

Implementing Computer-Mediated
Communication Learning Activities for
Adolescent Learners of Chinese as a
Foreign Language in Ireland: *Task
Design, Learning Process, Affordances
and Constraints*

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Declaration

I hereby declare that this thesis, submitted in candidature for the degree of Doctor of Philosophy at Trinity College, Dublin, has not previously been submitted for a degree at this or any other university.

The thesis is entirely my own work, and any assistance is acknowledged.

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Summary

This doctoral study took place during the Covid pandemic to investigate an innovative pedagogical approach which combined various Computer-Mediated Communication (CMC) tools to facilitate Irish adolescent learners of Chinese in telecollaboration communication. It involves a mixed methods approach that combines both quantitative and qualitative datasets, including questionnaires, interviews, and records of interactions. The research design is based on research questions and the iterative design nature of Design-Based Research (DBR) approach which provides the ecological validity for researchers to comprehensively understand and optimise the mechanism of telecollaboration interventions through iteratively analysing various types of data.

The doctoral research consists of two DBR cycles, in total 45 Irish secondary school students and 2 Chinese language teachers. Cycle 1 identified that (1) meaningful communication with native speakers is the key need and (2) exploring culture serves as a motivating factor for Irish learners of the Chinese language. In addition, young Irish CFL learner probably underestimated the challenge of engaging with native speakers, which would suggest that more scaffolding and preparation are required for beginner learners before and during telecollaborations. Therefore, Cycle 2 task design was optimised to include a project-based collaboration activity (eBook creation on Book Creator) and warm-up text-based conversations on Padlet prior to having visual telecollaboration meetings on Zoom. Overall, Cycle 2 findings suggested that both students and teachers appreciated the significance of task sequences and the structured affordances provided by Book Creator, Padlet and Zoom. Improvements in Chinese language competences such as Pinyin (Chinese pronunciation system), typing skills and identifying Chinese characters were emphasised in the eBook activity. Padlet played a facilitating role in enhancing students' intercultural awareness by providing a relaxed communication environment. Additionally, although the authentic and visual interactions with native speakers on Zoom increased overall confidence in speaking Chinese, anxiety and pressure arising from limited language proficiency and logistical issues among young Irish students of the Chinese language cannot be neglected. While there were many challenges and constraints in implementing telecollaboration projects for young CFL beginners, this doctoral research demonstrated a feasible path forward for Chinese language learning and practical guidance for telecollaboration communication with native Chinese speakers.

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Abstract

Drawing together the development of Chinese as a curricular language subject in Ireland and the most advances in technology enhanced language learning, this doctoral study took place during the Covid pandemic to investigate an innovative pedagogical approach which combined various modalities of Computer-Mediated Communication (CMC) to facilitate Irish adolescent learners of Chinese in telecollaboration communication. It takes Sociocultural Theory (SCT) and its key concepts as the primary theoretical underpinnings to investigate the developmental process of learning and the relationship between learners and social environment which is mediated by technological tools. Linguistic and/or intercultural exchange with native speakers of the target language is recognized as a particular type of CMC in the field of Computer-Assisted Language Learning (CALL). Çiftçi (2016) highlighted that most CMC studies favoured Higher Education context and connected students from western countries with a few exceptions to explore Eastern cultures. Although the research body grows in recent years, studies exploring adolescent learners of Chinese language are very rare (Wang & Devitt, 2022).

This study involves a mixed methods approach based on research questions and the iterative design nature of Design-Based Research approach employed in this study. It consists of two DBR cycles, in total 45 Irish secondary school students and 2 Chinese language teachers. Cycle 1 identified that (1) meaningful communication with native speakers is the key need and (2) exploring culture serves as a motivating factor for Irish learners of Chinese as a Foreign Language (CFL). In addition, young Irish CFL learner probably underestimated the challenge of engaging with native speakers, which would suggest that more scaffolding and preparation are required for beginner learners before and during telecollaborations. Therefore, Cycle 2 task design was optimised to include collaborative learning activities (eBook creation on Book Creator) and warm-up text-based conversations on Padlet prior to having a visual telecollaboration meeting on Zoom. Overall, Cycle 2 findings suggested that both students and teachers appreciated the significance of task sequences and the structured affordances provided by Book Creator, Padlet and Zoom. The combination of technology in Cycle 2 was suggested to be beneficial, offering valuable insights for authentic cultural learning and intercultural interactions, collaboration, and team development. Improvements in Chinese language competences such as Pinyin (Chinese pronunciation system), typing skills and identifying Chinese characters were emphasised in the eBook activity. Padlet played a facilitating role

in enhancing students' intercultural awareness by providing a relaxed communication environment. Additionally, although the authentic and visual interactions with native speakers on Zoom increased overall confidence in speaking Chinese, anxiety and pressure arising from limited language proficiency and logistical issues among young Irish students of the Chinese language cannot be neglected. While there were many challenges and constraints in implementing telecollaboration projects for young CFL beginners, this doctoral research demonstrated a feasible path forward for Chinese language learning and practical guidance for telecollaboration communication with native Chinese speakers.

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1. Chapter 1 Introduction

This thesis details a doctoral study involving two iterative Design-Based Research (DBR) cycles aimed at developing a telecollaboration initiative for Irish adolescents learning Chinese in Irish secondary schools. The study explores the use of various Computer-Mediated Communication (CMC) technologies to fulfil the learning needs of young Irish learners by facilitating interactions with native Chinese peers in an authentic online communication environment.

This introductory chapter will first outline the context of teaching and learning Chinese as a Foreign Language (CFL) in Ireland. Section 1.2 will then present the rationale and overarching aim of this doctoral study. Following this introduction to our research, Section 1.3 will provide an overview of this dissertation.

1.1. Context of the Research

Chinese as a foreign language learning was firstly introduced to Irish undergraduate students in 2006 (Wu, 2017). On the one hand, the development of Chinese in Irish higher educational institutes is inseparable from two Confucius Institutes' support, on the other hand, some secondary schools expresses an interest to offer Chinese language courses to students in 2007 along with the establishment of two Confucius Institutes in Ireland (Zhang & Wang, 2018).

A few years later, the National Council for Curriculum and Assessment (NCCA) - a statutory body of the Department of Education in Ireland - launched a taster Chinese course in 2012. This selective course mainly focuses on Chinese cultural aspects and a certain amount of linguistic contents for Transition Year (TY) students who progress from the Junior Cycle (shortly JC, first three years) of secondary school in Ireland. With the support of the Confucius Institute, there were 262 classes in secondary schools and TY grades ran this course in 2017 (UCC Confucius Institute, 2016) while the UCD Confucius Institute reported that 102 schools run the Chinese language course in (Osborne et al., 2019; UCD Confucius Institute, 2016). In 2014, a pilot programme was designed to JC adolescents to equip them with a learning foundation for future Chinese study (NCCA, 2016).

In 2017, Ireland launched *Languages Connect* - Ireland's Strategy for Foreign Languages in Education 2017-2026. This strategy identifies the introduction and the development of Chinese as a curricular subject for Irish Senior Cycle students in the coming

years as a key target. Following the launch of this national language strategy action, Chinese language has been established as a two-year curricular programme since 2020 (NCCA, 2020). In June of 2022, students took the first ever Leaving Certificate Chinese exam which is the final state examination of the secondary school system and is also utilised as the university matriculation examination in Ireland. To date, there are three types of Chinese language course implemented in Irish secondary school settings (see Table 1): Junior Cycle (JC) Chinese Short Course, Transition Year (TY) Chinese and Leaving Certificate Mandarin Chinese.

Cycle	Junior Cycle (12-15 years old)	Senior Cycle (15/16 years old above)	
		Transition Unit	Leaving Certificate
Title	Chinese Language and Culture	Chinese Culture and Language Studies	Leaving Certificate Mandarin Chinese
Language and Culture Weighting	70% language; 30% culture	70% culture; 30% language	Not indicated but focus on accurately and fluently using Chinese appropriate to the age and stage of learning
Study Hours	100 hours	45 hours	180 hours
Proficiency Level (CEFR)	• A1.1 for speaking and listening • Lower level for reading and writing	Not indicated	Broadly aligned with Pre-A1/A1 level of the CEFR
Assessment	Project/ a range of oral presentation styles, i.e. oral interview, role-play, poster presentation, digital presentation.	• Portfolio assessment • Project work/presentation	• An oral examination • An aural examination • A written examination

Table 1. An overview of Chinese language courses at secondary school level in Ireland.

With the introduction of Chinese as a Leaving Certificate specification in the Irish secondary educational system, there is a growing interest in Chinese language among students, schools and parents. However, compared to other Anglosphere countries (UK, Australia), Ireland is at the early stage of its development in terms of Chinese as a Foreign Language (CFL) learning (Osborne et al., 2019; Zhang & Wang, 2018). The introduction of Chinese language courses in Ireland also faces a number of challenges.

At an educational policy level, the language proficiency requirements for CFL remain at a very basic level (Pre-A1/A1 of CEFR) across the three cited learning contexts within secondary school. Although the TY Chinese course is popular among students (Zhang & Wang, 2018), the emphasis on culture introduction and learning reduces the focus on language components. Consequently, the TY module “did not really have an impact on the

TCFL at post-primary level” (Zhang & Wang, 2018). In addition, according to Carson et al. (2019), the introduction of the JC Chinese short course is received as an enjoyable and engaging programme. However, the initial phase of promoting this course did not go very well because few schools were willing to offer this course due to the increase of workload on teachers and the impact on the reduction of class hours for other existing subjects (Royal Irish, 2016; Zhang & Wang, 2018). Moreover, a shortage of appropriate learning materials and qualified Chinese teachers is another issue while promoting the JC Chinese short course in schools (Carson et al., 2019; Wang et al., 2019; Zhang & Wang, 2018). The delayed release of supporting documents for the course (Zhang & Wang, 2018) and a lack of Chinese language resources (Carson et al., 2019) have contributed to this challenge. To date, there are only two textbooks designed for young Irish CFL learners and published. Furthermore, Chinese native teachers face difficulties in registering as teachers of Chinese with the Teaching Council in Ireland. The accreditation of teaching for Chinese language is complex for teachers who obtained their teaching qualification outside of Ireland. Another group of Chinese teaching professionals is Irish teachers. Although the number of Irish teachers who teach Chinese at the secondary school level has grown in recent years, there is a demand for training to improve their Chinese proficiency in order to address the diverse learning needs of their students.

From a classroom practice perspective, the English language is primarily used in the Chinese language classroom due to the beginner proficiency level specified in the national Chinese language specification (NCCA, 2016). Additionally, Carson et al. (2019) found that the characteristic of in-class interactions in most participating JC Chinese classes is teacher-led, despite many teachers aiming to integrate more collaborative learning activities into their class plans.

While the challenges outlined can limit learning opportunities for Irish adolescent CFL learners to experience continuous developmental learning of CFL while they are in the secondary school, they also present a unique opportunity to generate innovative solutions to these challenges through CMC technologies (Wang et al., 2019). Furthermore, the nature of school-based teaching and assessment for JC and TY empowers Chinese language teachers to freely choose and design learning materials based on students’ learning needs. The formats of assessment for the JC Chinese short course are flexible which allow Chinese language teachers and learners to possibly create a project-based teaching and/or learning environment. Such flexibility and potential teacher autonomy in relate to CFL teaching and

learning attitude toward Chinese learning paves the way for introducing a telecollaboration initiative into teaching practice.

1.2. Rationale for the Research

Given the numerous challenges encountered in the promotion of CFL at secondary school level (as discussed in Section 1.1) and the clear research gap in relation to young CFL learners in the literature of CMC (refer to Section 2.4.1), this research aims to contribute to CFL in the Irish context by drawing on the most recent advances in CMC technologies to optimise communication environment for adolescent CFL learners. In summary, this doctoral study is designed to provide Irish adolescent CFL learners with interaction opportunities with native Chinese peers across two Design-Based Research (DBR) iterations.

Theoretical, methodological and design approaches were chosen to explore the following research questions:

1. What was the impact of Computer-Mediated Communication (CMC) activities on young Irish learners of Chinese as a Foreign Language (CFL)?
2. How did the choice of CMC technologies contribute to the CFL learning process?
3. What were the characteristics of ‘successful’ and ‘failed’ task design in the course of telecollaboration learning for the beginner Chinese language course?

1.3. Thesis Outline

This doctoral dissertation is presented in seven chapters. The current chapter begins with a general introduction on the context of research by providing background information about Chinese as a Foreign Language (CFL) learning and its challenges in Ireland. The rationale for conducting this research is then presented to briefly emphasise the importance of investigating CMC interventions in both practice and research. It also explains how this research and its methodology contribute to the existing body of knowledge and address the problem.

Chapter 2 presents a structured review of the literature. It begins with an introduction to Sociocultural Theory (SCT) as a theoretical framework adopted for this study. The core concepts of SCT- mediation, affordance, scaffolding, and Zone of Proximal Development- provide insights into the foreign language learning process and the relationship between learners and their social environment mediated by Computer-Mediated Communication (CMC) technologies. The review of CMC development in the CFL field not only highlights

a clear research gap in the literature in relation to young CFL learners, but also summarizes the key affordances and challenges of CMC technologies in common use. Through the review of the literature on technology-mediated Task-Based Language Teaching (TBLT) and Intercultural Communicative Competence (ICC), research needs are identified which in turn define the primary focus of this thesis.

Chapter 3 addresses a range of methodological issues. This chapter identifies Mixed-Method Research (MMR), particularly Design-Based Research (DBR), as an appropriate approach for this study. Two iterative cycles of DBR are presented, followed by an examination/exploration of data instruments utilised in the study. The data analysis approach is then presented and discussed.

Chapter 4 presents the pedagogical design and intervention implementation. It includes considerations for selecting appropriate technologies and pedagogical approaches utilised in this study. The process of the first iterative Cycle is illustrated, starting with a systematic review, followed by a needs analysis with young CFL learners and a consultation activity with educators and CFL teachers. This chapter details the implementation of the first Cycle. In addition, Cycle 1 findings are presented in the subsection of the Cycle 1 evaluation rather than in the conventional findings chapter, as the design and implementation of Cycle 2 were shaped by the evaluation of Cycle 1. The influence of Cycle 1 results on the design of Cycle 2 is then discussed.

Chapter 5 focuses on presenting key findings from the second iteration of this DBR research. It reports on findings from quantitative data collected from questionnaires, highlighting changes in Chinese language learning motivation and intercultural sensitivity before and after the second round of telecollaboration communication. The primary emphasis is on the qualitative analysis of interviews (thematic analysis) and interaction records (conversation analysis), aiming to provide an in-depth exploration of the learning process mediated by (a)synchronous CMC tools, as well as the challenges and constraints of implementing such initiatives in the context of the Irish CFL classroom.

Chapter 6 presents a discussion which is structured upon the research questions in order to highlight and compare important results with the existing literature. In addition, the impacts of activities mediated by various technologies on young Irish CFL learners are discussed. The chapter also explores the process of learning through the lens of sociocultural theory by investigating how mediation and the environment facilitate learning and interactions in each CMC-facilitated activity.

Chapter 7 is the final chapter of this thesis. It outlines the main contributions of this thesis and limitations of the research. Recommendations for practice and the future research directions are then proposed and discussed.

2. Chapter 2 Literature Review

2.1. Chapter Introduction

The previous chapter provided an introduction about the research background and thesis outline. Chapter 2 focuses on a structured review of the literature. It begins with an introduction to Sociocultural Theory (SCT) as a theoretical framework adopted for this study. The core concepts of SCT- mediation, affordance, scaffolding, and Zone of Proximal Development- provide insights into the foreign language learning process and the relationship between learners and their social environment mediated by Computer-Mediated Communication (CMC) technologies. In addition, this thesis is concerned not only with language development but with the development of Intercultural Communicative Competence (ICC). Section 2.3 outlines key constructs of ICC in order to inform the discussion of CMC that follows in Section 2.4. Moreover, the review of CMC development in the field of Chinese as a Foreign Language (CFL) not only highlights a clear research gap in the literature in relation to young CFL learners, but also summarizes the key affordances and challenges of CMC technologies in common use. Through the review of the literature on technology-mediated Task-Based Language Teaching (TBLT), research needs are identified which in turn define the primary focus of this thesis.

2.2. Sociocultural Theory

This section is set out to introduce Sociocultural Theory (SCT) which emphasises the learning process and the relationship between learners and their surrounding communication environment. In order to better understand SCT as the theoretical framework for language learning in this study, key fundamental constructs of SCT (mediations, Zone of Proximal Development, More Knowledgeable Others, scaffoldings, affordance and ecological perspectives on language learning) will be discussed below.

2.2.1. Introduction

Sociocultural Theory (SCT) was initially developed to explain psychological development and was conceptualised by Lev Vygotsky and colleagues in post-revolutionary Russia of the 1920s and 1930s. Vygotsky often used the term '*cultural-historical psychology*' to refer to the influence of context on human cognitive development in his works. Wertsch (1984) first coined the term '*sociocultural theory*' to refer to Vygotsky's theory and it subsequently gained widespread use and acceptance in the field of language

learning. With the translation of Vygotsky's works in the later twentieth century, SCT has drawn the attention and research interest of scholars in the past decades (Aljaafreh & Lantolf, 1994; Böhlke, 2003; Dunn & Lantolf, 2008; Kitade, 2000; Kozulin, 2018; Kozulin et al., 2003; Lantolf, 2000; Lantolf & Beckett, 2009; Lantolf & Pavlenko, 2008; Lantolf & Poehner, 2023; Lantolf & Xi, 2023; Poehner, 2008; Sauro & Smith, 2010; Wertsch, 1984).

Moreover, Lantolf and Beckett (2009, p. 459) documented the research timeline of SCT in the field of Second Language Acquisition (SLA) and clearly categorised publications into FOUR themes:

1. Theory as an approach to analyse and interpret collected data;
2. Theory as a practical framework which integrates theory and practical activity in L2 development;
3. Key concepts applications in practice, such as Zone of Proximal Development (ZPD), Dynamic Assessment, Mediation, Internalization etc;
4. Theory development or specific issues.

Overall, SCT lays emphasis on the developmental process of learning and the relationship between learners and social environment. According to Vygotsky's view, lower and higher cognition development exist in human mental function (1986). Vygotsky highlighted the crucial significance of social interaction and the cultural context in shaping human development. In addition, SCT aims to help people understand higher cognition development which happens in the social cultural and historical context of individuals and through participation in these contexts (Avgousti, 2018; Chun, 2011; Hauck, 2010; O'Dowd & Klippel, 2006).

Given that technology tools are integrated in the Chinese as a Foreign Language (CFL) learning activities in this PhD study, this thesis aims to investigate the learning process of Irish adolescent CFL learners in different technology-mediated communication environments. In order to understand the foundational constructs of SCT, we need to look at key concepts which are frequently discussed when applying SCT into language research.

2.2.2. Mediation

SCT acknowledges that the human mind is mediated by different tools (symbolic, physical tools) to connect with the world. Symbolic tools are created by human beings, which includes arts, languages, music, literature etc. Physical tools are designed and produced by human to improve physical world, such as hammer, car, bicycle etc. SCT posits that human mental development stays closely connected with the physical world and an

individual's historical cultural environment. The following sub-sections introduce the definition of mediation and types of mediation in L2 learning.

The concept of *Mediation* encompasses a wide range of understandings among Vygotskians (Miller, 2011; Wertsch, 1991), however, there remains some ambiguities in the areas of philosophy, ideology and psychology (Kozulin, 2018). Therefore, the definition of *Mediation* discussed in this thesis is adopted from psychology and refers to “an involvement of a third factor (mediator) into the interaction between two objects, events, or persons... mediation is always a process related to the formation, development, enhancement, or deterioration of human mental function” (Kozulin, 2018, pp. 23-24). The notion of mediation not only uncovers the relationship between humans and their environment, but also sheds light on the dynamic learning process. In addition, Wertsch (2007) distinguished two aspects of mediation, implicit and explicit mediation, the former tends to occur internally by involving symbols while the latter involves external actions or tools to facilitate the learning process. The focus of explicit mediation is “expanded beyond autonomous individuals functioning alone in a laboratory setting to individuals functioning in real world activities with other individuals and with culturally created tools (e.g. paper and pencil, abacus, computer, charts, diagrams, instrumentation, etc.)” (Lantolf & Poehner, 2008, p. 9). SLA researchers have investigated explicit mediation and its connections with learners performance, collaborative learning, and learning artefacts created by mediation tools (Donato, 1994; Kozulin, 2018; Lantolf & Poehner, 2008; Thorne, 2003). Furthermore, Lantolf (2000) explicitly reviewed three types of mediation activities: social mediation, artefact mediation and self-mediation. Social mediation refers to mediation by others through social interaction while artefact mediation includes interactions and outcomes mediated by tasks and technology. In terms of self-mediation, it looks into the use of private speech as a means of mediation for the purposes of mental rehearsal and the appropriation of a second language.

According to Lantolf et al. (2014), one important form of mediation is *Regulation* where language serves to shape children's behaviour and “children acquire the particular language used by the other members of a community (usually adults and older children)” (p. 200). Regulation can be categorised into three stages: object-regulation, other-regulation and self-regulation. Object-regulation involves the use of artefacts or objects in the environment, such as books and mobile phones. Other-regulation describes both implicit and explicit mediation by other individuals, often referred to scaffolding (Section 2.2.3), such as teachers' feedback, peers support during learning activities. Other-regulation is highly relevant to

Zone of Proximal Development (ZPD) as explained in Section 2.2.3 while self-regulation refers to human internalization of external forms of mediation (objects, others, artefacts) for executions. The process of regulation is dynamic and it can shift among three stages according to human development needs. It is crucial to be aware that language activity serves as a way to regulate the thinking process rather than constituting thinking itself (Lantolf & Thorne, 2006). Therefore, designed activity plays an important role as a means of mediation in the process of L2 learning in formal educational settings. For instance, learners are asked to collaboratively work in groups or dyads to complete a communicative task. The communicative task serves as a mediation way that provides possibilities and opportunities for learners to use the L2. If students are assigned to send an email to their classmates, email as a technology is a mediation tool for learners to achieve both communicative and practice goals.

In summary, mediation not only highlights the relationship between humans and their environment but also underscores the dynamic nature of the learning process. The social nature of artifacts enables L2 learners to construct meaning during activities. In the next section, Zone of Proximal Development (ZPD) will be introduced to better understand the relationship between learning and development among learners.

2.2.3. Zone of Proximal Development and Relevant Concepts

The previous section reviewed the concept of mediation and emphasised the dynamic nature of learning process where people use cultural-historical artifacts through interactions to (self)regulate the environment and their own cognitive development.

In order to address the importance of collaborative learning and the guidance and support from peers or experts in the process of learning, Zone of Proximal Development (ZPD) will be explained in this Section 2.2.3. ZPD, as another important construct of SCT, focuses on the relationship between learning and development as well as the significant mediational role that other people play in the process of human development. With the support from More Knowledgeable Others (MKO), learners can achieve better learning outcomes or higher goals.

Zone of Proximal Development (ZPD) was defined by Lev Vygotsky (1978) as “functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state...The actual developmental level characterises mental development retrospectively, while the ZPD characterises mental development prospectively...the ZPD permits us to delineate the child’s immediate future

and his dynamic developmental state, allowing not only for what already has been achieved developmentally but also for what is in the course of maturing” (p. 86). The ZPD represents a gap between what a learner can do independently and what they can do with the assistance of a More Knowledgeable Other (MKO). MKOs can be teachers, experts or peers who provide affordances for learning to novice or less capable individuals. ZPD as one of key constructs in SCT, it focuses on individual cognitive development through mediation in a social context. More specifically, The concept of ZPD elicits “the difference between what someone can do alone and what he or she can do with mediation” (Lantolf & Beckett, 2009).

However, it is critical to identify the mechanisms of effective support within the ZPD. Aljaafreh and Lantolf (1994) identified the principles of gradualness and contingency as key aspects of the ZPD. Additionally, the ultimate goal of guidance offered by experts within the ZPD is to afford learners to successively complete the task. The designed interventions and guidance should be appropriate to meet learner's needs and actual ability. As Aljaafreh and Lantolf (1994) suggested, the guidance “normally starts at a highly strategic, or implicit level and progressively becomes more specific, more concrete, until the appropriate level is reached” (p. 468). Moreover, it is important to keep in mind that the guidance here from an expert is not only offered by teachers but also by more capable peers.

Jerome Bruner and his colleagues in 1976 firstly use the term *Scaffolding* to refer to any assistance and help from adults or experts in the process of learning. Bruner subsequently defined scaffolding as “the steps taken to reduce the degrees of freedom in carrying out some tasks so that the child can concentrate on the difficult skill she is in the process of acquiring” (Bruner, 1978, p. 19). The notion of scaffolding is closely connected with the concept of ZPD. It can refer to different types of mediations, such as teacher's feedback or peer collaboration (human mediation), technology support (symbolic tool mediation), class tasks (designed activity). The occurrence of scaffolding depends on learners’ needs and performance in the process of ZPD. Aids and assistance from the expert will be tapered off when unnecessary.

In Vygotsky’s SCT theory, *More Knowledgeable Other* (MKO) refers to people who have more experience or higher skill levels than learners to solve specific problems and tasks. Here, MKO refers not only to teachers and parents who are obvious provide guidance during learning process, but also to peers who are more skilled in the collaborative works to facilitate others in the same age with the completion of tasks. In other words, MKOs as mediators scaffold learners through social interactions to construct their knowledge buildings in the process of ZPD.

2.2.4. Summary

In summary, SCT acknowledges human mind and mental development are mediated by different tools. Learning is a social activity through interactions with others in contextualised environment. Therefore, scaffoldings and MKOs from experts or peers assist learners to solve difficulties in the process of individual development. As noted above, the concept of ZPD illustrates that learning development is a dynamic mediated process in social contexts. Reviewing the key constructs of SCT will provide insights into understanding the learning process among Irish adolescent CFL learners in various technology-mediated communication environments for this study.

2.3. Intercultural Communicative Competence (ICC)

This doctoral thesis is not only concerned with language development but also with the development of Intercultural Communicative Competence (ICC). This section outlines key constructs in this field in order to inform the discussion of CMC that follows in Section 2.4.

2.3.1. Terminology

ICC has a variety of names in the literature and practice depending on research subjects and working fields (Deardorff, 2011; Fantini, 2009a; Koester & Lustig, 2015). Given the complexity of intercultural situations, Deardorff (2011) emphasised the importance of defining ICC as it helps determine “both the aspects to be assessed and the level of assessment (individual, program, organisation)” (p. 72). There is a widely used ICC model proposed by Byram (1997), which comprises five fundamental components: knowledge (*savoirs*), skills of interpreting and relating (*savoir comprendre*), skills of discovery and interaction (*savoir apprendre/faire*), attitudes (*savoir être*) and political education/critical cultural awareness (*savoirs’ engager*). Definitions of those components are outlined in Table 2.

Knowledge (<i>savoirs</i>)	“Knowledge of social groups and their products and practices in one’s own and in one’s interlocutor’s country, and of the general processes of societal and individual interaction” (p. 51).
Skills of interpreting and relating (<i>savoir comprendre</i>)	“Ability to interpret a document or event from another culture, to explain it and relate it to documents from one’s own” (p. 52).
Skills of discovery and interaction (<i>savoir apprendre/faire</i>)	“Ability to acquire new knowledge of a culture and cultural practices and the ability to operate knowledge, attitudes and skills under the constraints of real-time communication and interaction” (p. 52).
Attitudes (<i>savoir être</i>)	“Curiosity and openness, readiness to suspend disbelief about other cultures and belief about one’s own” (p. 50).
Political education/critical cultural awareness (<i>savoirs’ engager</i>)	“An ability to evaluate critically and on the basis of explicit criteria perspectives, practices and products in one’s own and other cultures and countries” (p. 53).

Table 2. Definitions of key components of Byram’s ICC model .

Although several critiques of Byram’s model have been discussed in the literature, it is worth noting that this model, being a product of its time, has had a considerable impact on intercultural education research, curriculum development, and teaching materials over the past two decades (Hoff, 2020).

Deardorff (2011) took the term of *Intercultural Competence* (IC) to broadly refer to interactions with people “from different backgrounds, regardless of location” (p. 66). Koester and Lustig (2015) defined ICC which focused on the interactions among people from different cultures by comparing the differences between cross-cultural studies and intercultural studies.

As addressed by Byram (1997), intercultural communication should take the social context into account as it is where interactions take place. The emphasis on social contexts is also consistent with the core of SCT, which addresses the relationship between individuals and communication environments in the intercultural communication. Moreover, the development of ICC is “an ongoing process” (Byram, 1997; Deardorff, 2011) and the reflection becomes vital in the course of intercultural communication over time.

However, Chen and Starosta (1996) critiqued the ambiguity of conceptualizing ICC in the previous literature. They proposed ICC as an “umbrella” concept which included three dimensions - intercultural awareness (cognitive), intercultural adroitness (behavioural) and intercultural sensitivity (affective). According to Chen and Starosta (1996), “the process of achieving awareness of cultural similarities and differences is enhanced and buffered by the

ability of intercultural sensitivity” (p. 4). The intersection between these two concepts enables researchers and teachers to investigate the ongoing development process in intercultural communication.

2.3.2. Assessing ICC and Intercultural Sensitivity Inventory

Given the complexity of ICC development, its assessment requires a combination of both direct and indirect measurements, which consists of mixed data instruments. Direct measurements include evaluating students' performances during the intercultural interaction (Byram, 1997; Ruben, 2016), class observations and (e)Portfolio to track the development of ICC among students (Byram, 1997; Deardorff, 2011; Jacobson et al., 1999; O'Dowd & Klippel, 2006).

As for indirect measurements, these involve self-report surveys (Olson & Kroeger, 2001; Paige et al., 2003; Schenker, 2012) and interviews (Fantini & Tirmizi, 2006; Straffon, 2003). Although self-report surveys are the most commonly used indirect assessment due to their time-saving and ease of data collection and analysis (Sinicrope et al., 2007). However, direct measurements offer valuable insights into understanding ICC development from a nuanced perspective.

In addition, it is important for students to perceive the aspects of measurement and its interconnection with learning outcomes (Deardorff, 2011; Fantini, 2009b). Deardorff (2011) suggested three steps in order to examine IC development:

- 1) clear define IC (or ICC) with theoretical framework supports
- 2) specify goals and measurable learning outcomes
- 3) direct and indirect measurements by combining different data instruments

Moreover, Deardorff (2011) highlighted the importance and necessity of examining IC in the secondary education settings. This thesis aims to investigate adolescent beginner CFL learners' attitudes and their emotional desire to understand cultural similarities and differences in the telecollaboration communication. Specifically, this study explores intercultural awareness (using interview and interaction data) and intercultural sensitivity (using self-report surveys) among young Irish CFL learners.

In terms of intercultural sensitivity inventory, Bennett (1986, 1993) developed the Intercultural Development Inventory (IDI), which comprises 50 items designed to assess individuals' orientations toward cultural differences. It encompasses three ethnocentric orientations and three ethnorelative orientations toward cultural differences. The IDI has been widely used in the education research to validate assessment aimed at building

intercultural competence (Bittinger et al., 2022; Hammer, 2011; Jaiswal et al., 2024; Lash et al., 2022; Olson & Kroeger, 2001; Paige et al., 2003; Straffon, 2003). Hammer et al. (2003) construed that intercultural sensitivity and intercultural competence was positively correlated that “the greater intercultural sensitivity is associated with greater potential for exercising intercultural competence” (p. 422). In their study, intercultural sensitivity involves the ability to recognize and appreciate cultural differences, whereas intercultural competence encompasses the aptitude to navigate and interact effectively within diverse cultural settings.

In addition, Bhawuk and Brislin (1992) designed a 46-item Intercultural Sensitivity Inventory based on the concepts of individualism and collectivism. They emphasised the significance of intercultural sensitivity in intercultural interaction and addressed that “people must be interested in other cultures, be sensitive enough to notice cultural differences, and then also be willing to modify their behavior as an indication of respect for the people of other cultures”(p. 416).

In summary, this section has reviewed ICC and its widely accepted terminology in this field. Within the realm of ICC, various terms and models have emerged, reflecting its complexity and significance. In addition, both direct and indirect measurements have been employed to evaluate the ongoing development process of ICC. The development of ICC through CMC will be discussed in the subsequent section.

2.4. Computer-Mediated Communication (CMC)

The primary goal of this thesis to investigate an innovative pedagogical approach that combined various modalities of Computer-Mediated Communication (CMC) to facilitate Irish adolescent learners of Chinese in telecollaboration communication. This section provides an overview of CMC in foreign language education, especially presenting the systematic review findings of CMC development in field of Chinese as a Foreign Language (CFL) in Section 2.4.1. It not only highlights a clear research gap in the literature in relation to young CFL learners as well as telecollaboration in the CFL field (Section 2.4.1.3 and Section 2.4.1.4), but also summarizes the key affordances (refer to Section 2.4.1.5) and challenges (refer to Section 2.4.1.6) of CMC technologies in common use. Telecollaboration as a specific type of CMC and its relevant issues will be introduced in Section 2.4.2.

Computer-mediated communication (CMC) has become an indispensable sub-field of computer assisted language learning (CALL), in particular since the advent of available

multimedia and internet in the phases of Integrative CALL in the twenty-first century (Warschauer, 2004). Herring (1996) defined CMC as “communication that takes place between human beings via the instrumentality of computers” (p. 1). Thorne (2007) defined CMC as “multimodal, often (but not exclusively) internet-mediated communication” (p. 325) to incorporate the affordances of the internet through various CMC tools and devices rather than solely through computers. The common forms of CMC technological tools are often categorised as synchronous and asynchronous. The key point to distinguish these two forms is whether communication occurs concurrently (as in video calls) or not (as in email). The common modes integrated in CMC tools are text, audio, video, and the combination of these three (Chun, 2016; Mahdi, 2014). As new communication technologies have emerged and developed, CMC tools have been included and explored in language learning research and practice. For example, there has been extensive research on virtual environments such as Second Life in recent years (Milton, 2012; Sadler, 2017; Shih & Yang, 2008; Sykes et al., 2008), augmented reality (Hawkinson, 2014; Liu & Tsai, 2012; Mahadzir, 2013; Richardson, 2016). Additionally, exploring ICC in the CMC environment is another prevalent topic in this field (Alonso-Belmonte & Vinagre, 2017; Anderson & Corbett, 2012; Belz, 2003; Chun, 2011; Godwin-Jones, 2013, 2019; Gutiérrez-Santiuste & Ritacco Real, 2023; O’Dowd & Dooley, 2020). In the review of intercultural learning mediated by technological tools, Çiftçi (2016) found that most studies favoured Higher Education contexts and connected students from western countries with a few exceptions to explore Eastern cultures. Although the research body grows in recent years, studies exploring adolescent learners of Chinese language are very rare, which will be discussed in the following section below.

2.4.1. Systematic Review of CMC in Chinese as a Foreign Language Learning (CFL)

This section is devoted to the findings of a systematic review that has been conducted in the course of this doctoral study. Overall, this review included 71 research papers (68 empirical research articles and 3 review articles) published between 2008 and 2022 (early April).

Overall, the developmental trends of technology mediated Chinese as a foreign language learning in the past 15 years were reviewed over five-year increments. In the first five-year period (2008-2012), asynchronous text-based CMC tools predominated in CFL practice. Videoconferencing has been more widely deployed along with the dispersion of mobile and course management system within schools in the second five years (2013-2017).

Over the recent five years (2018-2022), integrating multiple platforms as well as social networks, especially WeChat, have been widely investigated to create authentic communicative contexts in reviewed studies.

The review process is introduced in Section 2.4.1.1. Section 2.4.1.2 presents the criteria of inclusion and exclusion. Key findings of CMC in the field of CFL are outlined in Sections 2.4.1.3, 2.4.1.4, 2.4.1.5 and 2.4.1.6.

2.4.1.1. Review Process

Followed with the style of a Cochrane systematic review (Higgins & Green, 2008), this review included a qualitative synthesis of answers from peer-reviewed articles. Figure 1 sets out the stages of the review process and the papers included at each phase. The process of screening was divided into two steps: title/abstract screening and full text screening.

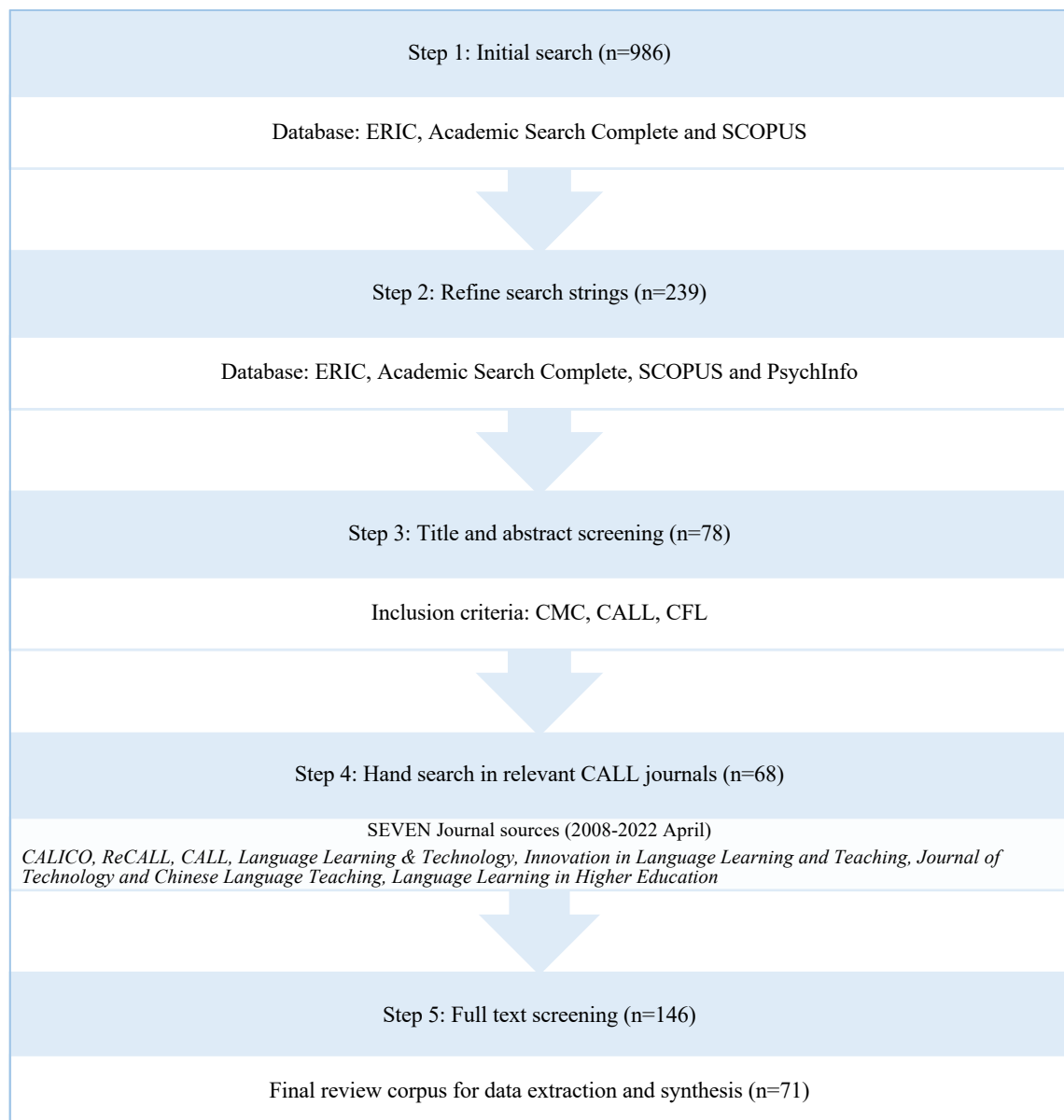


Figure 1. Systematic review screening and selection process.

2.4.1.2. Inclusion and Exclusion criteria

Some technologies which may have been prevalent in society in previous years are no longer in use while others, such as the smartphone, have emerged and grown to dominate the technology landscape. Given the pace and scale of change in digital technologies over recent years, papers published since 1 January 2008 were exclusively included. Focusing on the past 15 years (2008-2022) allowed technological development and its application in CFL to be examined. While there was a broad literature review on CALL and Chinese language learning, only papers referencing CMC tools specifically for CFL were included for screening. This category excluded papers exploring the development of Chinese as L1 as well as heritage language and literacy. In addition, given the language expertise of the two reviewers, any papers written in Chinese or English were included. The inclusion and exclusion criteria are shown in Table 3 below. The detailed summary of selected papers is shown in Appendix A.

Inclusion	Exclusion
Published on or after 1 Jan 2008	Published before 1 January 2008 or after 15 April 2022
Written in English and Chinese language	Neither English nor Chinese language
Chinese as a Foreign Language (CFL), Chinese as a Second Language (CSL), Teaching Chinese to Speakers of Other Languages (TCSOL)	Chinese as a heritage language learning, Chinese as L1
CMC tools	Not CMC tools
CMC implementation with the support of empirical data and review paper of the development of CMC in the CFL/CSL/TCSOL field	Purely theoretical discussion and conceptual review of either CMC tools without data or CMC tools that solely facilitated teaching a pedagogical approach without communication activities involved
Participants include learner-to-learner, learner-to-teacher, non-native speaker-to native-speaker (one-to-one, one-to-many, many-to-many)	Teacher training
Peer-reviewed academic journal articles	Not peer-reviewed academic journal articles

Table 3. Inclusion and exclusion criteria.

2.4.1.3. Research Gap Among Adolescent CFL Learners

With regard to the age and educational level of the learners, the vast majority (55 studies) recruited CFL learners from higher education institutions. Of the remaining studies, five focused on primary learners and eight on post-primary learners. The studies with young learners were predominantly within two countries (five based in Singapore and four based in the USA). It would be worth considering the curriculum or educational policy contexts that may support the use of CMC in these locations. The logistical and ethical issues of working with younger cohorts of learners may have limited the scale and scope of research with this age range. Unquestionably, the limited number of studies indicates **a clear research gap** in the literature in relation to younger learners that needs to be addressed.

