CLIL education as a pathway to effective CLIL implementation. It features three areas of knowledge and skills that the teacher participants found essential to effective CLIL lesson delivery: an understanding of the CLIL approach, knowledge of content subject areas, and teachers' English language proficiency. Section 4.3.2 deals with CLIL teacher supports encompassing three kinds of support: CLIL teaching resources, collaboration between language and content teachers, and allocation of CLIL class time. The teacher participants believed that

these supports helped enhance the quality of language-driven CLIL instruction. Finally, the teacher participants considered teaching preparation as a beneficial mechanism that helped them transfer their conceptual knowledge and skills to CLIL practice more effectively. CLIL teaching preparation is addressed in Section 4.3.3. This section emphasises lesson planning and teaching rehearsal.

4.3.1 CLIL education

The interview data show that teachers were considered the most influential factor in effective CLIL implementation. Participants reflected that in order for CLIL to be effective, teachers required proficiency in both the subject content and language. Tawan identified that possessing knowledge of the subject areas and being proficient in using English for instructional purposes were the key characteristics of CLIL teachers. These two areas of expertise were considered the fundamental elements of CLIL teaching for both language and content teachers. To meet these requirements, Alpha emphasised that professional development specific to CLIL was required.

Participants suggested that the CLIL education could be provided in the forms of in-service or pre-service teacher training, or as a part of a teacher education programme at a university. The participants believed that effective teacher education and development varied depending on the area of expertise of the potential CLIL teachers. In other words, as Roguefort explained:

> *Language teachers might focus more on developing the knowledge of content subjects while the content teachers might need to pay more attention to the language skills.*

The participants highlighted three possible aspects of knowledge and skills that should be included in the CLIL education: 1) CLIL approach (Section 4.3.1.1); 2) knowledge of content subject areas (Section 4.3.1.2); and, 3) English language proficiency (Section 4.3.1.3). The participants' reflections on how the three domains had an impact on the effectiveness of CLIL implementation are discussed in the sections below.

4.3.1.1 Understanding of the CLIL approach

In Thailand, CLIL is considered a new teaching approach. Sorbet described in his semi-structured interview that when he was introduced to CLIL in his third year of a Bachelor of Education

programme, he found CLIL demanding and difficult because it was different from other second language teaching approaches. Kiya expressed that she had once thought negatively about CLIL:

> *Before, I was conflicted about CLIL. I thought it was not my job to teach a content subject. CLIL should be a content teacher's responsibility, not a language teacher's. I did not know much about CLIL because there was only one CLIL lecture provided in the course. I came to understand more about CLIL after I received feedback on my lesson plan and micro teaching.*

Participants believed that the lack of understanding of CLIL also had an impact on CLIL implementation; as Sorbet put it, because the 4Cs were fundamental to CLIL, a lack of understanding of 4Cs might cause difficulties in many aspects of CLIL implementation, including lesson planning. Daisy added that a lack of understanding of CLIL had affected her selection of content:

> *At first, I misunderstood that a CLIL lesson must involve an experiment. Only science could be taught in CLIL class. After I had taught a few lessons, I found that maths, social science, and geography could also be taught in CLIL.*

As mentioned earlier, all six participants had gained and developed their knowledge and skills of CLIL through practice, rather than from formal instruction, although they had received CLIL-specific instruction during their studies. They felt that it would be beneficial if they were provided more time on formal instruction before practice to develop a strong foundation. In his semi-structured interview, Alpha suggested that CLIL teacher education should be provided as a separate course at a university to allow for the insightful learning of CLIL and more opportunities to practice teaching in broader content subject areas. The participants felt that the understanding of CLIL was one of the foundations of effective CLIL implementation, and therefore, it was important that teachers are equipped with knowledge of the basics of CLIL, including how to put CLIL into practice.

4.3.1.2 Knowledge of content subject areas

All six participants agreed that teaching CLIL required a high level of knowledge of content subjects. They added that every subject matter had its own pedagogical practice. According to the teacher participants, the lack of understanding of subject content could impact their language-

driven CLIL practice. Sorbet, for example, reflected that although he had gained fundamental knowledge of the subject content from school, he found his knowledge inadequate, especially for teaching students at an upper secondary level. According to the semi-structured and stimulated recall interviews, teachers' lack of knowledge of the subject content affected three aspects of CLIL implementation: selecting the content and mastering the content subjects, the accuracy of the lesson, and students' trust. Tawan shared that knowledge of content subjects influenced his content selection. He clarified that he was likely to select the content he was confident to teach. Following the selection of the content, all participants mentioned studying the content from different resources. Their aims were varied, including recollecting their background knowledge of the content subjects gained from school, building up the new knowledge, developing an insight into the subject-specific concepts, and ensuring the accuracy of the content. Mastering content subjects without support from a content specialist was a demanding process for a language teacher. It took a great deal of time and effort, as Kiya put it:

> *Teachers must ensure they know what they are going to teach, which, from my experience, does not happen overnight. I remembered studying a science concept and trying an experiment many times until I was confident that I understood the concept and that I could convey the concept to the class accurately.*

In addition, Alpha highlighted that self-mastering the content subjects could compromise accuracy and insight. The interview data suggested that the issue concerning content accuracy also arose from the adjustment of the content by a language teacher to suit students' level of English proficiency. The adjustment of the content was normally done by simplifying the language. However, messages could be unintentionally distorted if teachers lacked an understanding of the content. Another concern regarding the accuracy of the content was discussed by Rogefort in terms of lesson delivery. She described her fear of providing inaccurate input to her class and how she dealt with it as follows:

> *The accuracy of the lesson was my concern. When students asked questions beyond my knowledge, I chose to be honest with them by telling them that I did not know the answer, rather than providing inaccurate information just to save face. Then, I studied more on the points and discussed them with the students in the next class.*

For Sorbet and Alpha, showing a lack of content knowledge might generate uncertainty about their ability to teach, which could lead to unsuccessful lessons. In his semi-structured interview, Alpha reflected on his concern that students might feel that he was not qualified to teach science due to his professional background as an English teacher. Alpha continued by saying that gaining students' trust was important to him because it boosted his confidence in teaching.

As insufficient knowledge in content subject areas brought a myriad of challenges in language-driven CLIL implementation, the participants expressed their need for opportunities to develop their content knowledge with support from content-subject specialists. Sorbet suggested providing a course of content education covering the core subjects, including science, maths, social studies, and health and physical education, to language CLIL teachers. Alternatively, Tawan recommended developing knowledge of content subjects through collaboration with content teachers. These would help teachers develop a stronger foundation of content knowledge, which would support the long-term development of their knowledge when the teachers were on their own.

4.3.1.3 Teachers' English language proficiency

All participants believed that effective CLIL implementation goes hand in hand with effective English communication. In other words, Tawan and Kiya explained that teachers might not need an advanced level of English proficiency, but they required sufficient English knowledge and skills to communicate CLIL lessons effectively. The six participants identified two areas of English language proficiency that EFL teachers required, namely subject-specific language and English language for instruction. Data from semi-structured interviews suggested that subject-specific language was the most demanding aspect of English proficiency of all six participants. According to Daisy, it differentiated CLIL from general English classes. As EFL teachers, the participants were familiar with teaching English in the everyday domain, which as Roguefort put it, mostly related to BICS (Cummins, 2008). The subject-specific language appeared to be a new dimension of English language knowledge that they were developing as they implemented CLIL. According to the participants, this language domain was not provided as part of CLIL education. The participants were likely to master their knowledge of the subject-specific language through CLIL practices, for example, lesson planning, micro teaching, and their lecturer's and peers' feedback. However, underdeveloped knowledge of this language domain affected the mastery of content knowledge. Roguefort maintained that EFL teachers who implement CLIL should be able to

understand the content subject in English. Two of the participants shared that, to decode content subjects, they studied the content in Thai and then compared the Thai version with the English version. This helped ensure accurate interpretation of the content. Furthermore, several participants reported that insufficient knowledge of subject-specific language meant that great time and effort were needed to prepare and teach CLIL lessons. For instance, Tawan explained that:

> *Many subject-specific terms were not familiar to me. I had to study those terms from different resources to find out what meanings the terms carried in a subject-specific context. Then, I needed to prepare how to make the terms accessible to students. It took lots of time and effort.*

All participants asserted that knowledge of the subject-specific language was a supporting tool for mastering their understanding of content subjects, which directly affected their CLIL lesson delivery. Thus, Roguefort suggested that equipping EFL teachers with fundamental knowledge of the subject-specific language by an expert in the fields could be a supportive approach to teacher development.

Participants also discussed the importance of teachers' proficiency in English for instructional purposes. This involved, for example, language for giving task instructions, language for giving feedback, and strategies for classroom communication. The participants' accounts of English for instruction were consistent with their reflections on their CLIL practice. They emphasised throughout the stimulated recall interviews that conveying subject-specific terms and concepts was complicated. Sorbet said:

> *Teachers required competence in making the terms and concepts comprehensible through the medium of English, otherwise, CLIL would not be effective.*

In her semi-structured interview, Daisy described her experience as a learner, which reflected her beliefs regarding the impact of teachers' competence in English for instruction on effective lesson delivery:

> *When I was in secondary school, I studied in an EIS (English Integrated Study) programme in which maths and science were taught in English by content teachers. I did not learn much from the programme because the teachers were not capable of communicating their knowledge in English.*

Sorbet echoed Daisy's accounts. He pointed out that:

> *CLIL could be significantly demanding for teachers who lacked skills in English communication. No matter how advanced the teachers were in terms of content, lacking skills in using English to convey the content could result in a poor lesson.*

Although all participants believed that teachers' competence in using English for teaching was crucial to CLIL lesson delivery, Kiya noted that teachers' high level of fluency in English did not guarantee effective CLIL implementation. When it came to communication in the classroom setting, participants claimed that CLIL educators should take into account teachers' awareness of their language use and their abilities to adjust their language to suit students' level of English proficiency. Furthermore, they suggested that it would be helpful if teachers knew how to negotiate meanings when students had comprehension problems. According to the stimulated recall interviews, the most common difficult situation in CLIL classes was that students struggled to understand the content due to the language barrier. The EFL teachers needed to utilise all available knowledge and resources to negotiate this situation. Roguefort shared that she adopted techniques and strategies gained from learning and practice through her teacher education programme, including simplifying language, using body language, and using visual supports.

Most participants reflected that they were more careful about their use of language in CLIL lessons than they were in a general English class. Sorbet shared that when delivering the CLIL lessons, he monitored his own language and students' reactions, and was responsive to language-related problems. Kiya said that the ability to monitor her own language and to address language-related problems in the class were benefits of having a background in English language teaching; however, teachers with little background in this area might struggle to do so. In her stimulated recall interview, Kiya suggested that:

> *What could be helpful for prospective CLIL teachers, especially for non-language teachers, was to equip them with knowledge of fundamental English in a classroom setting and strategies for negotiating meanings, such as using pictures and authentic materials.*

The participants agreed that it required practice to be competent in using English for teaching. Therefore, Sorbet suggested that teachers should also be provided opportunities to practise the

skills with experts in the field and their peers allowing for feedback from both parties. In her stimulated recall interview, Roguefort concluded that:

> *Learning to teach in another language takes time. Teachers should not be obliged to use a hundred percent English in CLIL, especially at the beginning. It would be unrealistic, even for language teachers. Instead, the teachers should be supported to gradually increase the amount of English in their CLIL classes as their and students' English skills develop.*

4.3.2 CLIL teacher support

According to the interview data, three kinds of CLIL teacher support were identified. These included CLIL teaching resources (Section 4.3.2.1), a collaboration between language and content teachers (Section 4.3.2.2), and allocation of CLIL class time (Section 4.3.2.3). The participants believed that providing these forms of support would increase the quality of language-driven CLIL instruction and promote effective CLIL implementation.

4.3.2.1 CLIL teaching resources

The lack of CLIL teaching resources was mentioned in both semi-structured and stimulated recall interviews by all of the participants. It had an impact on how they planned and implemented their CLIL lessons. Kiya, for example, explained that the lack of CLIL textbooks was an issue for CLIL implementation in Thailand and that it was a significant challenge for her when planning a CLIL lesson. The six participants expressed a similar view when discussing CLIL textbooks, which were the teaching resource they felt they were most in need of. Roguefort added that despite qualified teachers, the effectiveness of CLIL could be compromised because of a lack of high-quality CLIL textbooks. All participants agreed that a 'high-quality' textbook was both designed and validated by experts in content and language areas, and made to suit the Thai EFL context. In the semi-structured interviews, when asked what should be provided to support effective CLIL instruction, the participants shared an obstacle associated with CLIL textbooks that they encountered when planning a CLIL lesson. To begin with, Sorbet articulated that he adjusted the content from online resources or textbooks made for use in contexts where English was the medium of instruction because content textbooks written in English in Thailand were not extensively available:

> *The content in subject areas, such as science and maths, was very difficult to find. Before, there was an open-access website where science and math textbooks made for a Thai school's English programme were available. But it was no longer available. I had to take the content from educational websites. A problem was that the online content might not be as valid as that from official textbooks. Another resource was a commercial textbook for native English-speaking learners. One problem with using the commercial textbook was that despite a comparable level (of difficulty) of the content, the language was too difficult for Thai EFL students.*

When the language used to communicate the content did not align with students' English proficiency, all participants reported simplifying the content to suit their students although they were aware of the impact of simplification on the validity and accuracy of the content. Daisy explained that:

> *I remembered taking a lesson from a science textbook for a Thai school's English programme. It was for Grade 4 students, but when I looked at the vocabulary used in the content, I felt like oh grade 4! It was too difficult. Some words could be replaced by simpler words. I ended up simplifying the original version.*

Furthermore, Kiya highlighted that the limited access to the content of subject areas in English limited the topics and levels of students to be taught. She explained that:

> *There was an array of content in Thai, but content in English was limited. It was impossible for CLIL teachers to translate the Thai content into English. It was time-consuming and more importantly, it would not be accurate. There were a few resources available for elementary and primary levels while the content for a higher level was rare. As a result, the level of students and the topics of the lessons that I taught were limited to the resources I had access to. I hope that there was a textbook made specifically for CLIL. It would be a great help.*

All six participants came to a similar conclusion that high-quality textbooks for CLIL should be available for teachers teaching at any level if CLIL was to be implemented. Roguefort expressed her need for up-to-date CLIL textbooks that contained a wide range of subject matters and topics based on the Thai basic education core curriculum while Sorbet suggested validation of CLIL

textbooks by experts in language and subject areas to ensure the accuracy and quality of the materials. Moreover, Roguefort emphasised that the language needed adjusting to suit Thai EFL learners:

> *When compared to the commercial textbooks for native English learners of the same age, the content of the CLIL textbooks for Thai EFL learners could be at the same level, but the language used to communicate the content might be less complex.*

Finally, as CLIL could either be taught by content or language teachers, Sorbet suggested that CLIL textbooks might contain teachers' guides for instruction, including, for example, essential subject-specific terms with meanings, recommended or alternative strategies for explaining the terms, and alternative learning activities with instructions. These would assist teachers in planning and delivering the lessons more effectively.

In addition to textbooks, participants discussed the importance of other teaching equipment to support CLIL lessons. Teaching equipment included educational instruments, tools, and classroom facilities, and different subject areas required different teaching equipment. Sorbet took an electric circuits lesson as an example and described that insulated wires, flashlight bulbs, and batteries might be required in this lesson for a demonstration or an experiment. According to the participants, teaching equipment might seem to be a minor component of instruction, but it played a major role in facilitating teaching and learning. In the stimulated recall interviews, three of the participants shared that they used their personal budget to buy some experiment materials for their science lessons due to limited school resources. Alpla explained that:

> *If possible, I would like schools to support teachers in terms of teaching equipment. My first CLIL lesson involved an experiment on plant transpiration. I spent quite a lot to buy some materials that were not available at my school.*

In the same vein, Tawan shared his concern that:

> *Much of the teaching equipment was very expensive and teachers could not afford them. Teaching materials and equipment should be adequately provided, not only for teachers but there should also be enough for students in the class. In this way, all students had equal learning experiences.*

Kiya echoed Alpha's and Tawan's accounts that:

> *I spent my budget on materials for an experiment activity in one of my lessons. In my opinion, teaching material and equipment should be sufficiently available, otherwise, CLIL would not achieve its full potential.*

Kiya and Roguefort recommended that allocating a budget and/or supplying CLIL classes with essential teaching equipment, including equipment for a scientific experiment could be a useful approach to facilitate CLIL instruction.

Moreover, participants believed that classroom spaces and facilities should be allocated in a way that suited particular subjects. For instance, Daisy shared that it was more convenient to teach a CLIL science lesson, which involved a scientific experiment, in a science classroom or laboratory than in her English classroom. However, the science classroom or laboratory was allocated particularly for science lessons, thus permission to access and use facilities and equipment in those rooms was required. Daisy explained that:

> *Inadequate equipment and space did affect learning and teaching. In my opinion, a language teacher teaching a CLIL science lesson should be allowed to access a science classroom or laboratory, where essential laboratory equipment was provided, and seating arrangement allowed sufficient space for experiment activities and small group interactions.*

Finally, Daisy suggested that basic classroom facilities, such as a projector with a projection screen, and speakers, should be available in most, if not all classrooms. Visual support was a helpful teaching resource, especially for supporting students' comprehension of the lessons. Providing those basic classroom facilities allowed teachers to use visual support to facilitate students' learning effectively.

4.3.2.2 Collaboration between content and language teachers

The participants shared that collaboration between content and language teachers could enhance the effectiveness of CLIL, especially when CLIL was not taught by teachers with specialties in both areas. As an EFL teacher, Tawan found the dual purpose of CLIL challenging to achieve because of the insufficient knowledge of content subjects. He felt that collaboration with content teachers would fulfil his knowledge gap as well as the dual-focused objective of CLIL instruction.

For the participants, collaboration could be at any stage of CLIL implementation. In her semi-structured interview, Daisy suggested collaboration at the lesson planning stage:

> *Both content and language teachers could collaborate in planning their CLIL lessons. The language teachers could act as a language mentor, providing suggestions on essential language aspects, for example, strategies or word choices for explaining key terms and concepts, and classroom language. At the same time, the content teachers could help language teachers develop their understanding of the content to be taught so that they could deliver the lesson accurately. I believed that the collaboration and exchange of knowledge between the teachers would help bridge the gap between content and language knowledge, which is a key to achieving effective CLIL teaching.*

In addition, collaboration might involve teachers from both areas working towards the shared learning objectives and assessment. Tawan elaborated that:

> *Students might learn two concurrent lessons on the same topic. One focused primarily on teaching the content while the other aimed to equip students with knowledge and skills of the language for learning the content. Both teachers could assess students' learning through the same assigned task at the end of the lessons. This would help avoid an increase in teachers' and students' workload. In this way, teachers would feel less pressure to achieve the dual goal of CLIL instruction, and students' learning in both areas would not be compromised.*

The participants also suggested that to facilitate collaboration between teachers, schools offering CLIL should develop a policy to promote teacher collaboration across the curriculum emphasising the importance of their roles in making CLIL implementation effective and establishing an official collaboration protocol. Tawan maintained that teachers may be willing to cooperate if they recognised the importance of their roles and gained support from school administrators and colleagues.

4.3.2.3 Allocation of class time

The six participants reported in both semi-structured and stimulated recall interviews that class time was an influential factor in effective CLIL implementation. Generally, English classes at

schools were allotted 50 minutes for one period, which was insufficient to complete a CLIL lesson, especially science, because many lessons involved learning through conducting an experiment. This needed a considerable amount of time, not only for students to complete the learning activities but also for teachers to explain and demonstrate those activities to the class. In his stimulated recall interview, Alpha explained the difficulties of negotiating the limited time for one of his lessons:

> *A science lesson was normally taught in a double-period class. It was challenging for me to cover the lesson in a single-period English class, let alone an experimental activity. In my CLIL lesson one, it took me approximately 20 minutes to explain and demonstrate the experiment instructions as well as to distribute materials and equipment to the class. The remaining time was really tight, so I reduced the amount of time for the experiment to allow time for wrapping up the activity. It turned out that reducing time affected the results of the experiment.*

Roguefort's semi-structured interview data echoed Alpha's reflection that insufficient learning time had an impact on students' learning. She explained that:

> *Time was very important. Some types of learning activities required a specific amount of time to complete, otherwise, the results might not meet the expectation. The activities in my class involved lots of oral presentations and an exchange of ideas. I found that students tended to be more engaged in those speaking activities when they were provided enough time to practice, and vice versa.*

Furthermore, the participants identified students' English proficiency as a key variable that influenced learning time. As most participants taught students with a low level of English proficiency, who were unfamiliar with learning through the medium of English, they had observed that they spent a majority of class time explaining concepts and dealing with students' comprehension. At the same time, the students required more time to process the English input. In her stimulated recall interview, Roguefort explained how students' English proficiency affected her class time:

> *I did not feel that time was an issue when I did CLIL micro teaching because my classmates grasped the lesson very quickly. But, in the real class, one hour was not enough to help students understand the key concepts. Many students struggled*

to understand the conveyed messages, so I often stopped to elaborate and clarify those points. These took more time than I had planned, which meant one lesson took more than one learning period.