2.4.1.4. Limited Amount of Telecollaborative Research in CFL

Different pairing types of CMC communication partners in CFL studies were investigated. In most of the studies, learners were paired with other learners of Chinese in their own classes rather than native Chinese speakers. However, 25 of the selected studies provided opportunities for learners to collaboratively learn with Chinese native speakers, with 23 of these involving learners from universities.

The limited number of studies working with native speaker peers and the focus on adult learners demonstrated a practical but crucial issue with organizing and researching telecollaboration projects facilitated by CMC tools – **logistics**. The logistics of organizing telecollaboration between institutions in different time zones and under different academic structures are difficult and can easily be exacerbated by technical and operational issues (Luo & Gui, 2021; Sung & Poole, 2017; Zhang, 2016). The prevalence of studies within class groups can be explained at least in part by the logistical difficulties for researchers and practitioners of engaging across class, school, geographic and temporal boundaries. A small number of studies addressed this issue by combining in and out of class learning (Jin, 2013; Oakley et al., 2018; Sung & Poole, 2017). Uneven language proficiency levels of target languages were recognized as another issue which hindered CFL learners from interactive communication with native speakers (Jiang & Li, 2018; Sugie & Mitsugi, 2014; K. Sunaoka, 2018; Zhang, 2016).

2.4.1.5. Affordances

SCT emphasises that learning development takes place within a context and mediated by elements in that context. From an ecological perspective, Van Lier (2000) develops the

concept of affordance within language learning as the interaction between aspects of the learning environment and learners' dynamic development process. In addition, he points out that learning (including language learning) is about the relationship between learners and their surrounding environment. The contexts and environments where learning take place play an important role in the process of learning development. In other words, the process of learning is not only about identifying and acquiring linguistic forms but also relevant to contexts and activities where utterances take place. In addition, Van Lier (2000) argues that SCT places its emphasis on learners and their engaged activities, as opposed to concentrating solely on the linguistic input perceived by learners. Van Lier as a proponent of ecological theoretical framework, attaches importance to affordances from the social environment and learners' dynamic development process. He suggested input can be replaced by the broader term of affordance to explore the opportunities for development offered by the context of learning.

In terms of “*affordance*”, this term was coined by Gibson (1979) to refer to the reciprocal relationship between an individual and a specific feature of the surrounding environment. Norman (1988) further expanded the concept of affordances concerning human-computer interaction. He emphasised that online interaction practices are not dictated solely by the technology itself but are influenced by how users employ that technology. The affordance of technology is not an unchanging characteristic of an object, but its existence is entirely contingent on the relationship between the user and the object. Therefore, training users on technology will be beneficial for perceiving and acting on affordances.

Within the ecological theoretical framework proposed by Van Lier and followers, a sustainable reciprocal relationship between learners and environment where they engage with learning will pave a way for L2 learning and lifelong development. The synthesised affordances of (a)synchronous CMC in the field of CFL are presented below in order to inform the discussion of telecollaboration as a specific CMC type in Section 2.4.2.

Overall, both synchronous and asynchronous CMC tools embedded in the learning environment offer affordances which can enhance learners' learning experience and increase their opportunities for development. Given the key features of CMC, its affordances in CFL are synthesised and discussed below: *active engagement, authenticity of communication, learner centeredness and multiple competences development.*

Active engagement

Empirical evidence from this review corpus showed that learner participation was predominantly active within collaborative activities entailing peer communication facilitated

by CMC. Some studies (17 out of 68 studies) examined the effects of CMC in CFL focusing on students' perceptions of technological tools. Thirteen of these studies reported that the introduction of CMC technology increased their enjoyment of CFL learning (Chen, 2010; Chin et al., 2008; Guo & Möllering, 2017; Huang et al., 2010; Ji & He, 2020; Jiang & Li, 2018; Lai et al., 2011; Li & Jiang, 2017; Luo & Gao, 2022; Luo & Gui, 2021; Qian & McCormick, 2014; Sugie & Mitsugi, 2014; Zhang, 2016). For instance, discussion forums provided students with a space and more preparation time to express their thoughts and opinions without the interruptions which could happen in the physical classroom (Chin et al., 2008). In the case of the virtual reality platform Second Life, its simulated 3D environment offered an immersive context which afforded participants authenticity, relevance, and enjoyment (Chen, 2010; Grant & Huang, 2010; Lan, 2014, 2016; Lan et al., 2019; Tang et al., 2016; Wang et al., 2020). High levels of synchronous and asynchronous interactivity among learners and learners-to-instructors were addressed and emphasised (Grant & Huang, 2010). CMC activities also pave the way to consolidate and transfer Chinese language knowledge into authentic interactions (Chen, 2013, 2020; Grant & Huang, 2010; Jiang & Li, 2018).

In summary, engagement in collaborative CMC activities afforded learners opportunities to deploy their developing language resources in a focused and interactive way, promoting engagement and enjoyment among students.

Authentic communication

SCT focuses on the developmental process of learning and the relationship between learners and the social environment. Two key elements in the SLA process, authentic contexts and social interaction, have been acknowledged as essentials to language learning by researchers (Ellis, 2005; Nunan, 1989) and practitioners. However, it is challenging to provide students with authentic opportunities to communicate especially when they have limited target language knowledge. The simulated interactional contexts within a traditional classroom may not only demotivate learners but also limit their potential learning outcomes. In this review corpus, the authentic context afforded by social network and telecollaboration projects has been emphasised in many studies (Jiang & Li, 2018; Jin, 2018; Ruan & Medwell, 2020; Sugie & Mitsugi, 2014; Sung & Poole, 2017; Tian & Wang, 2010; Tong et al., 2022; Wang et al., 2016; Wong et al., 2016; Zhang, 2016). Apparently, the authentic communicative environment was the key driver of learning activities in the context of WeChat (Jin, 2018). Furthermore, (Wong et al., 2016) emphasised that the richness of authentic contexts enabled students to develop their vocabulary use and improve the quality

of the artefact creations. However, Sung and Poole (2017) remarked that the authenticity required access to digital materials, language knowledge and technology skills, therefore they emphasised the importance of preparing and training learners, in particular adolescent learners, in the use of technology to maximise positive outcomes and avoid negative ones.

Learner centeredness

The selected studies emphasised that CMC implementations require CFL teachers to move away from a more traditional **sage on the stage** role to a more facilitative **guide on the side** role within the learning process. As facilitators, teachers' key function is to design and prepare CMC activities with appropriate language and technology scaffoldings and to provide appropriate formative feedback to learners.

Although many of the articles did not explicitly discuss the details of teachers' responsibilities in facilitating CMC interventions, a small number of studies did explore this aspect (Huang et al., 2010; Ji & He, 2020; Lan et al., 2013; Luo & Gui, 2021; Oakley et al., 2018; Ryder & Yamagata-Lynch, 2014; P. Zhang, 2014; Zhang, 2016). These studies noted that the teacher's role had changed to a facilitative role rather than a strictly didactic presence. The participating teacher from Xu and Moloney's study (2011) highlighted the shift in teaching from a delivery model to a more student-centred one by deploying the interactive whiteboard in the class. Ji and He (2020) addressed the importance of simultaneous feedback and scaffoldings from teachers as it "may also effectively change participants' attitudes, energize participants, as well as increase and broaden their participation in various ways" (p. 109). D. Zhang (2014) noted that the analysis of chat logs between CFL learners and native speakers helped teachers to identify "teaching points and moments" (p. 541). Grant and Huang (2010) categorised the roles of teachers within Second Life as: 1) to create and design the environment and activities; 2) to scaffold learners during activities, 3) to confirm the completion of activities. In addition, Oakley et al. (2018) reported that scaffoldings may vary depending on teachers' expectations of their students.

Furthermore, the literature addresses the importance of supporting telecollaborative practitioners with accessible structured training in order to foster four competences: organisational, pedagogical, digital and attitudinal (O'Dowd, 2015; O'Dowd et al., 2020). Some studies in our review corpus also demonstrated that teachers who had both sufficient technological expertise and an open attitude would positively impact on the effectiveness of CMC adoptions and implementations in practice (Lai, 2017; Oakley et al., 2018; Xu & Moloney, 2011). These studies emphasised the critical role of teachers in structuring,

supporting and providing feedback to learners in order to maximise the learning opportunities of CMC interventions.

Multifaceted skills and competences development

The literature shows that CFL researchers have been investigating the utilization of different CMC tools for developing learners' different language skills, such as listening (Tang et al., 2016), speaking (Chen, 2010; Guo & Möllering, 2017; Lan, 2016; Lan & Lin, 2016; Shi & Stickler, 2018; Xie et al., 2021; Xu & Peng, 2017), reading (Thoms et al., 2017), writing (Eubanks et al., 2018; Lan et al., 2019; Wang & Vásquez, 2014; Wong et al., 2011; Zhang, 2009; Zhang & Lu, 2014). In addition, the field of Intercultural Communicative Competence (ICC) has also been the focus of CFL researchers, especially in telecollaborative communications (Jiang, 2011; Jin, 2008; Luo & Gao, 2022; Qu & Hagley, 2021; Ruan & Medwell, 2020; Wang et al., 2013; Zhang, 2016).

Although the overall findings were positive, there were certainly limitations and challenges in the field of applying CMC in CFL research, which will be discussed in Section 2.4.1.6 below.

2.4.1.6. Limitations and Challenges

According to Hutchby (2001) and Thorne (2003), technological tools are not neutral media and the features of technology can both provide opportunities for and impose limitations on the potential for interaction. On the technological level, the issues noted across the review studies were related to technological problems and access. In terms of the technology itself, time lags or sound delays caused by unstable internet connections had a negative impact on participant engagement (Lai et al., 2011; Lan, 2016). Furthermore, insufficient technological support from IT specialists was identified as an issue in the reviewed corpus. Learning outcomes were affected by a lack of familiarity with tools among students (Lan, 2014; Wang et al., 2013). To ensure that both teachers and learners have adequate technological knowledge of the selected CMC tools, training prior to CMC activities was suggested by some studies (Huang et al., 2010; Lai et al., 2011; Renner, 2017; Wang et al., 2013). In relation to text-based CMC tools, learners must have a firm grasp of Chinese Pinyin or character typing skills. For example, participants stated that mastering faster typing and posting skills in Chinese would make them engage more in the online discussion forum (Chin et al., 2008). Finally, digital access was often problematic. To maximise the effects of CMC activities on learning performance, Sung and Poole (2017)

suggested that flexibility of access to CMC technology would allow students to effectively participate in activities in and out of class.

On the individual participant level, the utilisation of CMC in CFL practice, brought new requirements not only for learners but also for teachers. From the teachers' perspective, the major logistical, technological, and pedagogical organisation issues when preparing CMC activities can be much more time-consuming when compared to traditional CFL classes. Adequate scaffoldings from teachers at each stage of CMC tasks were required to maintain a well-supported environment for authentic communications (Wang et al., 2020). However, some teachers had a more negative attitude towards new technologies which influenced the implementation of CMC activities (Xu & Moloney, 2011). In addition, the challenge of establishing a sustainably interactive relationship between students and teachers was identified as the biggest obstacle (Lai et al., 2011). From the learners' perspective, telecollaboration projects led to concerns about increased anxiety levels and frustrations due to inadequate target language proficiency compared to native speakers (Jiang & Li, 2018; Lan et al., 2013; Sugie & Mitsugi, 2014; Sung & Poole, 2017; Tian & Wang, 2010). Nervousness was another factor which consistently hindered the quality of interactions with language partners (Zhang, 2016). Obstacles caused by individual differences (e.g. personal interests, expectations from language partners) was a further factor which prevented participants from in-depth communications (Luo & Gui, 2021; Zhang, 2016). Logistical issues were also discussed frequently in the review corpus such as scheduling synchronous communications with language partners out of class time (Luo & Gui, 2021; Oakley et al., 2018; Ryder & Yamagata-Lynch, 2014; Sung & Poole, 2017; Zhang, 2016).

In summary, the majority of studies with the systematic review corpus was in a formal education context across Anglosphere countries predominantly with adult learners in higher education institutions and most commonly with beginner-level learners. The review highlighted the limited number of studies focused on younger CFL learners or on intermediate and advanced learners. Although affordances of technology could bring enjoyment and increase motivation among CFL learners, critical challenges, and limitations on account of implementing CMC interventions in practice were identified, such as time lags and delays, increased teacher workload for planning and preparation, increased skills requirements of teachers and students, increased levels of anxiety and self-consciousness of learners. The next section will focus on telecollaboration communication with native speakers in CMC research.

2.4.2. *Telecollaboration*

Linguistic and/or intercultural exchange with native speakers of the target language is recognized as another specific type of CMC by some researchers (Antoniadou, 2011; Cappellini & Mompean, 2015; Fuchs et al., 2017; Godwin-Jones, 2019; Lewis & O'Dowd, 2016). A number of terms have been used to refer to those online collaborative learning opportunities of linguistic and/or intercultural exchange, such as *e-tandem* (Little et al., 1999; O'Rourke, 2005; Renner, 2017; Tian & Wang, 2010), *teletandem* (Cappellini, 2016; Cappellini & Mompean, 2015; Zakir et al., 2016), *telecollaboration* (Akiyama, 2017; Akiyama & Cunningham, 2018; Barron & Black, 2015; Belz & Müller-Hartmann, 2003; Belz, 2003; Cunningham, 2017; Godwin-Jones, 2019; Helm & Guth, 2010; Marull & Kumar, 2020; Schenker, 2012) or *online intercultural exchange* (Avgousti, 2018; Lee & Markey, 2014; Lewis & O'Dowd, 2016; Yang, 2018). E-tandem projects operate on the premise of learners' autonomy (Little et al., 1999; O'Rourke, 2005) and adhere to the reciprocal principle of partnerships where each partner should communicate in an equal portion of both languages (Appel & Mullen, 2000; O'Rourke, 2007). In addition, the technological medium of e-tandem partners use is often text-based whereas teletandem projects utilise videoconferencing tools (O'Dowd, 2022a). The term of online intercultural exchange places a strong emphasis on the intercultural and sociocultural dimensions of foreign language learning (Dooly & O'Dowd, 2012; Lewis & O'Dowd, 2016; O'Dowd, 2007, 2016). Most recently, O'Dowd (2022a) employs virtual exchange as an umbrella term encompassing individuals from diverse cultural backgrounds engaging in online interactions across multiple disciplines (not exclusively confined to language education).

This thesis adapts the term 'telecollaboration' which was coined by Warschauer (1996) to refer to social and intercultural dimensions of language learning and use that incorporate communication using CMC technology in any mode or mixture of modes between pairs or groups of distantly dispersed learners inside and outside the classroom (Belz, 2002; Warschauer, 1996). Developing learners' language competence and intercultural communicative competence are the dual goals of telecollaboration projects which have been widely investigated in the literature (Belz & Müller-Hartmann, 2003; Warschauer & Kern, 2000). Helm and Guth (2010) integrated an additional goal of new online literacies within a framework of Telecollaboration 2.0 which aims to elaboratively define learning objectives in the emerging and changeable context of telecollaboration. In the recent decade, both academia and practitioners have been actively pursuing the advancement of telecollaboration in formal higher education settings (such as the

UNCollaboration) and within teacher education (such as VALIANT initiative funded by the European Commission's Erasmus+ Programme).

Additionally, researchers frequently demonstrate that telecollaboration projects provide learners with more opportunities to be exposed to the target culture and enhance their intercultural communicative competence (Antoniadou, 2011; Chun, 2011; Godwin-Jones, 2019; Lee & Song, 2019; Lee & Markey, 2014; O'Dowd & Dooly, 2020) and intercultural sensitivity (Avgousti, 2018; Jin & Erben, 2007). Furthermore, such projects have also been shown to be helpful for learner identity building (Chun, 2016; Çiftçi & Savaş, 2018). Learners can construct intercultural awareness by critically reflecting on and comparing their own and other cultures (Abrams, 2003; Furstenberg et al., 2001; Kramsch & Thorne, 2002). Morgan (2001) reviewed a project where secondary school students from UK and French prepared materials and shared with each other. Results suggested that this project successfully facilitated the development of intercultural awareness among the students, promoting a deeper understanding of their own cultural world as well as fostering appreciation and knowledge of different cultures. In addition, the author addressed the importance of ethnographic skills for teachers to convert foreign cultures into homes and vice versa. Although many studies aim to investigate the development of ICC among learners through telecollaboration communication, some interchanges were found to be fact-based and superficial (Keranen & Bayyurt, 2006; Liaw & Master, 2010; Liaw, 2006). A review of intercultural communicative competence in CMC settings can be found in Section 2.3. It is noteworthy that telecollaboration project cannot always guarantee effective communication. Despite potentials and benefits of telecollaboration addressed in the literature, negative indications of implementing telecollaboration activities, such as communication misunderstandings, superficial discussions regarding (inter)cultural topics, language learning demotivation, were pointed out for both researchers and teachers to optimise further project designs (refer to Section 2.4.2). O'Dowd and Ritter (2006) summarised and discussed characteristics of failed telecollaboration projects. Nevertheless, failures of telecollaboration initiatives are not always negative as lessons from telecollaboration failures can be beneficial for students to realize the necessity of contextualized language used with native speakers comparing to oversimplified standard language practice from textbooks (Godwin-Jones, 2013). In addition, it highlights the facilitating role of teachers to strategically provide guidance and scaffolding along with thoughtfully designed tasks in telecollaboration (refer to Section 2.4.2.2).

With the advent of technology, various technological tools have been utilised in telecollaboration research, such as emails exchanges (Belz, 2003; Brammerts et al., 1996; Furcsa, 2009; Kitade, 2006; Little et al., 1999; Mahfouz, 2010), discussion forums (Ware & Kramsch, 2005; Zhang, 2009), social media (Hauck, 2007; Ruan & Medwell, 2020; Wang & Vásquez, 2014; Xue & Churchill, 2020), virtual reality platform Second Life (Chen, 2010; Henderson et al., 2009; Lan, 2016; Lan et al., 2013; Levak & Son, 2017; Liou, 2011; Liu, 2010; Melchor-Couto, 2016; Milton, 2012; Peterson, 2010, 2012; Wigham & Chanier, 2013), student-centered VR activity format global simulation (Blyth, 2018; Michelson & Dupuy, 2014), augmented reality (Godwin-Jones, 2016; Hawkinson, 2014; Mahadzir, 2013; Richardson, 2016; Zhang, 2018, 2021), more recent interest in Artificial Intelligence (Jeon, 2024; Lee et al., 2023; McCallum, 2023; Pack & Maloney, 2023; Sumo & Bah, 2021) to name a few. In addition, video conferences become more popular in recent years (Arellano-Soto & Parks, 2021; Austin et al., 2017; Lenkaitis, 2020; Spring et al., 2019; Van der Zwaard & Bannink, 2014; Wang, 2006; White et al., 2021). However, the similarities of video exchanges to face to face communication are filtered and designed (Kern, 2014; Malinowski & Kramsch, 2014) because videoconferencing “is affected by factors such as participants’ physical surroundings, the lack of full body language, the absence of spatial proximity, and the differing levels of experience or comfort of the learners with the platform or tool” (Godwin-Jones, 2019, p. 14).

In summary, technological tools possess both advantages and challenges and are not neutral mediums (Thorne, 2003). However, it’s essential to choose technological tools that are accessible and user-friendly for students, as pointed out by Godwin-Jones (2016).

2.4.2.1. Task Design in Telecollaboration Projects

The complexity of telecollaboration environment results many challenges to teachers who consider or intend to implement telecollaboration learning in the classroom, such as technological issues (viability of technology in school, technology accessibility to students), logistic issues related to bring together participants who are from different linguistic and cultural areas. Those challenges have also increased research interests among CALL scholars to investigate telecollaboration task design (Hampel, 2006; Hauck, 2010; Müller-Hartmann, 2000; Reinders & Thomas, 2012; Rosell-Aguilar, 2005; Ware & O'Dowd, 2008). The complexity of telecollaborative task requires an extended list of design criteria (Kurek & Müller-Hartmann, 2017). In addition, many CALL researchers have attempted to develop and revise criteria of CALL task design in recent years (Gruba, 2004; Guth & Helm, 2010;

Hampel, 2006; Hampel, 2010; O'Dowd & Ware, 2009; Rosell-Aguilar, 2005; Ware & O'Dowd, 2008).

In the late 20th century, Meskill (1999) provided a detailed task criteria to discuss the features of well-worked tasks in CALL environments, which can be synthesised as openness to question answers, attractiveness to learners' communication needs and appropriate rewarding mechanism, possibility to integrating multimodal skills, authenticity related to the real world as well as a containment of challenges for learners. Chapelle (2001) developed criteria from an interactionist SLA perspective which primarily focuses on form of language to develop language competences. Doughty and Long (2003) put emphasis on the differences between methodological and pedagogic principles of CALL task design, whereas the former looked into “universally desirable instructional design features, motivated by theory and research findings in SLA, educational psychology, and elsewhere, which show them to be either necessary for SLA or facilitative of it” (pp. 51-52), the latter one “comprise the potentially infinite range of local options for realizing the principles at the classroom level” (p. 53). In terms of general pedagogical task principles for foreign language classroom, researchers have addressed that meaningful language use, attainable learning objectives and viable structure of tasks are significant features of pedagogical task in language learning (Branden, 2006; Müller-Hartmann & Schocker-von Ditfurth, 2011). Mishra and Koehler (2006) emphasised the core role of task design in the integration of technological, pedagogical and content knowledge (TPACK). The intertwined relation between technology mediation and task design has been reviewed by Lai and Li (2011), which will be illustrated in Section 2.5. Participants from Kurek and Müller-Hartmann (2017) appreciated the values of clarified instructions and doable learning goals while involving in the telecollaborative task design. Therefore Kurek and Müller-Hartmann (2017) recommended telecollaboration tasks fulfil “task relevance to students' needs, its communicative potential, relevance to the real world, open-endedness and choice, and cognitive challenge” (p. 16) to maintain task attractiveness.

Task types and task sequencing play an important role in CALL environments. Levy and Kennedy (2004) addressed that "the overall balance required may then be achieved through effective task design and sequencing, and the careful selection of communication technologies that fit the pedagogical goals” (p. 53). O'Dowd and Ware (2009) synthesised over 40 studies and categorised telecollaboration tasks into three types following by the default implementation sequences: information exchange (at the initial introduction phase), comparison and analysis (at the comparative phase), and collaboration and product creation

(at the intense negotiation phase). Helm and Guth (2010) specified those three stages into a three-step cycle: pre-task, task, post-task from pedagogical perspective. Starting with information exchange activities allows participants to get to know each other. In some cases, its functions are similar to ice-breaker activities in the face-to-face classroom. The information exchange task has been widely utilised in many telecollaboration projects (Lee, 2006; O'Dowd, 2006; Vinagre, 2017; Warschauer, 1995; Wilden, 2007). In addition, the information exchange activity aims to build up trust and rapport among participants (Godwin-Jones, 2019; O'Dowd & Ware, 2009) prior to two further steps of comparison and analysis as well as collaboration artefact creation activity. According to Hampel (2006), information exchange and discussion usually occurred in the small group and in the plenary session where the goal of the task is clearly set out for output and active participation at the end of activities. In addition, it is common that communications become slower even less was covered in the online setting than the planned tasks suggested. Therefore, more scaffolding and flexibility than face-to-face class are necessities. In addition, the technological preference for the initial information exchange activity is synchronous text-based communications (Godwin-Jones, 2019), which enables participants to send and receive immediate messages.

Full awareness of available technological affordances facilitated by various modes when it comes to designing tasks in the online setting is addressed by Kress (2003) that “It is possible to choose, not merely with full competence within one mode ... but with full awareness of the affordances of many modes and of the media and their sites of appearance” (p. 38). To smoothly transfer to online environment, the affordance of the environment requires attentions among practitioners in both processes of task design and implementation (Hampel, 2006). In addition, essential training to both practitioners and students is suggested considering the complexity of the technology (Huang et al., 2010; Lai et al., 2011; O'Dowd, 2015; O'Dowd et al., 2020; Renner, 2017). Additionally, students were encouraged to utilise various modes as much as possible to develop their “electronic literacy” (Hampel, 2006). However, practitioners must be aware that some students may be overwhelmed by the options facilitated by multimodes and online environment (Hampel, 2006).

2.4.2.2. Roles of Participants

As Çiftçi (2016) demonstrated, telecollaboration communication may not be successful without the presence of facilitators or supervision of mature cross-cultural mediators. In order to yield effective communication, teachers have a crucial role in

facilitating and guiding communication (Angelova & Zhao, 2016; Menard-Warwick et al., 2013; O'Dowd, 2007, 2015, 2022a; Schenker, 2012; Ware & Kramsch, 2005).

In terms of roles played by teachers in telecollaboration, Çiftçi and Savaş (2018) synthesised these as monitor, prompter, guide and communicator. Teachers are activity designers and organisers, intercultural partners and models, activity coach and mentors (O'Dowd, 2022a; O'Dowd et al., 2020). Kramsch (2004) proposed language teachers are cross-cultural mediators who “mediate between different perspectives and to be conscious of their evaluation of difference” (p. 44). However, Tudini (2007) suggested ICC could be developed more in an authentic environment than a teacher-mediated context. Çiftçi (2016) called for a moderate involvement of instructors or researchers in the telecollaboration process. Additionally, research suggest that the extent of teacher involvement during the telecollaboration process will impact on the L2 exposure among participants (Godwin-Jones, 2019), with more independent student engagement will lead to more opportunities of using the target language and experiencing in-depth cultural insights. Moreover, Menard-Warwick et al. (2013) and O'Dowd and Ritter (2006) recommended establishing rapport between teachers from both sides before engaging in telecollaboration. Nonetheless, the caution and requirements imposed on participating teachers necessitate careful consideration of teachers' existing workload, especially for novice language teachers with no prior telecollaboration experience (Godwin-Jones, 2019). In brief, the role of teachers in telecollaboration is significantly important, as the ability to undertake the facilitator role with appropriate intervention is relevant to the quality of communication among students.

As for the intercultural interactions between non-native speakers (NNS) and native speakers (NS), “there is potential for asymmetries of power to shape how interaction occurs” (Liddicoat, 2016, p. 409). NS are frequently perceived as experts who have acquired a language, while NNS are cast in apprentice and learners roles in learning the language as a second language (L2) (Davies, 2013; Liddicoat, 2016; Liddicoat & Tudini, 2012; Vandergriff, 2013). In addition, interacting with NS in the L2 usually shape different situated identities which refers to individuals' sense of L2 self (Van der Zwaard & Bannink, 2018). Learners become more concerned with their inexpert L2 language and are afraid of losing face instead of prioritizing the accomplishment of the task in the communication (Kehrwald, 2008; Van der Zwaard & Bannink, 2014; Vandergriff, 2013). At the same time, NS and their language expertise contribute to L2 learning for NNS when NS take on the role of repairing communication when invited to do so (Hosoda, 2006). Additionally, NS as More Knowledgeable Others (MKOs) in telecollaboration not only take the role of linguistic

authority but also act as a model of social behaviour and cultural knowledge (Godwin-Jones, 2019; Hampel, 2006; Kramsch, 1997). However, not all students are motivated by the presence of NS for a range of reasons, for example conversations can be dominated by NS (Hampel, 2006). Furthermore, Helm and Guth (2010) criticised the reinforcement of homogeneous national cultures in telecollaboration. Van der Zwaard and Bannink (2018) reversed participation roles between NS and NNS and intentionally made NS as cultural learner and NNS as the cultural expert in telecollaboration communication. Their findings indicate that participant identities are not solely defined by language competence and the cultural expert role enabled NNS to adjust their identifies and break free from the confining role of apprenticeship.

In addition, learners experience a greater sense of security and comfort during communication because of anonymity and persistence of messages (Abrams, 2003; Anderson & Corbett, 2012). Liddicoat and Tudini (2012) suggested that the roles of participants tend to be flexible and not constrained in the text-based communication environment due to the anonymous nature of the technological medium. Learners with a low L2 proficiency can understand interlocutors through the text without speaking or listening concerns (Yamada & Akahori, 2007). Compared to text-based interactions, findings from Van der Zwaard and Bannink (2014, 2018) suggest that synchronous videoconferencing made participants experience more anxiety and constraints. However, some research suggested that the presence of interlocutors in videoconferencing communication would make communication more effective with the aids of non-verbal clues afforded by the images of partners (Ko, 2012; Yamada & Akahori, 2007). In summary, although telecollaboration raised interest among students, the social presence afforded by different technologies and media is crucial in interactions. It is suggested to involve more multimodal communications beyond videoconferencing to minimize the dominance occupied by native speakers in telecollaboration (Liaw & English, 2017; Warner & Dupuy, 2018).

2.4.2.3. Summary

Much of research observed the importance of task design and roles of teachers and appropriated CMC selection in the field of telecollaboration. While telecollaboration has gained widespread attention in higher education, research focused on younger cohorts is scarce in the literature. Additionally, the criteria for selecting CMC tools should take into account their feasibility in a school setting and the need to address limitations within classrooms. Another key element is the establishment of a stimulating environment, where

participants can effectively communicate with intercultural contacts within their ZPD. The selection of tasks for a stimulating environment also requires careful consideration to align with students' language proficiency and overall feasibility.

2.5. Technology and Task-Based Language Teaching

The previous section introduced the development of CMC and key issues discussed in the field. The design of this doctoral study involves technology-mediated tasks. It is necessary to review the concept of task-based language teaching (refer to Section 2.5.1) and illustrate its relationship with the selected theoretical framework SCT before delving into the discussion about technology-mediated TBLT in foreign language education (refer to Section 2.5.2).

2.5.1. Task-Based Language Teaching (TBLT)

The scope of task is broad in real world. 'Task' can refer to any activities which people aim to do for instance, painting a tree ('target task'). Activities which the teacher asks students to do, such as draw a tree on canvas in the class are 'pedagogical tasks'. Furthermore, if the teacher asks students to complete a drawing in an hour as their final grade, this is an 'assessment task'. In this thesis, the term of "pedagogical task" is taken from Ellis (2003, p. 16) to refer to:

*"a workplan that requires learners to process language pragmatically in order to **achieve an outcome** that can be evaluated in terms of whether the correct or appropriate propositional content has been conveyed. To this end, it requires them to give **primary attention to meaning** and to make use of their own linguistic resources, although the design of the task may predispose them to choose particular **forms**. A task is intended to result in language use that bears a resemblance, direct or indirect, to the way **language is used in the real world**. Like other language activities, a task can engage **productive or receptive**, and **oral or written skills** and also various **cognitive processes**".*

The theoretical foundations of TBLT are rooted in interactionist, sociocultural and ecological theories of Second Language Acquisition (Ortega, 2005). Key characteristics of the task are synthesised from the literature (Branden, 2006; Breen, 1987; Ellis, 2003; Long, 1985; Nunan, 2004; Richards & Lockhart, 1994; Skehan, 2003): *goal-oriented, meaningful communication with active engagement, the usage of target language and attention to the form (such as grammar)*. The purpose of a task is crucial for distinguishing TBLT from other teaching approaches. In order to achieve its goals, learners use the target language to receive language input and produce language output (Branden, 2006). The ultimate goal of language

learning is to foster ability to confidently achieve communicative purpose by means of target language. Therefore, active engagement through meaningful communications will be a sufficient condition in the course of task completion process. Additionally, whether focusing on form in TBLT is controversial in academia and teacher practice. Some researchers hold a ‘strong’ interpretation of this issue that communication is in the central place in TBLT while a focus on form is not necessary (Skehan, 2003; Willis & Willis, 2007). However, Nunan (2004) adopts a ‘weak’ interpretation that “ while focus on form activities do not constitute tasks in their own right, they do have a place in any task-based instructional cycle” (p. 111).

Should teachers focus on form or meaning in TBLT lesson? It is not a yes/no question in TBLT practice. As language teachers, they aim to balance form and meaning in the language classroom. However, focusing both on meaning and form (grammar) at the same time is not “easy and handleable for learners during conducting a task, especially for beginning level learners” (Willis & Willis, 2007, p. 16). Therefore, in TBLT classroom, the sequence of tasks are crucial and may affect the success of task completion. The discussion about task sequences will be illustrated in the section 2.5.1.2.

2.5.1.1. Connections Between TBLT and SCT

While task based language teaching does not assume a sociocultural theory of language learning, sociocultural theory proponents aim to investigate how collaborative interactions among learners to develop second language learning through task completion (Ellis, 2003; Feryok, 2017; Lantolf & Beckett, 2009). The core concepts of TBLT are compatible with SCT. Nunan (2004) set out seven principles for constructing TBLT framework in classroom. Key statements of those seven principles will be extracted in Table 4. Its connections with SCT framework relating to those principles will be also reviewed.

Principle 1: scaffolding	“Lessons and materials should provide supporting frameworks within which the learning takes place” (p. 35).
Principle 2: task dependency	“Within a lesson, one task should grow out of, and build upon, the ones that have gone before” (p. 35).
Principle 3: recycling	“Recycling language maximizes opportunities for learning and activates the ‘organic’ learning principle” (p. 36).
Principle 4: active learning	“Learners learn best by actively using the language they are learning” (p. 36).

Principle 5: integration	“Learners should be taught in ways that make clear the relationships between linguistic form, communicative function and semantic meaning” (p. 37).
Principle 6: reproduction to creation	“Learners should be encouraged to move from reproductive to creative language use” (p. 37).
Principle 7: reflection	“Learners should be given opportunities to reflect on what they have learned and how well they are doing” (p. 37).

Table 4. Seven principles of TBLT in the classroom (extracted key words from Nunan, 2004)

Principle 1: scaffolding

Teachers serve as facilitators to provide support and guidance whenever learners need rather directly deliver knowledge to learners. This principle is the continuation and development of SCT fundamental knowledge as well as ZPD. Understanding the point at which scaffolding begins and ends poses a significant challenge for teachers. “If the scaffolding is removed prematurely, the learning process will ‘collapse’. If it is maintained too long, the learners will not develop the independence required for autonomous language use” (Nunan, 2004, p. 35).

Principle 2: task dependency

This principle implies task design should be placed in the process of learners’ ZPD as “learners should not be expected to produce language that has not been introduced” (Nunan, 2004, p. 35). Completing a task may maintain several sub-tasks. Therefore, the procedure of task assignments and the sequence of sub-tasks should be carefully taken into consideration.

Principle 3: recycling

The learning process itself follows the mechanism with back and forward, ups and downs, as spiral developmental modal. “This recycling allows learners to encounter target language items in a range of different environments... how it (particular item) functions in relation to different content areas” (Nunan, 2004, p. 36). This principle is in line with how learning occurs within ZPD and has a certain connection with real world.

Principle 4: active learning

This principle has an affinity with the crucial conception ‘learning by doing’ of TBLT. ‘Learning by doing’ is connected to ‘experiential learning’ (Nunan, 2004). It suggests that the greater proportion of class time learners have, the more opportunities for them to use the language. However, this principle does not deny assigning an appropriate

proportion of class time for teachers to introduce task rules and relevant grammatical items which are helpful to achieve meaningful communication among learners.

Principle 5: integration

This principle lays emphasis on the interrelations among grammars, meanings and communicative functions of the languages. TBLT works as an analytical approach rather than synthetic approach which language components are taught separately.

Principle 6: reproduction to creation

Following by recycling learning process, learners are expected to creatively use the target language in different contexts through what they acquired from classroom. It means that "in creative tasks, learners are recombining familiar elements in novel ways" (Nunan, 2004, p. 37). This principle also aligns with ZPD process, which predicts that learners are capable/have potential abilities to successfully complete tasks in real world setting in the future.

Principle 7: reflection

This principle is in accordance with regulation which is the key concept in SCT framework. Regulation is categorised as three domains: object-regulation, other-regulation and self-regulation. Object-regulation refers to artefacts or objects in the environment which can be used, such as online translation tools. Other-regulation describes mediation by other individuals, such as, teachers' feedback, peers support during completing activity. Other-regulation is highly relevant to ZPD. Self-regulation refers to human internalization of external forms of mediation (objects, others, artefacts) for executions. It is worth noting that regulation is dynamic and can shift among three domains according to human development needs. Being a reflective learner is a beneficial way for learners to understand the process of their own learning and what they can improve in the future (Nunan, 2004).

In summary, TBLT is derived from SLA theories: interactionist, sociocultural and ecological theories. Key characteristics of the pedagogical task addressed the significances of task sequencing and roles of learners and teachers play during the task completion. The discussion of main TBLT constructing principles and SCT overviewed their connections which contribute to task design in the practice.

2.5.1.2. Task Sequences

In terms of task sequencing, an array of tasks is usually involved in a TBLT class rather than one single task. Tasks have interconnections with each other. The inner links among serial tasks offer learners scaffolding in order to achieve the final goal by completing

tasks step by step. As a result, the sequence of tasks is important to determine the extent of learners' motivation and engagement to complete tasks and learning. Willis and Willis (2007) advocated a general TBLT pedagogical cycle which includes pre-task, during task and post-task. Teachers should take task sequences into consideration when they prepare and design tasks in TBLT class. It is suggested that teachers firstly set out a topic and design pre-tasks as preparations for learners to help them familiarise with that topic. Some pre-tasks serve as priming to increase learners' motivation and open their mind to thinking. The next stage is to design task(s) which aims to help learners experience what they might have in the future. Post-tasks may involve a series of reflection activities which are also significant in the end of class or after class (Skehan, 2003). According to Ware and O'Dowd (2008), it is crucial to well-organised post-task activities based on previous interactions, such as portfolios, learning diaries. Belz and Thorne (2006) proposed an analysis activity for learners to evaluate task performances whereas Levy and Kennedy (2004) suggested students reflecting on forms through listening to the audio recordings and sharing screen of transcripts. Additionally, Lai and Li (2011) emphasised the importance of both pre- and post-task phases to facilitate learners' learning in the review paper. In addition, the engagement of learners in task procedure directly affects the successful completion of a task, whether learners take full advantage of language resources which they already have, no matter what proficiency level they are. Target language serving as a communicative tool provides a real-world context and mediations for learning process.

Here in this thesis, we are talking about pedagogical tasks in language education. The priority of a task is to engage learners to interactions meaningfully. If a particular form is introduced to them in the beginning and they are asked to practice this form in the process of a task, learners may use this form in their expressions as required but they could forget what it is in their minds. This is far away from the core characteristic of tasks.

2.5.2. Technology-mediated TBLT

The intertwined relationship between TBLT and technology is a crucial aspect in the field of CALL. Thomas (2014) indicated that CALL and TBLT developed in parallel until the mid-1990s through reviewing philosophical fundamentals of TBLT and research works have been completed in both areas (Chapelle, 2009; Ellis, 2003; González-Lloret & Ortega, 2014; Lai & Li, 2011). TBLT works as a pedagogical approach in CALL research while to a certain extent CALL may provide affordances to solve problems emerging in TBLT practice (Thomas, 2014).

The relationship between technology and TBLT is reciprocal and has been discussed in the previous literature (Lai & Li, 2011). Technology contributes to the development of language production both quantitatively and qualitatively while learners are doing the task. Research suggests that students become more motivated and less anxious in the text-based CMC environment due to its anonymity which in turn increase the amount of target language production (Beauvois, 1995; Vinagre, 2005; Warschauer, 1995; Zeng & Takatsuka, 2009). In addition, the anonymity of text-based chatting fosters a relaxed and less tense atmosphere, which contributes to social cohesiveness (Belz & Reinhardt, 2004; Lai & Li, 2011; Warner, 2004). This environment allows learners to engage in playful interactions and tease with group members during task performance. Thorne (2003) concluded that learners can easily switch between different identities in and out of classroom which makes them produce more diverse target language. It is worth noting that free discussions in the online environment may lead to a lower amount of negotiation instances (Blake, 2000; Jepson, 2005). Therefore, considerable attention to task design and careful arrangement of task sequence are suggested (González-Lloret, 2015; Lai & Li, 2011; Nunan, 1989; O'Dowd & Ware, 2009; Reinders & Thomas, 2012). Additionally, Mak and Coniam (2008) found that project-based tasks facilitated by wiki enable students to collaboratively generate more complex language outputs in a creative way. Similarly, technology enables students to conveniently document the design process of their own learning project and digitally shared learning artefacts (Kokotsaki et al., 2016; Patton, 2012). However, overt guidance on technology usage among young students and high quality group work are crucial to the success of project-based learning (Bell, 2010). Additionally, Sotillo (2000) addressed synchronous interactions afforded students freedom which was resembled face-to-face conversations while asynchronous discourse from students was more like traditional classrooms where initiation-response-feedback was frequently used in the task. However, relatively sufficient reaction time in asynchronous communications enables learners to produce more accurate and longer turns (Kitade, 2006), greater lexical richness (Wong et al., 2010) and complex conversation contents (Böhlke, 2003; Kitade, 2000; Sauro, 2012; Sauro & Smith, 2010; Sauro et al., 2011) in the asynchronous CMC environment. Furthermore, technology-mediated tasks are found to equalize participation especially in the text-based CMC activities because of “the absence of oral interaction constraints” (Ortega, 1997, p. 84). Therefore, students can possibly equally contribute to the task performance with fewer interruptions or speakership transformation focuses (Warschauer, 1996).

Additionally, in the course of task completion, the role of teachers shall be shifted from a dominant controller to an activity facilitator who return the activity ownership to students (Beauvois, 1998; Fitze & McGarrell, 2008; Kenning, 2010). The multifaceted roles which teachers play in the technology-mediated TBLT environment suggest “the teacher shifts out of the ‘omniscient informant’ role and focuses on structuring, juxtaposing, interpreting, and reflecting on inter-cultural experiences” (Kern et al., 2004). This pedagogical shift enables teachers to “serve as effective trainers and facilitators for the learners” (Lai & Li, 2011, p. 511).

One the other hand, TBLT provides pedagogical framework to promote technology in the language learning and teaching practice. A common agreement is reached among researchers and teachers that the design of technology-mediated tasks is way more complex than face-to-face tasks which requires teachers to be fully aware of technological affordances and constraints (Lai & Li, 2011). When it comes to successful telecollaboration task performance, a bundle of different skills and competences are indispensable (Kramsch & Thorne, 2002; Lamy, 2005), such as digital literacy, communication competences and strategies as well as intercultural competences (Avgousti, 2018; Chun, 2011; Hauck, 2010; O'Dowd, 2006). However, according to Reinders and White (2010), learners are frequently characterized as lacking these abilities. They may not have an understanding of the advantages provided by various forms of media or may struggle to effectively utilise them to fulfil their learning needs (Hampel, 2006; Kress, 2003). Therefore, essential training and gradual scaffolding is significant to the success of technology-mediated TBLT in practice (Chun, 1994; Hampel, 2006; Lai & Li, 2011; Levy & Kennedy, 2004; Skehan, 2003). In addition, research on the benefits of applying technology-mediated TBLT suggest students appreciated the utilisation of TBLT and enjoyed the completion process of tasks in online *ab initio* Chinese language classroom but some learners might become passive and frustrated with the usage of target language if holding a low attitude toward technology-mediated TBLT (Lai & Li, 2011). Overall, research suggested that learners with lower levels of anxiety actively were more actively engaged in activities in CMC environments than in physical classroom settings (Chun, 1994; Melchor-Couto, 2016; Satar & Özdener, 2008)

In summary, the connection between technology and TBLT is mutually beneficial, as discussed in the literature. Technology enhances language production from both qualitative and quantitative way during task-based activities. Additionally, TBLT offers a pedagogical framework that encourages the integration of technology into language learning and teaching.

2.6. Chapter Summary

This chapter provided a structured review of the literature. The key concepts of SCT provided insights into the foreign language learning process and the relationship between learners and their social environment. In addition, the review of CMC, especially telecollaboration, highlighted a clear research gap in the literature in relation to young CFL learners as well as telecollaboration in the CFL field. Through the review of the literature on technology-mediated TBLT, research needs were identified which in turn defined the primary focus and their methodological design of this thesis. The next chapter will delve into the methodological approach of this study in more detail.

3. Chapter 3 Methodology

3.1. Chapter Introduction

The previous chapter provided a structured review of the literature in related to the theoretical framework-SCT, the development of CMC in foreign language education, and the pedagogical approach technology-mediated TBLT. This chapter sets out the methodological principles and choices which guided this study. It begins with outlining the research questions that emerged from the literature review (refer to Section 3.2). It identifies Mixed-Method Research (MMR, refer to Section 3.3), particularly Design-Based Research (DBR, refer to Section 3.4), as an appropriate approach for this study. Two iterative cycles of this DBR study will be shown along with elaborations of utilizing data instruments (see Section 3.5) and analysis procedure (see Section 3.6). Ethical considerations (refer to Section 3.7) and research limitations (refer to Section 7.2) associated with conducting this research in the context of Irish secondary schooling will be independently addressed, along with a chapter summary in Section 3.8.

3.2. Research Questions

The previous chapter has identified a research gap in relation to young CFL learners in the literature of CMC (Wang & Devitt, 2022). Given the numerous challenges encountered in promoting Chinese as a language option at secondary school level (as discussed in Section 1.1) and the apparent research gap in relation to young CFL learners in the literature of CMC (refer to Section 2.3.1), this research aims to contribute to CFL in the Irish context by drawing on the most recent advances in CMC technologies to optimise communication environment for adolescent CFL learners. The whole doctoral study is designed to provide Irish adolescent CFL learners with interaction opportunities with native Chinese peers across two Design-Based Research (DBR) iterations.

Theoretical, methodological and design approaches were chosen to explore the following research questions:

1. What was the impact of Computer-Mediated Communication (CMC) activities on young Irish learners of Chinese as a Foreign Language (CFL)?
2. How did the choice of CMC technologies contribute to the CFL learning process?

3. What were the characteristics of ‘successful’ and ‘failed’ task design in the course of telecollaboration learning for CFL beginners?

Based on the research questions, Mixed Methods Research (MMR) is selected for this study to include descriptive quantitative data to probe language learning motivation changes and intercultural sensitivity development, in cooperation with in-depth qualitative research to explore online communication process and views of telecollaborative language learning. The definition of MMR and relevant key issues will be explained in Section 3.3.

3.3. Mixed Methods Research (MMR)

The core nature of mixed methods is ‘mixed’ itself. Johnson et al. (2007) analysed 19 definitions of mixed methods from various perspectives, such as approach types, processes, and philosophic views. Creswell and Clark (2017) synthesised key characteristics of *Mixed Methods Research* (MMR) and defined it as “the researcher collects and analyses both qualitative and quantitative data rigorously in response to research questions and hypotheses; integrates (or mixes or combines) the two forms of data and their results; organises these procedures into specific research designs that provide the logic and procedures for conducting the study; and frames these procedures within theory and philosophy” (p. 20).

No matter which research method is selected, advantages and disadvantages exist in every social science study. For example, quantitative research has often been criticized on account of lacking depth of context and width of content since researchers infrequently interact with participants (Bryman, 2006; Creswell & Clark, 2017; Maxwell, 2012). Additionally, qualitative research is often criticised for difficulties in generalizing findings to a large group due to the small number of participants as well as researchers’ biases made through interpretations (Creswell & Clark, 2017; Edwards & Holland, 2013; Johnson & Christensen, 2019; Nunan, 1992). MMR combines the strengths of quantitative and qualitative methods to make up for their weakness by using various types of data collection tools. In addition, MMR provides opportunities for collaborations among researchers whereas the high requirement of time contributions to some extent becomes a disadvantage of deploying MMR.

MMR was chosen as the most appropriate methodology based on the interpretative nature of this study to investigate experiences of people within the context as well as research questions. Given that, the quantitative aspect of MMR includes questionnaire data which provides an overview of Irish young learners’ motivation in Chinese language learning and

intercultural sensitivity. The descriptive quantitative analysis will help depict any possible developments of learning motives, language gains as well as intercultural awareness before and after CMC activities. In addition, the qualitative datasets of learning artefacts, interviews and interaction records provide insights into understanding Irish young CFL learners' learning process in each CMC facilitated activity. Moreover, qualitative data helps identify potential affordances and limitations of CMC tools for beginner CFL language learners. Therefore, MMR is the fit for tracking the development of learning from both quantitative and qualitative perspectives.

3.4. Methodological approach – Design-Based Research (DBR)

Given that the interpretive study aims to provide an in-depth understanding within a complex context, this doctoral research is designed to provide Irish adolescent CFL learners with interaction opportunities with native Chinese peers and optimise the telecollaboration experiences of young beginner CFL learners in Irish secondary schools.

The ecological theoretical underpinnings for this study (refer to Section 2.2) requires a methodological approach to dealing with the complexity of environment, the development of technological selection and task design, and the use of multiple data sources to answer the outlined research questions in Section 3.2. With the support of MMR, a Design-Based Research (DBR) approach is selected for this purpose. This section outlines the definition of DBR and its key characteristics in Section 3.4.1. Section 3.4.2 presents the general procedures for conducting a DBR study and discusses its advantages and disadvantages. Given the common iterative aspect shared between DBR and Action Research (AR), a comparison of these two approaches is necessary (refer to Section 3.4.3) before summarizing in Section 3.4.4.

3.4.1. Introduction

Design-Based Research (DBR) is defined as “a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories” (Wang & Hannafin, 2005, p. 6). Brown (1992) and Collins (1992) firstly coined the concept of DBR as a response to criticism that laboratory studies failed to capture the ecological aspects of real classroom situations. In fact, ecological perspectives emphasise the importance of conducting research in authentic settings to achieve ‘ecological validity’ (McKenney & Reeves, 2018). The concept of *learning ecology* shares commonalities with ecological

perspectives in *Sociocultural Theory* (refer to Section 2.2), which is described as “a complex, interacting system involving multiple elements of different types and levels by designing its elements and by anticipating how these elements function together to support learning” (Cobb et al., 2003, p. 9). These multiple elements may refer to learning tasks, materials and resources, tools and technologies as well as learning artefacts (Cobb et al., 2003).

Research deploying a DBR approach generally contains two levels of goals (Crippen & Brown, 2018). At the micro level, it is called ‘local impact’ which seeks to improve educational practice through refined and adaptive interventions. At the macro level, it refers to ‘theory generation’ which targets to develop theory in the field of educational research (Crippen & Brown, 2018). The dual goals of DBR (Figure 2) address that DBR is a theory-building research type, which emphasises the development of foundational knowledge and practical application (Hung, 2013; Orrill et al., 2003).

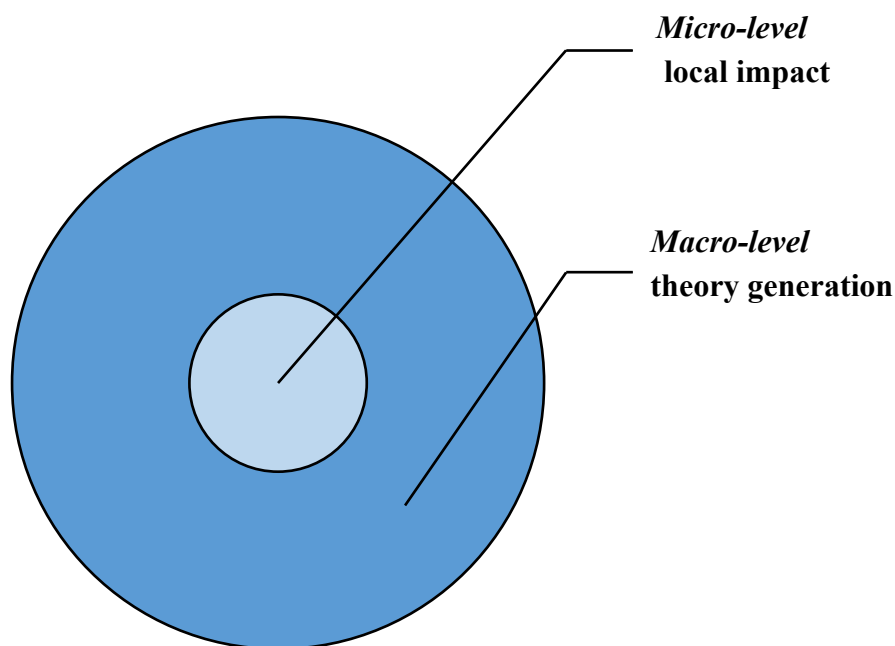


Figure 2. The dual goals of Design-Based Research (DBR) approach.

In order to identify the distinguishing features of DBR, a review of definitions in the literature was conducted. Table 5 represents the findings of this review which yielded the following 6 synthesised features.

- 1) Iterative processes
- 2) Integrative data sources
- 3) Collaborative and interactive work

- 4) Theory-oriented
- 5) Interventionist and problem-solving based
- 6) Contextualised scenario with conditions

References	Cobb et. al, 2003	Wang and Hannafin, 2005	Anderson and Shattuck, 2012	McKenney and Reeves, 2018
Features	Theory-driven, Interventionist, Prospective and reflective, Iterative design Pragmatic,	pragmatic, grounded, interactive, iterative, and flexible, integrative, contextual	Being situated in a real educational context Focusing on the design and testing of a significant intervention Using mixed methods Involving multiple iterations Involving a collaborative partnership between researchers and practitioners	Theoretically oriented Interventionist Collaborative Responsively grounded Iterative

Table 5. Features of DBR in the literature.

The iterative research process often involves cycles of identification, design, analysis, and evaluation to develop adaptable interventions in various contexts (McKenney & Reeves, 2018). In addition, its flexibility and dynamics ensure that each phase in different cycles is adaptive to new problems or emerging situations. As appointed out by Anderson and Shattuck (2012), “The results can be effectively used to assess, inform, and improve practice in at least this one (and likely other) contexts... there is always room for improvements in the design and subsequent evaluation” (pp. 16-17).

Additionally, DBR research encompasses various data sources and involves different data collection instruments (Anderson & Shattuck, 2012; Wang & Hannafin, 2005). The employment of various data analysis techniques enhances “the objectivity, validity, and applicability of the ongoing research” (Wang & Hannafin, 2005, p. 10). Adapted research instruments and analysis methods may be deployed when new needs and issues emerge after the implementation and evaluation of designed interventions. Moreover, researchers, who work as designers, frequently collaborate with practitioners in DBR studies. This collaboration raises voices from different parties and collect expertise to optimise interventions as much as possible (Armstrong et al., 2020; Barab & Squire, 2004; Collective, 2003; McKenney & Reeves, 2018). Furthermore, the definition of practitioners in the DBR

study is broad (McKenney & Reeves, 2018) and may include not only teachers but other kinds of educational professionals.

At the macro level, DBR aims to develop theoretical understanding and knowledge (Cobb et al., 2003; McKenney & Reeves, 2018; Wang & Hannafin, 2005). This goal characterises DBR with theory development as an integral part of the iterative research process. The continuous synergy between theory and practice contributes to further improvement (Armstrong et al., 2020; Barab & Squire, 2004; Collective, 2003; McKenney & Reeves, 2018). In addition, the maturation of theory comes from “consideration of not only empirical findings, but also consideration of their implications for specific dimensions of the design in question” (McKenney & Reeves, 2018, p. 13). Therefore, DBR is the suitable approach to address the research questions outlined in this doctoral study (refer to Section 3.2), which aims to provide insights into understanding how young beginner CFL learners interact by using languages (both English and Chinese) in the context mediated by various CMC technologies.

At the micro level, DBR research addresses problem-solving in real educational settings (Wang & Hannafin, 2005). It remedies the incompatibility between theory and practice and opens up possibilities for innovations and interventions where practical issues arise. Additionally, interventions can take various forms, including “educational products, processes, programs, or policies” (McKenney & Reeves, 2019, p. 13). Cobb et al. (2003) expanded and prompted this concept to include but not limited to “affordances and constraints of material artifacts, teaching and learning practices, and policy levers, as well as other forms of mediation” (p. 10). Moreover, unlike laboratory research, studies that employ the DBR approach take place in authentic educational environments. Barab and Squire (2004) highlighted that the richness of context and the learning process within DBR research aligned with the core concept of sociocultural theory (SCT) where individual’s cognitive development is mediated by social interactions within intricate environments. Furthermore, the design of DBR interventions and research processes is context-specific and subject to revisions based on contextual changes. Therefore, it is important for practitioners to keep in mind that instructional guidance is suitable only for certain events under specific conditions (Confrey, 2006).

In summary, DBR is featured with iterative designs with a specific context. At the micro level, this context-specific characteristic aligns with SCT which highlights the importance of the environment in human cognitive development. Additionally, DBR aims

to address practical issues through collaboration between researchers and practitioners. At the macro level, the development of theoretical understanding plays a significant role in the iterative DBR processes.

3.4.2. Advantages and Disadvantages of DBR

Being aware of the core features of DBR is crucial for both researchers and practitioners in understanding its design process. However, it is also important for them to recognise the advantages and disadvantages of DBR before implementation.

In terms of advantages, DBR provides ecological validity for understanding intervention mechanisms by analysing various types of data (Cobb et al., 2003; McKenney & Reeves, 2018). Due to the iterative nature and participant-centredness of DBR, researchers have the opportunity to reflect on problem-solving activities by incorporating feedback from both teachers and student participants (Armstrong et al., 2020; Barab & Squire, 2004; Collective, 2003; McKenney & Reeves, 2018). It is important to keep in mind that researchers stand on the periphery of the DBR project, acting as facilitators to support both teachers and students in conducting interventions. In addition, diverse backgrounds among practitioners and researchers offer collaborative opportunities to integrate knowledge and experiences in the intervention design. This collaboration not only addresses practical challenges but also enhances existing research theories, aligning with the goal of bridging the theory-practice gap (Cobb et al., 2003; McKenney & Reeves, 2018; Wang & Hannafin, 2005). Given that, it is suggested establishing a good rapport between researchers and teachers as well as schools (Gallagher & Fazio, 2017).

However, the disadvantages of DBR cannot be overlooked. Firstly, Wang and Hannafin (2005) pointed out that the presence of researchers in the classroom may be a distraction and cause Hawthorne effect which refers to the alteration of behaviours when people are aware that they are being observed or studies. In addition, the involvement of researchers in DBR may lead to subjective perspectives and bias in observations and unscrambling interview notes (Anderson & Shattuck, 2012).. However, researchers can employ a post-test design for learners and involve feedback from practitioners to cross-check observation results. Moreover, the contribution to achieve the goal of theory is critiqued by researchers (Anderson & Shattuck, 2012; McKenney & Reeves, 2018) as the constraints of time and financial support make long-term DBR research rare in most cases, although the iterative processes of DBR enrich the data sources. Additionally, DBR “data are routinely discarded, and research quality may be influenced negatively” (Wang & Hannafin, 2005, p.

20). Furthermore, it is rarely possible for researchers to generalize a ‘one-size-fits-all’ intervention or fundamental theory in real educational settings due to its complexity and different variables. Firestone (1993) addressed two folds of theory generalisation: analytic generalization (referring to theory deduction) and case-to-case generalization (also known as intervention application). This doctoral study belongs to the latter one which aims to contribute to understanding Irish young CFL beginners through two cycles of DBR telecollaboration interventions. DBR requires researchers and practitioners to consider contextual factors when deploying interventions from another context. Explicit descriptions of designed interventions, their contextual conditions, and underlying theories must be addressed (McKenney & Reeves, 2018). The adoption of interventions in another setting requires considerations of material facts, appropriateness, decision-making intentions, and its application grounds from the original case (McKenney & Reeves, 2018).

In summary, the core features of DBR contribute to ecological validity of the research through intervention iterations with wider data sources. The collaboration between researchers and teachers provides opportunities to integrate knowledge and experiences in the intervention design. In addition, the facilitation role reminds researchers to step back and keep away from the centre of class practice. However, there are certain drawbacks associated with the use of DBR: researchers’ bias, lack of adequate iterations in a single research project, challenges of theory generalisation and intervention applicability. The shared iterative nature between DBR and Action Research sometimes leads to misconceptions about conflating these two approaches. However, they possess distinct characteristics and serve divergent purposes. The subsequent section will elucidate these disparities.

3.4.3. Comparison Between DBR and Action Research

Both *Design-Based Research* and *Action Research* (AR) are research approaches well-suited for the educational research scope. They share several commonalities. Firstly, both are situated in authentic learning settings. Secondly, in terms of the research process, both are driven by the identification of problems in practice. Additionally, they are characterized by an iterative process, wherein invention and revision occur iteratively in authentic educational settings. Moreover, both DBR and AR evaluate the effectiveness of interventions (or treatments) through iterative data analysis. Concerning data collection, both approaches utilise common qualitative instruments, such as class observations, learning artifacts from students, interviews, or diaries, involving learning experiences from students and reflective perspectives from both students and their teachers.

However, identifying the differences between these two approaches is crucial for both researchers and practitioners. The first difference lies in the fact that AR is teacher-oriented or practitioner-initiated base research where the researcher and the practitioner are often the same person (Cohen & Ezra, 2018; McAteer, 2013; McNiff, 2013), whereas DBR involves collaborative efforts between researchers and teachers (Anderson & Shattuck, 2012; Cobb et al., 2003; McKenney & Reeves, 2018; Wang & Hannafin, 2005). Secondly, AR typically derives from the classroom setting where teachers identify problems or concerns about teaching in their own classroom. In contrast, DBR focuses on the design and development of interventions in real-world educational settings with the primary goal to improve the effectiveness of educational practices through iterative design and refinement (Anderson & Shattuck, 2012; Cobb et al., 2003; McKenney & Reeves, 2018; Wang & Hannafin, 2005). In addition, DBR seeks to develop theoretical understanding while AR aims to bring about immediate improvements in practice (Stringer, 2007; Whitehead & McNiff, 2006). Moreover, as AR is specifically suited in a fixed scenario where teachers address problems within their own classrooms (Cohen & Ezra, 2018; McAteer, 2013; Whitehead & McNiff, 2006). Conversely, the DBR research optimises as much of the design as possible, and conjectures will be generated and evaluated in different school settings (Anderson & Shattuck, 2012; Cobb et al., 2003; McKenney & Reeves, 2018; Wang & Hannafin, 2005). It intends to generate design principles and theories. Furthermore, AR focuses on immediate improvements in practice in a typically shorter time frame while DBR emphasises the importance of intervention refinements and is often conducted over an extended period to evaluate the effectiveness of interventions based on ongoing feedback.

In summary, both DBR and AR aims to solve practical problems through iterative research design process. However, DBR not only aims to generate design principles through optimised interventions, but also addresses collaborations between teachers and researchers.

3.4.4. Summary

This section presented the methodological approach taken in this research. At the micro level, DBR employs iterative designs within specific contexts, aligning with Sociocultural Theory's emphasis on environment in cognitive development. It involves collaborations between researchers and practitioners. At the macro level, the development of theoretical understanding plays a significant role in the iterative DBR processes. the core features of DBR contribute to ecological validity of the research through intervention iterations with wider data sources. However, it should be noted that there are certain

drawbacks associated with the use of DBR: researchers' bias, lack of adequate iterations in a single research project, challenges of theory generalisation and intervention applicability. Although both *DBR* and *Action Research* share iterative implementation process within the educational research scope, they possess distinct characteristics and serve divergent purposes. DBR is not only often conducted over an extended period to evaluate the effectiveness of interventions based on ongoing feedback, but also aims to develop theoretical framework through collaboration between teachers and researchers.

3.5. Research Instruments

The rationale for selecting research instruments is based on the research questions involved in this project, focusing on three aspects: 1) the impact of CMC-featured interventions; 2) the learning process facilitated by various tools; 3) the characteristics of telecollaboration task design for young CFL beginners. The complete set of data instruments is presented in Table 6. In order to holistically capture answers to each question, more than one dataset was deployed among different participant groups. The primary dataset is the first one listed after each question in Table 6. Overall, this doctoral study primarily takes qualitative data sources including interviews, interaction records, and the collection of learning.

1. What was the impact of Computer-Mediated Communication (CMC) activities on young Irish learners of Chinese as a Foreign Language (CFL)?		
Questionnaires (pre/post) • Learning motivation • Intercultural sensitivity	Interviews • Students • Teachers	Learning artefacts (eBooks)
2. How did the choice of CMC technologies contribute to the CFL learning process?		
Interviews • Students • Teachers	Interaction records • Chat logs • Video recordings	
3. What were the characteristics of ‘successful’ and ‘failed’ task design in the course of telecollaboration learning for CFL beginners?		
Interviews • Students • Teachers	Interaction records • Chat logs • Video recordings	

Table 6. Research instruments and research questions.

The following sections will respectively describe the research instruments selected for use for data collection in this study.

3.5.1. Questionnaires

Questionnaires are frequently used in the field of Second Language Acquisition (Brown, 2001; Dörnyei & Taguchi, 2009). Brown (2001) defined questionnaires as “any written instruments that present respondents with a series of questions or statements to which they are react either by writing out their answers or selecting them among existing answers” (p. 6). It is a self-report data collection instrument that avails of gathering information about “the thoughts, feelings, attitudes, beliefs, values, perceptions, personality, and behavioural intentions of research participants” (Johnson & Christensen, 2019, p. 497).

Questionnaires can be used to collect quantitative, qualitative, and mixed research data. Items listed in a questionnaire can be either open-ended or closed-ended (Brown, 1991; Dörnyei, 2007; Dörnyei & Taguchi, 2009). Open-ended items is used to collect qualitative data which contain participants’ thoughts and ideas although “questionnaires are not particularly suited for truly qualitative, exploratory research” (Dörnyei, 2007). However, questionnaires involving open-ended items receive critiques due to the superficial response from respondents (Dörnyei, 2007). On the contrary, closed-ended items are primarily included in most professional questionnaires (Brown, 1991; Dörnyei, 2007; Dörnyei & Taguchi, 2009). Respondents are required to select options from the list and their response will be numerically coded for further quantitative analysis. As noted above, questionnaires can be used along with other data collection instruments and directly show the response differences among participants. The well-constructed questionnaire not only can collect plenty of information from participants within a short period, but also can avail of efficiently processing data by means of quantitative analysis software (Cohen et al., 2018; Dörnyei, 2007; Dörnyei & Taguchi, 2009; Mackey & Gass, 2021). In addition, questionnaire may be distributed by diverse forms, such as by email, post, online survey platform. This flexibility of issuing questionnaires allows researchers latitude in data collecting activities. Moreover, the versatile nature of questionnaires helps gain interests among scientists and it can be utilised in the various range of research contexts, research purposes and participants. More importantly, questionnaire helps reduce bias from researchers and “increase the consistency and reliability of the results” (Dörnyei & Taguchi, 2009, p. 6).

However, low responses and poor sampling can bring about challenges in relation to data generalisation (Cohen et al., 2018). In addition, it is limited to investigate the reasons behind any changes of learner’s attitudes, conscious progress, and its development in questionnaires, especially when some participants over-report or under report the real situation due to the individual personality differences (Cohen et al., 2018; Dörnyei &

Taguchi, 2009; Mackey & Gass, 2021). Therefore, it is important to pilot questionnaires to ensure reliability and validity of the outcomes in the context (Cohen et al., 2018; Dörnyei & Taguchi, 2009; Mackey & Gass, 2021).

There are two questionnaires used in this doctoral study. The first one is related to explore young Irish learners' Chinese language learning motivation (refer to Section 3.5.1.1). The second one looks into participants' intercultural sensitivity (refer to Section 3.5.1.2), which is the affective characteristic of intercultural communicative competence as explained in Section 2.3. Both questionnaires were distributed to participants twice as the pre- and post-questionnaire to examine whether the intervention has impacted on young Irish learners' learning motivation in related to Chinese language. As student participants are under 18 years old in this doctoral study, concerns are given when constructing and selecting a questionnaire for them, such as reader-friendly to adolescents, precise language to describe questions.

3.5.1.1. Chinese Language Learning Motivation

As noted above, piloting research instruments is crucial before conducting a study. The motivation questionnaire in this study was adapted from a questionnaire administered in Carson et al. (2019). Two main considerations were given: research context and the validity of the questionnaire. On the one hand, according to Carson et al. (2019), this motivation questionnaire involved ten items which were adapted from an international and widespread standardised motivation survey developed by Tennant and Gardner (2004). The reliability and validity of this survey has been well evaluated in different contexts. On the other hand, this adapted version of the motivation questionnaire has been administered to a group of Irish young CFL learners (Carson et al., 2019). Since this research aims to recruit the same age range of participants from the Irish secondary school context, this questionnaire has been evaluated in the previous study for its readability. The language of this questionnaire is understandable and readable for young adolescents without leading any misunderstandings. Nevertheless, the question which focuses on the aspect of instrumental motivation (Carson et al., 2019) was replaced by the practical purpose of learning Chinese (refers to Question 6 in Appendix B) as it helps understand potential reasons behind choosing Chinese language among students involved in this research. The questionnaire with a 5-point Likert scale is reproduced in the Appendix B.

3.5.1.2. *Intercultural Sensitivity Scale (ISS)*

This doctoral thesis is not only concerned with language development but also with the development of Intercultural Communicative Competence (ICC), as discussed in Section 2.3. As noted above, an Intercultural Sensitivity Scale (ISS) was created to measure partners' "active desire to motivate themselves to understand, appreciate, and accept differences" (Chen & Starosta, 2000, p. 3) during intercultural communications. To provide exploratory evidence of the development of affective ICC aspect, the ISS was one of dataset in this research. This ISS uses a 5-point Likert scale (1=strongly disagree, 2=disagree, 3=uncertain, 4=agree, 5=strongly agree). It consists of 24 items categorised into five factors: *interaction engagement*, *respect for cultural differences*, *interaction confidence*, *interaction enjoyment* and *interaction attentiveness* (Appendix C).

3.5.1.3. *Summary*

This section presented the definition of questionnaires and discussed the advantages and disadvantages of questionnaires, along with reporting two questionnaires taken in this study. However, the validity of questionnaires is questioned and disrupted especially on account of small sampling size. The results of questionnaires will be largely influenced by individuals who either give positive or negative answers when the sample size is limited. Taking account of disadvantages in using questionnaires, qualitative research instruments (interviews in Section 3.5.2 and interaction records in Section 3.5.1) will be included in this doctoral study to provide both in-depth and plentiful data to answer research questions.

3.5.2. *Interview*

Interview is regarded as the most frequently used research instrument in qualitative research (Dörnyei, 2007) because of its commonality in people's life as well as obtaining diverse dimensions of participants' views (Cohen et al., 2018). Forms of the interview can be various according to different categorisation principles (Cohen et al., 2018; Dörnyei, 2007; Dunne et al., 2005; Jong & Jung, 2015; Nunan, 1992), such as one to one, focus group and retrospective interviews (interviewing techniques); structured, semi-structured, unstructured interviews (the structured degree of interview process/guide); one-off and multiple-session interviews (the number of sessions included). As addressed in the Section 3.5.1.3, interview is often selected to supplement disadvantages of using questionnaires through probing in-depth and wide breadth dimensions regarding particular phenomena and viewpoints from participants. Moreover, the presence of interviewers allows them to immediately follow up

with emergent issues raised by interviewees whereas it is not possible to do so in questionnaires (Cohen et al., 2018; Dörnyei, 2007). Additionally, interviews “covers a well-defined domain, which makes the answers comparable across different respondents” (Dörnyei, 2007, p. 135).

However, the distinct shortcomings of interviews also concern many researchers (Cohen et al., 2018; Dörnyei, 2007; Dunne et al., 2005; Jong & Jung, 2015; Nunan, 1992). Firstly, the complex process of preparing, conducting, editing, analysing interviews requires abundant time contributions from interviewers. Secondly, interviewers would need to have good communication skills and establish rapport in order to elicit information from interviewees (Cohen et al., 2018; Nunan, 1989). For example, interviewers often start with a few easy questions to create a relaxing atmosphere for respondents, however, it would be thorny if interviewees turned out to be shy in the conversation (Dörnyei, 2007). In addition, the introverted personality of interviewers themselves will increase difficulty in articulating questions to spontaneously capture sufficient data from interviewees. Furthermore, like questionnaires, social desirability bias also exists in the interview where respondents are not aware of their real feelings but tend to report feelings which are expected to be answered.

To better understand participants’ thoughts and their learning experience in different CMC facilitated activities, focus group interview among students (refer to Section 3.5.2.1) and semi-structured individual interview with participating teachers (refer to Section 3.5.2.2) are included as datasets.

3.5.2.1. Focus Group Interview

Focus group interview is originally from market research but widely undertaken in mixed-methods research afterwards (Dörnyei, 2007). It takes a group format which usually involves a small number of people in each group. The answer of the group size is indefinite and can be varied in dissimilar research projects for different purposes (Krueger, 2002). For examples, Krueger (2002) suggested 5 to 10 people per group with a preference of 6-8 people while Dörnyei (2007) recommended 6 to 12 participants as less than 6 is difficult to yield various opinions whereas more than 12 would lead to inequity among participants. Another technical question often addressed prior to conducting focus group interviews is whether to include homogeneous or heterogeneous people in the same group (Dörnyei, 2007). According to Dörnyei (2007), homogeneous samples tend to provide more dynamic and insightful ideas within a synergistic group environment. Therefore, the focus group segmentation often takes “within-group homogeneity and intergroup heterogeneity”

(Dörnyei, 2007). In this doctoral study, a careful consideration of grouping was given before starting interviewing (details refer to page 55 group composition).

Additionally, interviewers engaged in focus group interviews are referred to *Moderators* who simultaneously carry out many roles (Cohen et al., 2018; Krueger, 2002; Krueger & Casey, 2001). Comparing to interviewers from the one-to-one interview, moderators serve as facilitators in the whole interviewing process. Because of the salient feature of focus group interview for gathering emerging topics from interviewees, moderators often play as an outside listener through probing a prepared open-ended question to interviewees. However, moderators also occasionally lead the discussions when focus group members digress from the main topic. In addition, moderators may take the leader role to ensure every voice be heard if discussions are dominated by certain interviewees (Krueger, 2002).

The general phases of taking a focus group interview (Dilshad & Latif, 2013) are outlined in Figure 3. Due to the closure of schools during the Covid-19 pandemic in 2021, focus group interview was not utilised in Cycle 1. Therefore, the phases of focus group interviews will be illustrated with Cycle 2 as an example.

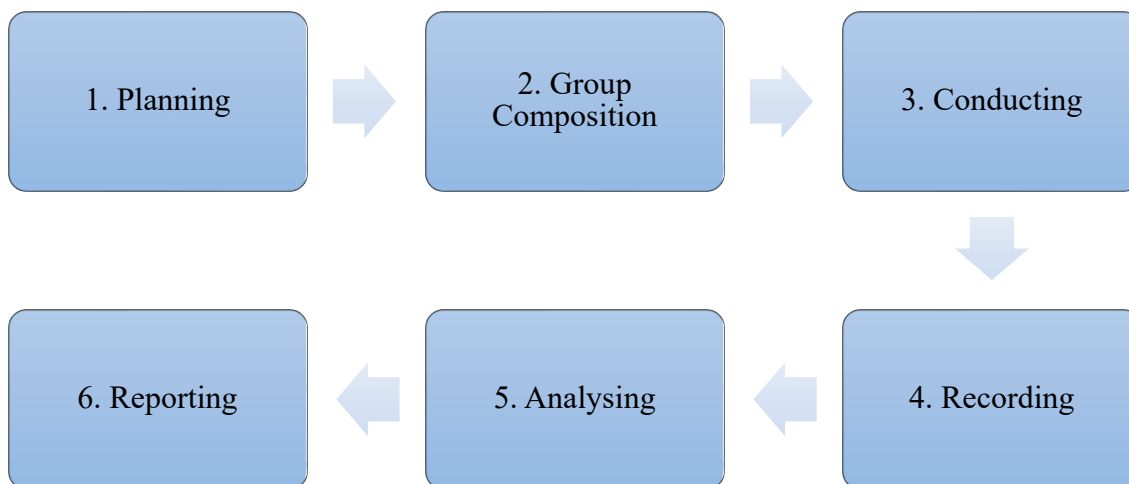


Figure 3. General phases of focus group interview.

In the phase of planning, interview questions were carefully drawn up by following research questions. The language used in forming interview questions are required to be clearly articulated and easily understood for young participants. To reach out this requirement, a native English person proofread all questions. The list of focus group

interview questions is outlined in Appendix D. In addition, prompts were fully prepared within the interview protocol in order to probe various opinions from participants, such as providing interviewees with printouts of recalling activities, offering language prompts if the whole group become silent.

As previously addressed, group composition takes account of group size, intragroup homogeneity and intergroup heterogeneity. Because of Covid-19 pandemic, focus group interview was excluded from Cycle 1 study, however, students from Cycle 2 were invited to focus group interviews at the end of the telecollaboration project. Considering the restriction of Chinese language class time, the key principle of group composition is putting participants from the same telecollaborative activity group to stay in the same interview group. Additionally, for the purpose of inspiring participants to share various ideas, interviewing two different activity groups together where possibly. The details of group composition in Cycle 2 are listed in Table 7.

School Name	Riverdale College/Dublin	Southview Secondary School/Dublin
Focus Group Size	4 to 7 per group	5 to 9 per group
Focus Group Composition	2 groups (all males)	2 groups
	Group 1: 7 members from two activity groups	Group 1: 9 members from two activity groups (7 females, 2 males)
	Group 2: 4 members from one activity group	Group 2: 5 members from the other two activity groups (4 females, 1 male)

Table 7. Cycle 2 focus group interview composition.

The time length of focus group interview was set for 25 minutes. The moderator arrived earlier to set up the interview room. Seats were put in a circle to create a comfortable and relaxing environment for interviewees. The moderator firstly gave a brief welcome and introduction talk which included the overview of discussion topics as well as basic guidelines of focus group interview. The first opening question was drawn to invite participants to talk about their overall experience and outcomes of the whole project. In order to break the ice between students and the moderator, two simple questions were provided to rate personal communication experience in Padlet and Zoom which were selected technological tools in this project. Then they moved on to share thoughts by discussing the prepared open-ended questions. The discussion would only be interrupted by the moderator in three scenarios: 1) many students talking at the same time which broke the ground rules; 2) time reminder; 3) eliciting clarifications if anything was unclear. Additionally, to reduce the level of anxiety

among students, their teachers were not engaged in the whole interview process. However, absences of some participants on the day of interviews are beyond control and this is the main reason for the unequal number involved in each focus group interview.

Accurately recording the whole interview process is significantly important for further data analysis. Therefore, three techniques were taken in Cycle 2 focus group interviews. Firstly, two high-quality digital audio recorders were separately placed on the table. Secondly, to better distinguishing every voice in the later transcription stage, two video recorders were put in the room to capture the movement of interviewees and their faces. Thirdly, a prepared notes-taking form was used for the moderator and the assistant to jot down key points of discussions.

The audio recordings were firstly transcribed by using *Trint* (a transcription tool) and subsequently manually checked by the moderator to ensure the accuracy of transcriptions. Video recordings assisted the recorder to recognize the articulated statements from each interviewee. When all transcriptions were ready, they were imported into a closed-access data analysis software *MAXQDA* for further analysis. The thematic analysis is selected for analysing all interview data. Full details of thematic analysis are presented in Section 3.6.2. The report was finally synthetically integrated in Section 5.2 of Chapter 5.

3.5.2.2. *Semi-structured Individual Interview*

Semi-structured interview took place among the participating teachers in both Cycles. The procedure of the individual interview remains the same as reported in Section 3.5.2.1. The interview guide with questions is listed in Appendix E.

3.5.2.3. *Summary*

This section presented the various types of interviews based on interview techniques, along with discussing the advantages and disadvantages of interview. Interview procedures were explicitly detailed through describing focused group interviews taken in Cycle 2 as well as semi-structured individual interviews with participating teachers. However, the weaknesses of interviews are also distinct such as time-consuming, high communication skills requirements for interviewers and social desirability bias lies among interviewees etc. Given that, interaction records are selected (refer to Section 3.5.1) to triangulate the validity of each dataset and to understand the process of CMC activities.

3.5.1. Interaction Records

Interaction records refer to multimodal resources which take place during people interact with other individuals, including recordings (video and audio), texts, images, emojis etc. This type of data source is crucial in the field of CALL research (González-Lloret, 2011, 2015; Herring, 2004; Jordan & Henderson, 1995; Meredith, 2019; Meredith & Potter, 2014; Tudini & Liddicoat, 2017). Video recordings enable researchers to (re)watch the video for interaction details (Cohen et al., 2018) while the repository of texts and images available on CMC assist researchers to explore communication contents. To investigate the interactive nature among interlocutors through (a)synchronous CMC, interaction records are included in this doctoral study. Text-based chat logs on Padlet and video-based recordings on Zoom are the two main strands of interaction records in this study. Those two datasets not only depict a detailed portray of interactions but also aim to triangulate the validity of the interview dataset. The analysis of these two data sources is available in Section 3.6.2.2.

3.6. Data Analysis

Since this study took mixed methods which involved both qualitative and quantitative datasets, this section will illustrate data analysis from these two dimensions.

3.6.1. Quantitative Data Analysis of Questionnaires

SPSS, a statistical software is selected to be used for quantitative data analysis, where the analysis process follows key steps set out by Dörnyei (2007): data input, screening and cleaning, data manipulation, and data analysis. The main sources of quantitative data in this study are questionnaires collected from participants, which will be reported in the following paragraphs.

Responses were keyed in SPSS as a raw data file. Each variable was given a descriptive label which indicates the meaning of variables by means of putting full questions from the questionnaire. In addition, value labels were also created to “describe the possible numbers that the variable can take and what each number stands for” (Dörnyei, 2007, p. 201). In terms of missing data, either caused by the absence of participants or the carelessness of omits, the cell will be empty without values.

The stage of data screening and cleaning involves “spotting and correcting as many of these errors and inaccuracies as possible before starting the actual analyses” (Dörnyei, 2007, p. 202). One specific issue is to deal with outliers if they occur in the dataset. There was an extreme negative respondent in Cycle 1 while he gave very low scores in ISS items.

Since the sample size was very small in Cycle 1, the descriptive statistics results were initially presented without removing the outlier (Wang et al., 2021).

Data manipulation is the final step prior to analysing data, which aims to deal with three matters: data missing, data recoding and data standardization. In this doctoral study, the questionnaire of Chinese language learning motivation contains two negatively worded items (Item 8 & Item 10, see Appendix B). In addition, 11 items from ISS (Item 2, 4, 7, 9, 12, 15, 18, 20, 22, see Appendix C) are required to be reversed scores before running descriptive statistics in SPSS.

The descriptive statistics of Cycle 1 will be presented in Section 4.4.4 while Cycle 2 results will be detailed in Chapter 5.

3.6.2. Qualitative Data Analysis

In the light of fruitful and diverse aspects provided by qualitative data, it is significant to choose a proper analysis approach. There are many ways to analyse qualitative data, such as content analysis (Gläser & Laudel, 2013; Gläser-Zikuda et al., 2020; Mayring, 2004), grounded theory (Charmaz, 2006; Corbin & Strauss, 1990; Glaser & Strauss, 2017; Glaser, 1998), discourse analysis (Gee, 2014; Lemke, 2012; Souto-Manning, 2014; Wetherell et al., 2001), thematic analysis (Braun & Clarke, 2006; Clarke & Braun, 2016; Dawadi, 2020; Kiger & Varpio, 2020; Maguire & Delahunt, 2017). The rationale of using thematic analysis for interviews is related to research questions in this study. Figuring out what participants feel and their learning experience in each CMC facilitated activity will help understand affordances and limitations of technology and its potentiality in regular Chinese teaching practice. Additionally, conversation analysis is selected for interaction records (both video recordings and text-based chat logs). This section sets out to explain these two analysis methods and analysing procedures.

3.6.2.1. Thematic Analysis of Interviews

Thematic analysis is defined as “a method for identifying, analysing and reporting patterns (themes) within data” (Braun & Clarke, 2006, p. 79). It is important for researchers to be aware that thematic analysis aims to address research questions through identifying themes from data instead of simply summarizing data. Braun and Clarke (2006) illustrated that there are two levels of themes in thematic analysis: semantic and latent. Semantic themes often contain meanings of data which is easily captured from data per se. On the contrary,

latent themes requires researchers/analysts to probe information beyond data itself. In addition, a set of terminology (Table 8) in terms of the thematic analysis need to be clearly addressed prior to processing thematic analysis.