The participants suggested that teachers minimise the scale of tasks and the amount of content when planning CLIL lessons to be more manageable within allotted class time. As regards larger-scale solutions, Sorbet proposed that:

Schools might reconsider adjusting the learning time structure for CLIL classes by increasing the allotment of time. This would allow teachers to provide a thorough lesson and explanation without worrying about disturbing others' class time. Students would have more time to process input and prepare for producing the output. Learning would be more effective.

4.3.3 CLIL teaching preparation

The six participants believed that adequate and careful preparation helped put together the knowledge into effective CLIL practice. For the participants, CLIL teaching preparation was dependent on individual teachers. However, it generally involved two different activities: lesson planning (Section 4.3.3.1) and CLIL teaching rehearsal (Section 4.3.3.2).

4.3.3.1 CLIL lesson planning

For the participants, lesson planning involved an evaluation of students' knowledge and proficiency, selecting a topic to be taught, finding and/ or creating teaching materials, establishing learning objectives in accordance with the learning indicators set out in the Thai basic education core curriculum, as well as planning learning activities and teaching procedures to be used in the class. According to the participants, a well-planned lesson was a minimum requirement for effective instruction. There were two key considerations that teachers should take into account when planning a CLIL lesson: suitability of the content for students and essential language for learning. The suitability of the content for students refers to the content which is aligned with students' prior knowledge and their level of English proficiency. Roguefort suggested that when selecting the content, it was important for teachers to take into account students' background knowledge and their English proficiency. For the participants, this was initially done by consulting the Thai basic education core curriculum along with observing and evaluating students' learning

performance throughout instruction. In the semi-structured interviews, the participants were reflecting on their experiences in CLIL lesson planning as part of their practice at the university. It was also the beginning of their teaching practicum when the data was collected. Thus, their first CLIL lesson was planned based mainly on the Thai basic education core curriculum without knowing the actual abilities of the students. In her semi-structured interview, Roguefort identified the shortcomings of not knowing her students as follows:

> *The issue that arose when planning a CLIL lesson with inadequate knowledge of students' backgrounds was that there was a mismatch between the level of difficulty of the lesson and students' actual abilities. In my experience, students' background knowledge of the content areas aligned with those outlined in the Thai Basic Education Core Curriculum, but their level of English language proficiency was likely to be varied, with the low achievers as the majority of the class. The mismatch made students unmotivated, and they struggled to learn. It was very challenging because when that occurs, teachers must find a way to fill the gap between students' backgrounds and the complexity of the planned lesson to keep the class going.*

Except for English programmes, all subjects at mainstream schools in Thailand are taught through the medium of Thai. Learning areas and achievement objectives were outlined by grade level in the Thai basic core curriculum and taught accordingly. In his semi-structured interview, Tawan echoed Roguefort's issue that the mismatch between students' background knowledge and the planned lesson affected the quality of his CLIL instruction. He had observed that students were likely to be able to make sense of the lesson when the level of the language complexity used to communicate the content aligned with their level of English proficiency. As students' background knowledge and their English proficiency were fundamental to CLIL lesson planning and instruction, Roguefort suggested in her stimulated recall interview that these two areas of students' background could be utilised as the criteria for content selection.

Moreover, as mentioned earlier, teachers were likely to adapt the content by simplifying the language so that it could be easily accessible. However, the interview data suggested that accessible language was not always comparable to simple language. When simplifying the language, teachers should proceed with caution to avoid oversimplification. Kiya pointed out that

the complexity of the language that appeared in the text might be a reflection of the level of content difficulty. The more complex the content was, the higher level of language knowledge was required. Therefore, when planning a CLIL lesson, apart from making the language accessible, for example through language simplification, Roguefort suggested that:

> *To support students' learning, teachers considered extracting the difficult language that should not be simplified, such as subject-specific terms, from the content and planning how it could be made comprehensible and what teaching material could be used to assist the explanation.*

Finally, as reflected by Daisy in Section 4.1.1, teachers might consider localising the content where applicable. The content that was closely linked to students' lives and experiences was meaningful for students to learn and could increase students' engagement in the lesson.

Planning the essential language for learning was another key aspect of CLIL lesson planning. The essential language for learning included the subject-specific terms, general academic terms which were important for learning a particular lesson, and language structures and expressions for learning and completing tasks. To decide on an essential language, Roguefort explained that she read and analysed the selected content, and then highlighted subject-specific terms, language structures as well as expressions in the text. Tawan added that he took students' English proficiency into consideration when extracting key terms and expressions to teach in his class. For example, Roguefort highlighted passive voice in the content to support students' comprehension of the main idea of climate change, which was caused by humans. According to the participants, preparing the essential language and teaching it explicitly in the class could accommodate students' comprehension of the content. Moreover, students, especially those with a low level of English proficiency, tended to struggle to complete tasks because they lacked knowledge of the required language for communicating the key ideas. Roguefort explained that:

> *It was important that teachers prepare task guidelines, providing an essential language for completing the tasks. The guideline would serve as a tool to facilitate students' production of the language output during the tasks.*

4.3.3.2 Teaching rehearsal

Teaching rehearsal involves teachers rehearsing CLIL instruction according to the planned lesson before class. The participants believed that adequate teaching rehearsal made CLIL successful. They reported rehearsing with and receiving feedback from their peers. Sorbet highlighted that rehearsal allowed him to be proactive about his language as well as strategies for the explanation. Furthermore, Daisy felt that rehearsal allowed her to anticipate problems that she might encounter in the class, and helped prepare alternative plans accordingly. In her stimulated recall interview, Roguefort explained that:

> *Teachers could not choose to teach only high-achieving students and they should not do so just to claim their success in teaching. Instead, they should be well-prepared for any level of students. In my view, rehearsing was an important duty that should not be neglected if they wanted their lessons to be successful.*

The interview data suggested that the reasons for the rehearsal included teachers' unfamiliarity with the content, and the nature of content subjects, which required different techniques of explanation compared to their EFL lessons. The participants put an emphasis on rehearsing the explanation of subject-specific terms and concepts, task instructions and demonstration, and essential language structures and expressions because these tended to be the most concerning aspects of teacher fronted-talk in CLIL. In her stimulated recall interview, Daisy reflected how not rehearsing could have affected her CLIL instruction:

> *Rehearsal was very important for CLIL. I might have been able to deal with my first CLIL lesson (water cycle) without rehearsal, but not for the second lesson (volume of the prism). Explaining the key terms in the second lesson, for example, 'three-dimensional', was complicated. Trying out different strategies for explaining those key terms before class helped me deal with teaching difficulties promptly, and deliver the lesson effectively.*

4.4 Chapter summary

The findings in this chapter reveal five major NoM strategies that the pre-service EFL teachers generally utilised in their language-driven CLIL lessons to negotiate meanings of subject-specific terms and concepts, namely students' schema activation, students' comprehension check,

modification, the use of visual supports, and the use of L1 (RQ 1). The primary reason for the teachers to adopt these NoM strategies largely involved students' comprehension. When all attempts to convey the meanings of the target terms or concepts were unsuccessful, four teachers were inclined to use L1, which was regarded as their final resource while the other two teachers tended to avoid L1 in their CLIL lessons and adopted visual supports and language modification instead (RQ1.1). Despite being avoided, L1 was regarded as an explicit and time-saving strategy for negotiating subject-specific terms and concepts. Furthermore, although the six teachers adopted different NoM strategies to deal with difficulties in explaining subject-specific terms and concepts, they shared a similar opinion that NoM strategies were useful tools that accommodated the explanation of subject-specific terms and concepts in language-driven CLIL.

Following the NoM strategies, the findings reveal three principal aspects of CLIL professional practice and support that the pre-service EFL teachers believed to be influential in effective CLIL implementation (RQ2). First of all, they believed that providing CLIL education equipping prospective CLIL teachers with essential knowledge and skills, namely the basics of the CLIL approach, knowledge of content subject areas as well as English language proficiency, was a threshold to effective CLIL implementation. Secondly, to increase the quality of CLIL implementation, CLIL support is required. The pre-service EFL teachers suggested that high-quality CLIL textbooks designed and validated by experts in both content and language areas, and made to suit the Thai EFL context, be available for teachers teaching at all levels. Teaching equipment should also be allocated to suit particular subjects to facilitate language-driven CLIL instruction. Furthermore, the EFL teachers emphasised the need for the development of a school policy that promotes collaboration between content and language teachers as they believed that it would fulfil the dual-focused objective of CLIL instruction. In addition to collaboration, the EFL teachers shared their concerns about the effects of insufficient class time on CLIL implementation. To mitigate the effect, they recommended minimising the scale of tasks and the amount of content to be more manageable within the allotted time. They also encouraged schools to consider adjusting the learning time structure by increasing the allotment of time for language-driven CLIL classes. Finally, the pre-service EFL teachers believed that a well-planned lesson and teaching rehearsal helped put together the knowledge into effective CLIL practice. Therefore, when planning a CLIL lesson, teachers needed to take into account the suitability of the lesson for students' prior knowledge and level of English proficiency. They should prepare essential

language for learning, including subject-specific and general academic terms, language structures, and expressions to facilitate students' learning and task completion. Following lesson planning was rehearsing teaching the planned lesson. The teachers believed that adequate teaching rehearsal made CLIL successful.

In the next chapter, I deal with a discussion of the pivotal findings from pre-service EFL teachers' NoM in language-driven CLIL and their beliefs regarding effective CLIL implementation concerning the three research questions and related literature.

CHAPTER 5 DISCUSSION

This chapter discusses the principal findings from the three research questions in relation to the literature and empirical studies. The three research questions are as follows:

RQ1: How do Thai pre-service EFL teachers explain and negotiate the meaning of subject-specific terms and concepts in CLIL lessons?

RQ1.1: What are the NoM strategies that the pre-service EFL teachers adopted to address difficulties concerning the explanation and students' comprehension of the subject-specific terms and concepts?

RQ2: What are Thai pre-service EFL teachers' beliefs regarding effective CLIL implementation?

The discussion emphasises convergences and divergences between the current findings and those found in the previous research. This chapter is organised into five main sections. Drawing on the findings from RQ1 and RQ 1.1, Section 5.1 discusses the NoM practices of the six pre-service EFL teachers. This is followed by a discussion of the use of L1 in language-driven CLIL classrooms (Section 5.2). In Section 5.3, I conceptualise professional development needs for language-driven CLIL teachers based on the findings associated with the EFL teachers' beliefs about effective CLIL implementation (RQ2). Finally, EFL teachers' professional roles and identities are discussed in Section 5.4, followed by a chapter summary (Section 5.5).

5.1 EFL Teachers' negotiation of meaning in language-driven CLIL

Teachers' NoM in language-driven CLIL settings in Thailand as well as in a broader context has been under-researched. NoM is a more comprehensive field in SLA literature than in CLIL. As reviewed in Chapter 2 (see Section 2.6), the existing body of research on NoM in CLIL settings has largely focused on its use by students in content-driven CLIL contexts (Azkarai & Imaz Agirre, 2016; García Mayo & Lázaro Ibarrola, 2015) following traditional NoM work in SLA (Foster, 1998; Long, 1996; Pica, 1988, 1996). The research presented in this thesis sheds light on pre-service EFL teachers' NoM strategies in language-driven CLIL in a Thai secondary school setting, which may help CLIL teachers, educators, and practitioners in Thailand and other comparable contexts to understand the roles of NoM strategies in helping learners and teachers achieve comprehension and learning goals.

The findings indicate that the pre-service EFL teachers employed five main types of NoM strategies in the explanation of subject-specific terms and concepts. These include schema activation, comprehension check, modification, the use of visual support, and the use of L1. According to the summary of NoM strategies in language-driven CLIL (Figure 9) presented in Chapter 4, several NoM strategies used by the teacher participants converge with those described in existing literature (see Section 2.6). Although they are categorised differently, the common characteristic is that NoM strategies in language-driven CLIL involve the use of a variety of both linguistic and non-linguistic, written and verbal resources to convey the meaning of the target terms or concepts. In other words, communicative resources used to facilitate the meaning-making process in the CLIL classrooms "extend beyond spoken and written words" (Mortimer & Scott, 2003, p. 21). This supports the argument in Chapter 2 that NoM strategies outlined in SLA research, such as repetition, confirmations, reformulations, comprehension checks, confirmation checks, and clarification requests, are "too narrow" (Lyster, 2002, p. 237) to describe NoM interaction in a CLIL context. This may be because content and words in CLIL are more complex than those which learners may encounter in more general instruction or outside the classroom.

Because this research focused on teacher-fronted talk, the NoM strategies identified in this study served as resources that facilitated students' comprehension of subject-specific terms and concepts and helped them construct new knowledge in the target language, rather than promoting students' modified output. At the teacher-fronted talk stage, students learned new concepts and applied them to assigned tasks at subsequent stages of the lesson in which they produced verbal and written output. However, the findings reveal that not all of the NoM strategies were successful all of the time in supporting students' comprehension. According to the teacher participants, students' target language proficiency and the nature of subject-specific terms or concepts were two main factors affecting their NoM practices. Thus, to effectively support students' understanding of subject-specific terms and concepts, the EFL teachers adopted the NoM strategies in combination according to target terms or concepts, and their perceptions of students' comprehension. Furthermore, some NoM strategies were carefully planned before the class, while the others were teachers' spontaneous responses to students' reactions. The key factors in the teacher participants' choices of NoM strategies are discussed in Section 5.1.1. This is followed by a discussion of NoM strategies that were pedagogically planned (Section 5.1.2).

5.1.1 The key factors in EFL teachers' choices of NoM strategies

In this research, eleven language-driven CLIL lessons from three subject areas were observed: science, mathematics, and geography (see Table 4). The findings highlight the influential roles of subject-specificity in the EFL teachers' choices of visual support and other NoM strategies. In other words, different explanation techniques were used for different subject-specific terms (Mahan, 2020; Waring et al., 2013). Lemke (1990) suggests that although similar basic strategies may be used to communicate a lesson, some strategies are likely to be more or less common depending on the subject areas. The overall findings in the present study show that the use of visual support to supplement or substitute for other NoM strategies was found to be common in all subjects and useful in facilitating students' comprehension of subject-specific terms and concepts. A science lesson, for example, was found to be complicated for the teacher participants when taught in English because of its contents which involved systems, processes, and actions. In Alpha's science lesson (see Extract 23 in Section 4.1.4.1), for instance, Alpha needed to use a video showing how an antibody worked to scaffold students' comprehension of the functions of the antibody.

In accordance with Lin (2012) and Aalto and Tarnanen (2017), the teacher participants in the present study found visual support such as pictures, diagrams, animations, and videos, the most helpful resources for students' meaning-making of the lessons (see Section 4.2.3). Similarly, in Tawan's math lessons, which contained abstract ideas represented by signs and symbols, Tawan found pictures more effective in conveying meaning than definitions. The findings coincide with Morton's (2015) conversation analysis of teachers' vocabulary explanation in Spanish CLIL classrooms, in which verbal and textual resources were used in combination with a range of multimodal resources to explain new vocabulary to the class. The study by Mahan (2020) also highlights the influence of subject-specificity in Norwegian science and social science teachers' choices of scaffolding strategies in CLIL. While science teaching involving natural phenomena relied more on visual support to help students visualise the process of the phenomena, social science teaching provided limited visual support focusing more on discussion and an exchange of ideas (Mahan, 2020). Additionally, when it came to subject-specific terms, teachers normally provided L1 translations of the terms (Mahan, 2020); however, the teacher participants in the research presented in this thesis limited their use of L1, considering it as their 'final resource'. A possible explanation for this dissimilar practice may be the differences between the teachers'

educational backgrounds as content (Mahan, 2020) and EFL teachers (the present study), which may affect their beliefs about the use of L1.

When terms or concepts were intangible, visual support became a secondary resource. For instance, in Daisy's math lesson (see Section 4.1.5), she drew on an everyday register associated with body parts alongside Thai equivalents to facilitate students' meaning-making of measurement units such as square centimetres, square metres, and square inches. As Daisy shared the same L1 with her students, providing L1 or L2 equivalents was beneficial to helping students learn the terms (see also An et al., 2021). Daisy's practice demonstrates that linking the lessons to students' prior knowledge and their L1 is essential to support knowledge construction in the target language.

It is also evident that making linguistic features explicit can accommodate students' meaning-making process, as demonstrated in Roguefort's climate change science lesson (see Section 4.1.3.2). The content for this lesson was written in passive voice to describe how the global environment was destroyed by human activities, leading to Roguefort's emphasis on grammar to help students make sense of the key concept. Roguefort's emphasis on passive voice is in line with Gibbons' (2015) explanation that the focus on form, which made grammar a part of the whole text, serves students' meaning-making of the key concept. In other words, the teaching of the form "is in the context of the overall meanings being made and the curriculum knowledge being constructed" (Gibbons, 2015, p. 228). This indicates that focus on form can be helpful for the meaning-making process when treated in a contextually inclusive way and "accommodated to match the academic content" (Banegas, 2021, p. 6). Thus, where necessary, teachers may explicitly draw students' attention to language forms during subject content learning (An et al., 2021) to accommodate the meaning-making process.

The present research also underlines the impact of students' target language proficiency on how EFL teachers negotiated the meaning of subject-specific terms and concepts. The EFL teachers' believed that students with low English proficiency relied largely on visual support to make sense of the target terms or concepts (see also Hellekjær, 2010; Kessler & Quinn, 1987; King et al., 1987). According to the teacher participants, most of their students had a low level of English proficiency despite being secondary school students. This meant that the level of language complexity in the L2 content materials was generally very challenging for the students. This resulted in teachers' modification of their verbal explanations and their selective use of non-verbal

NoM strategies to convey the meaning of the subject-specific terms and complex concepts. Daisy's accounts show that she believed sometimes providing too much verbal explanation in the target language could increase students' confusion rather than facilitate their comprehension. Alpha explained that he used pictures and animations because providing only an English explanation could be overwhelming for students. Sorbet pointed out that when students struggled to comprehend the materials, it was helpful to keep verbal explanations short and simple, and supplement the explanations with multimedia. Tawan also found that long passages demotivated students, thus he divided the content into short paragraphs to make the content manageable for students (see also Montet & Morgan, 2001). Similarly, teachers in the study by Bárcena-Toyos (2020) show their concern about students' low level of language proficiency hindering the learning of appropriate level of content. As a result, the teachers employed teaching strategies, such as selecting the least demanding content or using L1 to explain a difficult concept, to support students' learning.

Furthermore, the findings highlight limitations of language-related NoM strategies, particularly providing definitions, when used with the less proficient students. The teacher participants pointed out that students required a good command of English to understand English definitions of subject-specific terms (see also An et al., 2021; Bárcena-Toyos, 2020). Definitions of subject-specific terms are often written in academic language and contain other subject-specific terms; students with limited vocabulary are therefore likely to struggle to make sense of the target terms from the definition alone. Furthermore, in CLIL, definitions may require students to construct conceptual knowledge of the content, rather than just learning the meaning of vocabulary as in general English classes (Kääntä et al., 2018). Consequently, teachers are required to teach the difficult terms contained in definitions in addition to the target subject-specific terms, conceptually explaining each of these. As exemplified in Extract 14 (see Section 4.1.3.2), Daisy needed to elaborate on key terms in definitions, such as three dimensional, parallel faces, and lateral faces, to help students comprehend the concept of 'prism' so that students would be able to do the assigned task involving the calculation of the volume of a prism. She pointed out that background knowledge of mathematics and general academic language was the foundation that would help students to decode maths terms. This corroborates Dale and Cuevas's (1987) account that students require "prerequisite language proficiency" (p. 24) to be able to read mathematical texts and solve mathematics problems in the target language. Moreover, definitions should be provided together

with other teaching resources, for example, multimedia, to help students make sense of target terms from definitions. Roguefort reflected that a combination of different teaching resources supported students' comprehension of key terms.