<i>Data corpus</i>	all data collected for a particular research project
<i>Data set</i>	all the data from the corpus that are being used for a particular analysis
<i>Data item</i>	each individual piece of data collected, which together make up the data set or corpus
<i>Data extract</i>	an individual coded chunk of data, which has been identified within, and extracted from, a data item
<i>Theme</i>	a theme captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set.
<i>Code</i>	the smallest units of analysis that capture interesting features of the data (potentially) relevant to the research question. Codes are the building blocks for themes, (larger) patterns of meaning.

Table 8. Thematic analysis terminology (Braun & Clarke, 2006).

Qualitative data is frequently analysed either from the way of top-down or bottom-up in thematic analysis (Braun & Clarke, 2006; Maguire & Delahunt, 2017). Top-down thematic analysis is known as theoretical/deductive one where analysis is driven by research questions and/or research focuses (Maguire & Delahunt, 2017). As opposite, bottom-up thematic analysis shares some commons with Grounded Theory and works in the inductive way where analysis is driven through data per se. The top-down way to deduct themes driven by theoretical framework underpinned within this study was selected for both cycles. Additionally, flexibility is the most outstanding feature of thematic analysis (Braun & Clarke, 2006; Kiger & Varpio, 2020; Maguire & Delahunt, 2017) which is leading to a wide range of applications, from small to large sample size, additionally from single to multiple data sources. However, researcher bias, where analysts stand out the points and narrative perspectives, is questioned by critics (Braun & Clarke, 2006; Holloway & Todres, 2003; Nowell et al., 2017). In addition, a weak analysis report on account of containing many overlapped themes becomes unconvincing (Braun & Clarke, 2006) and therefore analysing techniques training is recommended to novice researchers.

Braun and Clarke (2006) propose a six-step guidance (see Figure 4 below) of using thematic analysis which is prevalent in qualitative research. While doing a thematic analysis, each phase is not in a linear relationship and analysts often need to “move forward and back between each phase time by time” (Maguire & Delahunt, 2017, p. 3354).

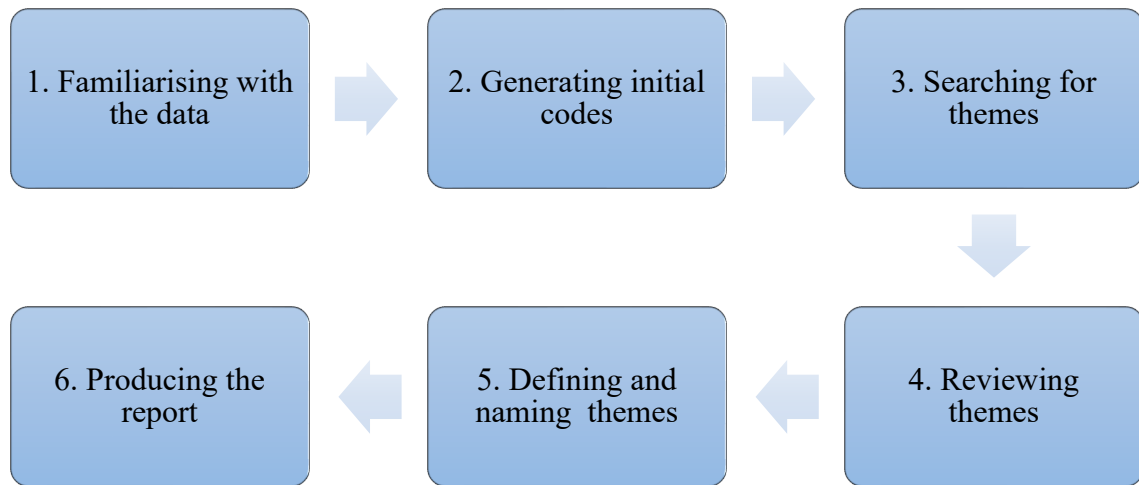


Figure 4. Six steps of thematic analysis (Braun & Clarke, 2006).

The specific analysis procedures within this study will be elaborated in the following paragraphs.

Step 1 Familiarising with the data: Qualitative datasets were imported into a qualitative and mixed methods data analysis software *MAXQDA*. Reviewing and checking files to grasp the overall impression of all data. In terms of interviews, they were transcribed and rechecked the accuracy through listening to interview recordings within *MAXQDA*.

Step 2 Generating initial codes: Codes, the basic blocks of thematic analysis, contains some interesting information which are potentially meaningful to answer research questions or have connections with theories. In turn, it accelerates analysts' efficiency to further define themes through identifying "repeated patterns (themes) across the data set" (Braun & Clarke, 2006, p. 89).

Step 3 Searching for themes: This study applied the deductive analysis method which firstly generated themes from the theoretical framework. With respect to any emerging themes, they were tagged with proper names which captured typical features at first glance. In this step, the same data extract could possibly be fit into different themes. In addition, the relationship between codes, themes and sub-themes required analysts' further attention.

Step 4 Reviewing themes: This step involves a challenging job which requires analysts to reduce the number of overlapped themes and probe latent themes behind the surface of data per se. A fine-tuned thematic map will be ready when this step is done (See Figure 5 below).

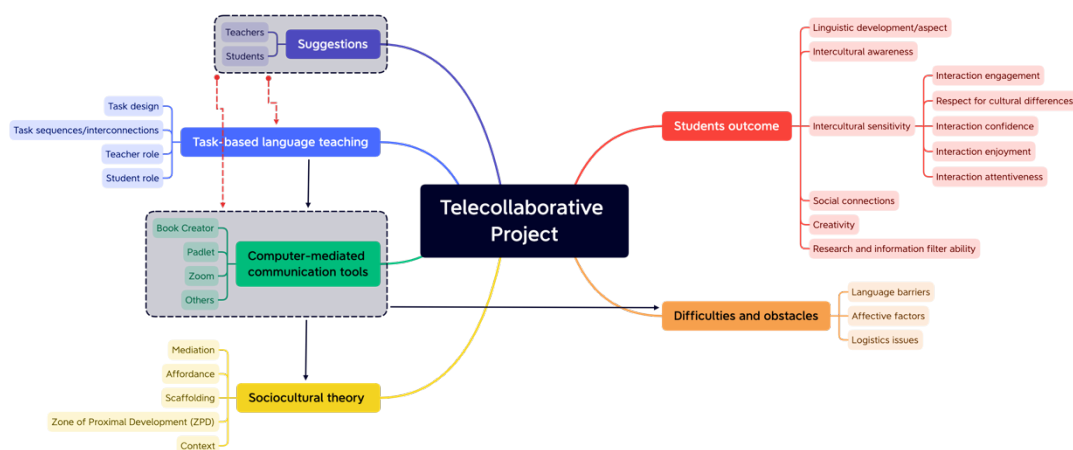


Figure 5. An overview of themes in this study.

Step 5 Defining and naming themes: Once the thematic map is finished, themes and sub-themes need to be clearly articulated within a coding schema. Appendix F is the coding schema generated for this study.

Step 6 Producing the report: The final step engages analysts to finalize and report analysis results to the potential audience. Cycle 1 report can be found in Section. 4.4.4.2. Cycle 2 results will be presented in Chapter 0 as the main output of this project.

In summary, the key goal of thematic analysis is to identify and interpret salient features from data per se instead of simply summarizing the data content. It can be either deductive (top-down) or inductive (bottom-up) analysis to capture both explicit and latent meanings driven from data per se. This study takes top-down way to deduct themes driven by the theoretical framework. Full thematic analysis coding schema can be found in Appendix F.

3.6.2.2. Conversation Analysis of Interaction Records

Raffaella Negretti (1999) is the pioneer of using *Conversation Analysis* (CA) to investigate online interactions among language learners. The applications of CA became prominent in the field of technology-mediated interactions in recent decades (González-Lloret, 2015) because it provides CMC researchers with a microanalytical perspective to look into the collected qualitative data which is an alternative to understand dynamic interactions among participants and how they construct authentic conversations in the CMC environment (González-Lloret, 2011). Aside from that, the large amount of authentic resources produced in turn show detailed records that how CMC affect and shape interactions. The review paper conducted by González-Lloret (2015) demonstrated that most

CA research for CALL focused on descriptive analysis which illustrated sequential organisation of interactions (González-Lloret, 2009, 2011; Rintel et al., 2001), the nature of technology-mediated pedagogical task (Jenks, 2009; Suzuki, 2013; Tsai & Kinginger, 2015; Tudini, 2012), affordances and limitations of tools (Arminen & Weilenmann, 2009; Fischer & Tenbrink, 2003; Jenks, 2009; Kitade, 2006; Meredith & Stokoe, 2013). According to research questions set out in this study, CA is the most appropriate analysing approach to look into participants' capability of reacting and interpreting the utterances of others and/or units of language used in different contexts facilitated by CMC platforms. Particularly, investigating functions of language use in each CMC platform will be addressed in this study. The summary of conducting CA for this study is set out below. Procedures are respectively illustrated by looking at each technology tool deployed in Cycle 2.

Padlet

Padlet is a real-time collaborative web platform which provides a group of people (either dyads or multiusers) with a closed access to ensure the interactive quality among participants. The quasi-synchronicity feature of Padlet can possibly afford participants to make chats become interactive communications like being interacting through social media, such as receiving and sending texts as well as other multi modes (links, emojis and pictures etc). The minimum analysis unit is *sentence* due to the nature of text-based message and the limitation of identifying anonymous interactants. The analysis procedure is divided into four stages (Figure 6): export records from the platform, sort out data, analyse data and report analysis results.

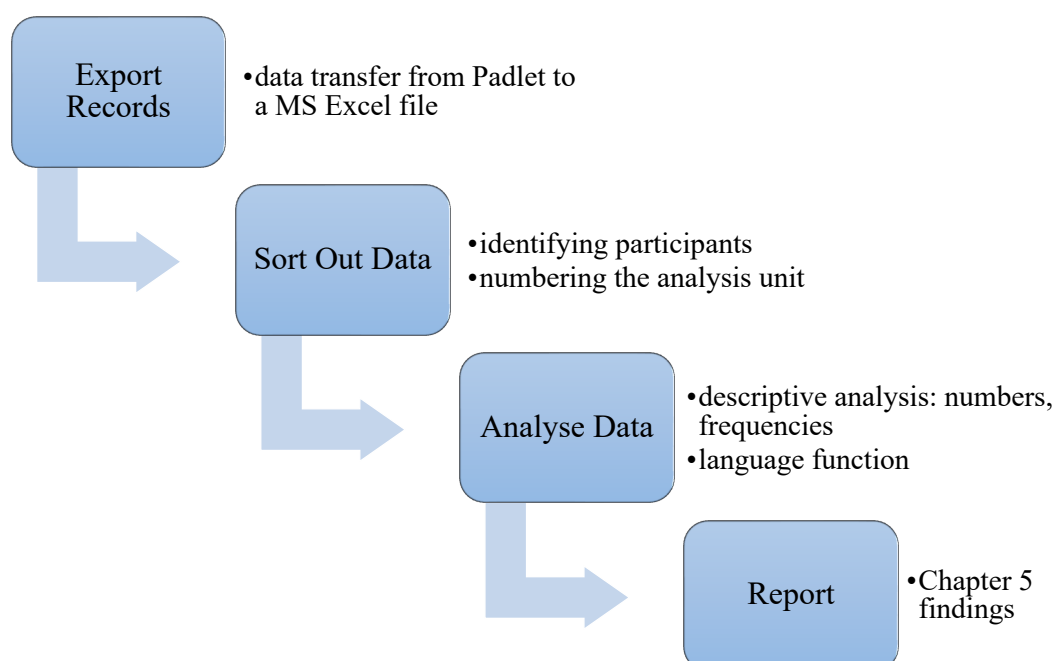


Figure 6. Procedures for conversation analysis on Padlet.

Firstly, chat records from each school on Padlet was exported into a *Microsoft Excel* spreadsheet and categorised following the group order. As noted above, although Padlet as a written communication platform evaluated the importance of privacy among users which meets the selection criteria of technological tools-anonymity and no requirement for account registration on Padlet, it also increased the difficulty to recognise text senders in some situations in Cycle 2. Therefore, not every message can be clearly identified and allocated to a sender. In addition, it is crucially important for analysts to identify interactants' identity in telecollaboration projects (at least, knowing interactants' nationalities). Therefore, the first step was to confirm the identity of message senders. Several techniques have been deployed:

- If participants were registered on Padlet, their pseudonyms were noted while observing the class by the researcher. The clarified identifies were then anonymised in accordance with participants' identifiers as theirs in other datasets.
- If participants were not registered on Padlet, as discussed, the challenges increased and not every message could be identified. However, language contexts afforded the researcher to identify some messages. For examples, the correspondences of identified messages can be smoothly allocated to the specific communicating party (either Irish participants or their counterparts from China) even though the participants' identifiers are unclear.
- The language format was another prompt, such as most messages solely displayed by Pinyin (Chinese language pronunciation system) were from Irish participants because they were used to do it in the regular Chinese class; short phrases or sentences with typos in Chinese characters were also produced by Irish participants due to their limited knowledge of Chinese language.
- In addition, the content of message would give some clues, such as some questions were raising to ask school life in China from an anonymous sender or answers including some cultural elements (popular sports rugby in Ireland, noon nap in China). As long as the nationality of senders was sorted, it could be moved on to the next analysis step. For those unidentified messages, they were categorised as "uncertain" in the spreadsheet.

Once the identification of senders finished, Padlet dataset was then numbered on the basis of sentence. The punctuation mark of sentence full stop "." and grammatically

complete sentence even without the period (see the quote below was counted as two sentences) were two main techniques used while numbering sentences.

I don't understand your character, can you type pinyin?

For those unidentified messages, they were also numbered for the purpose of data analysis in the next phase.

After the completion of data sort, it moved on to the phase of data analysis. It addressed two analytic perspectives: descriptive analysis and language function. The descriptive analysis constructed data by quantitatively summarising features of results, such as numbers, frequencies. Table 9 presented the descriptive analysis template deployed in each participating school of Cycle 2 study.

	Week 1 (G for group)				Week 2 (G for group)			
	G1	G 2	G3	G 4	G 1	G 2	G3	G 4
Number of SENTENCES by the whole group								
Number of SENTENCES <u>fully</u> in Chinese								
Number of SENTENCES certainly by Irish students								
Number of SENTENCES fully in <u>Chinese or translanguageing</u> certainly by Irish students								
Number of SENTENCES certainly by Chinese native students								
Images								
Emojis								

Table 9. Cycle 2 Padlet descriptive analysis template.

Analysing the language functions of interactions received attention among SLA scholars to probe different purposes of language used in communications (Flowerdew, 2012; Loewen & Sato, 2018; Sotillo, 2000; Swain & Lapkin, 1998). Likewise, CALL researchers found it helps understand the process of online communications and comparisons have been addressed between face-to-face and online interactions in the literature (Böhlke, 2003; Fitze & McGarrell, 2008; O'Malley et al., 1996; Zeng, 2017). The taxonomy of language functions was adapted from Li and Kim (2016) with some amends to fit into this study for both Padlet dataset and Zoom dataset (Zoom dataset will be discussed in the next subsection):

- 1) Redefine Function Item “Questioning” and “Requesting”;
- 2) Merging Function Item “Eliciting” and Item “Questioning” into one as Item “Questioning”;

- 3) Deleting Function Item “Justifying” from Category “Initiating”;
- 4) Adding emerging Items:
 Function Item “Informing” in Category “Initiating”
 Function Item “Repeating” in Category “Responding”
- 5) Revising definitions of Function Items (underlined with **Bold font**)

The adapted taxonomy of language functions was presented as a codebook of analysis in Appendix G. Once both the descriptive aspect analysis and the language function analysis were completed, data report was then generated and presented in Chapter 5 Section 5.3.1.

Zoom

Zoom is a video conference platform and becomes prevalent in areas of education and business since the outbreak of COVID-19 pandemic. Similar procedures of interaction analysis were undertaken within Zoom oral interaction dataset (Figure 7).

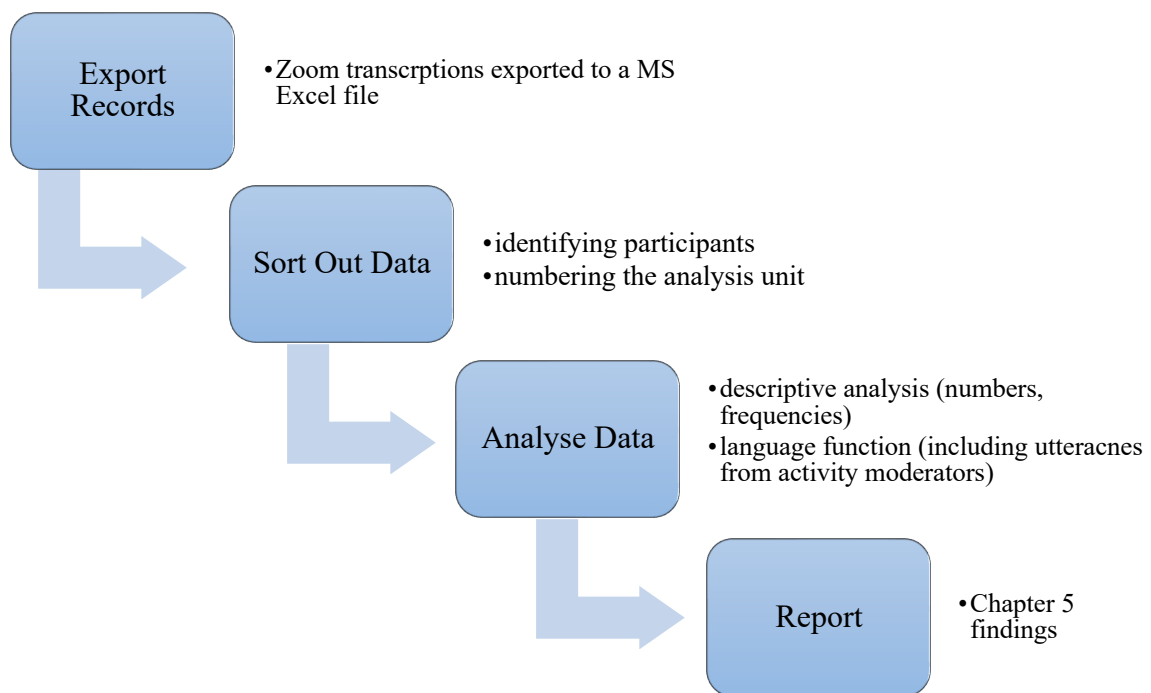


Figure 7. Procedures for conversation analysis on Zoom.

Unlike chat logs on Padlet, the smallest analysing unit in Zoom conversations was changed to *Utterance*, which is a piece of speech containing either a simple word or several lines of sentences. In addition, every utterance can be easily identified to a specific interlocutor with the assistance of visual and audio in Zoom. Therefore, the transcriptions of Zoom interactions were firstly imported into a *Microsoft Excel* file following with the

sequence of interactions by each participant. Participants were then anonymised with the same identifier in other datasets. Utterances were numbered before analysing. Table 10 was used as a template for the descriptive analysis of Zoom interactions in Cycle 2. It is worth noting that the responsibility of activity moderators (including teachers) was changed since many Irish participants logged into Zoom through their teacher's laptop with the restriction of the physical space in the classroom. It would be valuable to investigate utterances and purposes of languages from activity moderators while analysing oral interactions among student participants. Therefore, the number of utterances produced by activity moderators and its language function analysis were included.

	Zoom Session 1		Zoom Session 2	
Number of UTTERANCES by the whole group				
Number of UTTERANCES by Irish students				
Number of UTTERANCES by Chinese native students				
Number of UTTERANCES by the Teacher/Moderator				
Number of UTTERANCES fully in <u>Chinese or translanguaging</u> certainly by Irish students				

Table 10. Descriptive analysis template of Zoom interactions.

In addition, the analysis of Zoom interactions shared the same codebook of language functions (refer to Appendix G) but included two emerging functions (*Informing* and *Repeating*). The concept of turn-allocation was introduced and was deployed in the Zoom conversation analysis process. Full report of Zoom interaction analysis results will be presented in Chapter 5 Section 5.3.2.

3.6.3. Summary

The mixture of quantitative and qualitative datasets requires mixed method data analysis approaches. This section described the full procedure of quantitative data analysis dealing with questionnaires through a descriptive perspective. Since qualitative data plays a crucial role in this study, two different analysing approaches were deployed. The deductive thematic analysis was involved to find out latent themes behind interview data while conversation analysis was selected to investigate interactions facilitated by each CMC tools.

3.7. Ethics Considerations and Approval

As this research recruited adolescent students who are under 18 years of age from secondary schools, ethics concerns must be fully considered and prioritised prior to onsite interventions in classes. Recruitment for this study was voluntary for all participating schools

in each cycle. In both cycles, only after securing consent from both school principals and class teachers to conduct the study would a clear introduction be given to the possible student participants of this project. The nature of study, study phases and the duration of participation in this study were orally introduced in an understandable language to adolescent students. Both study information sheet and consent form to students were considered to be easily readable to young teenagers (see Appendix H). The full process of participants recruitment is listed in Figure 8.

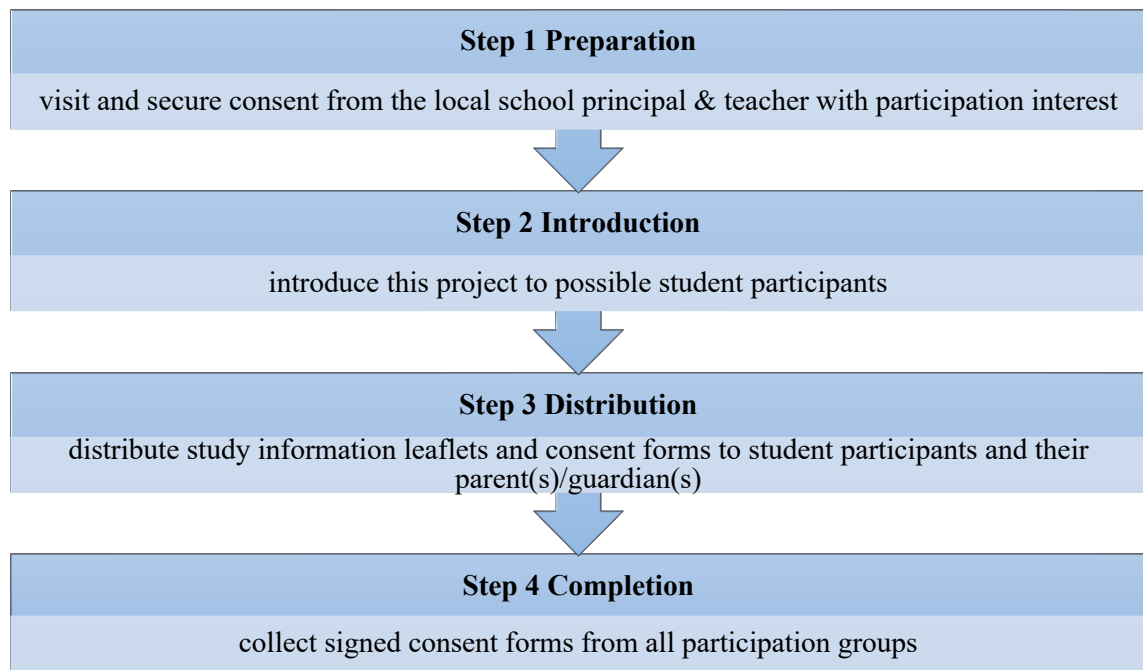


Figure 8. Participant recruitment process in this study.

Additionally, in line with General Data Protection Regulation (GDPR) regulations, all data collections were arranged at school, during school hours and at a time suited the participants and that did not cause any disruptions to their formal studies. All data were pseudonymised for the duration of the intervention phase and would subsequently be fully and irrevocably anonymised. All participants were clearly informed that their participation was voluntary. They can withdraw from the study anytime during data collection and until the data is fully anonymised without giving a reason.

3.8. Chapter Summary

This chapter started with outlining research questions involved in this study. In light of the complexity of study processes, mixed methods research was selected to be the most appropriate methodology to look after both qualitative and quantitative data. This chapter then moved on to explicitly describe the methodological approach DBR through providing

its definitions, key goals and characteristics, advantages and disadvantages, as well as comparisons with action research. The selected research instruments were outlined and explained in the context of this doctoral study (refer to Section 3.5). The mixture of both quantitative and qualitative data required two different analysis approaches in this study, which were explained in this Section 3.6. In addition, the ethical considerations were addressed (refer to Section 3.7). Lastly, the limitations of this study were discussed. The next chapter will delve into the iterative design of this research by addressing both pedagogical and technological considerations in two cycles.

4. Chapter 4 Iterative Pedagogical Design and Intervention Implementation

4.1. Chapter Introduction

The previous chapter presented the methodological principles and choices which guided this doctoral study. This chapter aims to present the iterative design of the entire doctoral project. In line with DBR principles, this study took the form of an iterative design process, which encompasses two DBR cycles. Cycle 1 focused on analysing the state of the art and assessing the feasibility of activity interventions as well as technological tools within the class setting in Ireland. The second iteration of interventions was informed and optimised based on Cycle 1 results. Given that a variety of technological tools and pedagogical tasks deployed in each cycle, it is important to justify the choices of technology and task before delving into each iteration. Therefore, Section 4.1 looks into the selection criteria and considerations about technological tools. Section 4.2 investigates pedagogical choices and designs involved. Section 4.3 presents Cycle 1 procedures. It is crucial to bear in mind that Cycle 1 findings will be presented in the subsection of Cycle 1 evaluation (refer to Section 4.3.4) instead of being in the conventional findings chapter, considering that the design and implementation of Cycle 2 are shaped by Cycle 1 evaluation. Cycle 2 procedures are then presented in Section 4.4. A summary of this chapter will be placed in Section 4.5.

4.2. Justification of Technological Choices

The affordance of technology in CFL has been addressed in Section 2.4.1.5. It is paramount to ensure that the technological tool(s) utilised in the study is the most appropriate and can effectively achieve pedagogical design goals. Therefore, a selection process of comparing available technological tools was conducted in both cycles. This section sets out to introduce the criteria of selecting technological tools (refer to Section 4.2.1) and its selection process (refer to Section 4.2.2).

4.2.1. Selection Criteria of Technological Tools

The selection of technological tools was cautiously processed based on the criteria of technology *efficiency, privacy and security concerns* as well as *financial cost*. Details can be found below.

4.2.1.1. Effective Multimodal Communication

The common modes integrated in CMC tools are text, audio, video, and the combination of these three (Chun, 2016; Mahdi, 2014). Recently, images and emojis attract some research interests among scholars (Sunaoka, 2016; Wang & Blackwell, 2015). To enhance participants' interactive experience, digital platforms which support multimodal communications would be considered. Another concern for including multimodal tools is given due to the elementary Chinese language proficiency among recruited participants. The various modes allow participants to flexibly express themselves without anxiety of using Chinese language. More importantly, it will help keep adolescents motivated during communicative activities if the selected tools are akin to social media.

In addition, the feature of Chinese language output display in characters requires technological support of character fonts among selected tools. From the perspectives of users, the selected technology should be easy to navigate especially for the young generation with a minimum effort of being familiar with each available function. In the meantime, technological platforms would need to include the possibility of interactive and collaborative learning among users (either group or dyad). Moreover, the powerful accessibility of technological tools in different mobile devices (phones, tablets, PCs, laptops) will increase feasibilities in and out of school time.

4.2.1.2. Privacy and Security Concerns

Considering the potential participants' age is under 18 years old, security and data protection concerns primarily are given while selecting technology tools. Firstly, the included tools should have closed accesses which are only available to engaged adolescents. This will also increase the level of security to avoid inappropriate disruptions from unknown users. Secondly, the selection of technological applications should be in line with the internet acceptable use policy in local schools from both countries. Schools usually establish firewalls to monitor and control networks regarding internet safety concerns. However, due to firewall issues, it may exclude some potential powerful digital applications.

4.2.1.3. Financial Considerations

This study seeks to develop task designs with technological affordances which can be easily reduplicated in other secondary schools in Ireland. Therefore, low/zero cost of purchasing technological tools will dispel financial concerns among schools and teachers in

practice. Additionally, it will help promote designs of this study among schools and benefit more CFL learners in Ireland.

4.2.2. Selection Process of Technological Tools

In accordance with the selection criteria listed above, fourteen technological tools were included for the first round of evaluation. They were roughly categorised into Artefact Creation, Videoconferencing Platform and Social Media Platform. One more tool was selected for Cycle 2 because of additional needs and constraints arising from Cycle 1 Table 11 summarises comparisons among these 15 tools and the adaptability of each tool is evaluated.

Tool	Multi-modes	Collaborations	Character Font	Privacy and Security	Free	Output format / Categorisation
Cycle 1						
Adobe Spark	√ (except audio)	x	√	√	√	Visual content /Artefact Creation
Soundtrap	x	√	x	√	√	Audio content /Artefact Creation
MS Photos	√	x	√	√	√	Visual content /Artefact Creation
iMovie	√	x	√	√	√	Visual content /Artefact Creation
Explain Everything	√	√	√/x	√	√	Audio and visual content /Artefact Creation
Flipgrid	√	x	√	√	√	Visual content /Artefact Creation
BunCee	√	x	√	√	√	Audio and visual content /Artefact Creation
Google Classroom	√	√	√	√/x (not available in China)	√	Audio and visual content /Artefact Creation
MS Teams	√	√	√	√/x (restricted access in China)	√	Audio and visual content / Videoconferencing Platform
Zoom	√	√	√	√ (no registration required)	√	Audio and visual content / Videoconferencing Platform
GoToMeeting	√	√	√	√	x	Audio and visual content / Videoconferencing Platform
Skype	√	√	√	√ (registration required)	√	Audio and visual content / Videoconferencing Platform

Tool	Multi-modes	Collaborations	Character Font	Privacy and Security	Free	Output format / Categorisation
Cycle 1						
Padlet	√	√	√	√	√	Audio and visual content / Social Media Platform
WeChat	√	x	√	√/x (new account verification difficulty)	√	Audio and visual content / Social Media Platform
Cycle 2						
Book Creator	√	√	√	√	√	eBook /Artefact Creation

Table 11. Comparison and evaluation of technological tools.

After the comparison of 15 technological tools, Zoom and Padlet fulfil all criteria in both countries. Since the initial idea is to create synchronous online exchange opportunities, Padlet was initially selected to be integrated in the Zoom meeting sessions instead of being separately utilised in Cycle 1. Nevertheless, feedback received from Cycle 1 participants (both students and their teacher) suggested that collaborative learning activities and warm-up text-based conversations would be recommended prior to having a visual telecollaboration meeting. Given that Book Creator and Padlet fulfilled all criteria and easily navigate for young students, they were utilised along with Zoom in the Cycle 2 study. Figure 9 lists technological tools utilised in this research.

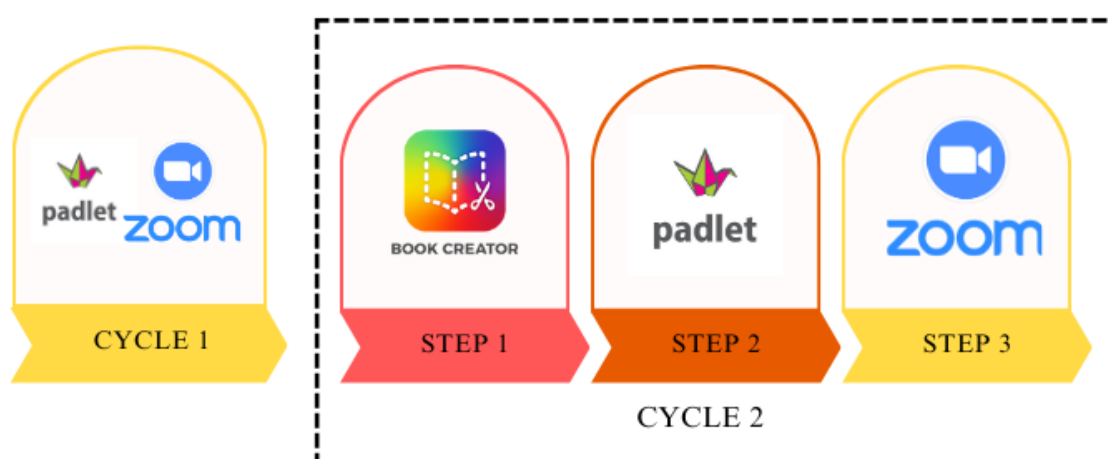


Figure 9. Selected technological tools in this study.

4.2.3. *Summary*

In summary, the selection of technological tools complies with four main considerations: effective multimodal communications available within tools, privacy protection in line with school internet security policy, low/no financial cost of purchasing tools. In practice, it is worth considering that with the advent of more available technological choices in the market, tools can be disused or replaced with advanced ones. Nevertheless, the key selection criteria should be set based on students' learning needs and telecollaborative activities requirements.

4.3. **Pedagogical Choices and Designs**

The initial idea of Cycle 1 intervention was to invite students to collaboratively create a learning artefact with their telecollaboration partners. However, due to the closure of schools during the Covid-19 pandemic and the short period of telecollaboration communication in Cycle 1, the implementation of collaboration learning with native Chinese teenagers was unsuccessful. Given that the language proficiency level of Chinese language is generally elementary among Irish participants, the first principle of designing telecollaborative tasks is focusing on information exchange. Considering young learners of Chinese language in Ireland face a shortage of authentic and pragmatic communicative opportunities in and out of school (refer to Section 1.1), the second principle of designing tasks is grounded in meaningful language usage among Irish students themselves as well as between Irish students and native Chinese teenagers.

4.3.1. *Telecollaboration Design: Information Exchange Task*

According to O'Dowd and Ware (2009), information exchange tasks refer to communicative activities where learners provide “telecollaborative partners with information about their personal biographies, local schools or towns or aspects of their home cultures” (p. 175). This type of tasks can be placed not only between telecollaborative partners but also within regular language classes took place in school. The goal of information exchange tasks for regular language classes is to enhance students understanding of each other and build up an internal relationship within class. In addition, information exchange tasks can play as an introductory activity to break ice between telecollaborative partners who have not met or known each other very well (O'Dowd & Ware, 2009).

In this study, the design of telecollaborative activities is categorised into information exchange task within groups given the time restrictions of telecollaboration as well as the Chinese language knowledge among Irish adolescent learners. Information exchange tasks

can be found across all telecollaboration sessions mediated by either asynchronous/quasi-synchronous CMC tool (Padlet) or synchronous CMC tool (Zoom). Full details of implementing information exchange activities will be illustrated in each iteration process, where Cycle 1 is in Section 4.4 and Cycle 2 is in Section 4.5.

4.3.1.1. Task Sequences

After two cycles of telecollaboration learning, feedback received from participating students and teachers confirmed that task sequences played an important role in communications with native Chinese teenagers (refer to Section 5.4.2.3). An optimised task sequence has been evaluated in Cycle 2 as a feasible and efficient way in the telecollaborative language learning especially to learners with limited language knowledge, to start with collaboration and learning artefact creation activities within the classroom (refer to Section 4.2.2) and then move on to text-based communicative opportunities and culminating in videoconferencing meetings. Collaboration among Irish students within the Chinese language class will be introduced in the upcoming section.

4.3.2. Bridge 21 Learning Model and Key Characteristics

The failure of Cycle 1 collaboration learning with native Chinese teenagers suggested more scaffolding is needed for young Irish learners of Chinese prior to telecollaboration. Given that project-based collaboration learning is recommended as a format of Class-Based Assessment in Irish secondary schools (refer to Section 1.1),

An eBook activity was selected in alignment with Bridge 21 learning model design protocols for Cycle 2 participating schools. This section will address key features of the Bridge 21 learning model and then exclusively present the implementation of eBook activity in Cycle 2 (refer to Section 4.3.2.1).

The Bridge 21 learning model is student-centred, which involves the following elements: technology-mediated, project-based, goal-oriented, social learning environment, learning space and reflection. This model addresses a shift from teacher-centred to student-led which aims to create a collaborative learning atmosphere for learners (Byrne et al., 2019; Lawlor et al., 2018; Sullivan et al., 2015). As mentioned above, project-based learning as an essential element of Bridge 21 model not only requires collaborative teamwork but also establishes an open and loose space for students to take control of the learning process, being responsible to themselves and to other team members (Lawlor et al., 2018). To date, the Bridge 21 model has been deployed in a wide range of post-primary school contexts in

Ireland across a range of curriculum areas including some European languages learning through Erasmus+ programmes (Byrne et al., 2019). However, Chinese as a curriculum specification at post-primary schools in Ireland has not been either investigated in depth or been integrated with Bridge 21 model (Wang et al., 2022). Therefore, this doctoral study considered integrating Bridge 21 learning model into the intervention. The full stages of Bridge 21 activity model are shown in Figure 10.

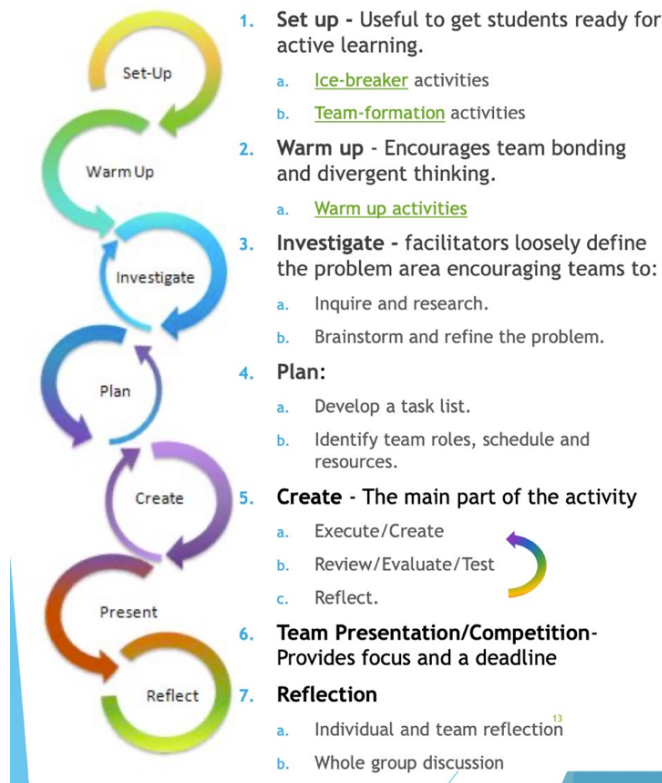


Figure 10. Bridge 21 activity model (*Bridge21 Introductory Handbook for Teachers*, 2016, p. 13).

4.3.2.1. Collaborative Activity: EBook and Implementation Stages

The primary goal of collaborative tasks within class is to utilise and share Chinese language knowledge with classmates in a meaningful and interactive way. The second goal is to get students ready for further telecollaborative communications with native Chinese teenagers. The format of collaborative tasks can vary in terms of students' language proficiency, such as designing and presenting a poster, short video, eBook, storytelling etc. Cycle 2 adapted the Bridge 21 learning model and selected Book Creator as the technological tool for an eBook creating activity. It is important to note that Book Creator has potentials to be utilised as a CMC tool among learners in telecollaboration activities. However, considering the dual goals of incorporating collaborative tasks within the Chinese language

class and the specific scenarios of eBook implementation in Cycle 2, this eBook activity does not represent a typical example of the CMC activity. In alignment with Bridge 21 model design protocols, the design of this eBook activity integrates the original seven stages into four stages (see Figure 11). Detailed procedures for this eBook activity will be presented in Section 4.4.2.2 when discussing Cycle 2 procedures.

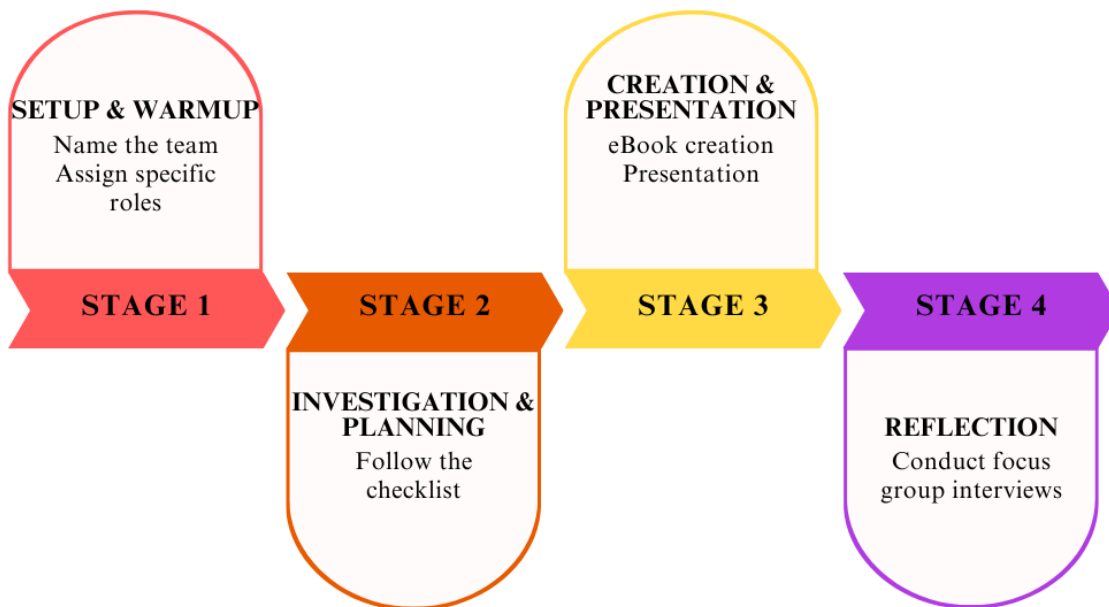


Figure 11. EBook activity phase flow.