5.1.2 NoM as pedagogically planned strategies

While several NoM practices were EFL teachers' spontaneous responses to students' reactions in the classrooms, some NoM strategies were carefully planned before classes. The planned NoM strategies observed during the lessons included: breaking content into small chunks (see Section 4.1.3.1), providing definitions, giving language-related examples, highlighting grammar (see Section 4.1.3.2), and using multimedia (see Section 4.1.4.1). A common practice found in all observed lessons was the teachers' use of PowerPoint slides to present CLIL materials. The information provided in the slides varied according to the content being taught. To provide an example, for the teaching of subject-specific terms, each slide contained a subject-specific term along with pictures or animations, its definition, and an example sentence in which the term was used (see Chapter 4). Similarly, a slide containing a small chunk of content with key terms and/ or grammatical structure colourfully highlighted, together with multimedia, was used for content teaching. These materials indicate that subject-specific terms and strategies adopted to make the terms accessible could be predetermined and well-planned. These NoM practices reflect the EFL teachers' beliefs that effective CLIL implementation involves thorough lesson planning and teaching rehearsal (see Section 4.3.3).

It is also evident in the EFL teachers' accounts of their beliefs about effective CLIL implementation that there were pedagogically planned NoM strategies that could not be clearly identified from the observational data, for example, language simplification. The EFL teachers reported that one of their tasks when planning CLIL lessons was to decide whether the content suited their students' abilities. When the language did not align with students' language proficiency, the teachers adapted the content by simplifying the language to make it easily accessible. The EFL teachers also rehearsed their planned lesson before class (see Section 4.3.3.2). Daisy explained that careful lesson planning and rehearsal allowed her to anticipate problems that might occur in the class and helped prepare alternative plans and strategies accordingly. However, that the EFL teachers placed importance on lesson planning and rehearsal might also be due to the fact that they were new to teaching.

EFL teachers' NoM practices reflect their language awareness and how they transferred linguistic knowledge and skills to make CLIL lessons accessible to their students, which are consistent with their beliefs about the importance of EFL teachers' target language proficiency to effective CLIL lesson delivery (see Section 4.3.1.3). Without language awareness, teachers are likely to overlook the importance of language teaching and learning in CLIL, as shown in the study by Bárcena-Toyos (2020). In that study, although teachers used scaffolding strategies, for example, multimedia, gestures, and visuals to facilitate students' learning, they reported that the strategies and essential language for carrying out tasks were unplanned. In a similar vein, the study of pre-service content teachers' CLIL lesson planning by Aalto and Tarnanen (2017) found that the teachers did not treat language as a target and tool for content learning, thus they overlooked the planning of scaffolding for students' meaning-making process. Interestingly, the pre-service teachers in Aalto and Tarnanen's (2017) study lacked language awareness and competence in analysing disciplinary language although they had completed a study unit on subject-specific pedagogical practices from the linguistic perspective.

Conversely, despite completing only a CLIL module that did not include any subject-specific pedagogy, the teacher participants in this research appeared to be aware of the role of language and the effects of English communication in subject content teaching. They recognised that CLIL involves "language learning as part of the general learning process" (Wannagat, 2007, p. 679), hence the planned strategies for CLIL lesson delivery and responsiveness to students' comprehension problems in the class. A factor in the divergence between the findings in this research and those in Aalto and Tarnanen (2017) might be that the participants in Aalto and Tarnanen (2017) had never put theory learnt from the study unit into real classroom practice, whereas the teacher participants in the present research had an experience in integrating CLIL both in microteaching and at school under the supervision of their instructor before their teaching practicum. The experiences gained from the practices of CLIL implementation might have raised their awareness of challenges students may encounter when learning content through the target language, leading to carefully planned strategies for lesson delivery.

5.2 Rethinking the use of L1 in language-driven CLIL

Results from the present study indicate that when struggling to convey meanings of subject-specific terms or concepts, the EFL teachers tended to switch to L1. Specific L1 strategies included

modelling tasks, checking students' comprehension, confirming students' answers, summarising key concepts, and translating the target terms or concepts (see Section 4.1.5). These findings reveal two issues regarding the use of L1 in language-driven CLIL. On the one hand, the EFL teachers reflected that L1 played a beneficial role in CLIL classrooms. On the other hand, there was a contradiction between the EFL teachers' beliefs about the use of L1 in CLIL and their teaching practices. These two issues are discussed in Section 5.2.1, and Section 5.2.2.

5.2.1 The roles of L1 in language-driven CLIL lesson delivery

One of the key findings of this thesis is the beneficial role of L1 in CLIL learning and instruction. In line with several studies on L1 in CLIL (Domalewska, 2017; Karabassova & San Isidro, 2020; Lasagabaster, 2017), EMI (Macaro et al., 2020), and EFL settings (Martínez Agudo, 2017), students' comprehension was identified as the main trigger for the EFL teachers' decision to use L1. Moreover, students' levels of target language proficiency and the complexity of lessons were considered to be the other influential factors in the EFL teachers' use of L1 (see also Lasagabaster, 2017). Students at any level of language proficiency can struggle to learn a lesson when the lesson content is too complex for them. As evident in Alpha's lesson (see Section 4.2.1), the complexity of the lesson made students struggle to understand some key terms or concepts despite having better English skills than the students in his first CLIL lesson. As has been found in other research (Domalewska, 2017; Karabassova & San Isidro, 2020; Macaro et al., 2020; Martínez Agudo, 2017; Milán-Maillo & Pladevall-Ballester, 2019; Moncada-Comas & Block, 2019), L1 was used as a scaffolding tool to negotiate meaning and facilitate students' comprehension. It proved to be a strategy that helped the majority of the EFL teachers, including Alpha, overcome CLIL teaching difficulties in conveying meanings of subject-specific terms or concepts. All participating teachers highlighted that L1 made the conveyed meaning of subject-specific terms and concepts explicit, thus mitigating misunderstanding or misinterpretation (see also Domalewska, 2017). The findings also corroborate Swain and Lapkin's (2013) assertion that when the complexity of the content increases, L1 can be a necessary tool, which facilitates the learning of students, especially those with a low level of language proficiency.

The teacher participants considered students' interactions in the classroom as important as students' comprehension. As found by Kääntä and Kasper (2018), students were expected to demonstrate their understanding of teachers' explanations by responding to teachers' questions.

Daisy explained that students tended to be quiet when she talked in English; however, they seemed comfortable talking when she switched to L1 (see Section 4.1.5). Quietness is common in Thai classrooms, especially when English is used as the medium of instruction. Lack of English competence and nervousness (see also Martínez Agudo, 2017), low confidence, and fear of making mistakes may account for Thai EFL students' silence. Some teachers interpreted the silence as a sign of incomprehension (see Extract 34 in Section 4.2.2). Roguefort explained that students' responses were crucial because they demonstrated the degree of students' comprehension, which helped her decide how to proceed with her class. Thus, the participants switched to L1 to increase students' engagement and participation in classroom interactions (see also Pun & Thomas, 2020) which helped them evaluate and contribute to students' comprehension.

Although the EFL teachers aimed to encourage students' responses in English, they did not reject students' use of L1 as long as the provided ideas were relevant to the lessons. The literature suggests that CLIL teachers take different approaches to the use of L1 in class. For instance, Kazakhstan teachers in the study by Karabassova and San Isidro (2020) disapproved of students' use of L1 in CLIL classes. They discouraged students from switching to their L1 believing that allowing students to use their L1 would develop a habit of resorting to L1. Lasagabaster's (2017) group discussions with six CLIL teachers teaching at schools in the Basque Autonomous Community (BAC) in Spain also show that the teachers believed that using English in class improves their students' competence, thus they tried to force students to use only the target language in the class. On the other hand, the teacher participants in this research did not reject students' use of L1 because they believed that allowing students to express ideas in L1 helped the students to apply their prior knowledge to the learning of the equivalent L2 content. Allowing students to use L1 also established a positive learning atmosphere because it helped students, especially those with a low level of English proficiency, to gain confidence in CLIL and the target language (see Extract 36 in Section 4.2.2). These affective factors play an essential role in second language learning. Cook (2010) asserts that learning a second language requires several factors, including the right motivation and attitude. The EFL teachers' belief that allowing students to use L1 was useful to the learning of CLIL coincides with Macaro's (2009) account that at a certain stage of teaching, the use of L1 might promote students' learning more than by using only the target language.

5.2.2 Contradiction between EFL teachers' beliefs and practices

Despite their willingness to use L1 to negotiate meaning in the observed classes, the participants expressed mixed beliefs regarding how and when L1 should be used during their interviews. On the one hand, all teachers agreed that L1 played an important role in supporting CLIL learning and instruction. They allowed students to use L1 during the teacher-fronted talk and four of them used L1 as a coping strategy when encountering teaching difficulties. On the other hand, when discussing their practices in the stimulated recall interviews, these four teachers described L1 as *'a final resource'*, which should be avoided or minimised. All participants emphasised that L1 should be used only when all attempts were unsuccessful to help students learn in the target language. Some of the common reasons given by the teacher participants for avoiding the use of L1 in their classes include: to maximise students' exposure to the target language allowing them to learn the language alongside the content, to familiarise students with learning through the target language, and to be a language model to students which they believed would accommodate students' output (see Section 4.2.2, 4.2.3).

The belief regarding the need to maximise students' exposure to the target language is one of the predominant key findings in research on teachers' use of L1 (see Karabassova & San Isidro, 2020; Lasagabaster, 2017; Martínez Agudo, 2017; McMillan & Turnbull, 2009; Milán-Maillo & Pladevall-Ballester, 2019). In their study, Milán-Maillo and Pladevall-Ballester (2019) argue that teachers' cautious use of L1 is affected by the traditional notions of second language learning. Some influential notions include negative interference of L1 in L2 learning, maximum L2 input, and native-like attainment (Lasagabaster, 2017; Lin, 2015; Mahboob & Lin, 2016). These notions have a deep root in additional language curriculum and teacher education. Enrolling in a five-year EFL teacher education programme at their university, the teacher participants in the study presented in this thesis had been trained to teach English using an array of second language teaching approaches, from the traditional grammar-translation to a more recent approach, such as CLIL (see Section 3.3.3). The EFL teachers were required to use English as the primary medium of instruction. They were trained to use teaching techniques, communication strategies, and other teaching resources, especially visual support, as primary resources to scaffold students' learning and deal with teaching difficulties. The EFL teachers were also encouraged to provide listening materials with native-speaker voices as a model of 'proper' English. L1 was considered an undesirable option. It appears that this knowledge and experience gained from the EFL teacher

education programme had been transferred to CLIL practices as evident in the observed lessons presented in Chapter 4.

Another factor affecting the EFL teachers' L1 practices could be the fact that they were assessed by their university. In the EFL teacher education programme at the teacher participants' university, English was the required medium of instruction for all teaching practices, including teaching practicum (see Section 3.3.3). In other words, the use of the target language is one of the assessment criteria. A similar practice was evident in Kwangsawad's (2018) study on pre-service EFL teachers' coping strategies in a CLIL science lesson, in which the teachers' teaching practices were assessed by their university. Classroom observations show that the pre-service teachers used only English with no translation of any words into Thai although they were aware that students struggled to understand the lesson in English (Kwangsawad, 2018). It can be concluded from the findings that the teacher participants' contradictory practices could be affected by many factors. On the one hand, their beliefs could be influenced by the education they received. On the other hand, the teacher participants' L1 practices were influenced by the fact that they were being assessed by their university. They might believe that L1 was beneficial, but they had to follow the assessment criteria by refraining from using it to get a good assessment.

5.3 Conceptualising professional development needs for language-driven CLIL teachers

Research shows that CLIL teachers face many challenges in implementing CLIL, including content teachers' and students' low level of target language proficiency, language teachers' lack of content knowledge, and both content and language teachers' lack of understanding of the CLIL teaching approach (Karabassova, 2020; Kewara & Prabjandee, 2018). Lo (2020) and Pavón Vázquez et al. (2020) suggest that as teachers play a key role in the CLIL classroom, CLIL professional development is required to develop teachers' target language competence, their understanding of CLIL fundamentals, and pedagogical strategies for supporting and developing students' learning. Along with teacher professional development, the other key elements are teacher collaboration (Pavón Vázquez et al., 2020), CLIL resources (Bárcena-Toyos, 2020), and time (Cammarata & Tedick, 2012). In alignment with the previous research, the current research findings concerning EFL teachers' beliefs regarding effective CLIL implementation reveal the EFL teachers' needs for CLIL professional development and support to make language-driven

CLIL effective. The findings suggest several key elements of effective CLIL implementation in the Thai context, particularly in the language-drive CLIL context where CLIL is implemented by a language teacher. The findings may also be useful for CLIL teachers who come from a content-teaching background, especially in terms of teachers' knowledge and skills, which are the building blocks for all types of proficient CLIL teachers.

Figure 26

The key factors in effective implementation of language-driven CLIL

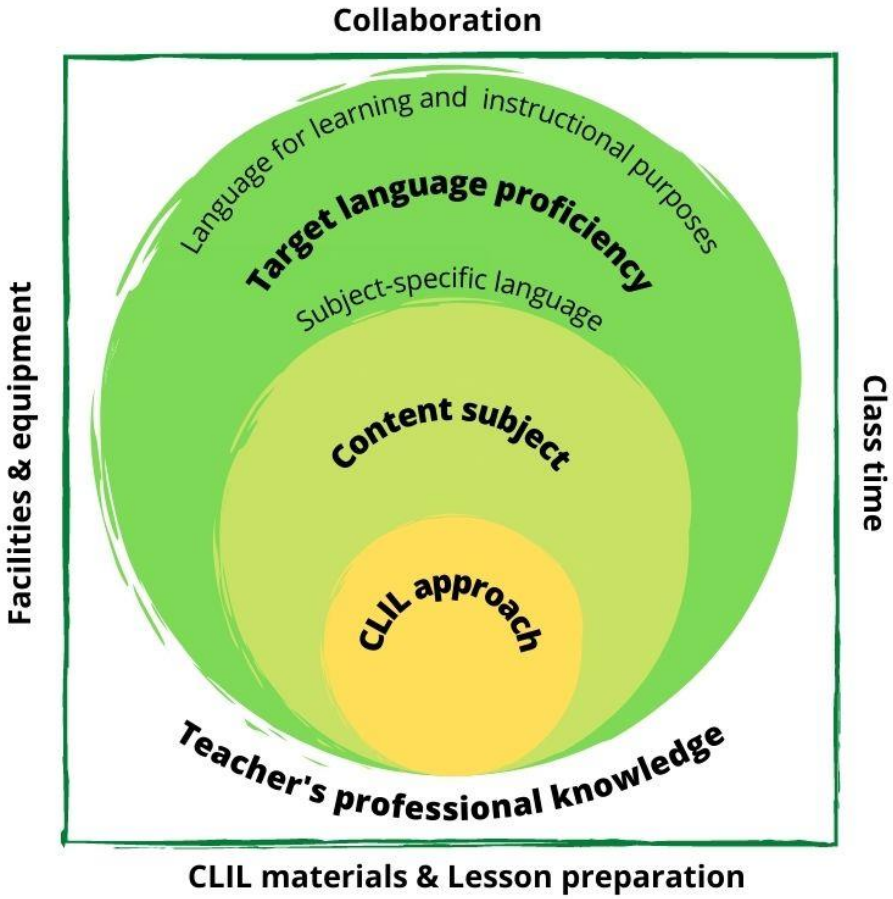


Figure 26 illustrates the key factors that the teacher participants believed to be influential to effective language-driven CLIL instruction and needed to be taken into account when providing professional development and support. It depicts the EFL teachers' accounts that a proficient CLIL teacher was central to effective CLIL implementation, while collaboration, CLIL materials, lesson preparation, classroom facilities and equipment, as well as class time were important supporting factors for their successful implementation of language-driven CLIL.

The teacher's professional knowledge was regarded by the participants as the most important factor. CLIL teacher education needs to equip potential CLIL teachers with essential knowledge and skills for language-driven CLIL instruction, namely CLIL approach, content subject areas, and target language proficiency. The EFL teachers believed that these three layers of knowledge and skills are the building blocks of proficient language-driven CLIL teachers, which would help them achieve the dual goal of CLIL instruction.

As depicted in Figure 26, the first layer of teacher's professional knowledge is the CLIL approach, which is the foundation of effective CLIL implementation. CLIL implementation is varied based on the contexts in which it is implemented; as Meier (2020) puts it, "there is no single CLIL recipe" (p. 170). If teachers lack an understanding of CLIL fundamentals, they may struggle to put CLIL into practice in a way that is appropriate to their context (Barrios & Milla Lara, 2020). Inadequate knowledge of the CLIL approach may also cause teachers' concern about the negative effects of teaching in English on students' content learning (Bárcena-Toyos, 2020; Karabassova, 2020) or uncertainty about their roles as a teacher. Thus, it is important that teachers understand the key principles of CLIL and how they are translated into particular educational policies or school curriculum. Understanding CLIL can guide the teachers in the requirements and expectations of their CLIL practices. It will also allow teachers to reconsider the learning goals of CLIL, and they may develop beliefs in their role as well as the importance of content and language integration (Lo, 2020). The findings in this research indicate that the participants believed that the CLIL education they received was too short and intensive. They felt that it would be beneficial if they were provided more time on learning CLIL-related theories and principles to develop a strong foundation before practice.

The other two layers of teachers' professional knowledge are subject knowledge and target language proficiency. In accordance with research on CLIL teacher qualification (Nguyen, 2016; Pérez Agustín, 2019), this research suggests that whether the CLIL teachers are content or language teachers, they are required to be proficient in both areas to implement CLIL effectively. In line with Skinnari and Nikula (2017) and Morton (2019), the teacher participants suggested that knowledge of the subject-specific content, and how to make this content accessible to students, are essential for language-driven CLIL teachers through professional development. Lacking one or another can lead to less effective lesson delivery. In addition to the knowledge of subject content,

the teacher participants believed that target language proficiency was another key component of CLIL teacher professional knowledge. This may be because CLIL teachers have to communicate CLIL lessons through the medium of an additional language (Papaja, 2013), be aware of their students' language competence, and scaffold their learning through the target language accordingly (Papaja, 2013; Pavón Vázquez et al., 2020; Pérez Agustín, 2019). This means that the language proficiency of CLIL teachers goes beyond teachers' typical language proficiency, which tends to "default to definitions drawn from general language proficiency frameworks, such as the Common European Framework of Reference (CEFR)" (Freeman et al., 2015, p. 131). Karabassova (2020) emphasises the need to establish more specific language skills for CLIL teachers based on the teachers' accounts in her research and to consider providing professional training accordingly.

The EFL teachers in the present research suggested that CLIL teachers do not need to be advanced users of the target language because, as Pérez Agustín (2019) puts it, "having a high command of a foreign language does not guarantee teaching in an effective way" (p. 121). This does not mean that teachers with low levels of target language proficiency are effective CLIL teachers; the teacher participants pointed out that CLIL teachers still needed to be proficient enough to communicate their knowledge and run the class in the target language. They needed pedagogical knowledge and target language commands for instructional purposes, such as classroom language and classroom management (see also Nguyen, 2016). In line with Nguyen (2016), the teacher participants in the present study suggested two essential areas of language-driven CLIL teachers' language proficiency, including subject-specific language and language for instructional purposes. The subject-specific language was regarded as essential not only to the teaching of CLIL lessons but also to the mastery of subject content (see Section 5.3.1). The teacher participants also emphasised the importance of preparing and teaching essential language, including grammatical structures and expressions related to the content of the lessons, to scaffold students' learning. This indicates that knowledge of language for learning was also an essential component of CLIL teachers' language proficiency (Section 5.3.2).