4.3.2.2. Summary

In summary, the flexibility in the Irish post-primary school curriculum for Chinese allows Chinese language teachers to adapt innovative teaching and learning methods, such as the Bridge 21 learning model, into the classroom. Bridge 21 learning model has great pedagogical potentials to be embedded into different types of group activities, such as video editing, poster design, for both JC Chinese short course as well as cross-disciplines subjects which benefits students in different ways. The adapted stages of Bridge 21 learning model in this study assisted participants with focusing on collaboratively creating an eBook that showcased previous learning outputs in an interactive way. The requirement of reflection on teamwork and learning outcomes not only afforded students' learning process getting productive but also provided activity moderators with insights on the improvements of activity design. Furthermore, it is crucial to clarify responsibilities among student in order to improving work efficacy. Additionally, the group size should be under a manageable number. Pair work as well as small group are recommended in practice.

4.4. Cycle 1 Procedures

Previous sections have justified both the choices of technological tools (Book Creator, Padlet, Zoom) utilised in this research and the reasons for selecting eBook activity as well as information exchange activities in telecollaboration communications. This section delves into Cycle 1 procedures, illustrated by following the DBR iterative process: problem identification, initial design, pilot implementation, and evaluation (see Figure 12 for phase flow). Overall, there were twelve Irish students of learning Chinese and one teacher involved in Cycle 1 pilot study from February to March 2021 (four weeks).

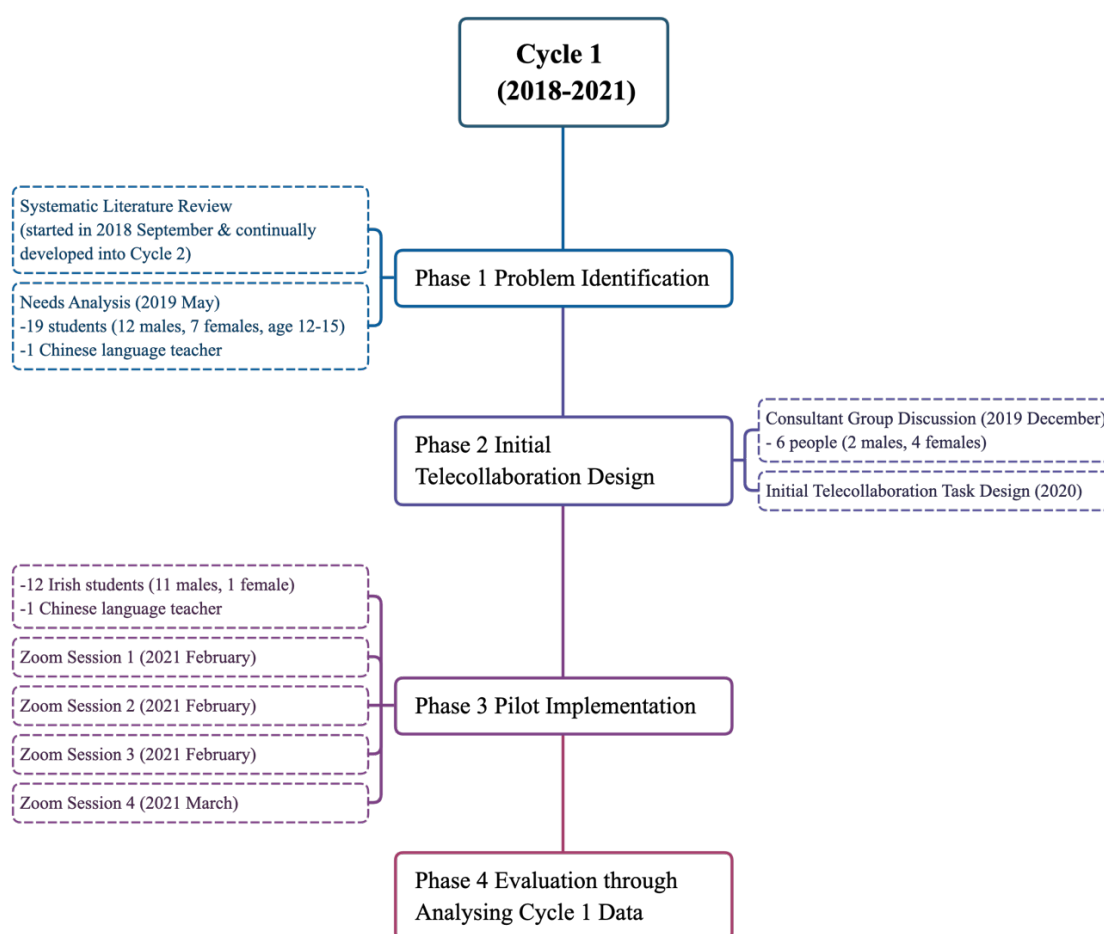


Figure 12. An overview of Cycle 1 procedures.

4.4.1. Phase 1 Problem Identification

This initial phase consisted of two activities: 1) a systematic literature review on the use of CMC tools in the field of CFL learning, and 2) a needs analysis with a cohort of JC students and their Chinese language teacher.

4.4.1.1. Systematic Review

The systematic review was initiated at the beginning of the doctoral program and continued into the early stage of Cycle 2. Overall, this systematic review analysed 71 research papers published between 2008 and early 2022, with detailed discussions of the key findings presented in Chapter 2 Section 2.4.1.

4.4.1.2. Needs Analysis

Additionally, a needs analysis was carried out to identify the primary needs of Irish young learners of Chinese. A group of 19 students (12 males, 7 females, age 12-15) studying Chinese in a secondary school in Dublin and their Chinese teacher were selected using an opportunistic sampling method. The student needs analysis was conducted in a workshop format to facilitate comprehensive discussions. It consisted of three sections (refer to Appendix I): a think-pair-share activity to identify the most important and interesting aspects of learning Chinese, a three-step interview on their experiences to date of learning Chinese and a focus group interview.

Additionally, the teacher needs analysis included a semi-structured interview with open-ended questions. The interview questions (Appendix J) were designed to explore expectations from students, meaningful communication task design, and the use of technology in the Chinese language class.

Impacts on choices of technological tools and task design

Overall, the needs analysis identified meaningful communication opportunities as the stakeholders' primary need. In the Irish post-primary context, young learners start as zero beginners and the only scenario for speaking Chinese is within the classroom setting. This limited exposure to authentic Chinese language contexts and communication opportunities have been restricted young cohorts of learners of Chinese from a meaningful communicative environment. In addition, the participating students expressed high motivation to learn Chinese and a strong desire to use the language for communicative purposes. They emphasised the importance of having opportunities to communicate with native Chinese speakers, particularly with the support of technology. Furthermore, their interest in engaging with China, through interactions with native speakers, was also reflected in their fascination with Chinese culture. Chinese culture was highlighted as the most desirable aspect of their learning experience.

Additionally, the participating teacher indicated that technology applications in the Chinese language class primarily focused on vocabulary development and accurate oral

language showcase. However, it is important to note that the school context, where much of the school and classroom communication is mediated through technology using tools such as MS Teams and OneNote, offers great potential to leverage technology and provide his students with opportunities for meaningful language use. As highlighted by Levy and Stockwell (2006), it is crucial to consider the effects of the computer on communication as well as on the communication partners involved. In a context where CMC is the norm for school communication, it can be further developed based on existing cross-linguistic digital communicative competence to support the development of language skills.

4.4.2. Phase 2 Initial Telecollaboration Design

To get a better understanding of Chinese teaching in the Irish secondary context and to hear different voices from various backgrounds regarding telecollaboration learning, Phase 2 consisted of one consultation activity prior to telecollaboration design.

4.4.2.1. Consultation Activity

Six individuals were invited to participate in a temporary educational consultation group with the objective of initiating basic principles of telecollaborative activity design.

Overview of the consultation group members

The group included one officer from the Irish foreign language learning policy-making group, who provided valuable insights and guidance regarding policy implications for telecollaborative activity design. Additionally, there was one Irish Chinese language teacher who brought practical teaching experience and a deep understanding of the specific needs and challenges faced by Irish students learning Chinese. Furthermore, two native Chinese language teachers, with expertise in teaching Chinese as a foreign language (CFL) and providing cultural insights, were also part of the group. The author and her supervisor formed the researcher group and served as facilitators for this consultation activity.

Procedures

This consulting activity took place in Zoom and utilised an online collaborative tool called Miro. The activity consisted of two steps to facilitate the consultation process. Firstly, consultants were asked to prioritize the requirements for Chinese language teaching in Irish secondary school based on their work experience. Secondly, consultants were invited to identify any specific concerns and suggest technology tools relevant to Chinese language teaching for Irish adolescent learners.

When the consultation activity finished, the participating researchers categorised the thoughts into different themes and incorporated them into the design of Cycle 1

telecollaborative tasks. The categorised themes derived from the consultation activity are illustrated in Appendix K.

Impacts on choices of technological tools and task design

With regard to specific concerns about adolescent learners of Chinese language and available technological tools choices, five themes were addressed by the consultation group:

- 1) task types
- 2) feasible technological tools and platforms in school;
- 3) communicative opportunities;
- 4) learning resources;
- 5) assessment for learning and self-direction.

Overall, themes 2), 3), 4) and 5) highlighted shared common concerns regarding the criteria of technology selection (as addressed in Section 4.2.1). Specifically, Theme 2) addressed considerations related to both financial aspects and security measures. Theme 3) focused on the criterion of technology efficiency. Themes 4) and 5) pertained to the reusability of learning resources generated through CMC tools. Given the consultation suggestions and technology selection criteria, Zoom and Padlet were selected as appropriate technological tools deployed in the first iteration.

Additionally, collaborative tasks received significant attention and in-depth discussions both in this educational consultation group and in the literature (refer to Section 2.4.2). Therefore, collaboratively creating learning artefacts was included in Cycle 1 telecollaboration task design. Moreover, according to the consultant group, it is important to note that translanguaging may serve as a means to increase learners' confidence by allowing them to communicate in both their native language and the target language.

4.4.3. Phase 3 Pilot Telecollaboration Implementation

It is important to note that the Covid-19 pandemic significantly impacted the whole PhD project. Telecollaboration in Cycle 1 took place during the closure of Irish secondary schools in spring 2021. The implementation of Cycle 1 telecollaboration project will be demonstrated in this subsection. It will firstly introduce background information about participants. The implementation of telecollaboration tasks will be then addressed.

4.4.3.1. Participants Information

The same group of Irish participants from Cycle 1 needs analysis went forward to Cycle 1 telecollaboration implementation phase. However, 12 out of 19 students and their

parents gave consent to data collection and analysis. The demographic information of Cycle 1 Irish participants can be found in Table 12.

In terms of Chinese language proficiency, a self-assessment grid (see Appendix L) was adapted from three resources: Common European Framework of Reference for Languages (CEFR) self-assessment grid, CEFR Collated Representative Samples of Descriptors for Young Learners (*Collated representative samples of descriptors of language competences developed for young learners aged 11-15 years: resource for educators*, 2016) as well as European Benchmarking Chinese Language (Lu & Song, 2017).

Irish Participants and Coding	12 students (11 males, 1 female, age 13-15) • Coding: C1-S01 to C1-S12 (C1 refers to Cycle 1; S is the abbreviation of the school's name) • CEFR Pre-A1 to A1 1 Chinese language teacher (male, under the pseudonym of Adam)
Duration	4 weeks
Research instruments	Intercultural sensitivity scale survey Reflective feedback
Data analysis	Descriptive analysis Thematic analysis

Table 12. Cycle 1 procedures with Irish participants' demographic information.

Table 13 indicates the basic information about native Chinese teenagers who were invited to be Irish participants' language partners. However, since the focus of this study was on Irish participants, native Chinese teenagers was excluded from data analysis.

Chinese Participants	11 students (2 male, 9 female, age 13-15) 2 English language teachers
English Language Proficiency	CEFR A1 to A2

Table 13. Cycle 1 native Chinese teenagers' demographic information.

4.4.3.2. Telecollaboration Activities Implementation

Cycle 1 comprised four synchronous telecollaborative sessions within four weeks in Spring 2021. In addition, A brief training session about Zoom was given by the researcher to native Chinese teenagers prior to videoconferencing with Irish participating students. Week 1 was organised with activities to break the ice among participants. Week 2 included one more ice-breaking activity and collaborative tasks which aimed to set up the group for the following collaboration task. However, participating teachers suggested terminating the

collaboration task of creating a learning artefact in the following two sessions as many barriers prevented students from completion (such as language mismatch, scaffolding deficiencies, sound distractions, pandemic panic, etc). Week 3 was adjusted to provide a relaxing communication environment by playing games and singing songs. Week 4 ended up with a farewell party where students learn new year wishes from peers in both languages. Full details of Cycle 1 Zoom activities can be found in Table 14.

Session 1 Welcome, meet your language fellows		
Duration	50 minutes	
Technological approach	Padlet and Zoom	
Pedagogical approach	Information exchange tasks (Ice-breaking and warm-up)	
Activity 1	Scavenger Hunt with colours	Ask students to find and display objects that match the colour in front of the camera.
Activity 2	Two likes and one dislike	- Give three simple statements about students themselves with two likes and one dislike. - Irish students are encouraged to say them in Chinese, but English is acceptable if they feel more comfortable.
Activity 3	Three commons within the group	- A team of 4-6 students (Irish and Chinese) is allocated to the Breakout Room in Zoom. - A question pool is given in both languages on Padlet. - Each student asks one question to others in the target language they are learning. Answering with the target language is preferable. - Find three commons in the group and post them on Padlet.
Activity 4	Name your team	Give your team a fancy name if you have time left.
Session 2 Team up		
Duration	50 minutes	
Technological approach	Zoom and its Breakout rooms	
Pedagogical approach	Information exchange task (ice-breaking) Collaborative task	
Activity 1	Who are you?	Students continue to introduce themselves to their partners.
Activity 2	Set up team	Collaborative task
Activity 3	Pick up topics	
Session 3 Game for fun		
Duration	50 minutes	
Technological approach	Zoom and Padlet	
Pedagogical approach	Information exchange task	
Activity 1	Paper fortune teller	
Activity 2	Sing songs	
Session 4 Farwell party		
Duration	50 minutes	

Technological approach	Zoom and Padlet	
Pedagogical approach	Information exchange task (Ice-breaking) Language element peer learning	
Activity 1	Rock paper scissors	
Activity 2	New year wishes	• Match 5 wishes to the correct Chinese translations. • Teach wishes in English to your Chinese buddies. • Teach wishes in Chinese to your Irish buddies. • Express your wishes to your buddies.

Table 14. An overview of Cycle 1 Zoom activity.

4.4.4. Phase 4 Cycle 1 Evaluation (Key Findings of Cycle 1)

The evaluation of Cycle 1 telecollaboration relied on analysing two data sources: participants' responses to intercultural sensitivity survey and their reflective feedback. Given that the design and implementation of Cycle 2 are influenced by the evaluation of Cycle 1, it is appropriate to present the Cycle 1 findings in this section rather than in the conventional findings chapter.

4.4.4.1. Intercultural Sensitivity Scale (ISS) Results

Copies of ISS (Appendix C) were distributed to Irish participants after finishing Cycle 1 telecollaborative sessions. Seven completed surveys were received and included in the data analysis. The descriptive statistics results of ISS are presented in Table 15.

		Interaction Engagement	Interaction Enjoyment	Respect for Cultural Differences	Interaction Confidence	Interaction Attentiveness
N	Valid	7	7	7	7	7
Mean		2.24	3.76	3.19	2.43	2.24
Std. Deviation		.65	1.37	.80	.62	.69
Minimum		1.00	1.00	1.50	1.40	1.00
Maximum		3.00	5.00	3.83	3.00	3.00

Table 15. Cycle 1 descriptive statistics of ISS items.

According to Table 15, the highest average score in Factor *Interaction Enjoyment* (3.76) implied that Irish learners enjoyed communicating with native speakers through telecollaborations. However, Cycle 1 Irish participants were more negative about the actual

interaction engagement with native speakers along with low averages of *Interaction Engagement* and *Interaction Attentiveness* ($M=2.24$). This result can be explained by the fact that one participant had very negative responses to this survey. This issue of skewing results was distinct in Cycle 1 ISS responses and this in turn reflected on the low averages of factors: *interaction engagement*, *interaction confidence* and *interaction attentiveness*. Besides, there may have been other factors at play including short telecollaboration duration, technological issues, and participants' limited Chinese proficiency.

4.4.4.2. Reflective Feedback

With the restriction of the outbreak of Covid-19, the focus group interview was replaced by an online survey in Cycle 1 to collect Irish participants' thoughts and telecollaboration learning experience. Ten open-ended reflective questions were designed and distributed to Irish participants (see Appendix M). The aim of analysing participants' feedback was to optimise Cycle 2 telecollaboration designs and enhance participants' engagement experience. Finally, ten responses were received and synthesised into four aspects: *development of Chinese language competence and intercultural awareness*, *changes in communication confidence*, *challenges and difficulties*, and *suggestions* for future telecollaboration activities.

Development of Chinese language competence and intercultural awareness

In terms of Chinese language competence development, the majority gave positive feedback (9 out of 10). Three responses appreciated peer learning experience with Chinese language partners. Two participants reported the sheet of questions in English and Chinese/Pinyin language afforded them to raise some questions to Chinese language partners.

"Overall, I found it very useful in improving my Chinese language grammar skills, as well as speaking and interacting with people from different cultural backgrounds. I found the Padlet and Zoom to be very helpful tools during the Chinese activities". C1-S10

"I found that we had fluent Chinese speakers it was helpful that if we made any mistakes we could ask for help". C1-S08

"I found being able to ask the Chinese students for help when its needed really helpful and educating". C1-S12

"The sheet that was used with the questions in English and Chinese". C1-S11

In terms of intercultural awareness, three specific topics attracted Irish participants' attention and interests: school life in China, food comparison between China and Western countries, Chinese New Year customs. 6 out of 10 responses demonstrated that with the help of technological tools (Zoom and Padlet), they were able to meet different people by asking and answering questions about which they were concerned under a very challenging COVID-19 situation. One respondent found that games played in both countries made him realise they shared some similarities with Chinese culture.

"I think that when the Chinese students were answering our questions in the breakout rooms it helped me understand more about Chinese cultural awareness". C1-S07

"I found that speaking to people that live in China help us get more awareness of Chinese cultural". C1-S08

"the Zoom meeting it was fun to see other people than the normal class as you can't go out due to current times". C1-S12

Changes in communication confidence

It is interesting that although the mean of Factor *Interaction Confidence* in ISS was low ($M=2.43$, refer to Table 15), most Irish participants (7 out of 10) were positive in their reflection that they became more confidence after interacting with Chinese language partners (see quotes from Student C1-S10 and C1-S12).

"I am a lot more confident now as if I made a mistake in the zoom calls the Chinese students would help me". C1-S12

"a bit more confident in speaking Chinese". C1-S10

Challenges and difficulties of implementing telecollaborations

In terms of challenges and difficulties, three out of ten participants mentioned the limited Chinese language knowledge (see quotes from Student C1-S05 and C1-S06) prevented them from communicating with Chinese students in Chinese language. Half number of participants demonstrated that technological issues bothered them during telecollaborations, such as internet quality (see the quote from Student C1-S02), failure in registering WeChat (see the below quote from Student C1-S07) which stopped them to continue connections with Chinese partners out of school time. One participant emphasised that the anxiety caused by telecollaborations made him less confident which in turn he negatively evaluated this project in all feedback questions.

“Pronunciation”. C1-S05

“not knowing enough Chinese”. C1-S06

“Internet quality”. C1-S02

“The biggest object was connecting to the WeChat”. C1-S07

Suggestions

As for suggestions, some participants suggested randomised group assignment with the equal number of students from both sides as it would increase opportunities to chat to different Chinese partners. One student suggested concentrating more on Padlet activities, which was akin to the response from the participated Chinese language teacher who suggested “try to just focus on one thing for maybe two calls”. This correspondence identified an issue that activities in four Zoom sessions became a heavy burden for both students and their teacher. It suggested that the design and implementation of telecollaborative activities needs to be as much feasible as possible to create a more actively interactive environment for students.

Some respondents reported that more scaffolding and language assistance from the teacher would help the conversation with Chinese students. In addition, one response indicated that he would like to have freedom to choose the language in communications. Another participant (C1-S02) suggested “better things to do” which could be interpreted as doing activities with more playful elements from the understanding of the author.

4.4.4.3. Summary

In summary, despite the limited number of participants in Cycle 1, our telecollaboration experiment seems to have provided an enjoyable and authentic environment for Irish adolescent learners. In addition, the duration was too short to see any major impacts on things such as ISS and language knowledge development. The disconnection between Cycle 1 needs analysis pre-telecollaboration (Wang et al., 2019) and post- telecollaboration results demonstrates that learners probably underestimated the challenge of engaging with native speakers, which would suggest that more scaffolding and preparation are required for beginner learners before and during telecollaborations. Given the limited class time of Chinese language in school and students’ language proficiency, the introduction of collaborative work facilitated by tech tools and the freedom of choosing the language are taken into consideration in the Cycle 2 activity design.

4.4.5. Review and Revision for Cycle 2

Cycle 1 played a significant role in examining affordances and limitations of telecollaboration activities and technologies in the Irish secondary school setting. The following section will review and discuss the pedagogical design, technology and data instruments utilised in Cycle 1. In addition, a series of project revision considerations will be summarised in Section 4.4.6.

4.4.5.1. Pedagogical Design and Technological Tools

In order to proceed to the next iteration Cycle 2, necessary adjustments in pedagogical design were demanded. According to feedback from Cycle 1 Irish students and their Chinese language teacher, sufficient scaffoldings are required prior to the first telecollaboration. Therefore, an eBook creating activity among Irish students within Chinese classes was selected as a scaffolding activity prior to telecollaboration sessions in Cycle 2. Consequently, it was decided that a suitable eBook design tool was required. Since Book Creator fulfilled all the technology selection criteria and it was selected as the most appropriate ICT platform to proceed within Cycle 2. However, the eBook activity implemented in this study, while incorporating elements of digital communication, should be understood as distinct from typical CMC activities. In addition, given that Padlet well assisted Zoom sessions in Cycle 1, the dominant role is given to Padlet which will work as a text-based chat platform to help connect students between Ireland and China in and out of class. Moreover, since cultural topics attracted Irish young learners' interest, the topic design of information exchange tasks inclined towards this aspect in Cycle 2.

4.4.5.2. Research Instruments

In terms of data instruments, several research issues had arisen from Cycle 1. Because Cycle 1 had taken place during the Covid-19 pandemic while schools were closed in Ireland, it was challenging to invite Irish students to attend focus group interviews, instead, an online closed-access survey which included ten open-ended questions was distributed to participants in Cycle 1. However, one of the pitfalls related to the questionnaire inevitably impacted on the depth and quality of the feedback from student participants. Therefore, focus group interviews were highly recommended to be included in data collection instruments of Cycle 2. Despite the short duration of the telecollaborative interventions, the design of conducting pre and post motivation and intercultural sensitivity surveys may tell potential affective differences before and after the telecollaboration.

4.4.6. Summary

In summary, the review of Cycle 1 highlights several points which should be included in Cycle 2: 1) an eBook collaboration activity facilitated by Book Creator within the Chinese language class; 2) taking full advantage of Padlet as a transition activity between eBook and Zoom videoconferences; 3) focus group interview and the design of pre and post surveys. Given that, the design of Cycle 2 is correspondently undertaken. The next section sets out to overview Cycle 2.

4.5. Cycle 2 Procedures

The previous section introduced the initial DBR cycle procedures. The primary findings of Cycle 1 suggested the need for adjustments to improve participants' telecollaboration experience in Cycle 2. Based on Cycle 1 evaluation results, Cycle 2 was formed with four phases: intervention design, implementation in two schools, evaluation, telecollaboration design principles and implementation issues (see Figure 13 for phase flow). Overall, there were thirty-three Irish students of learning Chinese and two teachers involved in Cycle 2 conducted between November 2021 and February 2022.

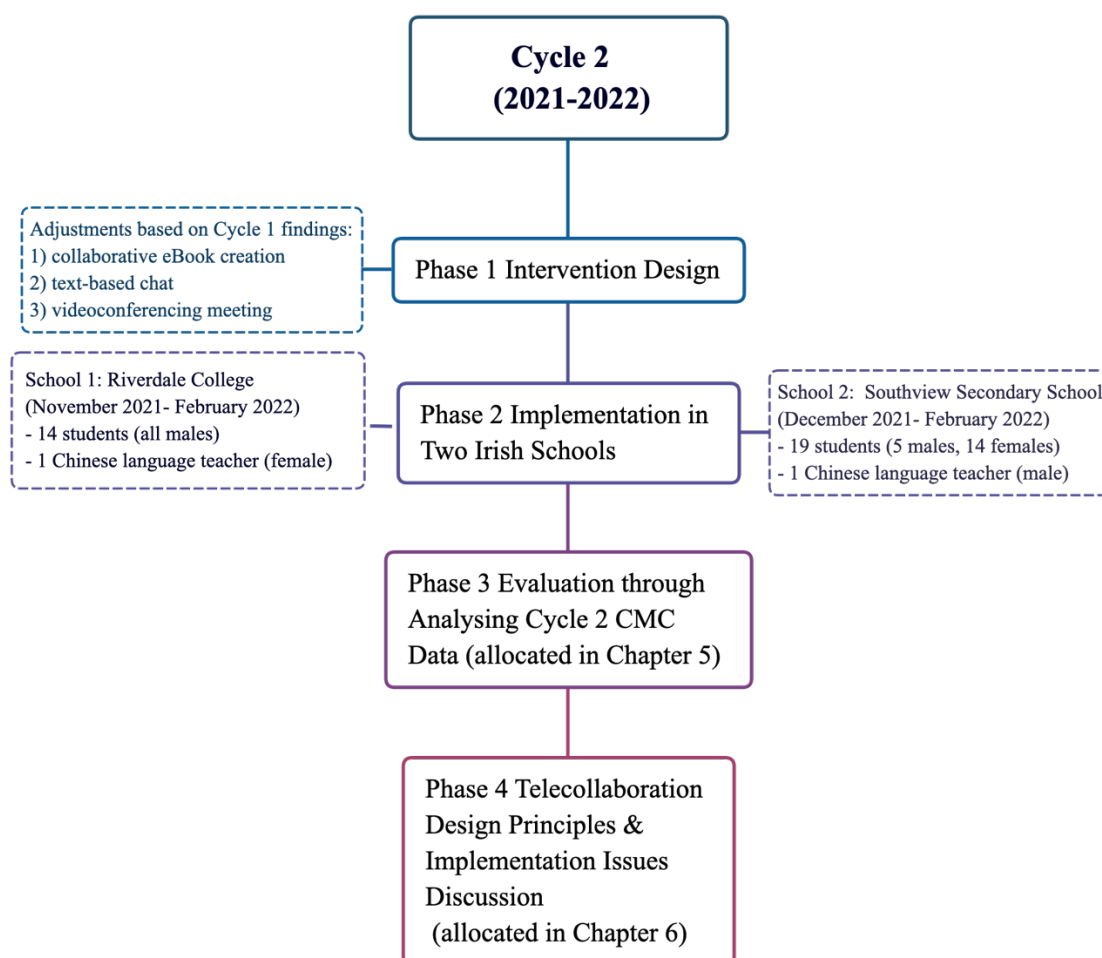


Figure 13. An overview of DBR Cycle 2 procedures.

This section will focus on the first two phases of Cycle 2 project (refer to Figure 13). It will firstly overview the demographic information about participants involved in Cycle 2. The detail of Cycle 2 activities will then be reported. Phase 3 involves analysing both quantitative and qualitative datasets of Cycle 2 (refer to Chapter 0). The discussion of Cycle 2 findings and task design will be detailed in Chapter 0.

4.5.1. Phase 1 Intervention Design

According to feedback from Cycle 1 Irish students and their Chinese language teacher, sufficient scaffolding is required prior to the first telecollaboration. Therefore, an optimised task sequence was introduced in the second iteration, starting with an eBook creation activity among Irish students within Chinese classes and then progressing to text-based communicative opportunities (Padlet chat), culminating in videoconferencing meetings (Zoom meeting). The information exchange task was the core of Cycle 2 telecollaboration activity design. The rational of selecting information exchange tasks can be found in Section 4.3.1.

In addition, an informal online form (refer to Appendix M) was distributed to participants prior to telecollaboration to collect information about participants (name, age, gender, hobbies, favourite subjects at school as well as favourite books/movies). That information would help activity moderators with group assignments for the following telecollaboration activities. Students who have similar interests were allocated in the same group in order to enhance the possibility of improving gender balance, interaction quality and conversation depth. Moreover, another consideration was given to maximise the opportunities for Irish adolescents to use Chinese language in an authentic online communicative context in relation to topics with which they are familiar. Therefore, topics relevant to students' daily life were included in Padlet sessions. In the meantime, there are no constraints on language choices, which enable students from both sides freely and flexibly use either English or Chinese to continue their conversations. A discussion about festivals can be considered when it comes across festive seasons. For instance, a topic of Chinese New Year was included in a Padlet chat session in Cycle 2 because of its occurrence in early February.

Details of Cycle 2 intervention implementation will be specified in the upcoming section 4.5.2.

4.5.2. Phase 2 Implementation in Two Schools

Cycle 2 was carried out when students returned to schools under mandatory requirements for face masks from winter 2021 to spring 2022.

4.5.2.1. Participants Information

Thirty-three participants from two Irish schools voluntarily participated in Cycle 2 study. Participant's information can be found in Table 16. As Riverdale College is a secondary school for boys, all participants from this school were all males. Southview Secondary School continued to participate in Cycle 2 but a different group of students studying Chinese language was recruited to participate. Both Southview Secondary School and Riverdale College are technology-supported schools where students have individual technological devices to assist students' daily learning. As noted in Section 1.1, the class contact hours of Chinese language courses are limited in both schools. Students from Riverdale College have two classes (three class hours in total) per week while Southview Secondary school only has one class hour available every week for participants.

School Name	Riverdale College	Southview Secondary School
Irish Participants and Coding	14 (all males, age 14-15) • Coding: C2-R01 to C2-R14 (C2 refers to Cycle 2; R is the abbreviation of the school's name) • CEFR Pre-A1 to B1 1 Chinese language teacher (female, native Chinese, under the pseudonym of Bella)	19 (14 females, 5 males, age 13-15) • Coding: C2-S30 to C2-S48 • (C2 refers to Cycle 2; S is the abbreviation of the school's name) • CEFR Pre-A1 to A1 1 Chinese language teacher (male, Irish, under the pseudonym of Adam)
Duration	9 weeks	7 weeks
Research instruments	Pre- and post-questionnaires about Chinese language learning motivation and intercultural sensitivity scale Interviews Interaction records	
Data analysis	Descriptive analysis Thematic analysis Conversation analysis	

Table 16. Cycle 2 procedures with Irish participants' demographic information.

Table 17 displays background information about Cycle 2 participating native Chinese teenagers. Their English proficiency is aligned with CEFR, respectively ranging

from B1 to B2 in Sunrise International School (a pseudonym) and A2 to B1 in Seaside Education Group (a pseudonym).

School Name/Location	Sunrise International School/Beijing (partnered with Riverdale)	Seaside Education Group/Beijing (partnered with Southview)
Chinese Participants	10 (3 males, 7 females, age 15-16)	13 (4 males, 9 females, age 12-15)
English Language Proficiency	CEFR B1 to B2	CEFR A2 to B1

Table 17. Cycle 2 native Chinese teenagers' demographic information.

In terms of technological tools in Cycle 2, three distinct tools were selected: *Book Creator*, *Padlet* and *Zoom*. The selection criteria and process of technological tools were detailed in Section 4.2.

Furthermore, Table 18 provides an overview of the activity durations during Cycle 2 in the two participating schools. While the duration of each activity varied due to differences in school curriculum and course timetables, the internal differences in Zoom meeting time within each school were not significant. As a result, these meetings can be roughly considered equal in length for the purpose of observing and comparing changes in utterances across the schools over time. Full analysis results of interaction records will be presented in Section 5.3.

	Riverdale College/Dublin	Southview Secondary School/Dublin
eBook	4 weeks (Nov 2021-Jan 2022)	3 weeks (Dec 2021 – Jan 2022)
Padlet	3 weeks (Jan-Feb 2022) In-class: 20-30 minutes & out of class	2 weeks (Feb 2022) In-class: 10-20 minutes & out of class
Zoom	2 weeks (Feb 2022) - Zoom session 1: 17 minutes (separate Breakout rooms) - Zoom session 2: 13 minutes	2 weeks (Feb 2022) - Zoom session 1: 37 minutes - Zoom session 2: 35 minutes

Table 18. An overview of Cycle 2 project duration.

The following sections will provide detailed introductions about each activity implementation.

4.5.2.2. EBook Activity

Stage 1 Setup and warmup: Participating students were randomly assigned into three groups with three to five members in the first week. A checklist of creating an eBook

(Appendix N) contains the main learning steps of Bridge 21 model, whereas illustrates sub-tasks and outputs in each stage, was printed out and distributed to each group. Specifically, participants firstly were encouraged to name the team and assign specific roles (Team Leader, Note taker, Resource investigator, Proofreader) for the following stages. As this is a project-based learning activity, it is crucial for each member to understand their responsibility and take ownership of the learning artefact. The team leader is responsible for keeping the team on track and staying on the task itself. The note taker contributes to making a record of brainstorming ideas from every member. The resource investigator seeks appropriate visual and audio elements as a content editor. The proof-reader will check on the language input before the official eBook launch and presentation. It should be noted that every member can take more than one role if they are comfortable.

In addition, each team decided on page numbers as well as the eBook title. To assist participants with recalling previous linguistic knowledge and cultural contents, a pool of topics was listed on the eBook checklist. Students discussed and confirmed brief contents of their eBook by extending given topics in the process of brainstorming.

Students then were invited by the teacher to login into a closed-accessed digital library on Book Creator. A quick tutorial session was provided for students to navigate around Book Creator on their own. They became familiar with typing Chinese characters and Pinyin (Chinese pronunciation system), searching images, drawing, uploading photos as well as voice recordings. The arrangement of the tutorial session not only facilitated participants to familiarise themselves with the tech tool (Book Creator), but also opened the way for generating creative eBooks in the coming weeks.

Stage 2 Investigation and planning: At this stage, the whole team used the checklist received as a step-by-step handbook guidance. Along with determined topics in the first stage, students moved on to list the gist of eBook contents. This step empowered each team to concentrate on constructing contents and messages they would pass on to the audience at the later presentation stage. Additionally, the following storyboard sketch phase allowed each team to depict a rough version of the eBook ahead of contributing on Book Creator. According to feedback from participants, they demonstrated this eBook checklist was handy and helpful in a way to generate creative ideas.

Stage 3 Creation and Presentation: Followed with Stage 2, every member started to contribute to the allocated page by inserting language structures as well as illustrations. With the affordances of Book Creator, participants can use their own iPad device to seamlessly collaborate on the same eBook without interruptions. In the final week of this activity, each

team was invited to co-present their book in front of other classmates. To attract the audience's attention, two questions were given by the presenting group to challenge the rest of their classmates. This not only increased attention among other students while one group presenting the book, but also created an active and engaged interactive environment.

Stage 4 Reflection: A focus group interview was respectively conducted to invite participants from both schools to recall the whole process of the eBook activity and freely talk about their experiences including challenges encountered during the activity. Reflections results were synthesised and represented in Chapter 5 Section 5.2.1.1 and Section 5.4.

4.5.2.3. Text-based Chat on Padlet

Padlet is a real-time collaborative web platform which provides a group of people (either dyads or multiusers) with a closed access to ensure the interactive quality among participants. A brief introduction of Padlet chat topics and activity instructions is set as Table 19 below.

Topic Name	Objectives	Activity Instructions	Notes
Topic 1: meet your pals on Padlet	- To break ice - To get to know each other	1) Use your real/nickname if choosing to register a Padlet account. No one can guess who you are if you are anonymous on Padlet. 2) Don't be shy to ask your pals if you want to know some words either in Chinese or in English. I bet you all are good helpers! 3) Afraid of missing your pals' questions? You won't. You can always check them by scrolling down the page. 4) To save the space, you can answer each other by using 'add comment' button under each post!	A blank activity table is in Appendix O.

Topic Name	Objectives	Activity Instructions	Notes
Topic 2: myself, my country and its culture	- To obtain more personal information and prepare for online meeting - To glimpse cultural stereotypes	1) You could start with introducing yourself a bit more on likes/dislikes, your English/Chinese language learning tips (obviously, your pals want to improve themselves on the target language) and future career plan. 2) Let's move on to national culture discussions- myths, history, architecture, cultural relic, food, drink etc. 3) Type any stereotypes you have heard about your pal's country/their culture and check the word file to find out the definition of cultural stereotypes.	
Topic 3: festive carnivals	- To showcase celebration activities both in China and Ireland - To introduce and discuss other festivals from both countries	1) The celebration of Chinese New Year is approaching both in China and Ireland! So, feel free to post any photos/dishes/traditions you have seen recently in your city/family. 2) Introduce and discuss other festivals/holidays you have in your home country? For example, Lantern Festival, Easter Holiday, St. Patrick's Day, Dragon Boat Festival..... What do you do in that specific festival? Is there any history/story behind?	

Table 19. A brief introduction of Padlet chat activities.

To increase the participation rate, students are asked to fill a blank activity table posted on Padlet (see Appendix O) after they received relevant information from language partners.

4.5.2.4. Online Meeting in Zoom

Taking into account time restrictions, there were four videoconferencing sessions in Cycle 1 while two Zoom meetings were carried out in Cycle 2. The details of Cycle 2 Zoom activities can be found in Table 20.

Zoom Session	Riverdale College		Southview Secondary School	
	Activity Name	Objectives	Activity Name	Objectives
Session 1	1) This is Me 2) New year wishes 3) Favourite holidays and festivals	- To find out pals; - To learn language expressions about new year wishes from Chinese pals; - To exchange information and expand cultural understandings of festivals in both countries.	1) One like and one dislike 2) School life in Ireland/China 3) Q&A	- To get to know each other and break the ice; - To understand commonalities and differences about school life in both countries; - To know other perspectives of each other and cultures through asking and answering questions.
Session 2	1) Explore Ireland and China on Padlet 2) Q&A	- To visually introduce places in front of others; - To broaden understandings through geographic maps and images. - To know other perspectives of each other and cultures through asking and answering questions.	1) Ice breaking activity 2) Explore Ireland and China on Padlet 3) Q&A	- To build up confidence in speaking Chinese language; - To visually introduce places in front of others; - To broaden understandings through geographic maps and images. - To know other perspectives of each other and cultures through asking and answering questions.

Table 20. An overview of Cycle 2 Zoom activities.

4.5.3. Phase 3 Cycle 2 Evaluation

The evaluation of Cycle 2 is derived from analysing three data sources: participants' responses to questionnaires, interviews, and interaction records, which form the main body of the research findings in Chapter 5.

4.5.4. Phase 4 Telecollaboration Design Principles

With the support of distinct research focuses on each cycle, design principles of telecollaboration activities can be fully addressed and understood within the Irish educational context (refer to Chapter 0).

4.5.5. Summary

This larger-scale Cycle 2 study aims to emphasise telecollaboration evaluation and the establishment of design principles. An optimised task sequence was introduced in Cycle 2 to test its feasibility and efficiency in telecollaborative language learning, particularly for learners with limited language knowledge. This sequence begins with collaboration and learning artifact creation activities within the classroom, progresses to text-based communicative opportunities, and culminates in videoconferencing meetings.

4.6. Chapter Summary

This chapter has presented two iterative cycles of DBR design details involved in this study. It firstly introduced both pedagogical approach and technological approach. The procedures of both iterations were then outlined with participants demographic details. Cycle 1 is a pilot that aims to evaluate the feasibility of implementing telecollaboration within the class, while Cycle 2 on a larger scale which is optimised based on the findings from Cycle 1. The key findings of Cycle 2 will be reported as the main research outputs in the next chapter.

5. Chapter 5 Findings

In the previous chapter, the research design has been outlined, which included a discussion on the pedagogical approach, technological approach and the details of two DBR cycle designs. Building upon that, this chapter presents the key findings of the second DBR cycle which used a mixed-methods approach that combines multiple research instruments, including questionnaires, interviews, and records of interactions (refer to Table 6 for details on the research instruments). The quantitative data obtained from the pre- and post-questionnaires, measuring Chinese language motivation and intercultural sensitivity scale, will be discussed in Section 5.1. The main results related to the qualitative analysis of the interviews, categorised by participant groups, will be presented in Section 5.2, while the analysis of the interaction records from Padlet and Zoom will be addressed in Section 5.3. Finally, Section 5.4 will exclusively present the synthesised reflections on challenges and difficulties in this study.

5.1. Questionnaires

In Cycle 2, two types of questionnaires were used: the Chinese language learning motivation questionnaire and the intercultural sensitivity scale (see Section 3.5.1 for more details). This section will firstly present the results of the Chinese language learning motivation questionnaire (pre and post) in Section 5.1.1. Following that, the results of the intercultural sensitivity Scale (pre and post) will be outlined in Section 5.1.2. A summary of the entire section can be found in Section 5.1.3.

5.1.1. Chinese Language Learning Motivation

The motivation questionnaire consisted of ten 5-point Likert-scale questions (Appendix B). A pre and post questionnaire design was employed to investigate potential changes in Chinese language learning motivation among Irish students (see Chapter 3 Section 3.5.1.1). A total of 32 completed responses were received for both the pre and post surveys.

This section will present the descriptive results of both the pre and post Chinese learning motivation surveys (refer to Section 5.1.1.1). A comparison analysis with the previous research (Carson et al., 2019) is set out in Section 5.1.1.2. The results of paired *t*-

tests to determine the statistical significance of the differences in scores between the pre and post motivation results will be presented in Section 5.1.1.3.

5.1.1.1. Descriptive Characteristics

Overall students were positively disposed to the learning of Chinese with quite high mean scores across all variables in both pre and post survey. In the pre survey, the majority demonstrated that they had a relatively strong integrative motivation to learn Chinese for interacting with Chinese-speaking people (Question 1) as illustrated by the high proportion of positive and very positive responses (yellow and blue colours) in Figure 14. Additionally, nearly two thirds of students were satisfied with Chinese course instruction (Question 5) prior to introducing telecollaboration learning opportunities. In terms of motivation intensity (Q7), the most favourable response to motivation intensity (Question 7, blue colour) was “very positive” among participants would suggest that over half participants evaluated themselves as a hard-working student of Chinese.

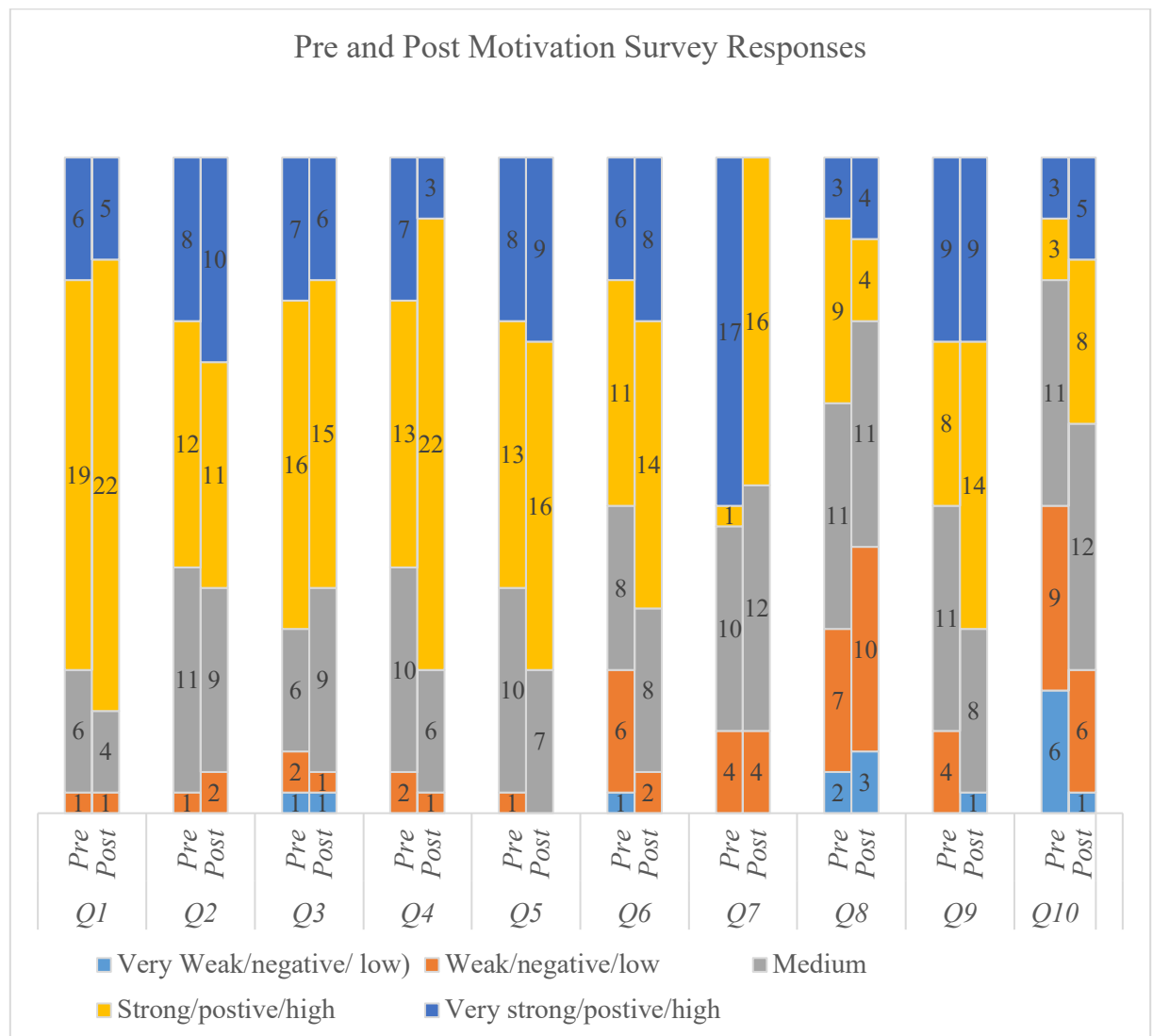


Figure 14. Cycle 2 responses to motivation surveys about learning Chinese.

As regards the post-survey, the proportion of responses in yellow colour illustrated in Figure 14 presented that most students (22 out of 32) reported “strong” motivation for both integrative motivation (Question 1) and attitude toward learning Chinese (Question 4) after the telecollaboration experience. This is consistent with the pre telecollaboration scores which characterized participants remained a relatively high learning motivation in this Chinese course. The favourable response to the desire for Chinese learning (Question 3, highlighted in yellow) further corroborated this trend among participants. In terms of motivation intensity (Question 7), the number of answering “very high” was dramatically reduced comparing to the pre-survey. Additionally, most participants responded “high” in this regard, suggesting a slightly decreased intensity (from very high to high) in effort to study Chinese.

As illustrated in Table 21, the most two positive values of the pre-survey were in relation to Question 1 Integrative motivation ($Mean = 3.94$) and Question 5 Attitude toward Chinese instruction ($Mean = 3.88$). These results suggested that the participants showed strong motivation and positive attitudes toward learning Chinese language. Although the lowest mean score was related to Chinese course anxiety ($M = 2.62$ in Question 10), it suggested that Irish participants did not feel very stressed while studying Chinese at school. However, participants reported a relatively higher anxiety level of using Chinese ($M = 3.13$ in Question 8). It is apparent that Irish participants had concerns about speaking Chinese with others out of class time. In summary, Irish students were largely positive about learning Chinese and had low anxiety levels about learning and using Chinese prior to the telecollaboration experience.

	Pre-survey scores		Post-survey scores	
	Mean	SD	Mean	SD
1. Integrative motivation	3.94	0.716	3.97	0.647
2. Interest in language learning	3.84	0.847	3.91	0.928
3. Desire to learn Chinese	3.81	0.965	3.77	0.907
4. Attitude toward learning Chinese	3.78	0.870	3.84	0.628
5. Attitude toward Chinese instruction	3.88	0.833	4.06	0.716
6. Practical purpose of learning Chinese	3.47	1.107	3.87	0.871
7. Motivation intensity	3.42	0.708	3.37	0.707
8. Chinese use anxiety	3.13	1.070	2.87	1.157

9. Attitude toward Chinese course	3.69	1.030	3.94	0.914
10. Chinese course anxiety	2.62	1.185	3.31	1.061

Table 21. Descriptive statistics of pre and post motivation results for Cycle 2 (n=32).

In addition, the most positive value regards participants' attitude toward Chinese teaching ($M = 4.06$, Question 5) after telecollaboration in the descriptive Table 21 would suggest that participants appreciated the introduction of telecollaboration learning approach into classroom. The lowest mean score of Chinese use anxiety ($M = 2.87$, Question 8) suggested some positive impacts from the telecollaboration project experience were recognized among participants and they to a certain extent became more confident in using Chinese in the course of telecollaboration activities. In addition, the high mean score of attitudes toward learning Chinese ($M = 3.94$, Question 9) suggested that this telecollaboration intervention aroused Irish students' interest in studying this course. However, the challenges of interacting with native speakers also brought them with a higher anxiety in relation to the Chinese course ($M = 3.31$, Question 10) comparing to the pre motivation survey. The rising trend in Chinese course anxiety may be correlated with a decrease in the mean score related to motivation intensity ($M = 3.37$). Participants might have overestimated their committed time to studying the Chinese language before this project, as communication difficulties with their language partners made them realize the need for more study time to overcome their limitations in Chinese language proficiency. In summary, most participants appreciated the opportunity of interacting with native Chinese in the class time. The telecollaboration intervention played a positive role in developing participants' confidence in using Chinese in and out of school.

Overall, values were stable between pre and post surveys with a slight upward trend across many variables but marginal negative changes in motivation intensity scores and overall desire to learn Chinese. In addition, even though the anxiety level in relation to the Chinese course ($M = 3.31$, Question 10) increased in the post survey, students' attitude toward this Chinese course positively grew ($M = 3.94$, Question 9) after the telecollaboration. Furthermore, the high motivation to interact with Chinese speaking people (Question 1) and positive interest in learning language (Question 2) may contribute to keep students remaining a relative strong motivation in studying this Chinese course.

5.1.1.2. Comparisons with Carson et al. (2019)

The above section presented the descriptive characteristics of Chinese language motivation before and after the telecollaboration intervention. This project adapted the motivation scale from Carson et al. (2019) (refer to Section 3.5.1.1). Given that both studies were conducted in the Irish context, it is valuable to compare the differences in results between this study and Carson et al. (2019). Consequently, a linear transformation was performed in SPSS, which the 5-point Likert scale was converted to a 7-point Likert scale.

As illustrated in Table 22, overall participants recruited in this study reported stronger motivations and higher positive attitudes toward learning Chinese with high mean scores across most variables in both pre and post surveys comparing to participants' scores in Carson et al. (2019). However, participants seemed more anxious about using Chinese in this Chinese course in both pre and post results (refer to Question 8 and 10), compared to participants in Carson et al. (2019). Additionally, although the mean scores in relation to Interest in language learning (Question 2), Practical purpose of learning Chinese (Question 6), Motivation Intensity (Question 7) and Attitude toward Chinese course (Question 9) in pre-survey were lower than participants' scores in Carson et al. (2019), the mean scores of the above questions increased and exceeded Carson et al. (2019) after students had telecollaboration learning experience.

	Pre-survey scores		Post-survey scores		Carson et al. (2019)	
	Mean	SD	Mean	SD	Mean	SD
1. Integrative motivation	5.41	1.073	5.45	0.970	4.59	1.472
2. Interest in language learning	5.27	1.270	5.36	1.393	5.29	1.292
3. Desire to learn Chinese	5.22	1.448	5.15	1.360	4.9	1.704
4. Attitude toward learning Chinese	5.17	1.305	5.27	0.942	5.12	1.605
5. Attitude toward Chinese instruction	5.31	1.249	5.59	1.073	4.97	1.623
6. Practical purpose of learning Chinese	4.7	1.660	5.31	1.306	4.85	1.579
7. Motivation intensity	4.63	1.063	4.56	1.061	4.68	1.305
8. Chinese use anxiety	4.19	1.605	3.81	1.736	3.7	1.568
9. Attitude toward Chinese course	5.03	1.545	5.41	1.370	5.18	1.510
10. Chinese course anxiety	3.44	1.777	4.47	1.591	3.31	1.620

Table 22. Comparisons of descriptive statistics between this Study (n=32) and Carson et al. (2019) (n=94).

Furthermore, the low standard deviations across the majority variables in both pre and post survey suggested that participants' responses were clustered to a medium to high positive attitude toward Chinese language and Chinese course. It is important to keep in mind that other factors such as limited sample size and different teaching approaches of Chinese language teachers in both studies could have influenced the results and should not be overlooked.

In summary, both pre and post results were broadly similar to results in Carson et al. (2019). However, participants demonstrated stronger learning motivation of learning Chinese in this study. The higher mean scores across anxiety variables in this study suggested that participants were slightly more conscious of interacting in Chinese than participants were in Carson et al. (2019)'s study.

5.1.1.3. Evaluations of Significant Differences

In the previous subsections, both descriptive statistics of this study and the comparisons with Carson et al. (2019) suggested a positive orientation of participants to the Chinese during telecollaboration learning. To assess any statistic differences between the pre and post questionnaire scores, a paired samples *t*-test was conducted on all variables and results were displayed in Table 23. Overall, although there was some variability between the pre and post results, the difference in scores was statistically significant for only two variables: Chinese course anxiety (Question 10) and Practical purpose of learning Chinese (Question 6).

In terms of Chinese course anxiety, there was a significant average difference between pre and post mean scores ($t(31)=2.247, p < 0.05$). On average, participants reported 0.69 point higher post mean score of Chinese course anxiety than its score in the pre survey (95% CI [0.063, 1.312]), which suggested that participants were more anxious about taking the Chinese language course after the telecollaboration. In addition, there was a statistically significant increase between pre and post *Practical purpose of learning Chinese* scores ($M = 0.41, SD = 0.875$), $t(31) = 2.627, p < 0.05$), which would suggest that participants' instrumental motivation (e.g. desire to learn in order to communicate with other family members or for future study) slightly increased after this telecollaboration project.

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	SD	SEM	95% Confidence Interval of the Difference				
				Lower	Upper			
1. Integrative motivation	0.03	.695	0.123	-0.219	0.282	0.254	31	0.801
2. Interest in language learning	0.06	.716	0.127	-0.196	0.321	0.494	31	0.625
3. Desire to learn Chinese	-0.05	.5730	0.101	-0.254	0.160	-0.463	31	0.647
4. Attitude toward learning Chinese	0.06	.840	0.148	-0.240	0.365	0.421	31	0.677
5. Attitude toward Chinese instruction	0.19	.896	0.158	-0.135	0.510	1.184	31	0.245
6. Practical purpose of learning Chinese	0.41	.875	0.155	0.091	0.722	2.627	31	0.013
7. Motivation intensity	-0.05	.6998	0.124	-0.299	0.205	-0.379	31	0.707
8. Chinese use anxiety	-0.25	1.814	0.321	-0.904	0.404	-0.780	31	0.442
9. Attitude toward Chinese course	0.25	.880	0.156	-0.067	0.567	1.607	31	0.118
10. Chinese course anxiety	0.69	1.731	0.306	0.063	1.312	2.247	31	0.032

Table 23. Paired samples test of pre and post Chinese language learning motivation (Post-Pre).

In summary, despite the short period of telecollaborations in Cycle 2, the descriptive results strongly suggested that Irish participants' motivation to interact with Chinese speaking people was high and slightly increased after the telecollaboration intervention. In addition, the results of the paired *t*-test would suggest although participants' motivation to use Chinese for practical purposes (instrumental motivation) increased, they became more anxious about the Chinese course after this telecollaboration project. Although participants highlighted the enjoyable aspect of interacting with Chinese teenagers in the focus group interview (refer to Section 3.5.2.1), the decrease in certain variables would suggest that the success of telecollaborations cannot be solely defined by the participation enjoyment, but must also consider other dimensions of evaluations

5.1.2. Intercultural Sensitivity Scale (ISS)

To evaluate the impact of telecollaboration learning experience on intercultural awareness among Irish students, the intercultural sensitivity scale was used in this study (full details refer to Section 3.5.1.2). There were respectively 29 responses to the pre-questionnaire of ISS and 32 responses to the post-questionnaire. This section is set out to present descriptive statistics of ISS survey results in Section 5.1.2.1. Section 5.1.2.2 will explore the potential relationships between the participants' intercultural sensitivity

following telecollaboration sessions (as dependent variables) and Chinese learning motivation (as an independent variable) through a linear regression analysis.

5.1.2.1. Descriptive Statistic Results

Overall, participants indicated a generally positive response to recognizing and respecting cultural differences across ISS five factors in the pre-ISS survey (as displayed in Table 24). The highest mean score of the *Respect Cultural Differences* factor ($Mean = 4.42$) suggested that the majority participants were willing to learn from their counterpart by keeping an open mind to embrace cultural diversity. Additionally, participants had previously experienced a relatively high level of enjoyment in interacting with individuals from diverse cultural backgrounds, as indicated by the positive mean score for the factor *Interaction Enjoyment* ($M = 4.11$). However, the lowest mean score was observed for the *Interaction Confidence* factor ($M = 3.56$), suggesting that many participants did not feel fully confident while communicating with their counterparts. This implied the need to enhance participants' confidence possibly by developing effective communication skills.

	Pre-survey scores (n=29)		Post-survey scores (n=32)	
	Mean	SD	Mean	SD
Interaction Engagement	3.98	0.374	3.96	0.535
Respect Cultural Differences	4.42	0.405	4.57	0.56
Interaction Confidence	3.56	0.732	3.58	0.652
Interaction Enjoyment	4.11	0.537	4.32	0.583
Interaction Attentiveness	3.62	0.469	3.53	0.58

Table 24. The pre- and post-survey descriptive statistics on the ISS.

In summary, before the study, participants had relatively high intercultural sensitivity as reflected in the positive mean scores. However, many participants felt occasional lack of confidence when communicating with individuals from different cultures, which highlighted the necessity of enhancing participants' communicative confidence in intercultural communication scenarios.

As for the post ISS survey (shown in Table 24), participants' ratings improved across three Factors while the other two Factors showed slight decreases compared to the pre-survey results. This suggested that participants reported positive growth in their responses related to *Respect Cultural Differences*, *Interaction Confidence* and *Interaction Enjoyment* factors. However, negative changes in participant responses to *Interaction Engagement* and *Interaction Attentiveness* required further attention. In addition, the most positive value in

relation to the *Respect for Cultural Differences* factor remained highest ($M = 4.57$) as it was in the pre-survey. This suggested that participants consistently demonstrated a strong inclination towards recognizing and respecting cultural differences throughout the study. It also highlighted the importance of fostering an environment that encourages the appreciation and acceptance of diverse cultures among young language learners. The lowest mean score for *Interaction Attentiveness* ($M = 3.53$) indicated that participants on average rated a moderate score when responding to items related to this factor in the survey. This would suggest that a potential area for improvement in participants' ability to effectively engage and attentively interact with individuals from different cultures during telecollaborative exchanges.

A paired t -test was employed to investigate potential changes in participants' intercultural sensitivity before and after engaging in the telecollaboration learning experience. However, the results indicated no statistically significant differences across all variables. This suggests that, on average, participants' scores remained relatively stable and consistent throughout the study. It is important to consider other factors such as the limited sample size and the relatively short duration of the telecollaboration, as these factors could have influenced the findings.

In summary, the highest mean score for the *Respect for Cultural Differences* factor remained consistently high throughout the study, indicating participants showed a strong inclination towards recognizing and respecting cultural differences. The increases of some mean scores in post-survey demonstrated a positive perception and impacts of telecollaboration learning among participants. However, it is necessary to give further attention to the negative shifts in relation to *Interaction Engagement* and *Interaction Attentiveness*. It would be valuable to further analyse and explore the reasons behind these changes, considering potential influences or contextual factors that might have contributed to the observed variations.

5.1.2.2. Linear Regression Analysis

To explore the relations between the participants' intercultural sensitivity following telecollaboration sessions (as dependent variables) and Chinese learning motivation, a linear regression analysis was conducted. According to Table 25, a significant regression equation was found ($F [1,30] = 7.802, p < 0.05$), with a R^2 of 0.206. It suggested that participants' motivation scores significantly predicted their intercultural sensitivity ($\beta = 0.454, p < 0.05$).

More specifically, there was a moderate positive correlation between the post scores on the motivation scale and the intercultural sensitivity scale.

Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.454 ^a	0.206	0.180	9.70156

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	734.363	1	734.363	7.802	.009 ^b
Residual	2823.605	30	94.120		
Total	3557.969	31			

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error				Lower Bound	Upper Bound
(Constant)	57.197	14.186		4.032	0.000	28.226	86.168
POST_SUM_Motivation	1.065	0.381	0.454	2.793	0.009	0.286	1.844

a. Dependent Variable: SUM_POST_ISS

b. Predictors: (Constant), POST_SUM_Motivation

Table 25. Linear regression model summary and coefficients.

In summary, there appears to be a statistically significant and positive relationship between the Chinese learning motivation and the participants' intercultural sensitivity scale.

5.1.3. Summary

This section presented the analysis of quantitative data focusing on participants' Chinese language learning motivation and intercultural sensitivity scale. Overall, the findings suggested that the telecollaboration intervention increased participants' motivation to interact with Chinese-speaking people and their motivation to use Chinese for practical

purposes. In addition, participants in this study demonstrated stronger learning motivation but also somewhat more consciousness of interacting in Chinese compared to the findings in Carson et al. (2019).

In terms of intercultural sensitivity scale, while participants showed a high level of intercultural sensitivity, there was a need to enhance their confidence in intercultural communication. The results highlighted the importance of respecting cultural differences and the positive impacts of telecollaboration. However, negative shifts in participant responses regarding interaction engagement and attentiveness required further investigation. The paired *t*-test indicated no significant differences in intercultural sensitivity before and after the telecollaboration, possibly influenced by factors such as sample size and the duration of the intervention. Lastly, there was a significant and positive relationship between Chinese learning motivation and participants' intercultural sensitivity. In the next section, a detailed report on participants' telecollaboration experience will be presented.

5.2. Interviews

As noted in Section 3.5.2, conducting interviews is often selected to supplement disadvantages of using questionnaires through probing in-depth dimensions regarding particular phenomena and viewpoints from participants. The results of interviews will be sorted by participant groups and presented following with the themes of the thematic analysis undertaken in this study. The key findings of focus group interviews from students will be firstly presented in Section 5.2.1. Perspectives of participating teachers will then be displayed in Section 5.2.2.

5.2.1. Focus Group Interview with Students

The focus group interviews were recorded, transcribed, and analysed as reported in Section 3.6.2.1. This section will present thematic analysis results according to each CMC activity involved in Cycle 2: eBook; Padlet chat; Zoom meeting.

5.2.1.1. eBook

Overall, the eBook played a significant role in developing participants' Chinese language knowledge. This activity process not only has strengthened their existing knowledge, but also enhanced accuracy in their Chinese character and Pinyin spelling. In addition, the activity requirement of teamwork increased participants' collaboration capability and improved their digital literacy skills.

Learning impact 1: linguistic development

The class hours of Chinese are limited in both participating schools (refer to Section 1.1 and Section 4.5.2). Consequently, students have had restricted access to utilize Chinese both in and out of school. Some students indicated that they had forgotten much of the vocabulary from the first year of studying Chinese, but the eBook activity offered students the opportunity to review the material from past.

“I think I remembered how to use a lot of vocabulary that I had forgotten since the first year.” C2-S45

“I think it has improved as I got a refresh on the vocab I had forgotten.” C2-S40

*“I think it has strengthened what I already know and reminded me of words I forgot.”
C2-R10*

While the primary purpose of the eBook activity was to review participants' prior knowledge of the Chinese language prior to telecollaboration sessions, it also provided an opportunity to enhance participants' proficiency in an important linguistic aspect of Chinese: characters. According to the feedback from students, the activity not only allowed them to practice spelling using Pinyin but also required them to type Pinyin and locate the correct characters from the keyboard suggestions while creating eBooks on Book Creator. Moreover, the eBook activity promoted flexible communication among team members, enabling them to express themselves more effectively.

“When we were making the book, it helped me understand Chinese characters better. When you translated the Pinyin into characters, you got more chances to memorise them as you needed to pick up them from keyboard results.” C2-R01

“Yes, I do, I feel I can recognize Chinese characters easier now.” C2-R47

“It was kind of easier to actually talk about stuff that I did daily, like how I wake up, when I go to school and when I do my homework and when I have dinner on the Book Creator, that was all you can do with that.” C2-R10

“I feel like Book Creator. You get to express yourself what you don't normally get to do in the classroom and get to talk about your likes and dislikes, more so than just learning (unintelligible) I have to communicate.” C2-R04

Briefly, participants emphasised the improvement of their Chinese Pinyin typing and consequently developed the accuracy of Chinese characters identification while doing eBook

activity. It also facilitated participants to flexibly express themselves with other team members.

Learning impact 2: peer collaborations

Participants appreciated the opportunities to work with classmates with whom they usually did not work in the class. The collaborative nature of teamwork acted as the cohesive force that accelerated students' motivation in both school (see interview excerpts displayed in Table 26). In addition, instead of one person shouldering all the work or having one person dedicated to the whole task, eBook activity requires equal work assignment among members in order to create a more cooperative and effective learning environment. Moreover, participants would need to search and filter online information about the topic they chose. The researcher role had to be taken by one or more team members in order to collect resources from websites. Many participants agreed that their research ability to some extent was enhanced during the eBook activity. Additionally, many students commented on the enjoyment and cooperation dimensions of the eBook activity which highlighted how working together had a positive impact on their learning experience.

Riverdale College	Southview Secondary School
<i>"Yes, because I had to research about different things to talk about and write it in Chinese." C2-R05</i> <i>I've also learned to work with my peers and create a beautiful book in Chinese and English with them." C2-R07</i> <i>"it was also fun to work with my peers to create a book that we all have a passion." C2-R10</i> <i>"It's fun to gather the information together. Yeah. Just like looking at all the sites and checking if they're reliable or not." C2-R14</i>	<i>"The Book Creator was funning experience cause we work together as a team." C2-S30</i> <i>"Cooperation, I think. We instead one person doing all the work, like one person just doing one job, we just got one page to like to do the vocabulary on. So more even split off, we work together." C2-S45</i> <i>"It was great that you work with the people you don't usually work with." C2-S46</i>

Table 26. Focus group interview excerpts from two participating schools (eBook).

In general, the positive and enjoyable collaboration setting not only maintained participants' motivation to learn Chinese, but also strengthened internal bonds among team members. In addition, participants reported that research skills, such as searching and

filtering online information, developed as well through co-designing an eBook with other classmates.

Mediation and affordances of Book Creator

The previous sub-section addressed the primary effects of collaboratively engaging in an eBook activity among participants. This subsection will focus on the mediating role of Book Creator through social and artefactual aspects as well as its affordances in this study. The analysis will unfold the nuanced ways in which Book Creator acts as a mediator, navigating the intersection of social interaction and digital artifacts.

Social mediation with peers

As discussed in Section 2.2, it is a truism in SLA that interacting with others influences language learning and development (Lantolf & Thorne, 2006; Swain et al., 2002; Swain & Lapkin, 2001; Vygotsky, 1978). Learning not only occurred within interactions between teachers and students (see Section 5.2.2.1 for teacher interviews), but also among students themselves when it comes to teamwork. Lantolf (2000) pointed out peers could support each other efficiently by using various strategies within the ZPD (refer to Section 2.2.3). In this study, the core feature of eBook activity design is collaboration, where learning is possibly mediated through peer interactions and negotiations during the activity. Irish participants reported that they learned about each other through the process of creating an eBook.

“I think that the Book Creator was pretty good as well because like you learn more vocabulary with people than your own. They might know some more than you know.” C2-S32 (echoed with other participants)

Overall, even if participants did not explicitly report the details of learning from other classmates, they valued the collaboration opportunity in the eBook activity and viewed teammates as More Knowledgeable Others on occasion. Groups which reached out the high level of collaborations completed the eBook work more efficiently reported by the participating teacher. However, the lack of collaboration observed among other groups hindered the progress of eBook work. This highlighted the importance of introducing and teaching effective collaboration techniques to the younger participants, enabling them to work more effectively as a team in future endeavours.

Artefact mediations

In terms of artefact mediation, students from the focus group interviews highlighted the eBook activity as a personalized learning experience facilitated by the technological tool.

Moreover, the impressive features integrated into the Book Creator were not only acknowledged by teachers but also recognized by students as a valuable resource as a continuous language learning e-portfolio folder. These powerful functions enabled participants to innovatively design and share ideas.

*“Every new information we learned, we can add on to the book that we already started it.
(echoed with others) It is like the folder.” C2-S30*

*“It (Book Creator) was so cool to keep track where you are. So you didn't forget or
skip.” C2-S41*

*“I will invite my first year students to start their eBook on Book Creator. They can create
pages and put new knowledge into eBook. I think it is a great idea to allow students to
accumulate what they have learned and review the eBook pages.” Teacher Bella*

In addition, Book Creator allowed participants to seamlessly work on the same content by using their own iPad device without interruptions (Wang et al., 2022). Hence, students flexibly expressed themselves during group discussions as well as presented personalised learning outcomes in the eBook artefact.

*“I've also learned how to express my activities and what I do on a daily basis to Book
Creator.” C2-R07*

*“I feel like Book Creator, you get to express yourself what you don't normally get to do in
the classroom and get to talk about your likes and dislikes, more so than just learning
(unintelligible) I have to communicate.” C2-S40*

In both participating schools, the main objective of the eBook activity was twofold: to review and reinforce Chinese language knowledge, and to prepare participants for upcoming telecollaborative interactions with native Chinese speakers. According to the feedback from the teacher in a later section, many students rarely feel excited in a traditional review class, however, Book Creator made the language review activity more enjoyable through working as a team.

In summary, participants highlighted the enhancement of their Chinese Pinyin typing skills and the improvement in accurately identifying Chinese characters during the eBook activity. On the one hand, the implementation of Book Creator transformed the language review activity into a more enjoyable and interactive experience by fostering teamwork. On the other hand, this eBook activity also facilitated flexible communication and expression

among team members. In addition, the positive and enjoyable collaborative environment not only sustained participants' motivation to learn Chinese but also fostered stronger individual connections among students. Additionally, they reported the development of research skills, such as searching and filtering online information while collaboratively design the eBook pages with classmates. Furthermore, participants expressed that the eBook activity provided a platform where they could store and access learning resources and materials for future practice.

5.2.1.2. Telecollaborations

The above subsection highlighted the impacts of eBook experience on Pinyin and character identification among participants. The following paragraphs will look at the impact of telecollaboration activities and the mediating roles of Padlet and Zoom.

Learning impact: intercultural communicative competence development

The concept of Intercultural Communicative Competence (ICC) encompasses various definitions, as discussed in Section 2.3. This study specifically look into the cognitive and affective aspects of ICC, namely intercultural sensitivity (refer to Section 2.3 and Section 5.1.2) and intercultural awareness (discussed in the subsequent paragraphs). Overall, the authenticity of telecollaborative communication afforded participants the opportunity to gain insights into the daily lives of Chinese teenagers. They exchanged information while exploring different topics such as food, hobbies, traveling as well as school life. Through the interactions on Padlet and Zoom, Irish participants concluded that there were many commonalities and similarities between Irish students and Chinese students.

“In fact, they like the same that we would like, and it just shows that like we are all the same people. It doesn't really matter.” C2-R10 (others reacted and agreed with this statement).

“It shows the commonality everyone else... I think it's just the commonality between nations in general and no matter where how far away we are. We all seem interconnected in these globalisations.” C2-R07

“I think it really shows that, you know, no matter how far away people are, you know, we're all kind of similar. We are not that different.” C2-R11

Some students demonstrated that they did not have many stereotypes of China and Chinese culture. On the contrary, they displayed a rather open and accepting attitude towards

the cultures of their interlocutors, as indicated by the high mean scores in the *Respect for Cultural Differences* factor of the intercultural sensitivity scale (refer to Section 5.1.2.1).

“Honestly, I didn’t have any pre assumptions. I just assumed they would be like similar to our life. I don’t really have the stereotypes that Asian and Chinese children, they usually get pressure on to get good grades, and play pianos that stereotypes.” C2-R10

The reasons behind this open-mindedness were noteworthy. It is speculated that: 1) Irish participants come from bilingual or multilingual backgrounds, may have contributed to this mindset as having started learning both Irish and English from primary school and being raised in multilingual family settings, they were exposed to diverse languages and cultures. 2) participants primarily focused on exchanging information during telecollaborative communications, which limited their opportunities for in-depth discussions on specific cultural phenomena or relevant topics. 3) The constraint of language proficiency also posed a barrier for Irish students to engaging in extensive conversations with their interlocutors.

In addition, as reported by Irish participants, telecollaborative communications enabled them not only to gain much authentic information, but also to start to establish friendship with Chinese teenagers.

“I would say there’s a lot of similarities which build up an internet friendship.” C2-R02

“We got to socialize with the other pupils from the other side of the world, they are also in high school. We use to talk to them and see what their interests are. It’s good to look like if you meet new people, not just from China or online. Just like anyone in general, you can talk to, improve your social skills.” C2-R14

“the Zoom call was fun, like meet other people.” C2-S45

In summary, by engaging in interactions on platforms such as Padlet and Zoom, Irish participants uncovered a multitude of shared experiences and resemblances between themselves and their Chinese counterparts. The reasons behind this open-mindedness were worth noting. Moreover, participants gained authentic and valuable information from Chinese teenagers during telecollaborative communications.

Mediation and affordances of Padlet and Zoom

Through the facilitation of Padlet and Zoom, telecollaboration activities provided Irish participants with a unique opportunity to share their experiences and delve into cultural differences with Chinese language partners. In the following subsection, we will explore the

diverse mediation and affordances that played a significant role in shaping these engaging telecollaboration experiences.

Social mediation: More Knowledgeable Others – Chinese native speakers

Given the limited proficiency in the Chinese language among Irish participants, their language partners from China played a vital role in expanding their understanding of Chinese culture and fostering intercultural awareness. For most of Irish participants, this is the first time to gain authentic insights into Chinese people and Chinese cultures. They particularly highlighted the intercultural aspect of their learning experience, attributing it to the guidance and mediation provided by their Chinese peers.

“It is good to learn about other culture. They were talking about places in China. I never heard any of them. So it is interesting.” C2-S30

“It (Padlet) was nice to learn about culture from other Chinese students.” C2-S47

Additionally, not only did Irish participants become familiar with Chinese teenagers’ school life and daily routine, but also they recognized the presence of commonalities and similarities they shared with Chinese teenagers. Participant C2-R07 and his cohorts highlighted that these shared commonalities fostered a sense of openness and reduced apprehension when it came to meeting new people.

“I would say there’s a lot of similarities which build up an internet friendship.” C2-R02

“I think it’s just the commonality between nations in general and no matter where how far away we are. We all seem interconnected in some sort of these globalization.” C2-R07

Artefact Mediation

In terms of artefact mediation in the telecollaborative communication, it includes interactions and outcomes mediated by tasks and technology. The affordances of activities and technology in turn assist individuals to achieve learning outcomes which might not be available in the face-to-face class environment. The different tools offer different affordances for learning. In the following subsections, technological affordances of Padlet and Zoom will be addressed in turn.

Technological Affordances of Padlet: Authenticity, Equity, Persistence

Overall, Padlet served as the first door open to Irish participants for authentic interactions with Chinese teenagers by offering a semi-synchronous yet interactive communication environment. Several students expressed positive feedback regarding the use

of Padlet as a communication tool. The cultural dimension of learning through Padlet was particularly emphasised by some participants. Furthermore, both students and teachers acknowledged the value of Padlet in enhancing Chinese typing skills during online messaging with native Chinese teenagers.

The communicative atmosphere fostered by Padlet was a pleasant and enjoyable experience in contrast to the passive information found on the internet or in textbooks. Additionally, Irish participants firstly discovered similarities in lifestyles with Chinese teenagers, but they soon realized the stark differences in school life in both countries. Therefore, the authenticity facilitated by Padlet embodies the development of intercultural awareness for Irish participants as it became more vivid and real for them to hear from native Chinese peers talking about school life and personal hobbies instead of obtaining from the textbook.

“I enjoyed it and I found it interesting to learn how different like school and cultures compares to ours.” C2-S41

“I like talking to them on Padlet. It was fun, kind like see what they like and what they didn't like, and if we have any similarity.” C2-S34.

In addition, the informal nature of conversations on Padlet made participants feel relaxed and encouraged them to actively participate in the interactions. Furthermore, two Irish students highlighted that the feature of text-based chat on Padlet provided them with valuable thinking time and allowed them to verify the accuracy of their language input during conversations.

“The Padlet is easier to speak cause you can kind of think about it and like not making a mistake. But when you are doing on Zoom call, it's like you are doing on the spot.” C2-S39

Furthermore, the interactive feature of Padlet conversations offered Irish students with equal opportunities to interact with their interlocutors with no interruptions which often arise in the group activity in a physical classroom setting.

“It (Padlet) was good cause everyone can contribute to it. So everyone at the same time could text or message each other.” C2-S30 (C2-S31 nodded and agreed)

In summary, Padlet played an important role in breaking the ice between participants from both sides. Authentic communication with natives on Padlet enabled Irish students to

cultivate intercultural awareness through critically reflecting on lifestyles and customs differences/similarities. Moreover, the relaxed and comfortable conversational atmosphere facilitated by Padlet allowed students to engage with their native peers even though they never meet in person before. Additionally, the feature of text-based chats on Padlet not only increased communication opportunities for students in a more equitable manner but also improved the quality of conversations as students had more time to react and compose their messages to their language partners.

Technological Affordances of Zoom – Visualization, Immediacy, Naturalness

Following their text-based chats on Padlet, participants in this study had the opportunity to engage in two consecutive Zoom meetings with native Chinese teenagers. Some students acknowledged the visual dimension of the tool, which enhanced naturalness and convenience of the conversations. In addition, participants valued the authentic interaction opportunities provided by Zoom, which made the exploration of Chinese cultures more enjoyable.

Apparently, visually meeting native speakers especially at the same age range brought the majority participants a great deal of excitement as it rarely happened in a regular language class at school. This reciprocal exchange allowed students to not only learn about the lives of teenagers from the other side of the world but also develop intercultural awareness by embracing and respecting cultural differences.

“I'd say the Zoom call was fun, like meet other people.” C2-S45

“It's fun to learn about new experiences that other people have across the world. You know, different cultures. Everything is very different and it's I find that very fun to learn and I think everyone else would agree. It was very enjoyable”. C2-R11 (others agreed)

“Zoom is easier than the Padlet because you all talk face to face, a proper conversation”. C2-R04 (others echoed)

“I think it was like very easy to talk in Zoom.” C2-R05

“I thought it was really nice to go the Zoom calls and talked to people from the different continent and talk about the culture, and asking questions about places they would recommend and things like to do, how different school is here and there.” C2-S38 (others agreed)

In summary, the authentic interaction opportunities provided by Zoom were highly valued by participants. Moreover, the visual experience of meeting native speakers,

particularly those of the same age, sparked excitement among the majority of participants. Positive feedback also indicated that students gained a slight increase in confidence along with the conduction of CMC facilitated activities.

5.2.1.3. Affordances of eBook Task- Feasibility, Gradualness, Collaboration, Facilitation

As noted in Section 2.5, due to the close relationship between technology and tasks in this study, it is impossible to evaluate the affordance that technology offered without addressing the integrated tasks *eBook collaborations* and *telecollaborative information exchanges* (refer to Section 4.3). The following paragraphs reported findings in terms of task affordances in Cycle 2.

Firstly, eBook as a creating activity requires participants assigned in small groups to design pages on Book Creator according to self-selected topics. This activity followed the Bridge 21 learning model (refer to Section **Error! Reference source not found.**). A written form of the structured activity instructions served as a checklist to guide students through the step-by-step process (specific activity procedures can be found in Section **Error! Reference source not found.**). The printed checklist enabled each team to concentrate on constructing content and messages they would convey to the audience at the later stage of presentation. Additionally, the follow-up storyboard sketch phase allowed the team to depict a preliminary version of the eBook ahead of contributing to Book Creator (refer to Section 4.3.2.1 Stage 2). According to feedback from participants, they demonstrated that the eBook checklist was practical and beneficial in generating creative ideas and guiding them throughout the eBook creation process. Clear role assignments also allowed students to take individual and collective responsibility for their work, which improved the efficiency of eBook completion.

“It was good to look at them(eBook instructional checklists) beforehand before you start with the eBook. So you can figure out who is going to do what.” C2-S30 (echoed with C2-S47)

“It (eBook checklist) was nice to figure out what we were actually going to do or start it with the book. We figure out what we want to put on it, everyone does what.” C2-S47

“I think all the steps are really helpful a lot. Like I feel like if we were just told to make this eBook, what we are gonna organise them as well and what would be more difficult to do.” C2-S32 (C2-S30 and S45 nodded)

“It (eBook checklist) is a good introduction before you actually step in your eBook. Because you can develop what you are going to put in and write it down.” C2-S38

In addition, the fundamental element of the eBook activity, teamwork, enabled students to collaborate with peers in the class. This helped develop participants' collaboration abilities through completing the eBook activity. For example, the process of selecting a topic involved students brainstorming ideas and collectively making a final decision. The allocation of team roles allowed them to take ownership and responsibility for different aspects of the eBook creation.

“I also like the team building and work with people on that task as well. And you kind of get to know them more during the course.” C2-S39

Moreover, the eBook activity plays another crucial role within the telecollaboration project as it aims to facilitate easier interactions with native speakers for Irish students in the following telecollaborative activities. According to students' feedback, the process of creating eBooks to some degree facilitated a smooth transition for them to communicate effectively with Chinese teenagers on platforms- Padlet and Zoom. Students clearly recognized the objective of the eBook activity, which was to provide them with an opportunity to review their previous knowledge of the Chinese language.

“I think it was really helpful cause we actually like use what we have learned and put all like something mix something.” C2-S43

“Yeah, like I forgot some of vocabulary from the last year. I just forgot it. When we do the eBook, I can remember some of vocabulary from last year.” C2-S45

In summary, the eBook activity involves small groups using Book Creator to design pages on chosen topics. The collaborative aspect of the eBook activity not only promoted teamwork but also facilitated the students' acquaintance with each other. The adapted version of eBook activity instructions from the Bridge 21 learning model ensured the feasibility of idea generation and supported the gradual completion of the eBook. Additionally, the eBook activity played a facilitating role for Irish students in enabling smoother communication with Chinese teenagers on Padlet and Zoom at the subsequent stages.

5.2.1.4. Affordances of Information Exchange Tasks- Communication enhancement and flexibility, Knowledge and culture sharing

Along with the eBook, the following telecollaborative communications with native Chinese on Padlet and Zoom were characterized as information exchange tasks. The design of discussion topics on Padlet set the ball rolling as topics were expanded by participants through interactions. Many participants acknowledged that the Padlet chats provided an opportunity for them to become acquainted with their language partners before their official meetings took place.

“Using Padlet before we did, Zoom helped us really know what the personalities of the people were.” C2-R01(C2-R02 and R04 nodded and agreed)

In addition, participants valued the task sequence in this telecollaboration project as it helped alleviate their nervousness when communicating with native speakers. The flexibility provided by both Padlet and Zoom allowed participants to express themselves more freely, thereby reducing their stress and anxiety levels.

“The Padlet was like a nice introduction before the Zoom call. Like we all introduced ourselves and like see what other people say and then it was not as nervous as when we were doing the Zoom call. Because we kind of like get to know other a little bit.” C2-S43

In summary, by engaging in telecollaborative communications, Irish participants uncovered a multitude of shared experiences and resemblances between themselves and their Chinese counterparts. Furthermore, the arrangement of telecollaboration tasks sequences and the flexibility of communications on Padlet and Zoom contributed to a decrease in participants’ nervousness and anxiety.

5.2.2. Semi-structured Individual Interview with Teachers

The semi-structured interview was conducted after the telecollaboration project. It was recorded, transcribed and analysed as reported in Section 3.5.2.2 and Section 3.6.2.1. This section will focus on feedback and experience from involved teachers through presenting thematic analysis results according to each CMC activity involved in Cycle 2 - eBook, Padlet chat, Zoom meeting.