As reported by the teacher participants, the external factors surrounding the teachers' professional knowledge are support from schools and stakeholders, including collaboration between language and content teachers, CLIL materials and lesson preparation, classroom facilities and equipment, and class time. The findings are in line with those in Pavón Vázquez and Ellison (2013) which

suggest that successful CLIL does not depend only on teachers' expertise in language and subject contents, but also on other surrounding factors, including collaboration between language and content teachers. While some of the factors had a minor impact on CLIL implementation, it is evident that CLIL materials and time could considerably affect the effectiveness of language-driven CLIL practices. A detailed discussion about the roles that CLIL materials and time play in language-driven CLIL implementation is presented in Section 5.3.3

5.3.1 Subject-specific language and EFL teachers' mastery of subject content

Subject-specific language was identified as a key area of language-driven CLIL teachers' target language proficiency, which was essential not only for CLIL lesson delivery but also for the EFL teachers' mastery of subject contents. Many studies suggest that the lack of knowledge of subject-specific language can hinder successful CLIL instruction (Kwangsawad, 2018; Skinnari & Bovellan, 2016; Tachaiyaphum & Sukying, 2017). Each subject area has "specific cognitive and language demands" (Lopriore, 2020, p. 97). To teach CLIL lessons, not only are teachers required to facilitate language learning through the subject contents, but they also need to learn the content in the target language (Bárcena-Toyos, 2020). This is congruent with Lemke's (1990) suggestion that "mastery of any of these subjects depends critically on mastering its language" (p. 155) because there is not just one academic language, but many forms used in different ways across different subject areas. The teacher participants regarded knowledge of the subject-specific language as their supporting tool for mastering as well as for teaching subject contents. They believed that CLIL teachers required an understanding of the subject contents to teach a particular subject content comprehensively; as D. L. Ball et al. (2008) put it, "teachers who do not themselves know a subject well are not likely to have the knowledge they need to help students learn this content" (p. 404). However, while all participants in the present study were trained to be EFL teachers, they reported that subject-specific language was a new dimension of language knowledge for them. This is because EFL teacher education generally trains the teachers to teach English in an everyday domain (Andrews & Lin, 2018) or BICS in Cummins's term (Cummins, 2008). The teacher participants in the present study felt that their knowledge of the subject-specific language was underdeveloped, and thus they were required to spend great time and effort to master the knowledge of the subject content and prepare the lesson (see also Kim & Lee, 2020; Lopriore, 2020).

As there was no support from the EFL teacher education programme, in terms of teachers' knowledge of subject-specific language and contents, the teacher participants had to self-study, drawing on their background knowledge gained from school. Oftentimes, they had to study the content in the Thai version of a textbook compared to the English version to ensure the accuracy of their interpretation. Self-mastering the content was challenging for the EFL teachers, especially at the secondary and higher education levels because of the increasingly specialised content and linguistic demands (see also Cammarata & Tedick, 2012; Lo, 2020). Sorbet, who taught CLIL to the ninth grade, explained that "subject contents at upper secondary levels was beyond my abilities to teach because they were profoundly specialised". In alignment with a participant's account in the study by Kim and Lee (2020), the teacher participants in the present research tended to select content based on how confidently they understood it. This may result in the lessons lacking variety and completeness. Additionally, the teacher participants were concerned about the accuracy and comprehensiveness of their understanding of subject content and content teaching. For instance, Alpha showed his concern that learning the content on his own would compromise the accuracy and insight of his understanding, while Roguefort expressed her fear of delivering wrong input to her students. The findings suggest that CLIL lessons taught by language teachers may lack comprehensiveness and accuracy if the teachers have limited knowledge of the subject content.

5.3.2 Language for learning and instruction

The observational data illustrated in Chapter 4 indicates that learning subject contents through English was challenging for the students in this study, especially those with a low level of English proficiency. Montet and Morgan (2001) claim that learning takes place when students can access subject contents. In line with the review of literature in Chapter 2, to make subject contents and language accessible to students, the teacher participants believed that language-driven CLIL teachers required knowledge of essential language features for learning and competence in using target language for instruction.

Language for learning identified in this research shares similar features to those in the Language Triptych discussed in Chapter 2. The Language Triptych entails language of learning (e.g., subject-specific terms), language for learning (e.g., general academic language and expressions for completing tasks), and language through learning (the new language acquired in the learning process). English for learning involves, for example, general academic terms, grammatical

structures, and idioms and expressions of the subject contents, which are essential for learning and completing tasks. However, "different subjects require different types of language use, not just in terms of specific vocabulary but also in terms of functions such as describing, sequencing, analysing, hypothesising or drawing inferences" (Pavón Vázquez et al., 2020, p. 85), meaning that teachers need to be sensitive to the ways in which academic language is used in a particular subject. Lemke (1990) points out that the essential language can be unfamiliar to students, thus they need language scaffolding to access the subject contents.

Language for instruction, on the other hand, includes classroom language (e.g., giving task instructions, managing class, giving feedback), strategies for classroom communication, and abilities to reflect on language use and make suitable language adjustments in response to students' needs. This research lends support to Papaja's (2013) discussion of the role of a teacher in a CLIL classroom that proficiency in the target language is one of the most important aspects of CLIL teachers' competence. Papaja (2013) continues to add that CLIL teachers not only need to be able to use language as a tool for CLIL instruction but they also need to be aware of the functions of the language to support CLIL learning. In a context where CLIL teachers have limited language skills, paying attention to planning a lesson and the language for teaching and learning can help teachers gain confidence and be able to effectively facilitate students' learning (Papaja, 2013).

While subject contents and subject-specific language were regarded as the most concerning aspect of teacher's professional knowledge for the teacher participants, language for learning and instruction appeared to be the strength that they brought from their specialty as EFL teachers. To provide an example, they could deal with communication problems caused by the complexity of subject contents and language by adopting available knowledge and resources learned from the EFL teacher education programme and their experience as EFL teachers, including NoM strategies. Furthermore, the findings reveal that the EFL teachers had high language awareness, which positively affected their efforts to plan and provide language scaffolding (Andrews & Lin, 2018), and to deal with students' learning difficulties caused by language barriers. As demonstrated in Section 4.3.1.3, the EFL teachers reported being careful about their language use and proactive to students' language-related problems. Also as discussed in Section 4.3.3.1, in the process of lesson planning, they took students' target language proficiency into account and

planned essential language for learning and NoM strategies accordingly to scaffold students' learning.

Teachers' abilities to analyse language use in the subject content (Cammarata & Tedick, 2012), to provide scaffolding according to students' needs, and to adopt teaching strategies that CLIL demands (Pavón Vázquez et al., 2020) to accommodate CLIL instruction are at the core of effective CLIL implementation. The participants in the present study believed that even if they had advanced knowledge of content subject areas, lacking competence in language for learning and instruction could lead to poor lessons. They expressed their belief that CLIL content teachers who had no or limited background in language teaching might find it difficult to convey subject contents in the target language, deal with language-related issues, and provide language scaffolding (Lo, 2020). As content subject teachers are not formally trained to teach language skills for learning the subject areas (Karabassova, 2020; Lemke, 1990; Tan, 2011), they may have low language awareness (Bárcena-Toyos, 2020; Cammarata & Tedick, 2012; Karabassova, 2018) and may not be able to effectively plan essential language for learning and support language learning in CLIL lessons. As a result, students might not fully benefit from CLIL. This was reflected in Daisy's own student experience in learning math and science taught by a content teacher at her high school (see Section 4.3.1.3):

> *I did not learn much because the teachers were not capable of communicating their knowledge in English.*

To sum up, the data from this study indicate that subject content knowledge and target language proficiency are the keys to achieving the dual goal of CLIL implementation. Language-driven CLIL teachers require an insightful understanding of subject contents so as to deliver a CLIL lesson accurately and comprehensively. They also require particular aspects of language competence: subject-specific language, language for learning, and language for instructional purposes to effectively support students' content and language learning. In light of these CLIL demands, CLIL teachers encounter a unique set of challenges in content and language integration.

5.3.3 CLIL materials and time

The findings of the present study show that CLIL materials and class time were influential factors in effective CLIL implementation. These are discussed in Section 5.3.3.1 and Section 5.3.3.2.

5.3.3.1 Shortage of CLIL materials

The findings in this research reveal challenges arising from a shortage of CLIL materials, including the need to adapt existing materials which increases teachers' workload, affecting effective CLIL implementation (Bárcena-Toyos, 2020; Coyle et al., 2010; Lazarević, 2019; López-Medina, 2016). The teacher participants explained that materials made specifically for CLIL were scarce, especially for a higher level (see also Coyle et al., 2010) such as secondary school. They needed to select contents from an existing textbook made for native English-speaking learners or authentic materials from internet sources (P. Ball, 2018; Coyle et al., 2010). In line with López-Medina (2016), the EFL teachers' major concern about the content from online resources or textbooks intended for native English-speaking learners was the suitability of the materials to their context. These materials could be considerably more difficult for EFL students because of their English proficiency (Brown, 2007; López-Medina, 2016; Papaja, 2013). This coincides with Crossley et al.'s (2007) account that students' meaning-making processes can be disrupted when the text levels do not align with their competence. Another aspect of subject-area textbooks that can hinder EFL students' comprehension is, as Brown (2007) puts it, decontextualised texts. In other words, the texts are written using complex sentence structures and technical terms without providing any contextual clues (Brown, 2007).

As presented in Section 4.3.2.1 and Section 4.3.3.1, when planning a CLIL lesson, the teacher participants created or adapted the materials by simplifying the texts to make materials accessible to their students (see also Ikeda et al., 2022; Lazarević, 2019; López-Medina, 2016; Lorenzo, 2008). However, there was caution regarding oversimplification. As explained by a teacher participant, if teachers interpreted 'accessible' as 'simple', making the texts accessible might result in oversimplification, which could prevent students from mastering their content and language proficiency. In line with this research, Lorenzo (2008) asserts that possible issues caused by text simplification can be that the simplified language is "too poor for any content to be learnt" (p. 22) or "classroom discourse would be so simplified anyway that academic language skills could not be mastered" (p. 22). Similarly, the analysis of simplified texts from ESL textbooks by Crossley et al. (2007) reveals some problems found in the simplified texts. Crossley et al. (2007) explain that as the simplified texts are made to provide accessible materials by, for example, cutting words, shortening sentences, and omitting transition words, they lack text cohesiveness which may make it difficult for students to understand. These could be the reasons for the suggestion that

simplification should be avoided when adapting materials (P. Ball, 2018). However, in many CLIL contexts, teachers did not seem to have many options. With the shortage of CLIL materials, "teachers will have to modify or sometimes simplify" (Montet & Morgan, 2001, p. 6) the available materials to suit their context and students' competence. Thus, the participants suggested that teachers should be cautious when simplifying the texts and consider using other teaching materials to scaffold students' meaning-making of technical terms instead of simplifying them.

5.3.3.2 Time

The findings of the present study also show that the lack of CLIL materials and support led to a great deal of teachers' time and efforts being used to manage additional workload, especially at the lesson planning stage (Cammarata & Tedick, 2012; Kewara & Prabjandee, 2018; Lazarević, 2019; Mehisto et al., 2008; Pappa et al., 2017; Tachaiyaphum & Sukying, 2017). In other words, CLIL lesson planning is time-consuming. The teacher participants had to learn subject content and its language in order to plan a suitable lesson and create CLIL materials. They also had to plan language items and prepare teaching materials, for example, visual support, to scaffold students' learning and comprehension because learning subject contents through the medium of English can be challenging for EFL students. As Pérez Agustín (2019) puts it, learning subject matters in an additional language is a demanding activity for students which requires teachers' attention to plan language and skills necessary for learning a CLIL lesson based on students' needs. The findings of the present study support those obtained by Tachaiyaphum and Sukying (2017) and Kwangsawad (2018) reviewed in Chapter 2. Tachaiyaphum and Sukying (2017) highlight that for pre-service EFL teachers, CLIL lesson preparation required lots of time since it involved, for example, finding and learning about subject contents as well as preparing materials used in the class such as materials for the scientific experiment (Tachaiyaphum & Sukying, 2017). Consistently, pre-service EFL teachers in the study by Kwangsawad (2018) and ESP teachers in the study by Kim and Lee (2020) indicated that their working effort into CLIL was twice as much as their effort put into their general English classes because they had to learn the subject matters and deal with unfamiliar materials and activities to plan and teach a CLIL lesson. The evidence of the impact of CLIL lesson planning on teachers' time is also found in Cammarata and Tedick's (2012) study on how immersion teachers in Spain balanced content and language in instruction. Data from interviews and teachers' journals indicate that dealing with language in content instruction and having limited resources caused teachers' extra time (Cammarata & Tedick, 2012).

This converges with the study by Kewara and Prabjandee (2018) reviewed in Chapter 2, in which content CLIL teachers reflect that the CLIL lesson planning process, including selecting suitable materials for students, is an investment of time and energy.

Furthermore, the findings demonstrate that language-driven CLIL lesson delivery was time-consuming. The participants pointed out that their English class time was insufficient to cover the entire CLIL lesson (see Section 4.3.2.3). In line with Villabona and Cenoz (2022), teacher participants explained that different subject matters entailed different learning aims and learning processes which determined the required class time. As Alpha explained, an inquiry-based science lesson involving an experiment activity required a large amount of time for teachers to distribute the experiment materials and demonstrate the experiment, and for students to complete the experiment and report the results. A similar challenge is reported in the case study of CLIL implementation at a Greek private school by Iskos et al. (2017). The findings in their study reveal two aspects of CLIL taught in STEM classes that posed challenges to teachers, namely lessons involving a lab class and students' proficiency. Students were required to actively go through a series of learning processes, such as handling lab equipment, following instructions, and learning language skills to record lab data in order to complete learning tasks (Iskos et al., 2017). Additionally, "learning science involves being introduced to the concepts, conventions, laws, theories, principles and ways of working of science" (Mortimer & Scott, 2003, p. 12). The lesson noticeably took longer when carried out in English. Therefore, fitting these series of science learning processes into a single-period English class was a difficult task for the teacher participants. The findings of the present study corroborate those in Bárcena-Toyos' (2020) and Cammarata and Tedick's (2012) studies reviewed in Chapter 2, which showed that teachers struggled to cover subject content as required by the school curriculum within the limited class time because teaching subject content through the target language required more time than teaching in L1. The time constraints led the teachers to focus primarily on content teaching to ensure that students learn the same amount of content as their non-CLIL counterparts (Bárcena-Toyos, 2020; Lazarević, 2019).

In addition to the nature of the subject matter, students' English proficiency also influenced the amount of time the teacher participants spent on language-driven CLIL instruction. The teacher participants elaborated that students who had a low level of English proficiency and never

experienced learning subject content through the medium of English struggled to grasp CLIL lessons. In their study on CLIL implementation in a Taiwan CLIL programme, Yang and Gosling (2014) also found that students had difficulty learning subject content due to their English proficiency. In a Spanish context, the observations of students attending the CLIL programme in Catalonia by Codó (2020) also revealed that students found CLIL challenging because of linguistic difficulties. One of the challenges students in Codó's study encountered was English terms that carried different meanings when the context changed (see also Mortimer & Scott, 2003). This was also seen in the present study for CLIL pre-service teachers as shown, for example, in Extract 30 where Daisy explained units of measurement in her maths lesson (see Chapter 4).

To help students make sense of key concepts, the teacher participants needed to spend the majority of their class time teaching both general academic and subject-specific vocabulary. Brown (2007) points out that "being able to handle the language most prevalent in academic learning is a long and difficult process" (p. 186). This was true for Roguefort's students as she found that her students needed a considerable amount of time to process the input in English. This may be due to, as Halbach (2014) puts it, students having to guess the meaning of unfamiliar terms, make a link between the visual support and the text teachers provided and drawing heavily on their prior knowledge so as to understand the target concept. Similar to an Austrian CLIL teacher in the study by Skinnari and Bovellan (2016), some of the teacher participants expressed their concern about not meeting content learning objectives because of the extra time spent on helping students deal with language difficulties. As a result, some of the teacher participants chose to summarise subject content rather than teaching it in detail in order to save time, as Kiya explained:

> *I could not cover all of the details within a limited time. Thus, I concentrated largely on the main ideas of the lesson.*

It should also be noted that another possible explanation for insufficient time can be that the teacher participants were student teachers. They might not be aware of the scale of the lesson they planned, which could be too large to cover within the allotted time. Given the extra time that CLIL required for meaning-making and learning activities, the teacher participants felt that more time should be allocated to CLIL classes.

5.4 EFL teachers' professional roles and identities

Teachers' roles and identities are reflected in the teacher participants' accounts of their teaching practice and beliefs. The dual focus of CLIL requires teachers to "be simultaneously both language and content teachers" (Papaja, 2013, p. 149). This means, as Valdés-Sánchez and Espinet (2020) explain, that teachers starting a CLIL class will be inevitably facing the process of "interpreting and reinterpreting their experiences" (p. 2430) to develop their new professional identity, such as being a content teacher, being a language teacher, and being a CLIL teacher. Moreover, for CLIL to be effective, teachers will have to play diverse roles, especially when insufficient support is provided. To provide an example, as discussed earlier, the teacher participants needed to be both learners and teachers of their CLIL lessons as they mastered the knowledge of subject-specific language and contents. Context specificity and the shortage of suitable CLIL materials led to the EFL teachers' development of their roles as an analyst of students' needs as well as materials evaluators and developers (see Section 5.3.3.1). In the study by Kim and Lee (2020), it was found that language teachers shifted their roles from traditional language teachers to more integrative roles, including facilitator and collaborator to serve the CLIL goals. Similarly, it is evident in the present study that the teacher participants played integrated roles when teaching a CLIL lesson although Kiya admitted that she thought the following about CLIL at the beginning of her CLIL education:

> *CLIL should be a content teacher's responsibility, not a language teacher's.*

This can be interpreted as revealing that teachers' "low awareness of the theory, rationale, and pedagogical intentions behind CLIL" (Karabassova, 2018, p. 9) had an impact on their perceived roles and identities. The differences between CLIL and other second language teaching approaches also made it difficult for Sorbet and Daisy to translate its principles to their English classrooms (see Section 4.3.1). The differences in teaching approaches result in different teachers' roles which may create a conflict between teachers' own identities and the roles they are expected to play (Pennington & Richards, 2016). The conflict may seem common in CLIL when teachers' responsibilities are extended beyond their professional background and expertise because teachers' educational background and their experiences play an important role in shaping their professional identities (Pappa et al., 2017; Pennington & Richards, 2016), their beliefs (De Mesmaeker & Lochtman, 2014) and their roles as a CLIL teacher (Skinnari & Bovellan, 2016). As shown in

previous studies, content CLIL teachers considered teaching their discipline as their priority, whereas developing students' language skills were regarded as language teachers' responsibility, despite being aware of the dual focus of CLIL (Bárcena-Toyos, 2020; Karabassova, 2018; Lo, 2014; Moncada-Comas & Block, 2019; Pham & Unaldi, 2021; Skinnari & Bovellan, 2016). In a similar vein, language CLIL teachers indicated their roles revolved around language teaching (Lo, 2014; Pham & Unaldi, 2021; Tan, 2011). However, in the study by Pham and Unaldi (2021), language teachers felt that teaching subject-specific language should be a content teacher's responsibility, which diverges from the findings in this research. This may be due to the teacher participants' belief that subject-specific language is a component of the language realm (see Section 4.3.1.3), hence their teaching responsibility.

According to the lesson observations in the present study, the teacher participants made language teaching explicit to scaffold the construction of content knowledge. They separately taught subject-specific terms, essential academic language, and grammatical structures prior to the explanation of subject contents. Sorbet perceived himself as a language model during the teacher-fronted talk stage, hence maximising his use of English, which, as he put it, could facilitate students' output in the latter stages of the lesson. Sorbet's practice was affected by second language acquisition, which is a foundation of many language teaching approaches that he learned from his EFL teacher education. In addition, some of the NoM strategies were adopted to make language accessible and facilitate students' meaning-making of the subject-specific terms when they found students having difficulties in understanding the terms. These teaching practices reflect the EFL teachers' beliefs about the importance of language to content learning and their role as language teachers. The EFL teachers' accounts of their beliefs regarding effective CLIL implementation also reflect how they valued their professional background as one of the essential aspects of CLIL teachers' qualifications (see Section 4.3.3.1), as Rougefort noted:

> *As a teacher, my job was to make the terms accessible to students. I would say that this was another aspect of required knowledge and skills for CLIL teachers.*

The findings also suggest that EFL teachers' teaching practices, their beliefs, and their perceived role as language teachers are influenced by their "experiences as learners" (S. Borg, 2018, p. 75). As shown in Extract 17 (see Section 4.1.3.2), Tawan's emphasis on the pronunciation of a key term was influenced by his personal experiences as an English learner. Similarly, Daisy's own

student experience in unsuccessful learning of maths and science taught by a content teacher through the medium of English at her school influenced her beliefs that competence in using English for teaching had an impact on effective CLIL implementation (see Section 4.3.1.3). Tawan's and Daisy's beliefs and practices corroborate Pennington and Richards' (2016) account of language teachers' identity that for EFL teachers, language proficiency is "central to their professional development as language teachers and their identity as knowledgeable professionals" (p. 12). This was also true for all participants as they raised concern about content teachers' low level of English proficiency, which might affect CLIL implementation. Their beliefs that teachers' language competence is essential to CLIL lesson delivery developed their confidence in CLIL teaching and valued their identity as language teachers (Pennington & Richards, 2016).

Although the findings in this research converge with those in previous research in that the teachers' perceived role as a language teacher was influenced by their professional background and experiences, it is evident that the teacher participants' perceived roles were not exclusively language teachers as per their stated professional background and experiences. Instead, their reported role was also to support students' content learning. As presented in Chapter 4, the EFL teachers' primary role shifted from language to content teachers when they taught subject content paying attention to helping students or working with them to co-construct the knowledge of content through the target language rather than teaching the language itself. The taught terms were commonly recapped as part of content teaching to scaffold content learning. The EFL teachers considered content as 'the core of the CLIL lessons' and thus their goal was to help students learn the contents. This is in line with Kim and Lee's (2020) account that language teachers' roles and identities may change when their focus is shifted from supporting language learning to facilitating students' content learning.

It is worth noting that because the participants were aware of the integrated role of language and content, they tried to perform the integrated role as content and language teachers. Yet, with insufficient competence in subject contents, the participants seemed to struggle when integrating the role of content teachers. This is evident in Roguefort's reflection on her fear of passing on inaccurate input and not being able to deal with students' questions related to subject disciplines, which, according to Alpha, might threaten students' trust (see Section 4.3.1.2). In accordance with Karabassova (2020), Roguefort chose to be honest with students when she could not answer

students' questions, rather than pretending to know it all to maintain her authority. Thus, teachers sometimes played a comparable role to their students when teaching subject content (see also Karabassova, 2020; Skinnari & Bovellan, 2016). Teachers and students helped one another to co-construct knowledge of content (Karabassova, 2020) by allowing students to share their ideas, asking for their prior knowledge, or asking students to summarise the concepts, especially with the class with high achievers.

Finally, it is also evident that school administration may affect EFL teachers' perceived identities. Because the participants implemented CLIL in their English classes based on the teaching practicum requirement from their university, the schools regarded their role as language teachers. They had limited access to teaching equipment and facilities, such as science laboratory and experiment equipment, as Daisy explained:

> *A language teacher teaching a CLIL science lesson should be allowed to access a science classroom or laboratory.*

The assigned role as language teachers and the limited access to non-English subject materials may reduce EFL teachers' sense of belonging and authority in teaching subject content, which could influence how they perceived themselves as a teacher.

It can be concluded that CLIL significantly influenced EFL teachers' roles and identities. They may encounter "a process of identity negotiation and reconstruction" (Lo, 2020, p. 21) depending on their personal experiences, professional background, and school context (Valdés-Sánchez & Espinet, 2020). As identities are ongoing processes, education and understanding of CLIL fundamentals may help teachers develop their new roles as CLIL teachers. As discussed earlier in the chapter, the participants became aware of the essence of CLIL and thus they were developing their integrative roles and confidence in teaching CLIL, which shaped their identities. Furthermore, teachers' professional expertise, their experiences, and school support play a crucial role in shaping their roles and identities. There is a need for development in terms of subject content for language teachers, language skills for content teachers, and a support system from school to help develop their confidence and promote their dual role to achieve CLIL purposes.

5.5 Chapter summary

This chapter has discussed the key findings of the present research with related literature and empirical studies to shed light on EFL teachers' NoM practices in language-driven CLIL lessons and their beliefs about effective CLIL implementation. It provided an overview of the key findings, followed by a discussion of the EFL teachers' NoM practices to facilitate students' comprehension of subject-specific terms and concepts which were affected by subject-specificity and students' language proficiency, and were pedagogically planned. It then discussed the roles of L1 in language-driven CLIL and a contradiction between EFL teachers' beliefs about the use of L1 in CLIL and their practices. Although all teachers agreed that L1 played a beneficial role in supporting language-driven CLIL learning and instruction, they felt that L1 should be avoided or minimised. The subsequent section conceptualised professional development needs for language-driven CLIL, which the EFL teachers believed to be essential to effective CLIL implementation. The reported needs consisted of CLIL education which equipped teachers with the understanding of CLIL fundamentals, knowledge of content subject areas, and language proficiency; and support from schools and stakeholders, especially in terms of teacher collaboration and CLIL materials. Lastly, EFL teachers' roles and identities were discussed. The EFL teachers integrated the roles of language and content teachers when teaching a language-driven CLIL lesson. They also needed to be both learners and teachers since they had to master the knowledge of subject-specific language and contents so as to teach language-driven CLIL lessons. Moreover, in light of the shortage of suitable CLIL materials, the EFL teachers were required to be an analyst of their students' needs as well as materials evaluators and developers. The EFL teachers' educational backgrounds, their experiences as teachers and learners, and school contexts played an important role in shaping their role as CLIL teachers.

CHAPTER 6 CONCLUSION

This chapter concludes the research reported in this thesis which aimed to develop an understanding of Thai pre-service EFL teachers' NoM practices in language-driven CLIL and their beliefs about effective CLIL implementation. Two main research questions and one sub-research question were addressed: (1) How do Thai pre-service EFL teachers explain and negotiate the meaning of subject-specific terms and concepts in CLIL lessons?; (1.1) What are the NoM strategies that the pre-service EFL teachers adopted to address difficulties concerning the explanation and students' comprehension of the subject-specific terms and concepts?; and, (2) What are Thai pre-service EFL teachers' beliefs regarding effective CLIL implementation? This chapter begins with a summary of the principal findings of this study (Section 6.1), followed by the limitations (Section 6.2). Then, I explain the potential contributions and implications of my thesis in Section 6.3. Finally, I provide suggestions for further research in Section 6.4, and conclude the chapter with my final reflective notes on undertaking this study in Section 6.5.

6.1 Summary of the findings

This research has sought to shed light on pre-service EFL teachers' NoM strategies in language-driven CLIL and their beliefs about effective CLIL implementation. The findings indicate that the pre-service EFL teachers employed an array of NoM strategies to facilitate students' comprehension of subject-specific terms and concepts. I grouped the NoM strategies into five main strategies: students' schema activation, students' comprehension check, modification, the use of visual support, and the use of L1 (see Figure 9). According to the teacher participants, the effective use of NoM strategies was dependent on students' language proficiency and the nature of subject-specific terms or concepts. Visual support was found to be common in all observed lessons as a supplement to or substitution for other NoM strategies to facilitate students' comprehension of subject-specific terms or concepts concerning systems, processes, and actions. The observational data and the EFL teachers' accounts of their practices demonstrated that the teachers largely relied on visual support and avoided long verbal explanations because of students' low level of language proficiency. For abstract or intangible terms or concepts, drawing on students' prior knowledge and experiences were used as a strategy to accommodate students' knowledge construction. Additionally, focus on form by teaching grammar as part of the teaching of a science concept appeared to support students'

meaning-making process. The findings also reveal that English definitions of subject-specific terms were of limited use with students who had a low level of English language proficiency.

While in some cases, NoM practices were EFL teachers' spontaneous responses to students' reactions in the classrooms, some were carefully planned before classes. EFL teachers believed that their NoM practices were influenced by their background in English language teaching. As EFL teachers, they appeared to be aware of the impact of effective English communication in the classroom, hence they carefully planned strategies for CLIL lesson delivery and responding to students' comprehension problems in class. EFL teachers' NoM practices reflect their language awareness and how they transferred linguistic knowledge and skills to make CLIL lessons accessible to their students. These practices are consistent with their beliefs about the importance of teachers' target language proficiency to effective CLIL lesson delivery.

One of the key findings concerns the use of L1. The EFL teachers reported the advantages of L1 to language-driven CLIL implementation, for example, increasing students' engagement and participation in interactions, facilitating students' comprehension of subject-specific terms and concepts, and decreasing the time spent on the explanation of terms and concepts which allowed teachers to cover the lesson in limited class time. However, despite the reported benefits, there was a contradiction between the EFL teachers' beliefs about the use of L1 and their practices. Although the majority of the teacher participants used L1 to address the difficulties in the explanation of subject-specific terms or concepts, they considered L1 to be their 'final resource', which should be avoided or minimised. Their beliefs about the use of L1 might be affected by traditional notions of second language learning, underpinned their teacher education programme. Another influential factor could have been the teaching assessment from their university. In other words, they may have avoided L1 in their classes in order to pass the teaching practicum assessment.

Furthermore, the findings demonstrate key factors that the teacher participants believed to be influential in effective language-driven CLIL instruction (see Figure 25). The teachers reported that CLIL teacher education needed to equip potential CLIL teachers with essential knowledge and skills for CLIL instruction, namely knowledge of the CLIL approach, content subject areas, and target language proficiency. They suggested that there are two essential areas of CLIL teachers' language proficiency: subject-specific language and language for instructional purposes. The findings show that subject-specific language was essential not only to the teaching of CLIL lessons but also to the EFL teachers' mastery of subject contents. The teacher

participants also emphasised the importance of preparing and teaching essential language to scaffold students' learning. This indicates that knowledge of language for learning was also an essential component of CLIL teachers' language proficiency. Moreover, the EFL teachers believed that support from schools and stakeholders, including collaboration between language and content teachers, CLIL materials and lesson preparation, classroom facilities and equipment, and class time all play an important role in effective CLIL implementation.

Finally, it is evident that CLIL significantly influenced EFL teachers' roles and identities. The findings demonstrate that the teacher participants played integrated roles when teaching a language-driven CLIL lesson. Their roles were not exclusively language teachers, but also content teachers who supported students' content learning. Furthermore, the teacher participants needed to be both learners and teachers of their CLIL lessons because they had to master the knowledge of subject-specific language and contents to teach a CLIL lesson. Context specificity and the shortage of suitable CLIL materials also led to EFL teachers' development of their roles as an analyst of students' needs as well as materials evaluators and developers. The findings suggest that the EFL teachers' educational background, their experiences as a teacher and learners, and their school contexts play an important role in shaping the participants' professional identities and their roles as CLIL teachers.

6.2 Limitations

This multiple-case study yielded in-depth insight into language-driven CLIL practices from the EFL teachers' perspectives. This case study was subjective, context-specific, and small in sample size. The data were collected from six participants teaching at two different schools thus the findings of this study cannot be generalised. However, a sufficient contextual description of the CLIL practices in this study was provided so that transferability to CLIL practices in contexts with similar characteristics can be made. Furthermore, triangulation was applied to mitigate bias and enhance the accuracy of data interpretation and analysis (see Section 3.8).

Shifting methods of data collection to a digital approach allowed me to conduct the case study without having to travel to Thailand, which reduced financial costs, while still yielding rich and in-depth explanations of EFL teachers' NoM practices and their beliefs about effective CLIL implementation. Furthermore, Zoom's screen-sharing features facilitated the display of selected key episodes from the filmed lessons to the participants as stimuli and topics for discussions during interviews. Digital data, such as video-recorded interviews and filmed

lessons, also allowed me to revisit the data during the data analysis to ensure the accuracy of the transcripts, data analysis, and interpretation.

However, the digital approach to data collection has some limitations. The filmed lessons might not be able to capture all the classroom context and environment including students' interactions because the primary focus was on the teachers' teaching practices. Consequently, students' responses and surrounding factors absent from the filmed lessons, which might affect the teachers' practices, could not be observed. Another limitation was time differences between New Zealand and Thailand resulting in the limited time slots for the interviews and the delays in the stimulated recall interviews.

6.3 Contributions and implications

The present study has contributed to the contextual, theoretical, and practical understandings of EFL teachers' beliefs and language-driven CLIL practices. It also yielded significant implications for language-driven CLIL practice and professional development. These contributions and implications are discussed in the following sections.

6.3.1 Context

CLIL is not a new teaching approach in Thailand given that it was introduced by the Thai MOE in 2006. However, as presented in the literature review (Section 2.3), CLIL implementation in the Thai context is still under-researched. To the best of my knowledge, EFL teachers' NoM practices in language-driven CLIL have not been researched in the Thai context. Furthermore, more research exploring EFL teachers' beliefs based on their hands-on experiences implementing CLIL in this context is needed in order to develop a practical approach to promote effective CLIL implementation. The present study contributes to knowledge and understanding of language-driven CLIL practices in Thai secondary classrooms, particularly how the EFL teachers made subject-specific terms or concepts in the target language accessible to students.

The study has provided several useful NoM strategies (see Figure 9) that the EFL teachers adopted to facilitate students' comprehension of subject-specific terms and concepts along with the EFL teachers' accounts of their use of the strategies. It is hoped that the findings will help raise teachers' awareness of and draw CLIL teacher educators' attention to subject-specific language and the beneficial role of NoM strategies in language-driven CLIL learning and instruction.

Moreover, the findings concerning EFL teachers' beliefs about effective CLIL implementation have also revealed key factors in effective language-driven CLIL implementation in Thailand. This has helped to conceptualise essential elements of language-driven CLIL professional development, which may serve as a guide to CLIL stakeholders for the development of CLIL support and the CLIL teacher training programme. For language-driven CLIL in Thailand to be effective, this study suggests that CLIL teacher educators should provide professional development to enhance EFL teachers' understanding of CLIL and their competence, especially in terms of the target language and subject content proficiency. Support from schools and stakeholders, in terms of policy and practice, should also be available. It is also hoped that the outcomes of this study will broaden an understanding of language-driven CLIL classroom practice and contribute to developing EFL pre-service teacher education and training programmes to prepare EFL teachers for CLIL implementation both in Thailand and other similar contexts.

6.3.2 Theoretical understanding of NoM from a language-driven CLIL perspective

The outcomes of this study have extended the range of NoM strategies developed from SLA perspectives comprising a variety of resources, including, for example, students' schema, visual support, and L1 to accommodate the meaning-making process (see Figure 9). The outcomes lead to a conclusion that supports the argument made in the literature review that the NoM framework based on the SLA perspectives is inadequate to characterise an NoM interaction in a CLIL context (see Section 2.5 and Section 5.1). In CLIL classrooms, students have to make sense of subject-specific terms, which might sometimes require an understanding of the conceptual meaning of the terms to learn the key concept. Therefore, the NoM strategies used to support students' meaning-making process extended beyond spoken and written language. The functions of NoM in CLIL were not only to maintain mutual understanding but also to evaluate and develop students' comprehension which facilitated their construction of new content knowledge. Furthermore, the findings highlighted that whether or not NoM strategies were successful in supporting students' comprehension depended on subject-specificity. Different subject-specific terms have their own characteristics, and thus may be made comprehensible by different NoM strategies (see Section 5.1.1). Finally, some NoM strategies might not be suitable for students with a low level of language proficiency. For example, as discussed in Section 5.1.1, low proficiency students were likely to struggle to make sense of subject-specific terms when facilitated by language-related strategies. Accordingly,

teachers should take into account subject-specificity and students' proficiency when planning and delivering a CLIL lesson (see Section 6.3.3.1).

6.3.3 Practice

This thesis argues that for language-driven CLIL to be effective, the following practical implications should be taken into account: scaffolding language in language-driven CLIL (Section 6.3.3.1), professional development for language-driven CLIL (Section 6.3.3.2), teacher collaboration (Section 6.3.3.3), and CLIL materials (Section 6.3.3.4).

6.3.3.1 Scaffolding language in language-driven CLIL

The case study presented in this thesis showed that NoM strategies helped facilitate students' meaning-making of subject-specific terms and concepts. The successful use of the NoM strategies depended on subject-specificity and students' language abilities; therefore, CLIL teachers need to be aware of these two factors as part of CLIL lesson planning and teaching.

An initial step in lesson planning may be scrutinising subject content or a theme-based text to determine the language that students will need in order to learn the lesson, for example, subject-specific language, grammatical structures, and language functions for communicating or completing tasks (e.g., presenting, analysing, describing). At this stage, teachers should anticipate difficulties students may have in learning the language as well as the content, and then plan appropriate NoM strategies and teaching materials to support students' comprehension.

As suggested by the findings of this research, it may be useful to prepare visual support, such as pictures, diagrams, or video clips, and use them in combination with other verbal and language-related strategies to accommodate students' learning of new terms or concepts. In delivering a CLIL lesson, although the language is not the main content of the lesson, it should not be neglected. Teachers may need to introduce key terms to the class before teaching the content to prepare them for learning the content.

Moreover, as discussed in Section 5.1.1, teachers can also make language teaching explicit, but not in isolation from the content, to support students' comprehension of the subject content. In this way, students will learn language and content simultaneously. Finally, teachers should be mindful of students' learning and their NoM strategies so that they can responsively adapt their strategies to address students' learning difficulties.

6.3.3.2 Professional development for language-driven CLIL

The findings of this study revealed that teachers play a key role in CLIL implementation. Although the teacher participants had completed a CLIL module, they felt that they were not sufficiently equipped with essential knowledge and skills for CLIL implementation. Furthermore, the teachers suggested that a lack of support from schools and stakeholders, especially in terms of collaboration and CLIL materials, could considerably impact the effectiveness of language-driven CLIL implementation. Therefore, some implications for professional development to promote effective language-driven CLIL implementation are provided.

Firstly, professional development for language-driven CLIL should develop teachers' understanding of the key principles of CLIL and how they are translated into local educational policies or school curriculum. Understanding CLIL fundamentals can inform the teachers about the requirements and expectations of their CLIL practices. It will also help teachers to reinterpret their roles both as language teachers and content teachers to achieve the goal of content and language integration.

Secondly, careful consideration of how to support EFL teachers' knowledge of subject content is required. A CLIL professional development programme needs to provide an opportunity for the EFL teachers to develop the knowledge of content from content specialists. This may be achieved by collaboration between language and content teachers, where both teachers can exchange knowledge of their expertise to develop CLIL lessons and improve their practices. This will be discussed in Section 6.3.3.3.

Thirdly, EFL teachers need to be competent in the target language to teach CLIL effectively. As "language differs in the discourses of different subject areas" (Schleppegrell, 2004, p. 113), CLIL teacher training needs to develop EFL teachers' target language proficiency and awareness of language in CLIL, including subject-specific language, and language for learning and instruction. EFL teachers should also be trained to use a variety of teaching and NoM strategies to support students' learning and comprehension. These aspects of language proficiency will help the teachers to analyse the language essential to learning in CLIL lessons. They will also assist in planning pedagogy to scaffold students' comprehension of CLIL materials. Furthermore, an opportunity for EFL teachers to practice applying the theory in the classroom may be helpful to develop teachers' language awareness and abilities to scaffold students' learning of subject contents through the target language.

In addition to the target language proficiency, the beneficial roles of L1 in facilitating the learning of CLIL lessons should not be overlooked. EFL teachers should not abandon the use of L1 to maximise students' exposure to the target language because the goal of language learning in CLIL is not to achieve a nativelike level, but to be a proficient global language user. The quality of L2 input may be more important than its quantity, as Lin (2015) emphasises, "the input that is made maximum is useful only when that input is also made comprehensible" (p. 78).

Moreover, nowadays, an opportunity to maximise students' exposure to the target language is not limited to learning in the classroom because, in this digital era, internet and technological tools allow students to be exposed to a foreign language easily through online resources, including, for example, movies, TV shows, and podcasts. Denman et al. (2013) explored challenges and opportunities for CLIL learning and instruction in junior vocational secondary education in the Netherlands. In their study, many students reported that their English learning took place not only in their CLIL classes but also outside school through digital media and the internet, including, for example, watching English movies with Dutch subtitles, watching television in English, and chatting online in English. Therefore, what is important for teachers may be to design a lesson that motivates students to learn further through the available resources outside classes rather than sticking to maximising English input in the class. An example lesson that was found effective and motivating for students to learn is a lesson in the study by Denman et al. (2013) in which teachers linked their CLIL lessons to students' real life by using news, traditions, and authentic materials in English (e.g., popular media from television and the internet).

There is no reason to refrain from using L1 when it is a useful resource that supports the learning and meaning-making process. More importantly, in a context where CLIL class time is limited, the use of L1 can shorten the time teachers spend on explaining key terms or concepts allowing them to complete a lesson within the allotted time. The research presented in this thesis suggests that CLIL teachers and teacher educators rethink the use of L1 in language-driven CLIL. EFL teachers who teach a CLIL class with less proficient students should allow students to use L1 to facilitate the meaning-making process when students are not ready to use the target language. As regards CLIL teacher educators, instead of promoting teachers to use only the target language in the classroom, CLIL professional development should develop EFL teachers' understanding of the nature of learning in language-driven CLIL, the roles of L1 in

both content and language learning, as well as the pedagogic use of L1 to support learning, and allow them to use L1 as a teaching resource.

Finally, language and content teachers may need different aspects of CLIL professional development as shown in the findings of the present study and the review of the literature. For example, while subject content and subject-specific language is the most concerning issue for language CLIL teachers, language for learning and instruction can be a limitation for content CLIL teachers (Lazarević, 2019; Lo, 2020; Morton, 2019). CLIL teachers teaching in different contexts may require language training at a different level (Spratt, 2017). Therefore, it is important for CLIL educators to take into account teachers' backgrounds, their experiences, as well as their needs, and then provide CLIL professional development accordingly (Banegas, 2021; Pavón Vázquez & Ellison, 2013).