5.2.2.1. eBook

According to the participating teachers, the eBook activity was perceived as a personalized learning journey for the students. It made students feel a sense of ownership of

created content in the eBook. As a result, students became more motivated in the activity. In addition, one teacher appreciated the way it provides scaffolding by starting with the eBook and then incorporating Padlet and Zoom. This sequential approach enhances the communicative experience for the students.

“I think Book Creator, you know, is a good thing to use at the start, because it helps them to kind of personalized learning a bit. So I actually liked the way that the scaffolding there as well, the fact that we started with the eBook, and then you know use Padlet and then Zoom I thought that was a very good kind of a good kind of way to develop the experience, communicative experience for them.” Teacher Adam

“It(eBook) is good for the students to make plan, work together and review what they have learned.” Teacher Bella

Moreover, the level of collaboration within the group directly influenced the pace of eBook completions. The teacher from Riverdale College addressed that her students who had assigned roles in the team actively and effectively contributed to the content of the eBook. Conversely, some students were passive in their involvement, which was attributed to a lack of well-organised collaborations within the group.

“One of the group has almost finished the book, because each student has a role and they know what to do, so team work is very important.” Teacher Bella

In addition, participating teachers recognised eBook activities on Book Creator as a powerful tool for contributing to continuous language learning e-portfolio folder. Specifically, one teacher planned to include it in her regular class (see quote below).

“I will invite my first year students to start their eBook on Book Creator. They can create pages and put new knowledge into eBook. I think it is a great idea to allow students to accumulate what they have learned and review the eBook pages.” Teacher Bella

In both participating schools, the initial idea of this eBook activity aimed to review previous Chinese language knowledge and to pave the way for the following telecollaborative communications with native Chinese. Teachers acknowledged that some students who previously lacked interest in studying Chinese actively participated in the eBook activity and performed well.

“They used lots of knowledge which we have learned in the past. Few students they were not interested in studying Chinese, but this time they take part of (in) it and did good.”

Teacher Bella

In summary, the participating teachers shared similar perspectives as the students in terms of eBook and its affordances. held similar points of view as student did in the focus group interview. They also acknowledged and emphasised the beneficial role of the eBook in facilitating students' Chinese language learning.

5.2.2.2. Telecollaborations

In terms of telecollaboration activities, teachers addressed the contribution of Padlet to the development of Chinese language skills, particularly in expanding vocabulary.

“My students enjoyed chatting with Chinese students on Padlet. They actually learned a few words from Chinese students. I can still remember a word “YYDS” which I initially didn’t know what that meant. But I got it after googling. YYDS is an abbreviation of a phrase “forever god” in Chinese which refers to an expression of admiration and appreciation of someone or something. So my students and I both learned something.”

Teacher Bella

In addition, the use of Padlet proved highly beneficial in promoting communication and replicating the role of social media in the students' daily lives.

“It was very useful in stimulating communication and mimicked the role played by social media in the students’ quality lives. It engaged the students visually and helped them to relax into the task. The atmosphere in the classroom was quite buoyant and positive. The students were having fun.” Teacher Adam

Another participating teacher reported that after the telecollaboration, she started to use Padlet in helping speed up the efficiency of feedback on reviewing students practicing results. The teacher found it convenient to display the students' answers through the projector instead of physically moving around the classroom to check their iPad devices. This approach also allowed students to easily view both their own and their peers' results.

“I am using Padlet very often now for the purpose of checking students’ in-class language practice. If we learned a new dialogue, I would send them a Padlet link and ask them to type their answers in Chinese. Then I can simultaneously know whether the Chinese characters produced are correct or not. I will not need to walk around in the

classroom and check on answers displayed on their iPad devices because I and my students can easily see them through the projector.” Teacher Bella

As for Zoom meetings, the primary benefit was enhancing students' confidence in oral interactions.

“It (Zoom) allowed the students to meet face to face and provided them with the opportunity to gain confidence in the spoken production of Chinese.” Teacher Adam

In addition, both participating teachers addressed the positive impact of task sequences in enhancing the overall quality of communication among students.

“I think Book Creator, you know, is a good thing to use at the start, because it helps them to kind of personalized learning a bit. So I actually liked the way that the scaffolding there as well, the fact that we started with the eBook, and then you know use Padlet and then Zoom I thought that was a very good kind of a good kind of way to develop the experience, communicative experience for them.” Teacher Adam

“I think the actual general design was very, very good and you know. The Book Creator first then Padlet, then the Zoom call, I think that worked extremely well.” Teacher Bella

In summary, the telecollaboration activities involving Padlet and Zoom were highly praised by teachers for their contribution to the development of Chinese language skills and communication confidence among students. Moreover, they recognized the positive impact of task sequences on enhancing overall communication quality among students.

5.2.2.3. Roles of Teachers-Scaffolder, Facilitator, Activity Cheerleader

In Cycle 2, the participating teachers fulfilled roles as scaffolders, facilitators, and cheerleaders for the activities. As experts in the Chinese language and culture, they provided language assistance to Irish learners, including grammar corrections and sentence constructions, in the creation of eBook content and Padlet interactions. In addition, teachers acted as facilitators in the eBook activity by offering instructions and exemplars to guide students. As demonstrated, teachers primarily observed the activities, however, they intervened only when students encountered difficulties which they could not resolve. In addition, teachers provided students with scaffolding to gradually develop their skills in navigating the platforms and completing the activities. Once students became proficient in using the technological platforms and actively participated in the activities, the teachers could confidently step back and be activity observers.

“I kind of coach them verbally, to ask the questions to one another and then also when they were on Padlet when they were typing to the Chinese students. You know, I walk around to see what they were doing, and you know, I asked them what they wanted to say, you know, sometimes they would be typing something and they'd asked me if it was correct, and I, you know, tell them, it was correct else we verbally prompt, prompt them, you know, to use a different kind of verb or whatever, depending on the sentence that they were trying to use to communicate and rather in typing on Padlet if that makes sense.”

Teacher Bella

One of the participating teachers noticed his students felt self-conscious at the beginning of verbally interacting with native speakers on Zoom. To assist them, the teacher wrote sentence structures on the whiteboard to prompt conversations related to their school day. However, based on the teacher's feedback, it appeared that implicit scaffold primarily benefited students who were sitting in the front row. The teacher reflected on the need for visible and targeted language support, particularly for beginner students in the telecollaboration activities.

“I actually wrote it on the board on the whiteboard so the you know the Zoom call was projected on the whiteboard and then there was on the left hand side of the board, in different kinds of colors and marker there was some kind of vocab that will be useful for the topic with they were going to be speaking about all day... But I don't think they paid any heed to follow what I am saying on the day, you know. Maybe one group at the front and we're aware that it was there and the rest just didn't seem to take it in.” Teacher

Adam

In summary, teachers mainly played facilitating and mediating roles in the telecollaboration activities, which included providing language assistance, grammar corrections, activity instructions and examples. They would transition into activity observers when students became more proficient and engaged.

5.2.3. Summary

This section presented the themes and subthemes from interviews and introduced findings which followed the sequence of activities (eBook creation on Book Creator, text-based chat on Padlet and videoconferencing on Zoom) undertaken in Cycle 2. Overall, both students and teachers recognized the benefits of telecollaboration activities and shared similar opinions on their affordances. In addition, they appreciated the importance of task sequences and structured technological affordances provided by Book Creator, Padlet and

Zoom. Those tasks reduced students' anxiety and facilitated the discovery of experience sharing. Regarding the eBook activity, students highlighted improvements in Chinese Pinyin typing skills, accurately identifying characters, and flexible communication within their team members. The collaborative environment on Book Creator fostered motivation and individual connections among students. In addition, participants developed research skills and found the eBook platform useful for storing future learning resources as repertoires. As regards Padlet, it played a facilitating role in enhancing students' intercultural awareness as they experienced relaxed and equitable communication opportunities. As for the Zoom meetings, it offered Irish students authentic and visual interactions with native speakers, leading to increased confidence in speaking Chinese. Furthermore, teachers fulfilled roles as activity scaffolders, facilitators and observers through offering language assistance and activity instructions.

The upcoming section will present the findings of the analysis of interaction records and investigate the learning process of telecollaboration communications on Padlet and Zoom.

5.3. Interaction Records

The previous section explored the affordances of the technological tools and the types of mediation in activities according to both participating students and teachers. This section aims to look into participants' capability of reacting and interpreting the utterances of others and/or units of language used in different contexts facilitated by CMC platforms. It sets out to present the analysis results of interaction records on Padlet and Zoom. The details of recording transcriptions were reported in Section 3.5.1. All interaction data underwent coding according to the guidelines outlined in Section 3.6.2.2. Specifically, the analysis of Padlet chat logs focused on two categories: *Language Functions* and *the Usage of Multi-modes*. As participants did not get the best out of possible modes in Zoom, all video recordings were analysed and presented in two strands – Language Functions and Turn Allocation, considering the feature of oral interactions. Generally, the content of both text-based chats and oral conversations focused on information exchange in terms of personal hobbies and lifestyle sharing.

5.3.1. Padlet Chat Logs

The quasi-synchronicity feature of Padlet can possibly afford participants to make chats become interactive communications like being interacting through social media, such as receiving and sending texts as well as other multi modes (links, emojis and pictures etc).

The minimum analysis unit is *sentence* due to the nature of text-based message and the limitation of identifying anonymous interactants.

5.3.1.1. Overview of Padlet Chat Logs in Two Schools

Overall, the number of language sentences varied significantly between groups in Riverdale while the inter-group differences were relatively minor in Southview. In addition, English was predominantly used in both schools while Southview students engaged in more Chinese language conversations during chats compared to Riverdale students. However, Riverdale students and their Chinese partners explored a broader range of cultural topics than those in Southview. Moreover, the number of sentences broadly decreased in both schools due to unforeseen circumstances such as illness absence, technological restrictions, and implicit instructions regarding the use of the target language. The following subsections will provide detailed reports on the interaction patterns in each participating school.

Riverdale College

Figure 15 showed the number of sentences certainly produced by Irish participants and the proportion of Chinese language output in Riverdale College. It was apparent that the number of sentences generated by each group varied significantly, with English being the predominant language of communication. Additionally, participants from Group 3 made a remarkable contribution of the conversations in Week 1. In Week 2, there was an increase in sentence production by Irish participants from Group 1 and Group 2. However, the number of sentences written fully in Chinese or involving translanguaging only indicated an increase in Group 2. Additionally, the students in Group 3 were absent due to illness on the day of the instant messaging activity in Week 2. Consequently, all the language output on Padlet came from a native Chinese student named Nadia in Group 3, while the Irish students did not make any attempts to respond to the questions proposed by Nadia in the following days. Apparently, the Irish groups had not yet established a practice of utilizing Padlet to continue conversations beyond the confines of the classroom.

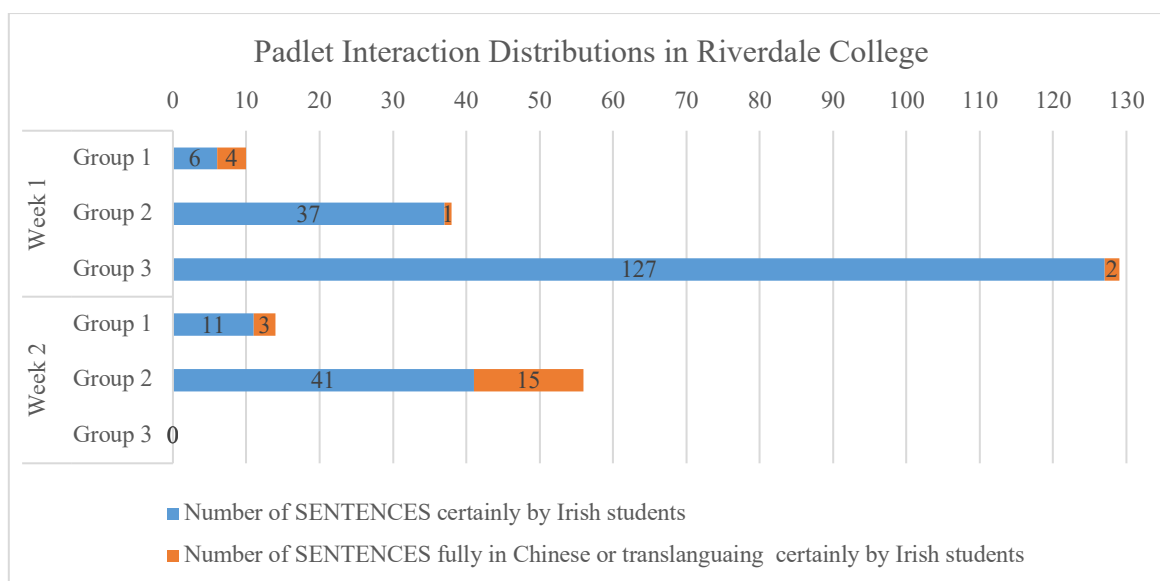


Figure 15. Padlet interaction distributions in Riverdale College.

Despite the design of the Padlet information exchange in Week 1 aimed to facilitate interaction between students and provide Irish students with an opportunity to use their basic Chinese language skills, Figure 15 suggested that Riverdale students rarely opted to type texts in Chinese during the discussions. This can be attributed to the absence of clear instructions and requirements for using the target language at the outset of the activity. Irish students paid attention to information exchange instead of utilizing Chinese to exchange personal information or using English to discuss emerging topic when requiring advanced Chinese language knowledge.

Moreover, sentences written in Chinese from Irish students were about greetings, personal likes and dislikes in Week 1. Figure 16 presents an Irish student (pseudonymised as Batman) posted a common greeting phrase “你好” which means “Hello/Hi” in English to his counterparts before asking a question “什么样的电影在中国流行” which means “which types of movies are popular in China?” in English. According to the responses in Figure 16, a Chinese student (named PoeTree) replied in both Chinese characters and Pinyin. The choice of Pinyin input from PoeTree is considerate because PoeTree knew that the

vocabulary “搞笑” (English meaning: comic) and “开心麻花” (a name of a Chinese comedy film company) might be new to the Irish participants.

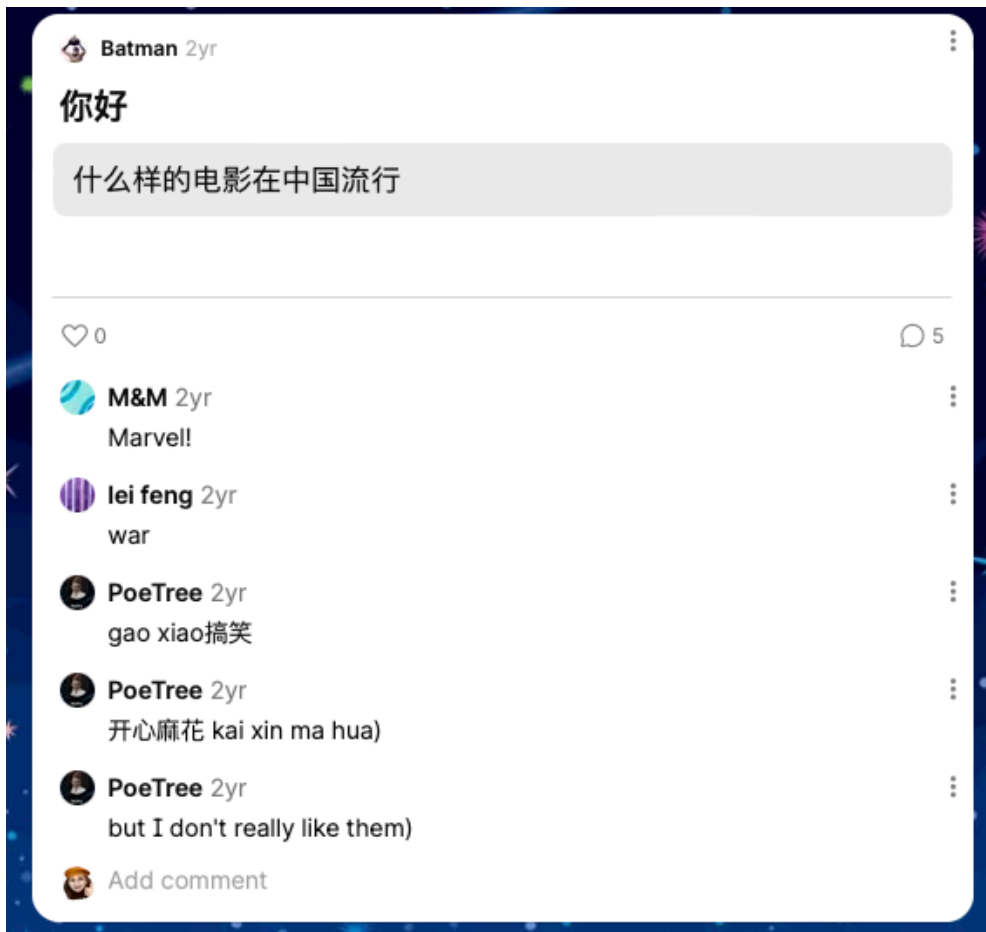


Figure 16. Screenshot of Padlet chat logs relevant to greeting and popular types of movies in China.

As shown in Figure 17, the topic of favourite sports was initiated by a Chinese participant (based on the posted photo). Three Irish students were able to answer in Chinese language as they have learned this topic and sentence structures. A Chinese participant named Bruce commented on the popularity of rugby in China and explained his interest in watching American National Football League. However, the discussion did not progress from there.

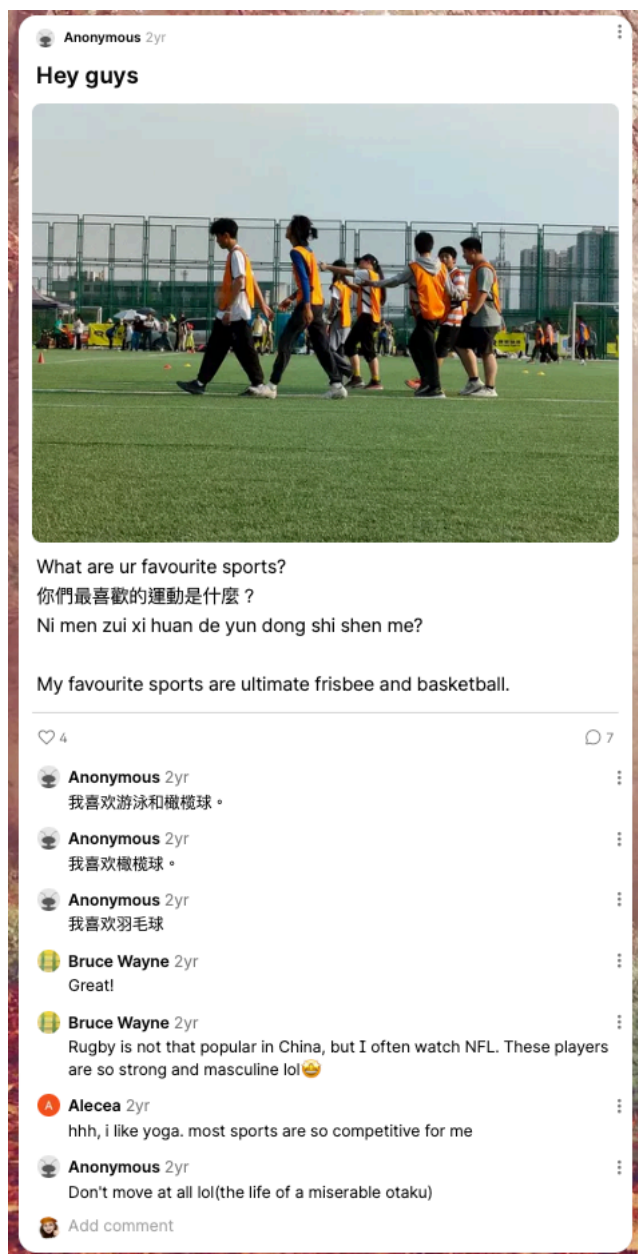


Figure 17. Screenshot of favourite sports discussion.

In addition, the topic of the Week 2 Padlet task was designated for culture sharing. Participants not only covered cultural discussions (like festivals and cultural stereotype), but also included a wide range of topics including personal life (such as sports, pets, hobbies,

and food). For instance, Figure 18 presents a stereotype of red hair among Irish people held by Alecea (the pseudonym of a Chinese student). Alecea strategically posted a following question to ask Irish students' impression of China or Chinese people. One anonymised Irish participant mentioned the height of Chinese people. The correspondence from a Chinese participant commented on this regard but showed an intention to avoid potential conflicts to address the casualness of their talk.

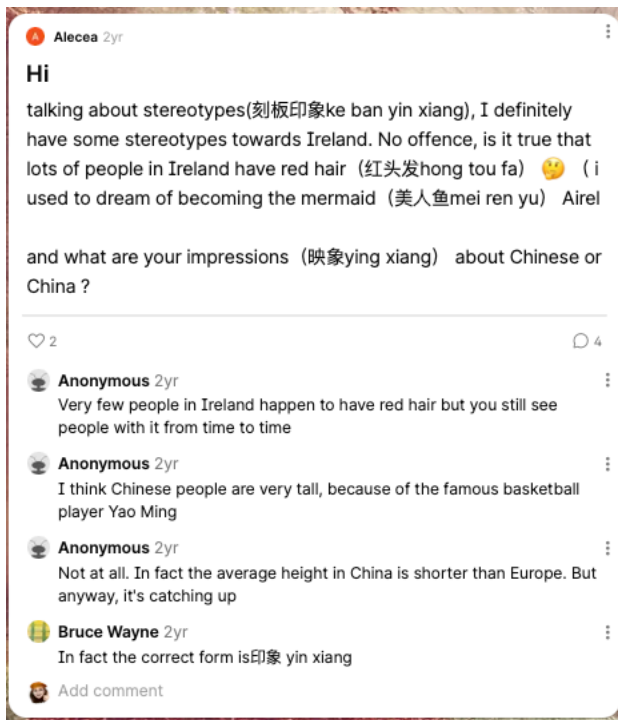


Figure 18. Cultural stereotype discussion on Padlet.

Moreover, another discussion about stereotypes (refer to Figure 19) arose unintentionally when participants commented on an Irish student's painting of a panda. One Chinese student PoeTree tactfully expressed that he felt panda was a kind of stereotype which people from different countries had. The Irish student Batman showed curiosity and inquired about this perception from the Chinese students. Another Chinese student Lei Feng provided a straightforward explanation. However, this discussion abruptly came to a halt without further development.

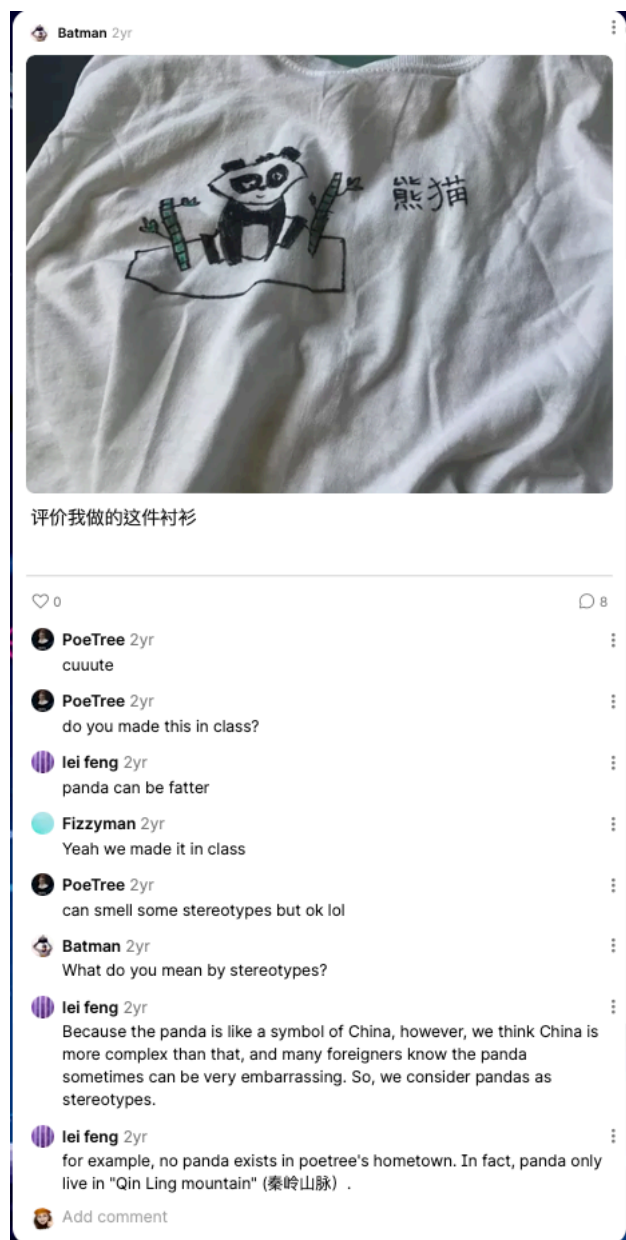


Figure 19. Inadvertent cultural stereotype discussion on Padlet.

Furthermore, the typos in words from the Irish side did not affect the interactions on Padlet. As depicted in Figure 20, an Irish student using the pseudonym Fizzyman inquired about the time in China. The correct Chinese word for "now" is "现在" rather than "潜在." However, due to the assistance of English translation, it did not lead to any misunderstanding among participants.



Figure 20. Typos of “now” from an Irish student on Padlet.

In summary, Riverdale College participants explored various topics with their Chinese counterparts although lacking profound discussions. In addition, despite the presence of occasional grammar or typing errors from Riverdale students, these expressions were understandable and received responses from Chinese teenagers.

Southview Secondary School

The frequency of group interactions among Southview Secondary School was displayed in Figure 21. Although the number of sentences in Week 2 declined across the most groups comparing to its amount in Week 1, the total number of sentences in Chinese increased in most groups. Efforts were clearly made for Southview Secondary School students to use Chinese on Padlet chats.

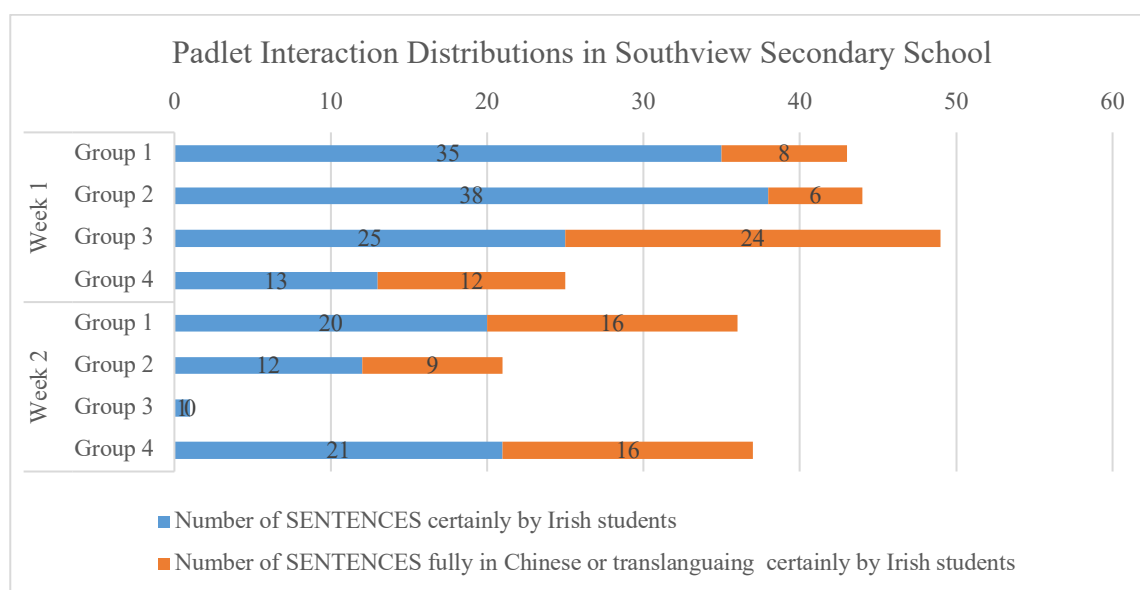


Figure 21. Padlet interaction distributions in Southview Secondary School.

Given that Week 1 aimed to foster familiarity between both sides of students on Padlet, sentence outputs in Chinese primarily covered greetings, self-introductions and farewells. However, the unclear language instructions led to an inequivalent usage of communication languages, as native Chinese participants rarely responded in Chinese to their Irish partners. For example, as shown in Figure 22 depicted that an Irish student introduced herself and her favourite colour in Chinese, but her counterpart responded in English that he also liked blue and liked dumplings.



Figure 22. Example of inequivalent usage of English and Chinese on Padlet.

Additionally, the anonymity provided by Padlet ensured privacy but also resulted in repetitive conversations about self-introductions across all groups (see Figure 23). For instance, three Irish students introduced themselves in both Week 1 and Week 2 communications.



Figure 23. Screenshot of repetitive self-introduction conversations.

Nevertheless, participants were suggested leaving their pseudonyms in the message to avoid misunderstandings in order to continue communication. For example, Figure 24 displayed a vignette where two participants put their names at the end of message every time. This would suggest that in an online multiparty environment like Padlet, responding directly to a specific individual or message (termed *addressivity*) becomes important to ensure effective communication and engagement among participants. It involves considering the turn-taking dynamics, understanding the context of previous messages, and actively responding to specific individuals or their contributions.



Figure 24. Example of addressivity technique in Padlet.

Regarding Week 2, native Chinese participants did not promptly respond to Irish students, resulting in one-way message posting on Padlet without receiving any replies. This may have been influenced by the arrangement of mixing Zoom and Padlet during Week 2. Although all native Chinese students were present in the Zoom video call, they were unable to attend to messages on Padlet. In contrast, the Irish participants shared the same laptop for the video call, allowing some of them to access Padlet and type their answers while waiting to converse with their language partners. Another potential explanation, as suggested by Schönfeldt and Golato (2003), is that the multiparty communication environment may have led to unsuccessful turn-taking transitions, where questions were left unanswered.

In summary, the number of sentences dramatically varied and unevenly changed from Week 1 to Week 2 in Riverdale whereas Southview had steady increase among groups. While English remained the main communication language in both schools, students from Southview put in effort to generate Chinese sentences related to personal interests and daily life. Moreover, Southview students showed a better performance in generate sentences in Chinese language (including translanguaging) but the spread of topics were more diverse in Riverdale. In addition, while the participants had the freedom to initiate conversations and explore a wide range of topics, illness absence, unclear language instructions and limited technological support resulted in uneven target language outputs among Irish participants and Chinese teenagers. Furthermore, the rather low response rate occasionally occurred, suggesting a lack of *addressivity* in the conversations on Padlet. Moreover, participants did not show a tendency to use Padlet to communicate with their counterparts beyond the classroom.

5.3.1.2. *Language Functions on Padlet*

The previous subsections reported on the frequency of language outputs in each participating school. In order to gain further insights into the Padlet conversations, a further analysis was conducted to examine the functions of language used on Padlet (see Section 3.7.3. for the coding schema of language functions).

Figure 25 illustrates that the most common language function was ***Stating*** in the Responding category in most situations in both schools. However, with the exception of Week 2 in Southview Secondary School, when the Chinese partners were slow to respond, the most frequent function was Stating in the Initiating category. This suggests that Irish participants tended to prefer answering questions rather than taking the initiative to ask questions to their partners.

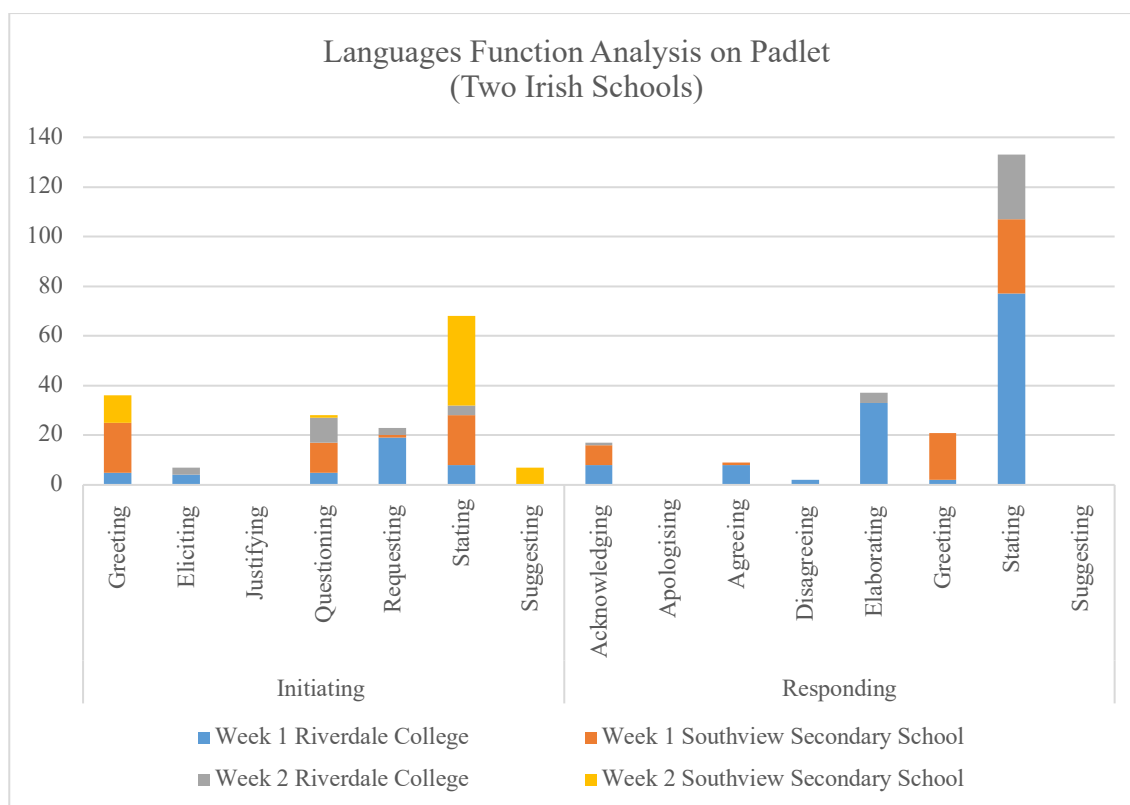


Figure 25. Functions of languages analysis on Padlet (two Irish schools).

Texts categorised as Stating and Elaborating in the Responding category were interconnected, although there were instances when they were interrupted by other topics. Herring (1999) suggested that sequential disruptions often occur due to the linear nature of online communication. The Excerpt 1 exemplifies this pattern: the conversation began with a discussion about school subjects. The Chinese participant expressed an interest in classical history and asked her Irish partner for more information. However, the Irish student shifted the topic to music without immediately responding to the request. Eventually, the request for information on classical history was fulfilled towards the end of the conversation.

Excerpt 1. Sequential disruptions on Padlet.

Text 1 Irish participant: I learn lots of subjects, like maths, geography, and about Ancient Greece. I love learning about science (Responding Stating, Responding Elaborating)

Text 2 Chinese participant: Wow you learn classical history :D I'm so interested, can you tell me more? (Responding Acknowledging, Initiating Request)

Text 3 Irish participant: I really love learning music outside of school. In school, i like to learn about Ancient Greece, Science, Maths, Irish, and Chinese. I nd them to be very interesting subjects. (Responding Stating, Responding Elaborating)

Text 4: Chinese participant: I personally have learned Arabic and French before :D
(Initiating Stating)

Text 5 Irish participant: Classical history is really cool. We learn the Ancient Greek language in my class, and we study the Greeks and Romans and they're daily lives, and myths and legends. (Responding Stating, Responding Elaborating)

Additionally, the occurrence of texts categorised as Eliciting in Initiating was limited within the Padlet chat logs, and it occurred in two situations: either as a sole initiation or as a response following a question posed by the interlocutor (see Excerpt 2 below).

Excerpt 2. Eliciting in Initiating on Padlet.

Text 1 Irish participant: 自拍

(English translation: selfie. Initiating Eliciting. The students invited Chinese students to comment on the image.)

Text 2 Irish participant: 我画的

(English translation: I drew it. Initiating Eliciting. The participant intended to hear from his partners.)

Text 3 Irish participant: Oh, you play guitar? Do you play acoustic or electric?

(Initiating Questioning, Initiating Eliciting. The Irish student ask more questions when he heard his Chinese language partner played guitar.)

Text 4 Irish participant: School life is quite stressful at the moment. Our school don't do mocks, but our teachers are very keen on making sure we know everything we need for the Junior Cycle. How are you enjoying the holiday? How are you going to celebrate Chinese New Year?

(Responding Stating, Responding Elaborating, Initiating Questioning, Initiating Eliciting. The Irish student answered the question from his Chinese language partner and tried to draw out answers from his partner about Chinese New Year.)

Figure 26 depicted the distribution of language outputs either fully or translanguageing in Chinese among Irish participants. The results indicated that the most common language functions were Greeting and Stating in Initiating. This observation suggested that Irish participants' proficiency in utilizing Chinese greetings and they frequently used Chinese to start conversations.

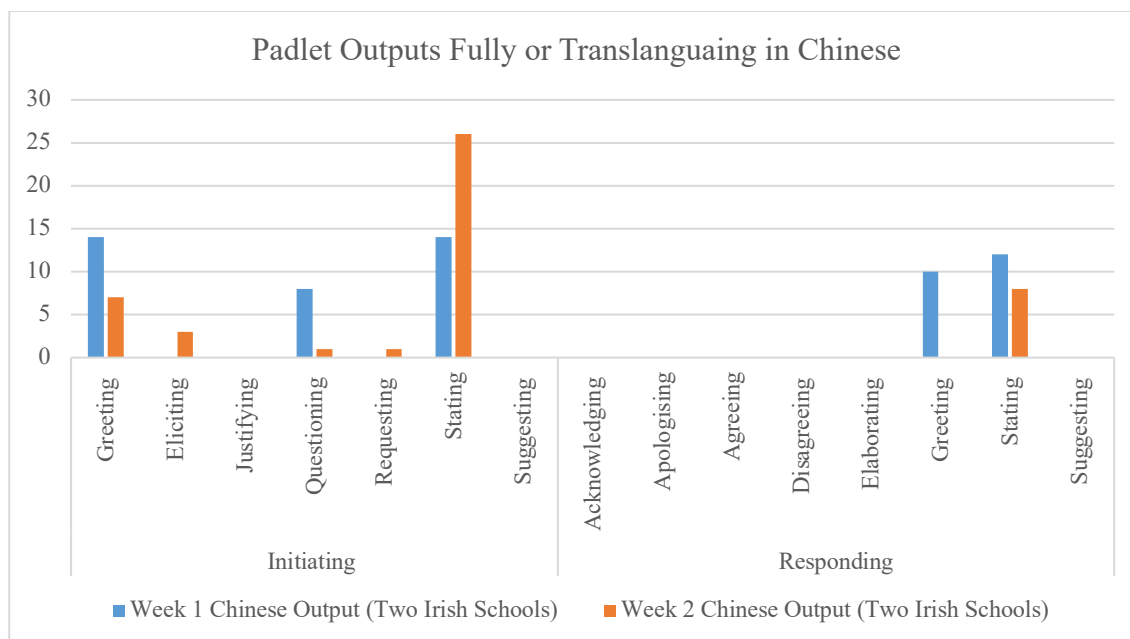


Figure 26. An overview of Padlet outputs fully or translanguaging in Chinese among Irish participants.

In summary, the majority of participants from both schools showed a preference for responding rather than initiating questions. The disruptions occurring on Padlet validated the statement of the linear feature of online communication (Herring, 1999), however, participants were able to address and reconnect the previous disrupted topics thanks to the persistent presence of chat logs provided by Padlet, which facilitated the continuity of the conversation.

5.3.1.3. The Usage of Multi-modes on Padlet

Figure 27 presented the utilisation of multi-modes on Padlet in each school. The findings suggested Irish participants had a preference for using emojis over images to convey their emotions on Padlet, with Riverdale students displaying a higher frequency of emoji usage compared to Southview students.

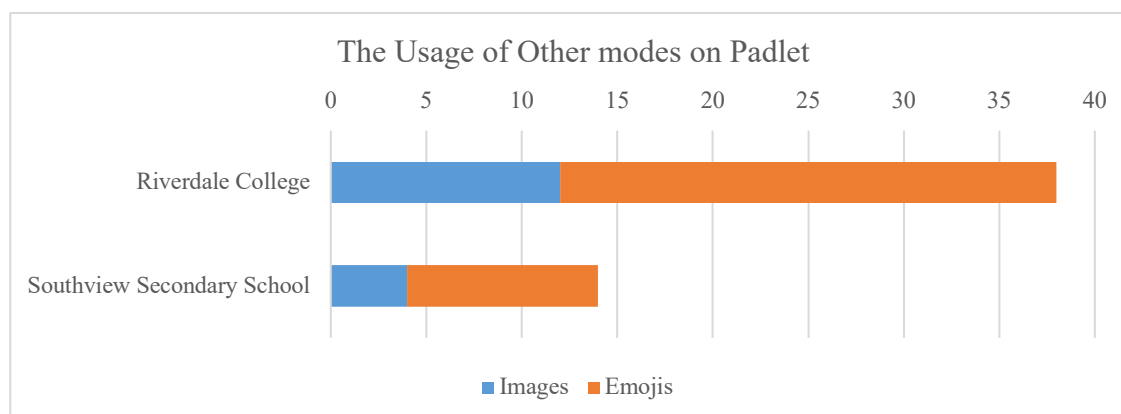


Figure 27. The usage of other modes on Padlet.

In addition, the most common context of using emojis in Southview was to do with expressing their favourite pets (Figure 28). The selection of animated animal icons not only reflected the students' preferences but also potentially resulted from the frequent appearance of those emojis after typing on the keyboard. Apart from emojis and images, there was no other modes to be used in the communications.