6.3.3.3 CLIL teacher collaboration

As previously discussed, one of the factors hindering effective CLIL implementation is that CLIL teachers are not equipped with sufficient knowledge and skills required for achieving the dual goal of CLIL. The teacher participants reported the need for collaboration between language and content teachers (see also Brown, 2007; Gajo, 2007; Kwangsawad, 2018; Lo, 2020; Morton, 2019; Pavón Vázquez et al., 2020; Pérez Agustín, 2019; Tachaiyaphum & Sukying, 2017; Tan, 2011) as they believed that collaboration would allow teachers from different areas of expertise to share pedagogical practices of their discipline (see also Pavón Vázquez et al., 2020), which could promote teacher professional development (see also Lo, 2020; Pérez Agustín, 2019) and effective CLIL implementation.

Collaboration can be applied in different ways depending on many factors, including school contexts (Lo, 2020). Lo (2015) suggests that one approach to collaboration can be collaborative lesson planning in which language teachers advise content teachers on language teaching and scaffolding while content teachers can help language teachers in terms of the content of their subject areas. In alignment with Lo (2015), Pérez Agustín (2019) highlights the need for content and language teachers to work collaboratively during the lesson planning stage to analyse students' needs and plan essential language and skills for learning the content accordingly to facilitate learning. Another form of collaboration is collaborative teaching. Milán-Maillo and Pladevall-Ballester (2019) propose two forms of collaborative teaching. One involves language teachers responsible for language teaching while content teachers are in charge of content teaching. Another form can be parallel lessons in which one is taught in L1

and another is taught using L2 as the medium of instruction (Milán-Maillo & Pladevall-Ballester, 2019).

In line with the previous studies, the findings in this research identify two approaches to CLIL teacher collaboration. On the one hand, it was suggested that language and content teachers might collaborate in planning their CLIL lessons with the language teachers working as language mentors and vice versa. Collaboration at this stage, as Daisy explained, *would bridge the gap between teachers' knowledge of content and the target language.* On the other hand, Tawan suggested parallel CLIL lessons in which one focused primarily on teaching the content, whereas another aimed to equip students with the language for learning the content (see also Pavón Vázquez, 2014). In other words, both teachers may work towards the shared learning objectives: content teachers are in charge of the content objectives, while the language teachers focus on the language objectives so as to meet the dual focus of a lesson. By doing so, Tawan explained that both teachers' and students' pressure and workload can be reduced.

In addition to *'how'* collaboration can be done, what seemed to be as important was *'what support'* is available for cross-curricular collaboration. Research suggests that support from school leaders is central to the quality of collaboration (Mehisto et al., 2008; Pappa et al., 2017). However, the participants' suggestion for schools to provide support for CLIL teacher collaboration, for instance, by developing a policy to promote cross-curricular collaboration (see Section 4.3.2.2), indicates the lack of school support for teacher collaboration (Lazarević, 2019; Pavón Vázquez et al., 2020; Pham & Unaldi, 2021). This corroborates the study by Pavón Vázquez et al. (2020) which highlights that the factor hindering CLIL teacher collaboration is a lack of institutional support, including time, funding, and collaboration guidance. Therefore, collaboration remains not fully practical (Lazarević, 2019; Pham & Unaldi, 2021). The participants in the present research emphasised that to facilitate collaboration, school policy needed to clearly translate the teachers' roles in collaboration in a practical way so that they understood their responsibilities and how collaboration functioned and recognised the importance of their roles. As teachers from different disciplines generally have their own pedagogical practices, collaboration may create a conflict in relation to teachers' teaching ideologies, responsibilities, and workload (Lo, 2014). School support as well as an understanding of their roles and what collaboration entails will help teachers to collaboratively and successfully integrate content and language pedagogical practices into CLIL implementation.

6.3.3.4 CLIL materials

The findings reveal that the lack of CLIL materials, especially CLIL textbooks, increased the teachers' time and effort in planning a CLIL lesson. In response to the problems caused by the shortage of CLIL materials, the participants suggested that CLIL stakeholders, particularly subject content and language experts, develop 'high-quality' CLIL textbooks for use in EFL contexts, which are up-to-date and aligned with a basic core curriculum, suit EFL students' language competence, and provide teachers' guides for instruction, for example, essential subject-specific terms with meanings, recommended teaching strategies, and alternative learning activities with instructions (see Section 4.3.2.1). The participants also suggested that the developed CLIL textbooks need to be available at all levels of education (see also López-Medina, 2016). They believed that having CLIL textbooks would support lesson planning and delivery. López-Medina (2016) describes some of the advantages textbooks bring to teaching, for instance, providing well-organised modules with logically sequenced content, covering the school curriculum, and being designed by educational experts. However, although developing CLIL textbooks for a specific context is seen as a solution to the CLIL material problem, López-Medina (2016) explains that it takes time and it may not feasible for publishers to produce textbooks that are specific to a certain context. Although there are textbooks that claim to provide CLIL modules, some may not serve CLIL's dual goals of content and language learning. Ikeda et al. (2022) clarify that "textbooks that wear a label bearing the phrase "CLIL inside" often have little to distinguish them from other EFL materials and may not be "CLIL" even in the broadest definition of the word" (p. 114). Thus, teachers must be cautious when selecting a textbook that purports to support CLIL.

Since producing a high-quality CLIL textbook to suit a specific educational context is a demanding task, especially for global publishers (Banegas, 2021; López-Medina, 2016), and some available CLIL textbooks may not serve the CLIL purposes being claimed (Ikeda et al., 2022), cooperation among local CLIL stakeholders and publishers may be a viable option for CLIL materials development. Still, this can be a considerable investment of resources, including time, budget, and CLIL scholars. Perhaps a more sustainable and feasible option may be to train CLIL teachers to be able to evaluate the available CLIL textbooks (López-Medina, 2016), analyse their students' needs and curriculum, and then adapt and create their own CLIL materials that best suit their classes (Ikeda et al., 2022; Mattheoudakis, 2017). As CLIL is context-dependent, the analysis of context needs as well as available materials and resources is at the heart of successful CLIL implementation (Pavón Vázquez & Ellison, 2013). Schools may

also set up a platform for teachers to share their materials. To provide an example, as part of the teacher collaboration mechanism, a school may set up an online platform containing folders organised according to subject areas and grade levels. Teachers can upload their CLIL lesson plans and materials to the folders and at the same time, they can make use of their colleagues' materials when applicable. In the long term, this form of sharing platform can be a collection of CLIL materials in which teachers can recycle or reuse the materials throughout an academic year. By doing so, teachers do not need to "reinvent the wheel" (Mehisto et al., 2008, p. 22), and thus their time and workload related to CLIL lesson preparation may be reduced.

6.4 Suggestions for further research

This study adopted a multiple interpretive case study approach to investigate pre-service EFL teachers' beliefs and their language-driven CLIL practices within the Thai EFL context. The findings have contributed to contextual, theoretical and practical understandings of EFL teachers' NoM strategies used to support the learning of subject-specific terms and concepts in CLIL secondary classrooms and their beliefs regarding effective CLIL implementation. However, the present study focused on the teacher-fronted talk stage at which the lessons were introduced to the classes. Further research could explore the roles of NoM strategies in a CLIL lesson, demonstrating how they support students and teachers to carry out tasks at the later stages of the lesson.

The findings of this study were based mainly on the pre-service EFL teachers' perspectives. To fully understand the dynamic of NoM interactions, future research could explore how students' learning of subject-specific terms or concepts could be improved through teachers' use of NoM strategies. Gaining an understanding of effective CLIL implementation from students' perspectives as well as research of experienced CLIL teacher practice would also be of interest in the future.

Finally, as mentioned in Section 6.3.3.2, CLIL teachers face a unique set of challenges in CLIL implementation based on their professional background and the contexts in which CLIL is implemented. Therefore, the research questions addressed in this study could be explored with content CLIL teachers using similar research methods and procedures to broaden understandings of CLIL practices and create professional development to serve the needs of different types of CLIL teachers.

6.5 Final remarks

CLIL is a highly demanding approach to put into practice. As an EFL teacher educator and once a pre-service teacher implementing CLIL, I truly believe that effective use of language for communication is the threshold of successful language-driven CLIL lesson delivery. I embarked on my research journey aiming to investigate how the EFL teachers explained subject-specific terms and concepts and what strategies they used to negotiate the meanings of the terms and concepts when comprehension problems occurred. The findings have developed my understanding of EFL teachers' NoM practices and in some ways have altered my perspective on the language of instruction in language-driven CLIL. To help students to understand subject-specific terms or concepts in a target language, EFL teachers not only needed a good command of the target language, but they also had to be able to deploy different resources to scaffold students' learning and comprehension. Furthermore, L1 appeared to be a useful resource available for both the EFL teachers and students. Although I will still encourage EFL teachers to use the target language as the primary medium of instruction, I would also recommend that they do not abandon L1.

I also sought to explore EFL teachers' beliefs to understand what constituted effective CLIL implementation. I have learnt from the findings that effective CLIL implementation required several dimensions of support. It required CLIL professional development to develop a proficient teacher who had an understanding of CLIL fundamentals, competence in using the target language for both learning and teaching purposes, and knowledge of subject content and its language. On a larger scale, teachers needed support from schools and stakeholders, especially in terms of CLIL materials and teacher collaboration, to achieve the full potential of CLIL.

Finally, CLIL has the potential to promote students' target language proficiency, cognitive skills, and meaningful learning experiences because, through CLIL, students can use target language to "talk about curriculum content and make sense of their practice at different levels and contexts (Hemmi & Banegas, 2021, p. 9). However, the success in CLIL implementation depends on many educational and contextual factors. Further work is needed to gain an insight into CLIL implementation in different contexts and inform the best pedagogical practices in CLIL learning and instruction.

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APPENDICES

Appendix 1: Human research ethics approval

Te Kura Toi Tangata
Division of Education
The University of Waikato
Private Bag 3105
Hamilton, New Zealand, 3240

DivEd Ethics Committee

fedu.ethics@waikato.ac.nz
07 8384500 ext. 7870
www.waikato.ac.nz/education

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

30/1/2020

Dear Nutthida Tachaiyaphum

Division of Education Ethics Application Approved FEDU005/20

I am pleased to advise you that your ethics application for the project entitled "Content and Language Integrated Learning (CLIL) in Practice: An Investigation of Thai EFL Pre-service Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms" was approved by Te Kura Toi Tangata Division of Education Ethics Committee on January 30th, 2020.

Please be aware that the Te Kura Toi Tangata Division of Education Ethics Committee must be advised (by memo) of any changes to the details recorded in your ethics application. Please send any such advice to fedu.ethics@waikato.ac.nz. You will receive a memo of approval once the change(s) has been considered.

Kind regards

Co-chair
Te Kura Toi Tangata Division of Education Ethics Committee

Appendix 2: Approval of extensions to research methods

MEMORANDUM

To: **Nutthida Tachaiyaphum**

cc: Dr Laura Gurney
Dr Nicola Daly

From: **Dr Noeline Wright**
Co-chair Division of Education Research Ethics Committee

Date: 31 March 2020

Request for Extension to Research Ethics Approval – Student (FEDU005/20)

Thank you for your request for an extension to the ethics approval for the project:

> **Content and Language Integrated Learning (CLIL) in Practice: An Investigation of Thai EFL Pre-service Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms**

It is noted that you wish to change the data collection methods to Skype, Zoom or a similar means from face-to-face interviews due to the COVID-19 related restrictions.

I am pleased to advise that this extension has received approval.

The memo and the updated documents you have provided will be kept on file.

Please note that researchers are asked to consult with the Division's Research Ethics Committee in the first instance if any further changes to the approved research design are proposed.

The Committee wishes you all the best with your research.

Dr Noeline Wright
Co-chair Division of Education Research Ethics Committee

PVC's Office
Te Wānanga Toi Tangata
Division of Education
The University of Waikato
Private Bag 3105
Hamilton, New Zealand

Phone +64 7 838 4500
www.waikato.ac.nz

THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

MEMORANDUM

To: **Nutthida Tachaiyaphum**

cc: Dr Laura Gurney
Dr Nicola Daly

From: **Dr Noeline Wright**
Co-chair Division of Education Research Ethics Committee

Date: 8 June 2020

Request for Extension to Research Ethics Approval – Student (FEDU005/20)

Thank you for your request for an extension to the ethics approval for the project:

Content and Language Integrated Learning (CLIL) in Practice: An Investigation of Thai EFL Pre-service Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

It is noted that you hope to change your data collection method to video observation due to Covid-19 restrictions.

I am pleased to advise that this extension has received approval.

Thank you for the updated information letters which will be kept on file.

Please note that researchers are asked to consult with the Division's Research Ethics Committee in the first instance if any further changes to the approved research design are proposed.

The Committee wishes you all the best with your research.

Dr Noeline Wright
Co-chair Division of Education Research Ethics Committee

PVC's Office
Te Wānanga Toi Tangata
Division of Education
The University of Waikato
Private Bag 3105
Hamilton, New Zealand

Phone +64 7 838 4500
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THE UNIVERSITY OF WAIKATO
Te Whare Wānanga o Waikato

MEMORANDUM

To: **Nutthida Tachaiyaphum**

cc: Dr Laura Gurney
Dr Nicola Daly

From: **Dr Noeline Wright**
Co-chair Division of Education Research Ethics Committee

Date: 10/07/2020

Request for Extension to Research Ethics Approval – Student (FEDU005/20)

Thank you for your request for an extension to the ethics approval for the project:

Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai EFL Pre-service Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

It is noted that you wish to change your interview procedure so that participants engage in a stimulated recall interview via Skype, Zoom or a similar means due to Covid-19 restrictions.

I am pleased to advise that this extension has received approval.

Thank you for the memo and the updated information letters and consent forms which will be kept on file.

I am pleased to advise that this extension has received approval.

Please note that researchers are asked to consult with the Division's Research Ethics Committee in the first instance if any further changes to the approved research design are proposed.

The Committee wishes you all the best with your research.

Dr Noeline Wright
Co-chair Division of Education Research Ethics Committee

Appendix 3: Information letter to the Dean of EDU at the participants' university

Information Letter

TO: DEAN OF THE FACULTY OF EDUCATION, ……XX……..UNIVERSITY

Date: xx (month) 2020

Title of the Research Project: Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai Pre-service EFL Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

Principal Researcher: Nutthida Tachaiyaphum

My name is Nutthida Tachaiyaphum. I am a PhD scholar at the Division of Education, University of Waikato in New Zealand. I am undertaking this research project for my PhD to understand the EFL pre-service teachers' use of English in explaining content and new subject-specific vocabulary to students in CLIL lessons at Thai secondary schools. I am writing to ask permission to approach fifth-year English major students in the Faculty of Education to participate in this research project.

What is the research about?

CLIL is a teaching approach in which an additional language is used for teaching both content and language. In Thailand, the language used as a medium of instruction in CLIL is English. In the CLIL classroom context, it is believed that the negotiation of meaning helps learners and teachers achieve comprehension and learning goals.

It is also argued that *how* teachers teach CLIL lessons, particularly conveying and explaining subject-specific terms and concepts, is influenced by their beliefs concerning effective CLIL instruction.

I would like to invite the pre-service EFL teachers (fifth-year English major students) at the Faculty of Education, …xx… University to participate in this research about teachers' beliefs and negotiation of meaning in CLIL lessons. The purpose of this research is to explore how pre-service EFL teachers explain the content and new subject-specific vocabulary to make them comprehensible to students, and their beliefs about effective CLIL lessons.

What does participation involve?

I aim to recruit six pre-service EFL teachers for the research, which will involve a semi-structured interview, two classroom observations, and a stimulated recall interview.

1) A semi-structured interview will be conducted and recorded via Skype, Zoom or a similar means before they start their teaching practicum. The interview is expected to last 40 to 60 minutes. They will be asked about their profile, background knowledge about CLIL, beliefs about CLIL in general and about effective CLIL lessons, and challenges associated with CLIL teaching based on their experiences of CLIL education in TEFL1 and TEFL2 courses at the Faculty of Education.

> *Sample Questions: 1) Could you describe how you use English in your CLIL classes? 2) How would you describe your role as a CLIL teacher?3) How do your beliefs regarding language teaching influence the way you implement CLIL to your English class?*

The recorded interviews will then be transcribed by the researcher. A copy of the interview transcriptions will be sent to the pre-service teachers for checking before further analysis.

2) Two classroom observations will be conducted (two of each participant's CLIL classes at school) after the semi-structured interview. All stages of teaching will be observed during these classes, with special attention to the presentation stage including when teachers explain the content and introduce new vocabulary to students. Each participant will be asked to film two of their CLIL lessons taught in their normal English classes and share the filmed lessons with the researcher. The filmed lessons will also be used for the purposes of stimulated recall interviews. Photos from the filmed lessons may be included in my thesis, providing that all possibly identifying features are removed or obscured. Students may appear in the videos, but no data will be used in my thesis as the focus of the research is only on teachers' teaching practice. The participants will be asked to share two unedited videos of their CLIL lessons to the researcher. In the event that the participants are not willing to share the unedited videos, there is an option for them to share the edited videos made for the purpose of university assessment. The filmed lessons will then be transcribed by the researcher for further analysis.

3) A stimulated recall interview will take place after the observations of two CLIL lessons via Zoom, Skype or a similar means. Participants will be asked questions in relation to their thoughts and reasons behind their teaching in the two CLIL lessons. Selected key events,

consisting of teachers' explanations of subject-specific vocabulary and complex ideas, will be the main emphasis of the interview.

> *Sample Questions: 1) Could you explain your reasoning behind the lesson design? 2) Could you describe which part of lesson was the most challenging part for you to teach? 3) Are you aware of any beliefs you hold now about effective ways of CLIL implementation that you did not have before starting teaching practicum?*

The interview will be recorded. The recorded interviews will then be transcribed by the researcher. A copy of the interview transcriptions will be sent to the pre-service teachers for checking before further analysis.

Rights of a participant

1) The pre-service EFL teachers' decision to participate and the data that they provide will in no way affect their relationship with the university, nor will this data be used to critique or evaluate their teaching performance or affect their teaching practicum grade.

2) Participation in the research is completely voluntary. If students decide to participate, they will have the right to withdraw from further participation at any stage by contacting and sending the signed withdrawal form to the researcher. However, if they decide to withdraw, all data they have provided up until that point may continue to be processed if they consent to this.

3) Throughout the study, all communication channels will be kept open to contact my supervisors or me regarding queries about the research.

Anonymity/ Confidentiality

Every effort will be made to ensure anonymity but this cannot be guaranteed.

Use of the information

Data collected will be used mainly in writing my doctoral thesis at the University of Waikato. When this is finished, it will be published on the University of Waikato's Research Commons. A summary of the findings will be sent to you on request. Moreover, parts of the research may also be used in writing articles, book chapters, and presentations at educational institutions or at conferences.

Data Storage

Electronic data (interview recordings, classroom observation recordings, and transcripts) will be stored on a password-protected computer accessible only by the researchers.

If you are happy for the fifth-year English major students at the Faculty of Education, …xx… University to be invited to participate in the study, please sign the attached Consent Form and send it to my email (see contact details below).

If you have any queries, please contact me in the first instance. If you wish to ask further questions, please contact my supervisors. Contact details are as follows:

Nutthida Tachaiyaphum,
Division of Education, University of Waikato, New Zealand
Email: nutthida.t@msu.ac.th, nt123@students.waikato.ac.nz
Phone: +64223604878 (NZ), +66827559697 (TH)

Dr. Laura Gurney, Lecturer,
Division of Education, University of Waikato, New Zealand
Email: laura.gurney@waikato.ac.nz

Dr. Nicola Daly, Senior Lecturer,
Division of Education, University of Waikato, New Zealand
Email: nicola.daly@waikato.ac.nz

Appendix 4: Informed consent form for the Dean of EDU at the participants' university

Consent Form

TO: DEAN OF THE FACULTY OF EDUCATION, …XX… UNIVERSITY

Date: xx (month) 2020

Title of the Research Project: Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai Pre-service EFL Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

---

I have read and I understand the information presented in the information letter about the research conducted by Nutthida Tachaiyaphum, under the supervision of Dr Laura Gurney and Dr Nicola Daly, Division of Education, University of Waikato, New Zealand.

I was informed that participation in the study is voluntary and that the pre-service EFL teachers at the Faculty of Education, …xx… University can withdraw their consent to participate by sending the signed withdrawal form to the researcher.

I have been given a copy of the Information Letter and Consent Form to keep.

I give my approval to Nutthida Tachaiyaphum to recruit pre-service EFL teachers as her research participants, and to conduct the research at the Faculty of Education, …xx…University according to the conditions set out in the Information Letter.

Dean's Name (printed) ……

Signature …… Date ……

Please email this form to:

Nutthida Tachaiyaphum,
Division of Education, University of Waikato, New Zealand
Email: nutthida.t@msu.ac.th OR nt123@students.waikato.ac.nz

Appendix 5: Information letter to the participants' academic advisor

Information Letter

TO: ACADEMIC ADVISOR (ENGLISH MAJOR), FACULTY OF EDUCATION, …XX… UNIVERSITY

Date: xx (month) 2020

Title of the Research Project: Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai Pre-service EFL Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

Principal Researcher: Nutthida Tachaiyaphum

My name is Nutthida Tachaiyaphum. I am a PhD scholar at the Division of Education, University of Waikato in New Zealand. I am undertaking this research project for my PhD to understand the EFL pre-service teachers' use of English in explaining content and new subject-specific vocabulary to students in CLIL lessons at Thai secondary schools. I am writing to ask permission to approach fifth-year English major students in the Faculty of Education to participate in this research project.

What is the research about?

CLIL is a teaching approach in which an additional language is used for teaching both content and language. In Thailand, the language used as a medium of instruction in CLIL is English. In the CLIL classroom context, it is believed that the negotiation of meaning helps learners and teachers achieve comprehension and learning goals.

It is also argued that *how* teachers teach CLIL lessons, particularly conveying and explaining subject-specific terms and concepts, is influenced by their beliefs concerning effective CLIL instruction.

I would like to invite the pre-service EFL teachers (fifth-year English major students) at the Faculty of Education, …xx… University to participate in this research about teachers' beliefs and negotiation of meaning in CLIL lessons. The purpose of this research is to explore how EFL pre-service teachers explain the content and new subject-specific vocabulary to make it comprehensible to students, and their beliefs about effective CLIL lessons.

What does participation involve?

I aim to recruit six pre-service EFL teachers for the research, which will involve a semi-structured interview, two classroom observations, and a stimulated recall interview.

1) A semi-structured interview will be conducted and recorded via Skype, Zoom or a similar means before they start their teaching practicum. The interview is expected to last 40 to 60 minutes. They will be asked about their profile, background knowledge about CLIL, beliefs about CLIL in general and about effective CLIL lessons, and challenges associated with CLIL teaching based on their experiences of CLIL education in TEFL1 and TEFL2 courses at the Faculty of Education.

> *Sample Questions: 1) Could you describe how you use English in your CLIL classes? 2) How would you describe your role as a CLIL teacher? 3) How do your beliefs regarding language teaching influence the way you implement CLIL to your English class?*

The recorded interviews will then be transcribed by the researcher. A copy of the interview transcriptions will be sent to the pre-service teachers for checking before further analysis.

2) Two classroom observations will be conducted (two of each participant's CLIL classes at school) after the semi-structured interview. All stages of teaching will be observed during these classes, with special attention to the presentation stage including when the pre-service teachers explain the content and introduce new vocabulary to students. Each participant will be asked to film two of their CLIL lessons taught in their normal English classes and share the filmed lessons with the researcher. The filmed lessons will also be used for the purposes of stimulated recall interviews. Photos from the filmed lessons may be included in my thesis, providing that all possibly identifying features are removed or obscured. Students may appear in the videos, but no data will be used in my thesis as the focus of the research is only on teachers' teaching practice. The participants will be asked to share two unedited videos of their CLIL lessons to the researcher. In the event that the participants are not willing to share the unedited videos, there is an option for them to share the edited videos made for the purpose of university assessment. The filmed lessons will then be transcribed by the researcher for further analysis.

3) A stimulated recall interview will take place after the observations of two CLIL lessons via Zoom, Skype or a similar means. Participants will be asked questions in relation to their thoughts and reasons behind their teaching in the two CLIL lessons. Selected key events,

consisting of teachers' explanations of subject-specific vocabulary and complex ideas, will be the main emphasis of the interview.

> *Sample Questions: 1) Could you explain your reasoning behind the lesson design? 2) Could you describe which part of the lesson was the most challenging part for you to teach? 3) Are you aware of any beliefs you hold now about effective ways of CLIL implementation that you did not have before starting teaching practicum?*

The interview will be recorded. The recorded interviews will then be transcribed by the researcher. A copy of the interview transcriptions will be sent to the pre-service teachers for checking before further analysis.

Rights of a participant

1) The pre-service EFL teachers' decision to participate and the data that they provide will in no way affect their relationship with the university, nor will they be used to critique or evaluate their teaching performance or affect their teaching practicum grade.

2) Participation in the research is completely voluntary. If students decide to participate, they will have the right to withdraw from further participation at any stage by contacting and sending the signed withdrawal form to the researcher. However, if they decide to withdraw, all data they have provided up until that point may continue to be processed if they consent to this.

3) Throughout the study, all communication channels will be kept open to contact my supervisors or me regarding queries about the research.

Anonymity/ Confidentiality

Every effort will be made to ensure anonymity but this cannot be guaranteed.

Use of the information

Data collected will be used mainly in writing my doctoral thesis at the University of Waikato. When this is finished, it will be published on the University of Waikato's Research Commons. A summary of the findings will be sent to you on request. Moreover, parts of the research may also be used in writing articles, book chapters, and presentations at educational institutions or at conferences.

Data Storage

Electronic data (interview recordings, classroom observation recordings, and transcripts) will be stored on a password-protected computer accessible only by the researchers.

If you are happy for the fifth-year English major students at the Faculty of Education, …xx… University to be invited to participate in the study, please sign the attached Consent Form and send it to my email (see contact details below).

If you have any queries, please contact me in the first instance. If you wish to ask further questions, please contact my supervisors. Contact details are as follows:

Nutthida Tachaiyaphum,
Division of Education, University of Waikato, New Zealand
Email: nutthida.t@msu.ac.th
Phone: +64223604878 (NZ), +66827559697 (TH)

Dr. Laura Gurney, Lecturer,
Division of Education, University of Waikato, New Zealand
Email: laura.gurney@waikato.ac.nz

Dr. Nicola Daly, Senior Lecturer,
Division of Education, University of Waikato, New Zealand
Email: nicola.daly@waikato.ac.nz

Appendix 6: Informed consent form for the participants' academic advisor

Consent Form

TO: ACADEMIC ADVISOR (ENGLISH MAJOR), FACULTY OF EDUCATION, …XX… UNIVERSITY

Date: xx (month) 2020

Title of the Research Project: Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai Pre-service EFL Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

---

I have read and I understand the information presented in the information letter about the research conducted by Nutthida Tachaiyaphum, under the supervision of Dr Laura Gurney and Dr Nicola Daly, Division of Education, University of Waikato, New Zealand.

I was informed that participation in the study is voluntary and that the pre-service EFL teachers at the Faculty of Education, …xx…University can withdraw their consent to participate by sending the signed withdrawal form to the researcher.

I have been given a copy of the Information Letter and Consent Form to keep.

I give my approval to Nutthida Tachaiyaphum to recruit pre-service EFL teachers at the Faculty of Education, …xx…University as her research participants, according to the conditions set out in the Information Letter.

Academic advisor's Name (printed) ……

Signature …… Date ……

Please email this form to:

Nutthida Tachaiyaphum,
Division of Education, University of Waikato, New Zealand
Email: nutthida.t@msu.ac.th

Appendix 7: Information letter to school principals

Information Letter

TO: PRINCIPAL OF …….SCHOOL

Date: xx (month) 2020

Title of the Research Project: Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai Pre-service EFL Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

Principal Researcher: Nutthida Tachaiyaphum

My name is Nutthida Tachaiyaphum. I am a PhD scholar at the Division of Education, University of Waikato in New Zealand. I am undertaking this research project for my PhD to understand the pre-service EFL teachers' use of English in explaining content and new subject-specific vocabulary to students in CLIL lessons at Thai secondary schools. I am writing to ask permission to attend two classes with each of the three pre-service EFL teachers who have agreed to participate in this research project.

What is the research about?

CLIL is a teaching approach in which an additional language is used for teaching both content and language. In Thailand, the language used as a medium of instruction in CLIL is English. In the CLIL classroom context, it is believed that the negotiation of meaning helps learners and teachers achieve comprehension and learning goals.

It is also argued that *how* teachers teach CLIL lessons, particularly conveying and explaining subject-specific terms and concepts, is influenced by their beliefs concerning effective CLIL instruction.

I would like to request for permission to collect data from EFL pre-service teachers at your school for this research. The purpose of this research is to explore how pre-service EFL teachers explain the content and new subject-specific vocabulary to make it comprehensible to students, and their beliefs about effective CLIL lessons.

What does participation involve?

I aim to recruit the pre-service EFL teachers at your school for the research, which will involve a semi-structured interview, two classroom observations, and a stimulated recall interview.

1) A semi-structured interview will be conducted and recorded via Skype, Zoom or a similar means before they start their teaching practicum. The interview is expected to last 40 to 60 minutes. They will be asked about their profile, background knowledge about CLIL, beliefs about CLIL in general and about effective CLIL lessons, and challenges associated with CLIL teaching based on their experiences of CLIL education in TEFL1 and TEFL2 courses at the Faculty of Education.

> Sample Questions: *1) Could you describe how you use English in your CLIL classes? 2) How would you describe your role as a CLIL teacher? 3) How do your beliefs regarding language teaching influence the way you implement CLIL to your English class?*

The recorded interviews will then be transcribed by the researcher. A copy of the interview transcriptions will be sent to the pre-service teachers for checking before further analysis.

2) Two classroom observations will be conducted after the semi-structured interview. All stages of teaching will be observed with close attention to the presentation stage including when teachers explain the content and introduce new vocabulary to students. Each participant will be asked to film two of their CLIL lessons taught in their normal English classes and share the filmed lessons with the researcher. The researcher will conduct a video observation. An observation schedule will be used to guide the observations. The filmed lessons will also be used for the purposes of stimulated recall interviews. Photos from the filmed lessons may be included in my thesis, providing that all possibly identifying features are removed or obscured. The participants will be asked to share two unedited videos of their CLIL lessons to the researcher. In the event that the participants are not willing to share the unedited videos, there is an option for them to share the edited videos made for the purpose of university assessment. The filmed lessons will then be transcribed by the researcher for further analysis.

3) A stimulated recall interview will take place after the observations of two CLIL lessons via Zoom, Skype or a similar means. Participants will be asked questions in relation to their thoughts and reasons behind their teaching in the two CLIL lessons. Selected key events, consisting of teachers' explanations of subject-specific vocabulary and complex ideas, will be the main emphasis of the interview.

> Sample Questions: *1) Could you explain your reasoning behind the lesson design? 2) Could you described which part of the lesson was the most challenging part for you to*

teach? 3) Are you aware of any beliefs you hold now about effective ways of CLIL implementation that you did not have before starting teaching practicum?

The interview will be recorded. The recorded interviews will then be transcribed by the researcher. A copy of the interview transcriptions will be sent to you for checking before further analysis.

It should be noted that this is not an extra work commitment as the participants are already filming certain classes for the purpose of university assessment. So, this will not have an impact on the teachers and students' class time. With regards to the semi-structured and stimulated recall interviews, I will discuss with the pre-service teachers and carefully arrange the interview schedules based on their teaching schedules and schools' activities. This is to ensure that all activities the pre-service teachers will be required to do will not disrupt the school, the teacher or the pre-service teachers.

Students may appear in the videos; however, no data will be used, and the students will not be identifiable in the research. The research requires only the pre-service EFL teachers' data.

Rights of a participant

1) The pre-service EFL teachers' decision to participate and the data that they provide will in no way affect their relationship with …xx… and your school, nor will they be used to critique or evaluate their teaching performance or affect their teaching practicum grade.

2) Participation in the research is completely voluntary. If the pre-service EFL teachers decide to participate, they will have the right to withdraw from further participation at any stage by contacting and sending the signed withdrawal form to the researcher. However, if they decide to withdraw, all data they have provided up until that point may continue to be processed if they consent to this.

3) Throughout the study, all communication channels will be kept open to contact my supervisors or me regarding queries about the research.

Anonymity/ Confidentiality

Every effort will be made to ensure anonymity but this cannot be guaranteed.

Use of the information

Data collected will be used mainly in writing my doctoral thesis at the University of Waikato. When this is finished, it will be published on the University of Waikato's Research Commons.

A summary of the findings will be sent to you on request. Moreover, parts of the research may also be used in writing articles, book chapters, and presentations at educational institutions or at conferences.

Data Storage

Electronic data (interview recordings, classroom observation recordings, and transcripts) will be stored on a password-protected computer accessible only by the researchers.

If you are happy for this research to be conducted with the pre-service EFL teachers at your school, please sign the attached Consent Form and send it to my email (see contact details below).

If you have any queries, please contact me in the first instance or my supervisors if you have further questions. Contact details are as follows:

Nutthida Tachaiyaphum,
Division of Education, University of Waikato, New Zealand
Email: nutthida.t@msu.ac.th
Phone: +64223604878 (NZ), +66827559697 (TH)

Dr. Laura Gurney, Lecturer,
Division of Education, University of Waikato, New Zealand
Email: laura.gurney@waikato.ac.nz

Dr. Nicola Daly, Senior Lecturer,
Division of Education, University of Waikato, New Zealand
Email: nicola.daly@waikato.ac.nz

Appendix 8: Informed consent form for school principals

Consent Form

TO: PRINCIPAL OF ……SCHOOL

Date: xx (month) 2020

Title of the Research Project: Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai Pre-service EFL Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

---

I have read and I understand the information presented in the information letter about the research conducted by Nutthida Tachaiyaphum, under the supervision of Dr Laura Gurney and Dr Nicola Daly, Division of Education, University of Waikato, New Zealand.

I was informed that participation in the study is voluntary and that the pre-service EFL teachers at my school can withdraw their consent to participate by sending the signed withdrawal form to the researcher.

I have been given a copy of the Information Letter and Consent Form to keep.

I give my approval to Nutthida Tachaiyaphum to collect data for this research from the pre-service EFL teachers at my school according to the conditions set out in the Information Letter.

Principal's Name (printed) ……

Signature …… Date ……

Please email this form to:

Nutthida Tachaiyaphum,
Division of Education, University of Waikato, New Zealand
Email: nutthida.t@msu.ac.th

Appendix 9: Information letter to participants

Information Letter

TO: PARTICIPANT

Date: xx (month) 2020

Title of the Research Project: Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai Pre-service EFL Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

Principal Researcher: Nutthida Tachaiyaphum

My name is Nutthida Tachaiyaphum. I am a PhD scholar at the Division of Education, University of Waikato in New Zealand. I am undertaking this research project for my PhD to understand the pre-service EFL teachers' use of English in explaining content and new subject-specific vocabulary to students in CLIL lessons at Thai secondary schools. I am writing to invite you to participate in my research project.

What is the research about?

CLIL is a teaching approach in which an additional language is used for teaching both content and language. In Thailand, the language used as a medium of instruction in CLIL is English. In the CLIL classroom context, it is believed that the negotiation of meaning helps learners and teachers achieve comprehension and learning goals.

It is also argued that *how* teachers teach CLIL lessons, particularly conveying and explaining subject-specific terms and concepts, is influenced by their beliefs concerning effective CLIL instruction.

You are invited to participate in this research about teachers' beliefs and negotiation of meaning in CLIL lessons. The purpose of this research is to explore how EFL pre-service teachers explain the content and new subject-specific vocabulary to make it comprehensible to students, and their beliefs about effective CLIL lessons.

What does participation involve?

Participation in the research will involve a semi-structured interview, two classroom observation, and a stimulated recall interview.

1) A semi-structured interview will be conducted and recorded via Skype, Zoom or a similar means before you start your teaching practicum. The interview is expected to last 40 to 60 minutes. You will be asked about your profile, background knowledge about CLIL, beliefs

about CLIL in general and about effective CLIL lessons, and challenges associated with CLIL teaching based on your experiences of CLIL education in TEFL1 and TEFL2 courses at the Faculty of Education.

> *Sample Questions: 1) Could you describe how you use English in your CLIL classes? 2) How would you describe your role as a CLIL teacher? 3) How do your beliefs regarding language teaching influence the way you implement CLIL to your English class?*

The recorded interviews will then be transcribed by the researcher. A copy of the interview transcriptions will be sent to you for checking before further analysis.

2) Two classroom observations will take place after the semi-structured interview. All stages of teaching will be observed during these classes, with special attention to the presentation stage including when you explain the content and introduce new vocabulary to students. You will be asked to film two of your CLIL lessons taught in your normal English classes and share the filmed lessons with the researcher. The filmed lessons will also be used for the purposes of stimulated recall interviews. Photos from the filmed lessons may be included in the thesis, providing that all possibly identifying features are removed or obscured. Students may appear in the videos, but no data will be used in the thesis as the focus of the research is only on teachers' teaching practice. You will be asked to share two unedited videos of your CLIL lessons to the researcher. In the event that you are not willing to share the unedited videos, there is an option for you to share the edited videos made for the purpose of university assessment. The filmed lessons will then be transcribed by the researcher for further analysis.

3) You will be asked to participate in a stimulated recall interview after the observations of two CLIL lessons via Zoom, Skype or a similar means. You will be asked questions in relation to your thought and reasons behind your teaching in the two CLIL lessons. Selected key events, consisting of teachers' *explanations of subject-specific vocabulary and complex ideas,* will be the main emphasis of the interview.

> *Sample Questions: 1) Could you explain your reasoning behind the lesson design? 2) Could you describe which part of the lesson was the most challenging part for you to teach? 3) Are you aware of any beliefs you hold now about effective ways of CLIL implementation that you did not have before starting teaching practicum?*

The interview will be recorded. The recorded interviews will then be transcribed by the researcher. A copy of the interview transcriptions will be sent to you for checking before further analysis.

Who may participate in the research?

In order to participate in the research, you must (1) be a fifth-year pre-service teacher studying in English major at the EDU, …xx…; (2) have completed TEFL 1 and TEFL 2 courses where you are trained to implement CLIL; (3) use CLIL in your English classes at a *Thai secondary school* as part of your one-year teaching practicum.

Your rights as a participant

1) Your decision to participate and the data that you provide will in no way affect your relationship with …xx… and the school, nor will they be used to critique or evaluate your teaching performance or affect your teaching practicum grade.

2) Participation in the research is completely voluntary. If you decide to participate, you will have the right to withdraw from further participation at any stage by contacting and sending the signed withdrawal form to me. However, if you decide to withdraw, all data you have provided up until that point may continue to be processed if you consent to this.

3) Throughout the study, all communication channels will be kept open to contact my supervisor or me regarding queries about the research.

Anonymity/ Confidentiality

Every effort will be made to ensure anonymity but this cannot be guaranteed.

Use of the information

Data collected will be used mainly in writing my doctoral thesis at the University of Waikato. When this is finished, it will be published on the University of Waikato's Research Commons. A summary of the findings will be sent to you on request. Moreover, parts of the research may also be used in writing articles, book chapters, and presentations at educational institutions or at conferences.

Data Storage

Electronic data (interview recordings, classroom observation recordings, and transcripts) will be stored on a password-protected computer accessible only by the researchers.

If you are happy to participate in the research, please sign the attached Consent Form and send it to my email (see contact details below).

If you have any queries, please contact me in the first instance. If you wish to ask further questions, please contact my supervisors. Contact details are as follows:

Nutthida Tachaiyaphum,
Division of Education, University of Waikato, New Zealand
Email: nutthida.t@msu.ac.th
Phone: +64223604878 (NZ), +66827559697 (TH)

Dr. Laura Gurney, Lecturer,
Division of Education, University of Waikato, New Zealand
Email: laura.gurney@waikato.ac.nz

Dr. Nicola Daly, Senior Lecturer,
Division of Education, University of Waikato, New Zealand
Email: nicola.daly@waikato.ac.nz

Appendix 10: Informed consent form for participants

Consent Form

TO: PARTICIPANT

Date: xx (month) 2020

Title of the Research Project: Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai Pre-service EFL Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

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I have read and I understand the information presented in the information letter about the research conducted by Nutthida Tachaiyaphum, under the supervision of Dr Laura Gurney and Dr Nicola Daly, Division of Education, University of Waikato, New Zealand.

I was informed that participation in the study is voluntary and that I can withdraw my consent to participate by sending the signed withdrawal form to the researcher.

I have been given a copy of the Information Letter and Consent Form to keep.

I freely agree to participate in this project, according to the conditions set out in the Information Letter. I consent to my interview being audio-recorded and classroom observations being filmed.

Participant's Name (printed) ……..

Signature …… Date ……

Please email this form to:

Nutthida Tachaiyaphum,
Division of Education, University of Waikato, New Zealand
Email: nutthida.t@msu.ac.th

Appendix 11: Withdrawal form for participants

Withdrawal Form

(To be used for participants who wish to withdraw from the project)

Date:

Title of the Research Project: Content and Language Integrated Learning (CLL) in Practice: An Investigation of Thai Pre-service EFL Teachers' Beliefs and Negotiation of Meaning in Thai Secondary Classrooms

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I hereby wish to WITHDRAW my consent to participate in the above research project. I understand that any data collected as part of my participation in the study will remain as part of the study records.

Participant's Name (printed) ……

Signature …… Date ……

Please email this form to:

Nutthida Tachaiyaphum,
Division of Education, University of Waikato, New Zealand
Email: nutthida.t@msu.ac.th

Appendix 12: Semi-structured interview schedule

Semi-structured interview questions

Teachers' Background (ข้อมูลทั่วไป)

- How long have you been learning English?

  เรียนภาษาอังกฤษมาเป็นเวลานานเท่าไร

- Where have you learned English?

  เรียนภาษาอังกฤษจากที่ไหน

- Have you ever studied in an English-speaking country while at MSU? If yes, could you describe your English learning experience in the country?

  ระหว่างที่ศึกษาอยู่ที่ มมส เคยเรียนไปภาษาอังกฤษที่ต่างประเทศหรือไม่ ถ้าเคยช่วยเล่าประสบการณ์การเรียนที่ต่างประเทศโดยสังเขป

- How often do you use English in your daily life? (Describe when and where English is used)

  ปกติใช้ภาษาอังกฤษในชีวิตประจำวันบ่อยแค่ไหน เล่าโดยสังเขป

- How much do you use English as a medium of instruction in your English class?

  ใช้ภาษาอังกฤษในการจัดการเรียนการสอนมากน้อยเพียงใด

- As a prospective English teacher, how would you describe your English language abilities for teaching?

  อธิบายความสามารถทางภาษาอังกฤษสำหรับการสอนของตนเองโดยสังเขป

- How will knowing English be useful for your future teaching career?

Teachers' Experiences and Beliefs about CLIL implementation (ประการณ์และความเชื่อเกี่ยวกับ CLIL)

- Could you tell me briefly about TEFL 1 and TEFL 2 courses?

  เล่าข้อมูลเกี่ยวกับรายวิชา TEFL 1 และ TEFL 2 โดยสังเขป

- What have you learned about CLIL from the two courses?

  ได้เรียนรู้อะไรบ้างเกี่ยวกับ CLIL จากรายวิชาดังกล่าว

- What is a topic(s) or subject(s) (Maths, Science, Biology, etc.) that you prefer to teach? Could you explain why?

  ชอบสอนเลือกเนื้อหาจากวิชาใดมาสอนใน CLIL ทำไมจึงเลือกสอนเนื้อหาของวิชาดังกล่าว

- What is topic(s)/subject(s) that you do not like teaching, or that are difficult to teach? Could you explain why?

  เนื้อหาวิชาใดที่ไม่ค่อยเลือกมาสอนใน CLIL หรือคิดว่าเป็นเนื้อหาที่ยากต่อการสอน CLIL ทำไมจึงเป็นเช่นนั้น

- Could you explain how you integrate 4Cs into your CLIL lessons?

  อธิบายการบูรณาการ 4Cs ในบทเรียน CLIL ให้ฟังหน่อย

- How do you find integrating 4Cs in your CLIL lesson? (e.g., communication, content, cognition, culture)

  มีความคิดเห็นอย่างไรกับการบูรณาการ 4Cs ในบทเรียน CLIL

- How would you describe using English as a medium of instruction in your CLIL class compared to your English class?

  อธิบายการใช้ภาษาอังกฤษของตนเองในการสอน CLIL เมื่อเปรียบเทียบกับการใช้ภาษาอังกฤษในการสอนภาษาอังกฤษโดยทั่วไป

- Do you think CLIL has an impact on the way you use English to deliver the lesson? Please describe.

  คิดว่า CLIL มีผลต่อวิธีการใช้ภาษาอังกฤษในการจัดการเรียนการสอนของตัวเองหรือไม่ อย่างไร

- Are there any difficulties you encounter when presenting new content and vocabulary in CLIL class? How do you overcome the difficulties?

  มีอุปสรรคบ้างหรือไม่เวลาอธิบายคำศัพท์และเนื้อหาใหม่ ๆ ใน CLIL แล้วแก้ปัญหาอย่างไร

- According to your experience, are there challenges or limitations regarding CLIL implementation? Please describe.

  จากประสบการณ์ส่วนตัว คิดว่ามีข้อจำกัดและความท้าทายในการสอน CLIL หรือไม่ อะไรบ้าง

- Have you used any other teaching strategies/ techniques to support your CLIL teaching? Please describe.

  มีเทคนิควิธีการอะไรบ้างที่ใช้ในการสอน CLIL เพื่อให้การเรียนการสอนบรรลุจุดประสงค์

- How do your beliefs regarding language teaching influence the way you implement CLIL to your English class?

  ความเชื่อของตนเองที่มีต่อการจัดการเรียนการสอนภาษาอังกฤษคืออะไร

  คิดว่าความเชื่อดังกล่าวมีผลต่อการจัดการเรียนการสอน CLIL หรือไม่ อย่างไร

- How would you describe your role as a CLIL teacher? อธิบายบทบาทของครู CLIL
  - *Would you say your role is an English teacher or a content teacher when teaching a CLIL lesson? Could you explain why?*

    เวลาสอน CLIL คิดว่าบทบาทของตนเป็นครูภาษาอังกฤษหรือครูสอนรายวิชาอื่น

- What are the characteristics of a CLIL teacher?

  คุณลักษณะของครู CLIL มีอะไรบ้าง

- In your opinion, what makes CLIL teaching not fully effective?

  คิดว่าอะไรที่เป็นปัจจัยทำให้การสอน CLIL ไม่ประสบผลสำเร็จ
  - *What makes CLIL effective?*

    แล้วปัจจัยใดที่ช่วยให้การสอน CLIL ประสบผลสำเร็จและมีประสิทธิภาพ

- What contribution do you think CLIL would make to Education in Thailand?

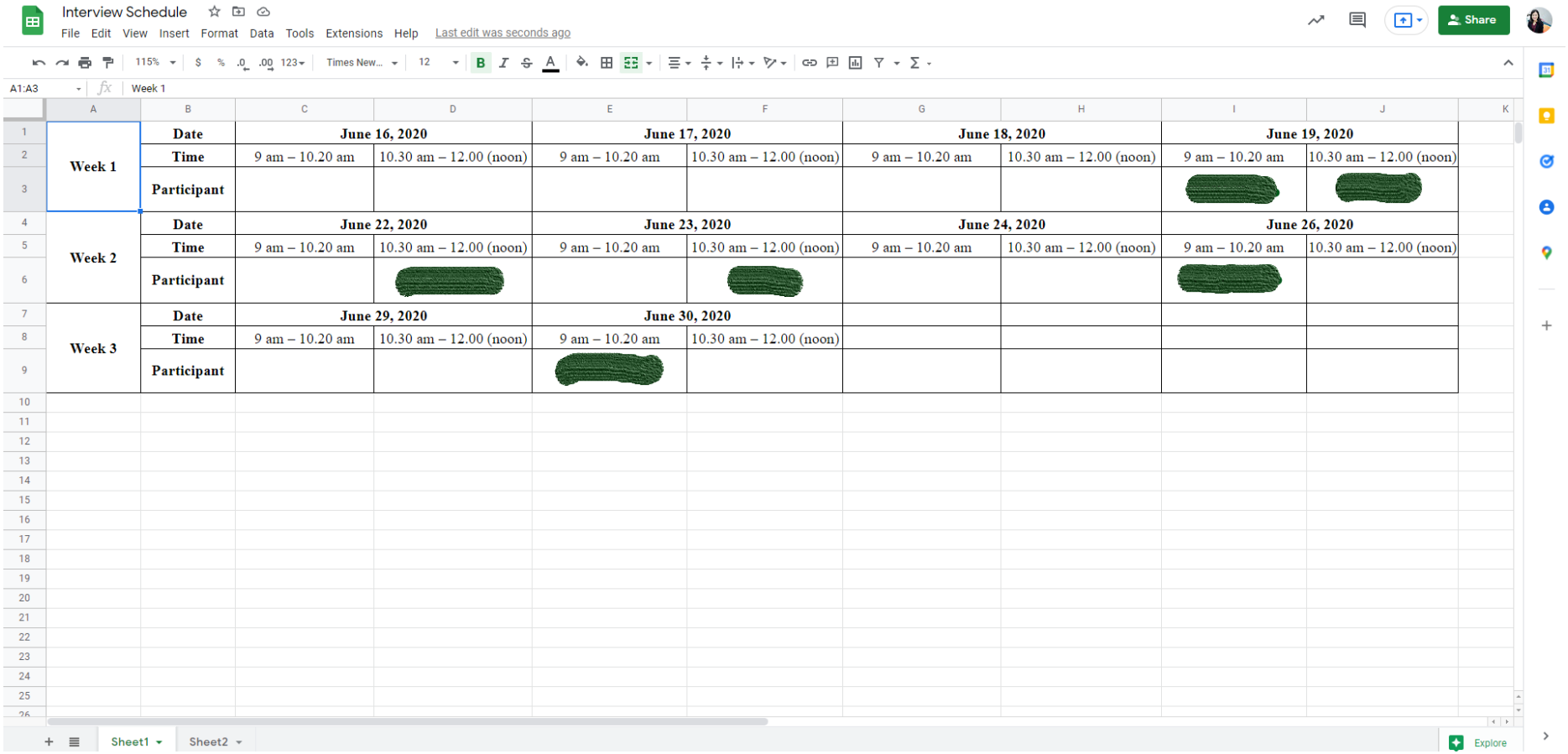
  คิดว่า CLIL จะช่วยพัฒนาการศึกษาไทยอย่างไรได้บ้าง

- Could you indicate what professional development support should be provided to support effective CLIL teaching in Thailand?

  ครูควรได้รับการสนับสนุนในรูปแบบใดบ้างเพื่อให้สามารถจัดการเรียนการสอนแบบ CLIL ได้อย่างมีประสิทธิภาพ

Note: The questions will not be asked exactly in the same form and order with all the interviewees, but they will be varied according to each interview situation.

Appendix 13: Semi-structured interview timetable



Week 1	Date	June 16, 2020		June 17, 2020		June 18, 2020		June 19, 2020		
	Time	9 am – 10.20 am	10.30 am – 12.00 (noon)	9 am – 10.20 am	10.30 am – 12.00 (noon)	9 am – 10.20 am	10.30 am – 12.00 (noon)	9 am – 10.20 am	10.30 am – 12.00 (noon)	
	Participant							[redacted]	[redacted]	
Week 2	Date	June 22, 2020		June 23, 2020		June 24, 2020		June 26, 2020		
	Time	9 am – 10.20 am	10.30 am – 12.00 (noon)	9 am – 10.20 am	10.30 am – 12.00 (noon)	9 am – 10.20 am	10.30 am – 12.00 (noon)	9 am – 10.20 am	10.30 am – 12.00 (noon)	
	Participant		[redacted]		[redacted]			[redacted]		
Week 3	Date	June 29, 2020		June 30, 2020						
	Time	9 am – 10.20 am	10.30 am – 12.00 (noon)	9 am – 10.20 am	10.30 am – 12.00 (noon)					
	Participant			[redacted]						

Appendix 14: Classroom observation schedule

Classroom Observation Schedule

Topic of the Lesson: …… Class: ……...

Date: ……. Time/ Duration: ……..

Learning Objective(s): ……

Teaching procedures	NoM (√)										Other forms of NoM	Details
	Using synonym	Paraphrasing	Modifying pronunciation	Modify grammatical structure	Using visual supports	Translating into L1	Giving examples	Highlighting key words	Providing definition	Confirming student's answer		
Explanation of vocabulary												

Teaching procedures	NoM (√)										Other forms of NoM	Details
	Using synonym	Paraphrasing	Modifying pronunciation	Modify grammatical structure	Using visual supports	Translating into L1	Giving examples	Highlighting key words	Providing definition	Confirming student's answer		
Explanation of content												
Others:												

Teaching procedures	NoM (√)										Other forms of NoM	Details
	Using synonym	Paraphrasing	Modifying pronunciation	Modify grammatical structure	Using visual supports	Translating into L1	Giving examples	Highlighting key words	Providing definition	Confirming student's answer		

Appendix 15: Guideline for CLIL lesson filming

Guideline for recording a CLIL lesson

Directions: You are invited to film *TWO CLIL lessons* according to the guideline below.

1. Focus of classroom observation

- Teachers' lesson delivery, specifically the teacher-fronted talk mode (presentation stage)

2. Key elements to be recorded

- **Teacher's actions and talks:** Record the interactions in your classroom by focusing mainly on the teacher's actions and talks;
- **Presentation stage:** The teacher's lesson explanation (e.g., key terms, key concepts, content) at the presentation stage (teacher-fronted talk) must be fully presented;
- **Students' participation:** Other stages of teaching at which the main focus is on students' participation in the lesson activities should also be recorded to capture the overall interactions and classroom environment.

3. Sharing the filmed lessons

- Please share the filmed lessons via Google drive to the following email: nutthida.t@msu.ac.th

Note: Please ensure that students who do not wish to be recorded are kept outside the camera's scope at all times.

Appendix 16: Stimulated recall interview schedule

Stimulated Recall Interview Protocol

Initiation of Recall

- Could you generally reflect on your two observed CLIL lessons (student levels, teaching procedures, teaching materials, etc.)?
- Could you discuss the general outcomes you wished to make during the lessons?
- Were there any difficulties you faced in the CLIL classroom in terms of content and vocabulary teaching? How did you overcome these difficulties?
- Was there any part of the lessons that were difficult to understand or difficult to teach? Could you explain why?

During the Audio Stimulated Recall

- How and why was ……. activity/ event……. used in the lesson? (What factors affected your lesson planning/ activity design)
- Could you explain your decision to do this?

After Recall

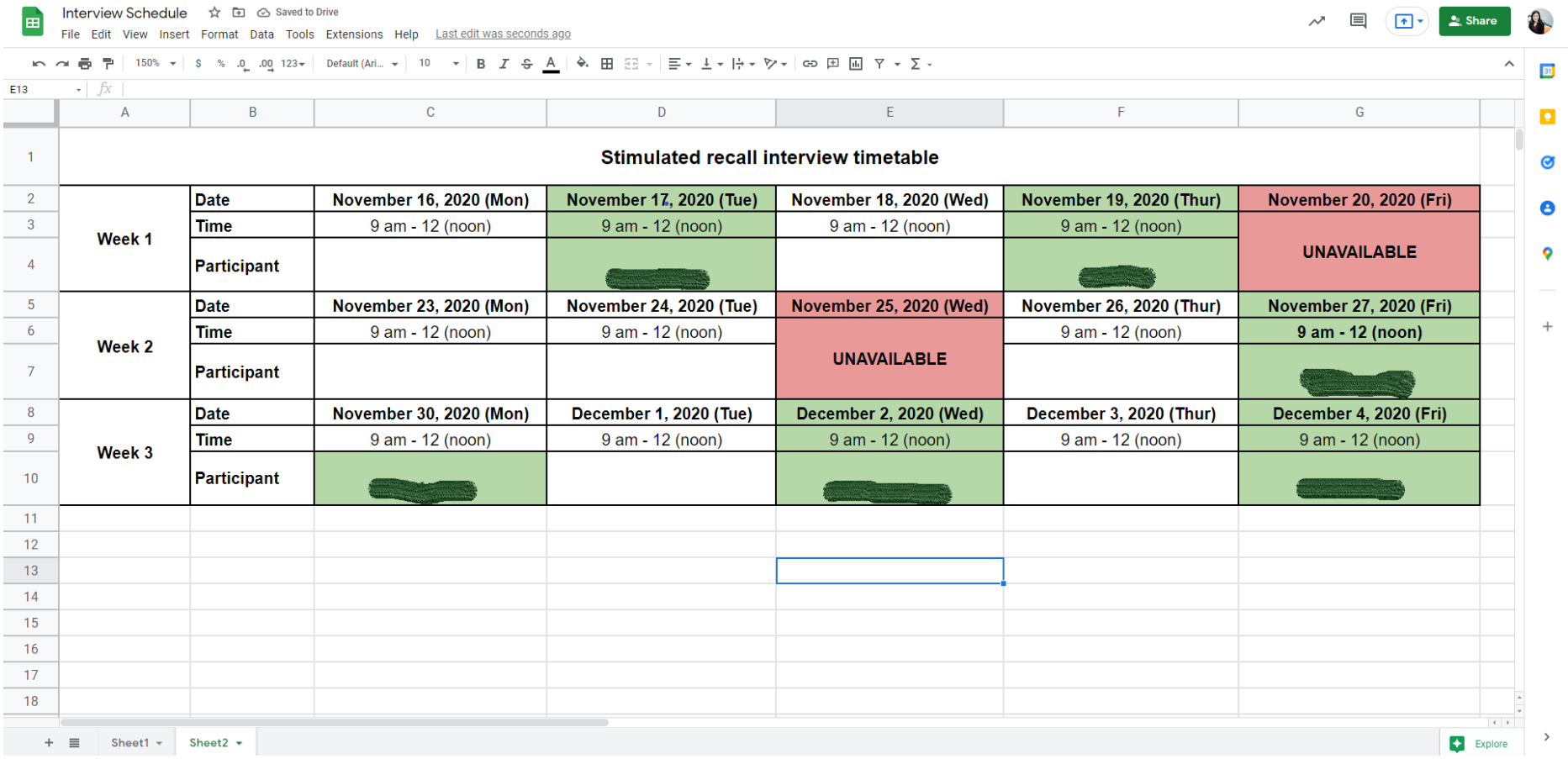
- Could you describe which part(s) of CLIL lessons was/were the easiest for you to teach? (e.g., communication, content, cognition, culture)
- Could you describe which part(s) of CLIL lessons was/were the *most challenging* for you to teach? (e.g., communication, content, cognition, culture)
- What worked particularly well? Was there anything that did not work well?
- Did you use any other teaching strategies to support your CLIL lessons? If yes/no, please describe. (Probe: learning theories learned during their course of study)
- Are you aware of any beliefs you hold now about effective ways of CLIL implementation that you did not have before starting teaching practicum?
- How did your beliefs regarding language teaching influenced the way you implemented the observed CLIL lessons?
- Are there challenges or limitations regarding CLIL implementation?
- Based on your experiences, what could be some key factors you believe affecting effective CLIL implementation?
- Could you indicate what professional development support should be provided to support effective CLIL teaching?

Note:

1) Questions for the audio stimulated recall stage will be generated and expanded according to the key episodes from the audio-recordings of classroom observations.

2) Some questions related to experiences and beliefs about effective CLIL implementation that have previously asked in the semi-structured interview will also be discussed to explore its relationship to the actual practices.

Appendix 17: Stimulated recall interview timetable



Stimulated recall interview timetable						
Week 1	**Date**	**November 16, 2020 (Mon)**	**November 17, 2020 (Tue)**	**November 18, 2020 (Wed)**	**November 19, 2020 (Thur)**	**November 20, 2020 (Fri)**
	Time	9 am - 12 (noon)	9 am - 12 (noon)	9 am - 12 (noon)	9 am - 12 (noon)	**UNAVAILABLE**
	Participant		[redacted]		[redacted]	
Week 2	**Date**	**November 23, 2020 (Mon)**	**November 24, 2020 (Tue)**	**November 25, 2020 (Wed)**	**November 26, 2020 (Thur)**	**November 27, 2020 (Fri)**
	Time	9 am - 12 (noon)	9 am - 12 (noon)	**UNAVAILABLE**	9 am - 12 (noon)	**9 am - 12 (noon)**
	Participant					[redacted]
Week 3	**Date**	**November 30, 2020 (Mon)**	**December 1, 2020 (Tue)**	**December 2, 2020 (Wed)**	**December 3, 2020 (Thur)**	**December 4, 2020 (Fri)**
	Time	9 am - 12 (noon)	9 am - 12 (noon)	9 am - 12 (noon)	9 am - 12 (noon)	9 am - 12 (noon)
	Participant	[redacted]		[redacted]		[redacted]