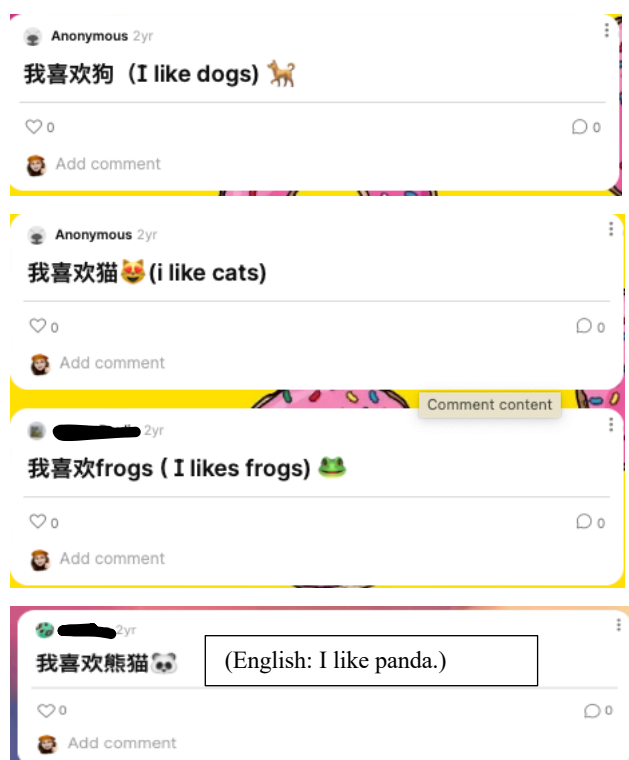


Figure 28. Emoji expressions in Southview.

Overall, Irish participants on Padlet showed a preference for emojis over images to express their emotions, particularly among Riverdale students who used emojis more frequently than Southview students.

5.3.1.4. Summary

In summary, the number of sentences on Padlet varied significantly and inconsistently between Week 1 and Week 2 in Riverdale, while Southview showed a steady increase. Given the limited language proficiency of Chinese among Irish participants, English became the primary communication language in both schools. Southview students performed better in generating sentences in Chinese while Riverdale students explore a greater diversity of topics. However, the uneven target language outputs among Irish participants and Chinese teenagers were influenced by factors such as illness absence,

unclear language instructions, and limited technological support. Additionally, the occasional low response rate raised a critical issue that the importance of addressivity to maintain a meaningful and cohesive conversation in an online multiparty environment. The anonymity provided by Padlet posed challenges in determining the text sender's identity, leading to repetitive self-introductions across groups. However, the presence of chat logs provided by Padlet facilitated the reconnection of disrupted topics, ensuring continuity in conversations. Furthermore, the analysis of language functions suggested that Irish participants frequently responded with statements. The use of Chinese or translanguaging mainly occurred when Irish participants initiated greetings at the beginning of text-based conversations on Padlet. It is noteworthy that the affordances of quasi-synchronicity and asynchronicity facilitated by Padlet were not fully utilised beyond the classroom setting.

5.3.2. Zoom Recordings

The previous subsection provided an overview of how Irish participants utilised the Chinese language, along with an analysis of the language functions and multimodal features observed on Padlet. In the following paragraphs, the focus shifts to the analysis of Zoom interactions.

Contrary to the chat logs on Padlet, the smallest unit of analysis in Zoom conversations is the *Utterance*, which is a piece of speech containing either a simple word or several lines of sentences. In addition, every utterance can be easily identified to a specific interlocutor with the assistance of visual and audio in Zoom. Full guidelines of coding Zoom interactions can be found in Section 3.6.2.2.

5.3.2.1. Overview of Zoom Recordings

The length of Zoom interaction has been reported in Section 4.5.2. Respectively, each Zoom session lasted within 20 minutes in Riverdale and around 35 minutes in Southview.

The total number of utterances in Zoom session 1 remained similar in both schools, with 223 utterances in Riverdale College and 212 utterances in Southview Secondary School, as shown in Figure 29. Despite having a shorter interactional time, students from Riverdale produced 1.5 times more speech utterances in parallel Breakout rooms compared to students from Southview sharing one digital device in Zoom session 1. This suggested that interactions in breakout rooms were more efficient and effective than those in the main room on Zoom. Breakout room conversations resembled the feature of face-to-face talks with

fewer interruptions from activity moderators. This flexible mode of expression provided participants with more freedom and ownership of their interactions.

Additionally, the overall number of utterances sharply decreased in Zoom session 2 in both schools compared to the students' performance in Zoom session 1. The significant decrease in the total number of utterances by Irish students in Southview raises concerns, as the communication environment and conditions remained the same. It is worthwhile to investigate the underlying reasons for this decline.

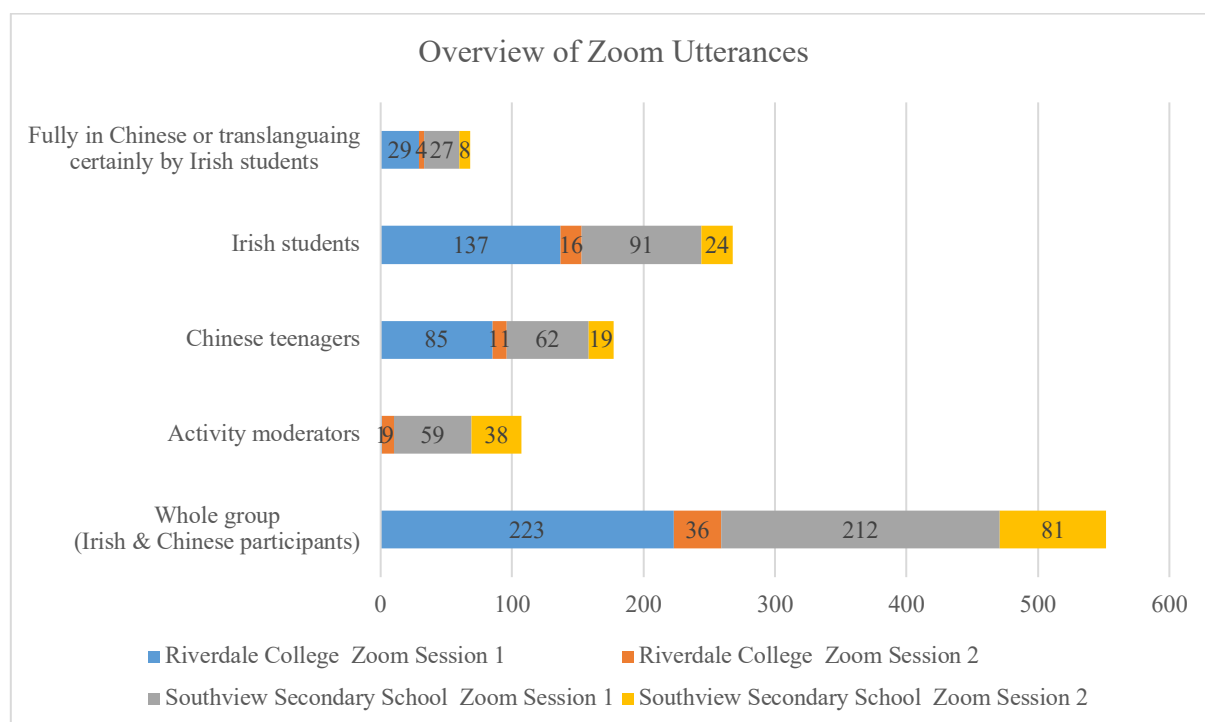


Figure 29. An overview of utterances in each participant group.

Moreover, it was apparent that English remained the dominant language for communication in the Zoom sessions. Utterances in Chinese or translanguaging primarily focused on self-introduction (name, age, family member), hobbies and food preferences. The language knowledge was previously practiced in the eBook activity and it made participants feel more natural and confident in talking with their counterparts in the Zoom sessions.

In summary, although the communication conditions were different, the total number of utterances in Zoom session 1 was similar in both schools. In Zoom session 2, there was a sharp decrease in the total number of utterances in Riverdale, which suggested that Breakout room interactions proved to be more efficient comparing to interacting in the main. In addition, utterances in Chinese or translanguaging primarily focused on self-introduction, hobbies, and food preferences, which were previously practiced in the eBook activity. This made participants feel more confident during the Zoom sessions. Moreover, there was a

difference in the involvement of moderators between Riverdale and Southview. Further analysis of the language functions related to the moderators will be displayed in the next subsection.

5.3.2.2. Language Functions on Zoom

In order to investigate the functions of utterances on Zoom among different participant groups, the analysis of language was undertaken. The codebook was adapted from the Padlet protocol. Since the feature of oral conversations is different from its in written context, two emerging functions (*Informing* and *Repeating*) were included in the codebook which can be found in Appendix G.

Zoom Session 1

As illustrated in Figure 30, the number of Questioning in Initiating was the largest in both schools, which suggested Irish participants have a tendency to ask questions to their language partners. Additionally, the numbers of Greeting in Initiating remained the same in both schools whereas participants from Riverdale included more statements compared to students from Southview.

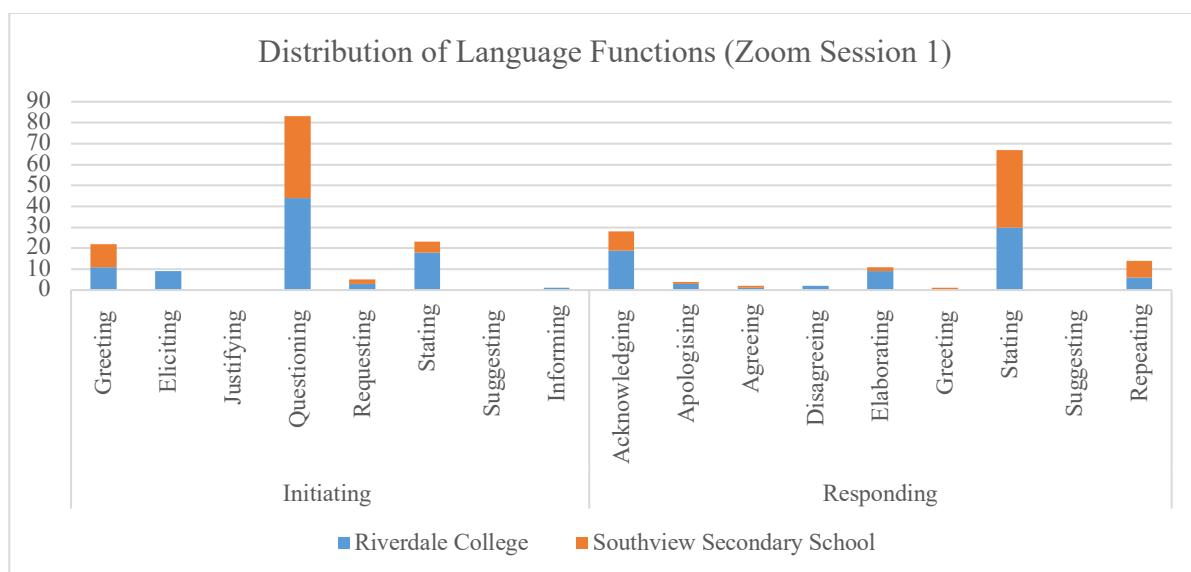


Figure 30. An overview of Zoom session 1 language functions.

Moreover, the analysis of Eliciting in Initiating suggested that Riverdale students actively sought to elicit opinions and information from their language partners during the conversation (refer to Excerpt 3). This excerpt focused on a discussion about the location of one Chinese student's hometown. Apparently, neither Xi'an nor Shanxi (two different locations in China) was familiar to the Irish participants. The Irish side made efforts to

prompt their partner for further details through a series of initiating questions (Lines 5, 7, 9). Irish participants eventually gained a clear understanding that their language partner was from Xi'an, a city located in the middle of China and it was not close to Beijing but near the Inner-Mongolia.

Excerpt 3. Discussions about a location in China.

Line 1 C2-R06 which part of China are you from?

Line 2 C2-CN26: I am from Xi'an, in Shanxi province.

Line 3 C2-R14 shanxi?

Line 4 C2-CN26: yeah, Shanxi province. in the middle of China.

Line 5 C2-R14 Is that close to Beijing?

Line 6 C2-CN26: no. Beijing is in the north of China. We are in the center.

Line 7 C2-R06 in the inner-mongolia?

Line 8 C2-CN26: it's not in the inner-mongolia.

Line 9 C2-R06 are you near the inner-mongolia?

Line 10 C2-CN26: yes.

In terms of Function of Responding, Irish participants predominantly used the Stating in their responses. Students from Riverdale also provided more elaborations following their statements compared to students from Southview. However, Southview students showed a higher frequency of the Function of Repeating compared to students from Riverdale. In addition, some Irish students would take the strategy of repeating for confirmation or eliciting an explanation, such as Excerpt 3 above Line 3 the Irish student C2-R14 repeated "Shanxi" and the Chinese student C2-CN26 explained the location of "Shanxi" in Line 4. Moreover, Excerpt 4 presented a short conversation of hobbies between an Irish student C2-S31 and a Chinese student Scott. This Irish student repeated the content which his counterpart said (Line 3, 7) before commenting. This would suggest that some Irish students ensured their understanding or eliciting for an explanation through repeating contents.

Excerpt 4. A short conversation of hobbies between an Irish student and a Chinese student.

Line 1 C2-S31: You got any hobbies?

Line 2 Scott: *I like ice hockey.*

Line 3 C2-S31: *Ice hockey? that's brilliant. I have no hobbies. You got pet?*

Line 4 Scott: *no.*

Line 5 C2-S31 *do you want one?*

Line 6 Scott: *I want a dog.*

Line 7 C2-S31: *You want a dog, lovely. What type?*

Regarding the language functions of utterances in Chinese, Figure 31 suggested a preference among participants for initiating conversations in Chinese.

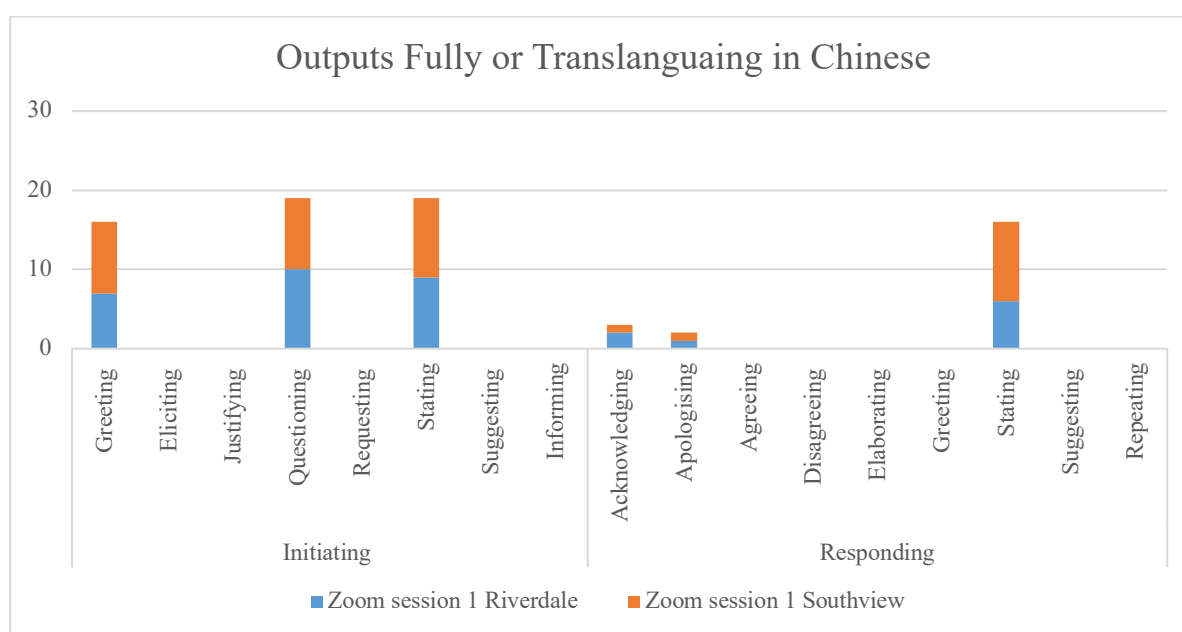


Figure 31. Outputs fully or translanguaging in Chinese (Zoom Session 1).

It is understandable that students started the conversation by using the existing knowledge of Chinese language. For example, Excerpt 5 presented a conversation about food. Irish student C2-R03 initially spoke Chinese to express his favourite food is rice and hamburger. And he explained that he also liked pizza when he went to church on Sunday in English (Line 4).

Excerpt 5. A conversation of favourite food in translanguaging.

Line 1 C2-R03 我喜欢米饭. (C2-CN20 repeated C2-R03 in a low voice) 汉堡

Line 2 C2-CN20: 汉堡, right?

Line 3 Irish side: yeah, 汉堡

Line 4 C2-R02 I also like pizza in Sunday afternoons when I go to church what musical artist do you like?

As another example in Excerpt 6, Irish student C2-R06 made efforts to find out his partner through asking questions. C2-R06 firstly asked the identity in Chinese (Line 1) but the rest of dialogues (Line 5, 6 and Line 9) switched to English.

Excerpt 6. An example of translanguaging on Zoom.

Line 1 C2-R06 你是雷锋吗? (Eng trans: Are you Leifeng?)

Line 2 Leifeng: yes, i guess so.

Line 3 C2-R06 do you have any questions?

Line 4 Leifeng: who is that guy? C2-R06

Line 5 C2-R06 ask questions and find out.

Line 6 C2-R06 I am C2-R06. 我是 C2-R06.

Line 7 C2-R06 do you have any questions?

Line 8 leifeng: any question ?

Line 9 C2-R06 no question?

Apparently, neither Irish student C2-R03 or C2-R06 was capable to continue the topic in English as it would exceed the Irish students' proficiency level to respond to questions in Chinese as they were not able to predict the content of conversations from language partners.

In summary, Irish participants in both schools showed a tendency to ask questions to their language partners in Zoom session 1. In addition, findings suggested that Riverdale students actively endeavoured to gather information from their language partners during the conversation. In terms of Responding functions, students from Riverdale provided more elaborations following their statements, while Southview students displayed a higher frequency of Repeating to ensure understanding before responding. Although repetition was used by language beginners, their partners from China might get bored which prevented establishing relationship among them. Regarding the language functions of utterances in Chinese, participants showed a preference for initiating conversations in Chinese where they could employ their existing knowledge of Chinese language. However, the relative low

number of responding in Chinese may suggest that Irish participants were incapable of engaging in in-depth discussions due to the limited Chinese language proficiency level.

Zoom Session 2

As mentioned earlier, there was a significant decrease in the total number of utterances in Zoom session 2 compared to Zoom session 1 in both Irish schools. Figure 32 illustrated the distribution of language functions in Zoom session 2. Overall, students from Southview demonstrated a higher utilisation of various language functions compared to students from Riverdale in the second Zoom session.

In terms of Initiating Functions, there was an equal distribution of Questioning and Stating among participants in Riverdale, whereas students from Southview displayed a higher frequency of initiating statements. Additionally, participants from Southview appeared to be more positively engaged in the interactions compared to those from Riverdale. On the one hand, the higher number of initiating functions in Southview could be linked to the prompts provided by activity moderators, which suggested that the level of involvement of activity moderators had an impact on the quality of online conversations. On the other hand, this may be attributed to the unfamiliarity of Riverdale students with the shift from small group device sharing in Zoom session 1 to whole-class device sharing in Zoom session 2. This suggested that sharing one device on Zoom to some extent hindered participants from effectively engaging in conversations. Regarding Responding Functions, the most frequently used language function in both schools was Stating, same as its in Zoom Session 1.

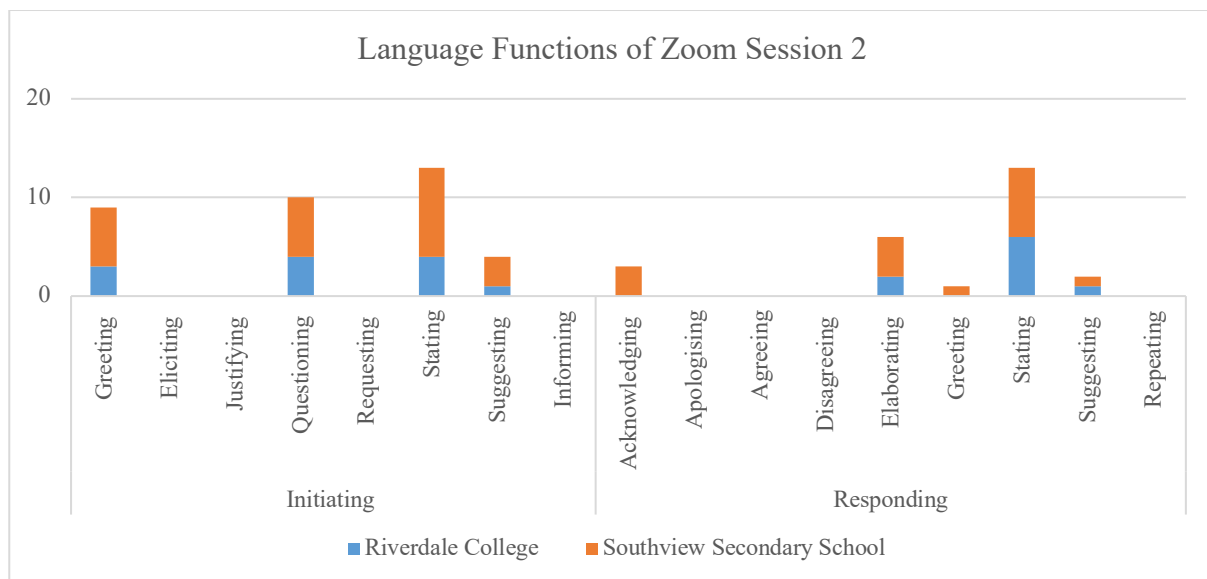


Figure 32. The distribution of language functions in Zoom Session 2.

In terms of language functions in Chinese, students from Southview initiated the conversation with a higher number of statements in Chinese compared to students from Riverdale, as illustrated in Figure 33.

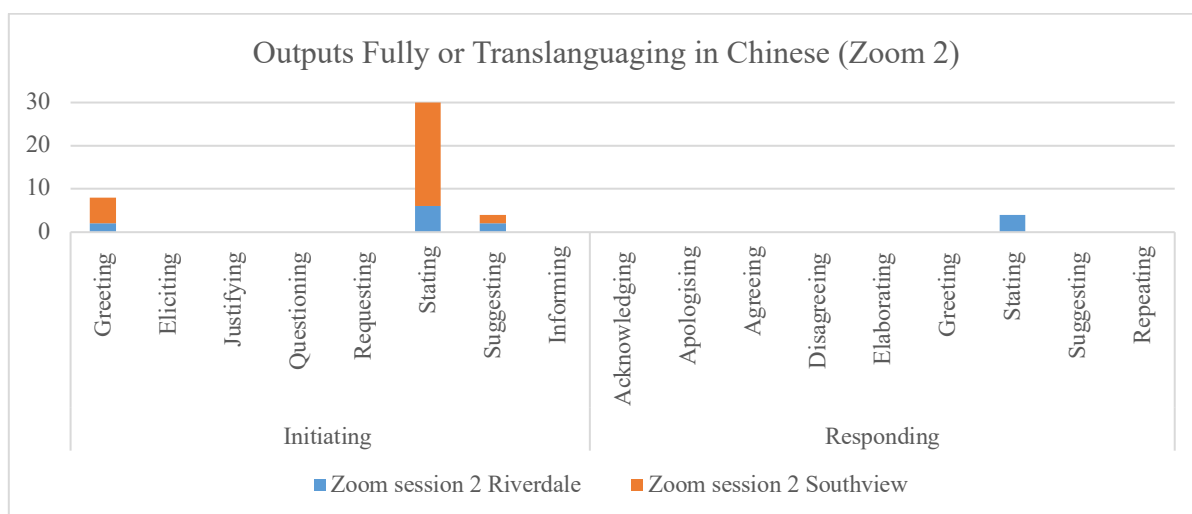


Figure 33. Outputs fully or translanguaging in Chinese (Zoom Session 2).

Again, the topics discussed in Chinese were aligned with participants' Chinese language knowledge, which encompassed self-introduction (name, age, nationality) and discussions on food preferences, school subjects, leisure hobbies (see the Excerpt 7 below). In addition, participants switched to using English when discussing unfamiliar topics or beyond their language repertoire.

Excerpt 7. Utterances fully or translanguaging in Chinese in Zoom session 2.

Riverdale	Southview
Line 1: C2-R06 你好，我叫C2-R06，我是蒙古人。我是十四岁。I recommend Mongolia. (English trans: Hi, I am C2-R06. I am Mongolian. I am 14 years old.) Line 2: C2-R01 你好，我叫C2-R01 我十四岁，我是爱尔兰人。Brooklyn, New york. (English trans: Hi, I am C2-R01. I am 14 years old. I am Irish.) Line 3: C2-R14 我叫C2-R14. 我十四岁。I lived there for 2 months in the big area of (unintelligible). (English trans: I am C2-R14. I am 14 years old.)	Line 1: C2-S32 你好，我叫C2-S32. 我喜欢(unintelligible)，我不喜欢(unintelligible). (English trans: Hi, I am C2-S32. I like (unintelligible). I don't like (unintelligible).) Line 2: C2-S31 我喜欢吃面条。你喜欢喝什么？(English trans: I like eating noodles. What do you like to drink?) Line 3: C2-S38 你好，Yuhang. 我叫C2-S38. 我十四岁，我喜欢弹钢琴和看电视。你喜欢什么？(English trans: Hi, Yuhang. I am C2-S38. I am 14 years old. I like playing piano and watching TV. What do you like?)

	Line 4: C2-S36 美术 (<i>English trans: Subject Arts</i>)

In summary, students from Southview demonstrated a higher utilisation of various language functions compared to those from Riverdale in the Zoom session 2. In addition, Southview students had a higher frequency of initiating statements, possibly influenced by activity moderators' prompts and their familiarity with sharing one device with the whole class. In terms of responding functions, both schools predominantly used Stating, similar to Zoom session 1. As regards the analysis of utterances in Chinese, Southview students initiated more statements which covered topics such as self-introduction, food preferences, school subjects, and hobbies. However, when it came to unfamiliar topics or in-depth discussions, participants opted to use English to continue the conversations.

Language function analysis of activity moderators

Due to the significant involvement of activity moderators in Zoom sessions, except for Zoom session 1 in Riverdale, the nature of interactions shifted towards being moderator-led, which resulted a sharp decrease in student utterances in both schools. Figure 34 presented the distribution of language functions used by activity moderators. Overall, the frequency of Initiating exceeded that of Responding.

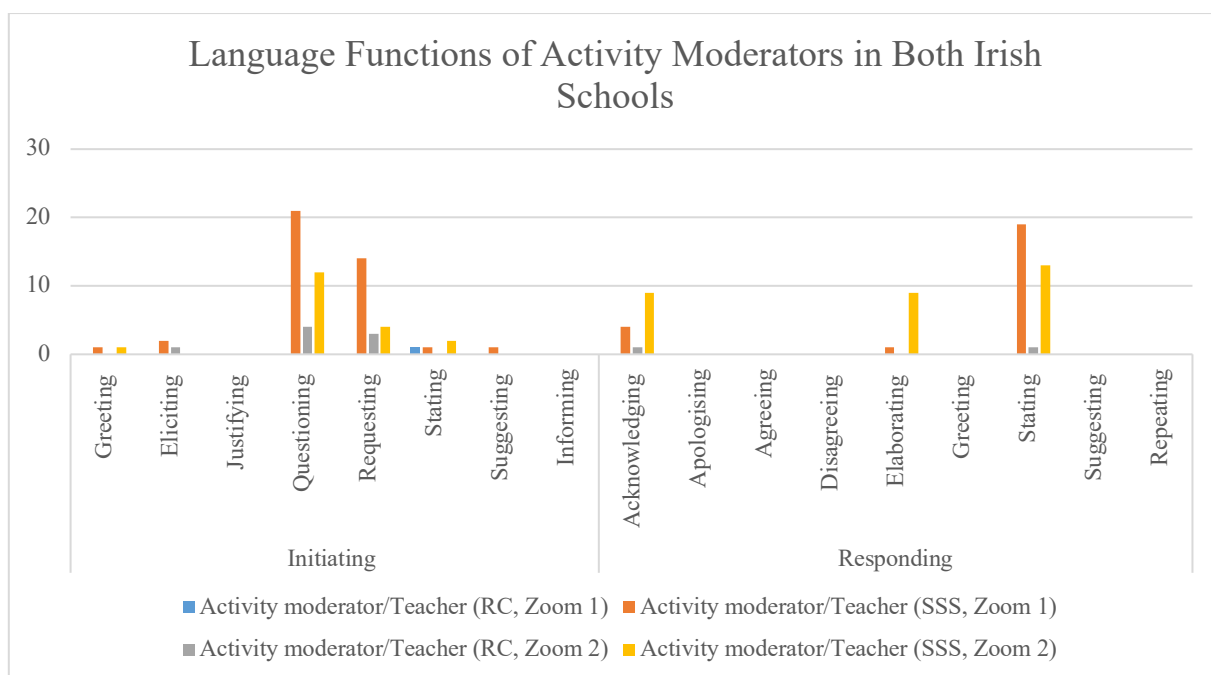


Figure 34. Language functions of activity moderators in both Irish Schools.

The most frequently employed Functions were *Questioning*, *Requesting*, *Stating*, *Acknowledging* and *Elaborating*. Examples can be found in Table 27.

Language Function	Example	Context
Questioning	Moderator: okay, any of you have been to New York before? no matter you are Chinese or Irish. C2-R14 I've been to New York.	An Irish student recommended New York to their Chinese partners, however, he has never been there. To keep conversations efficient and encourage participants to interact on their own. Moderator asked this question. C2-R14 engaged in afterwards.
Requesting	Moderator: Anchea, 可以打开你的麦克风吗?	Moderator asked the Chinese student to turn on the microphone to avoid tech issue.
Stating	C2-S32 No, I heard she was saying "I don't like" but I didn't understand what she is saying after that. Moderator: 没关系, 她不喜欢打篮球, she does not like playing basketball. she likes strawberries.	Irish student did not get what her counterpart said and the moderator comfort her and explain the contents in English.

Language Function	Example	Context
Acknowledging	Moderator: 非常好 (Eng trans: very good), Can you say it in English again to us please? 可以用英文再说一下吗	One Chinese student self-introduced in Chinese but he does not realize the language is far beyond the Irish students' language proficiency. To ensure Irish student understand the contents, the moderator asked this student to introduce again in English.
Elaborating	Moderator: we don't have water slides. Because the weather is not warm very often. So Irish people only get to go to water slides like that when we go to Europe. So if we go to Spain, we can have an experience like that. So we can't really have that experience in our country cause it is not warm enough in the summer. Thank you for your sharing, Luna. It looks amazing.	One Chinese student shared a water park located in China with Irish students. The moderator explained there was no water slide in Ireland and Irish people will visit Spain to have such activity.

Table 27. Examples of the highest frequencies of language functions.

Apparently, the interventions of activity moderators aimed to prompt and facilitate conversations. However, the heightened intervention of moderators inadvertently restricted the students' ability to independently steer conversations, despite the moderators' intention to promote active student engagement in the discussions.

In summary, activity moderators intervened to encourage and facilitate conversations. However, the increased intervention unintentionally limited the students' autonomy in directing the conversations.

5.3.2.3. Turn Allocation

The previous subsection looked into the analysis of utterances from a perspective of language functions. Turn allocation is also a common concept deployed in CA to identify the next speaker when an utterance is over (see Section 3.6.2.2). As suggested by González-Lloret (2011), participants use various turn-allocation techniques in synchronous CMC interactions, such as other-selection by current speaker, self-selection by others and self-

selection by current speaker. This sub-section aims to investigate the characteristics of turn-allocations in telecollaboration communications on Zoom.

Figure 35 displayed the distribution of turn-allocation techniques in two Irish schools (including their partnered schools from China). Overall, the frequency of using turn-allocation techniques remained the same in both schools, where other-selection by current speaker was the highest, followed by self-selection by others and self-selection by current speaker was lowest.

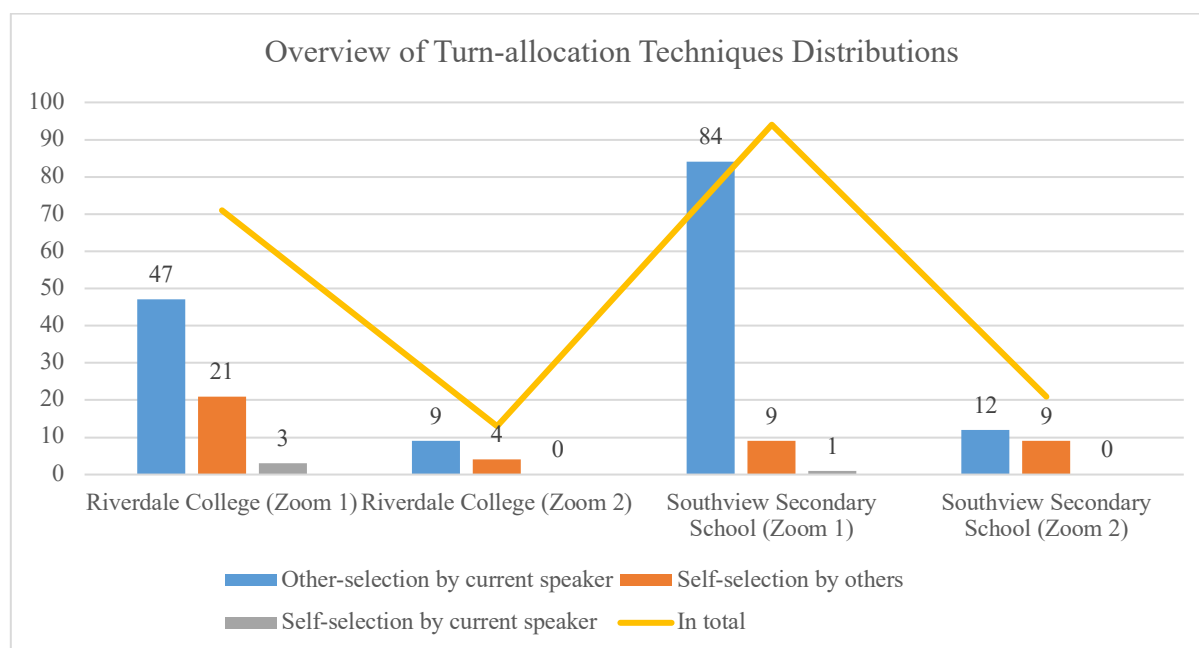


Figure 35. An overview of turn-allocation techniques distributions.

Riverdale and its Chinese partnered school

As illustrated in Figure 35, the overall number of turn-allocations in Zoom session 1 was seventy-one. The number of other-selection by current speaker was 47 where students frequently named the next speaker in most cases and visual assistances of the camera also contributed.

In addition, self-selection by others occurred 21 times, while self-selection by the current speaker happened only three times. Although there was no intervention from activity moderators in Riverdale in Zoom session 1, students actively participated in the conversation without using other-selection by current speaker technique, as they spontaneously joined the flow and continued the discussion on the topic (refer to Excerpt 8).

Excerpt 8. An example of participants spontaneously joining the flow.

Line 1 Moderator: C2-CN26, you are going to be the second one.

Line 2 C2-CN26: 我叫 C2-CN26, 我今年 15 岁, 我是中国人。 I recommend my hometown Xi'an in Shanxi Province. (English trans: I am C2-CH26. I am 15 years old, I am Chinese.)

Line 3 C2-R06: how old is the city?

Line 4 C2-CN26: it's almost 2500. It's a very old city.

Line 5 C2-R06: Do you live in Xi'an? (no response)

Line 6 C2-R06: Do you study and live in Xi'an?

Line 7 C2-CN26: yes, I live in Xi'an for 14 years. I was studying in Xi'an for the middle school and primary school.

However, the situation was changed in Zoom session 2. Firstly, the number of turn-allocations significantly decreased to 13. Secondly, other-selection by current speaker occurred nine times where five of them were from activity moderators who attempted to invite student participants to join the conversations by naming a student each time. In addition, no participant chose themselves (self-selection by current speaker) to take a turn in Zoom session 2. It is understandable that the organisation of online communication was changed to talk in the main room on Zoom where the size of chat group became too big to interact with each other. In addition, when the conversations were led by activity moderators, the willingness and motivation of student participants to take turns weakened as they were aware that regardless of the circumstances, activity moderators would choose someone to continue the talks.

In summary, the frequency of utilizing turn-allocation techniques remained consistent in both schools across two Zoom sessions: Other-selection by the current speaker was the most frequent, followed by self-selection by others, and self-selection by the current speaker was the least frequent. In addition, the motivation of students to take turns diminished when activity moderators led the conversations.

Southview and its Chinese partnered school

As participants from Southview utilised a single device in both Zoom sessions. Some insightful points were observed through analysing the different speaking parties in the most frequent technique of other-selection by current speaker.

	Zoom Session 1		Zoom Session 2	
	Activity moderator as current speaker	Student as current speaker	Activity moderator as current speaker	Student as current speaker
Student as the selected speaker	33	45	9	0
Activity moderator as the selected speaker		6		3

Table 28. An overview of different parties in other-selection by current speaker in Southview.

As outlined in Table 28. the number of students as current speaker passing turns to other students was largest in Zoom session 1 whereas there was no such utterance occurred in Zoom session 2. In addition, activity moderators took the control of turn-allocations despite they intended to involve students from both sides in the conversation. Consequently, participants became passive and waited to be called rather than actively engaging in the conversations.

Other-selection by current speaker (students to students)

When it came to choosing the next speaker by naming them, it frequently occurred when students launched the first turn of their conversation. Apparently, selecting a person by naming them was efficient, especially when multiple participants presented online. Excerpt 9 demonstrated that C2-S36 took the initiative to start the conversation with C2-CN51.

Excerpt 9. An example of using other-selection by current speaker (students to students).

C2-S36: C2-CN51, what's your favourite subject?

C2-CN51: My favourite subject is Music.

In addition, self-selection by others was a common occurrence among Chinese participants in both Zoom sessions, as they were unfamiliar with the names of every Irish student while sharing a single device. Moreover, the ongoing flow of conversations and the affordance of “raising hands” function on Zoom did not require naming a person in the technique of Other-selection by current speakers. However, there were two instances where conversations did not last long because the Irish side missed the question when Teacher Adam shifted the laptop to a different group of Irish students. This suggested the importance

of taking into account of the group size when sharing one device for online communications in the classroom setting.

Other-selection by current speaker (students as current speaker to activity moderators)

Participants frequently approached activity moderators when they were unsure about which language (English or Chinese) to use because the language instruction was not clearly explained in advance. In this study, students would seek assistance from activity moderators if they needed language support or required help with technical issues (Excerpt 10).

Excerpt 10. An example of other-selection by current speaker (students as current speaker to activity moderators).

C2-CN53: 行, 老师, 英文还是中文? (English translation: Okay, Teacher, shall I use English or Chinese (to introduce myself)?, language instruction query)

C2-S38: Where should I stay? (Teacher Adam suggested her coming to the screen really close and making sure she is in the middle of the camera, tech issue check).

C2-S36 how do I say "how old are you" (Looking for language assistance without naming as the physical presence of the teacher who was standing next to the student speaker)

Other-selection by current speakers (activity moderator as current speakers to student)

Activity moderators provided guidance where a lapse occurred in the online communications. Line 1 and Line 2 in Excerpt 11 demonstrated that moderators encouraged students to initiate a new conversation by selecting a speaker. In addition, the moderator advised the native Chinese to speak slowly (Line 3). Line 4 and Line 5 indicated that the moderator explained the situation either in English or in Chinese, depending on who was about to take a next turn or when the previous turn was beyond the language capacity of the students on the other side.

Excerpt 11. An example of other-selection by current speakers (activity moderator as current speakers to student).

Line 1 Moderator: pick one you would like to ask.

Line 2 Teacher Adam: do you want to pick somebody?

Line 3 Moderator: 先中文, 慢一点。 (English Translation: Speak in Chinese first, go slowly please)

Line 4 Moderator: C2-CN56, 你可以用中文问一下 C2-S38 吗? 她喜欢什么?
(English Translation: C2-CN56, maybe you ask C2-S38 what does she like in Chinese?)

Line 5 Moderator: 非常好, 可以用英文再说一下吗 (very good, can you say it in English again to us please?)

In terms of language prompts, finding suggested that the conversations primarily took place between Teacher Adam and the Irish students. Teacher Adam offered many language assistances to encourage his students to participate more actively but these interventions did disrupt the natural flow of conversation among students themselves. In Excerpt 12, participants previously shared school timetable (Line 1 to Line 3) but the topic was changed to the favourite food due to the intervention of Teacher Adam (Line 4 to Line 14). Consequently, the conversation turned into a teacher-led dialogue between the teacher and his students.

Excerpt 12. An example of teacher-led communications.

Line 1 C2-S36: how long is your lunch break for school?

Line 2 C2-CN50: one hours

Line 3 C2-S36: we have 45 minutes lunch break.

Line 4 Teacher Adam: and what do you have for dinner?

Line 5 C2-S35 In Ireland, we eat a lot.

Line 6 Teacher Adam continue to encourage his students: what's your favorite food? 你最喜欢的

Line 7 C2-S35 我最喜欢三明治. (English Translation: My favorite food is sandwich.)

Line 8 Teacher Adam joined: 你很喜欢三明治 (English Translation: You really like sandwich)。

C2-S35 Is it?

Line 9 Teacher Adam: you really like it.

Line 10 C2-S35 oh, 我很喜欢 (English Translation: I really like it)

Line 11 Teacher Adam: how would you say "in China" ? so how would you say that first in China? 在中国

Line 12 C2-S35 repeated after Teacher Adam: 在中国 (English Translation: in China)

Line 13 Teacher Adam continued: 你吃汉堡吗? (English Translation: Do you eat burgers?)

Line 14 C2-S35 在中国, 你吃汉堡吗? did you hear that?

Line 15 C2-CN50: 我比较喜欢吃耶 (English Translation: I like eating burgers.)

5.3.3. Summary

The analysis of utterances on Zoom suggested that participants in both schools had better performances and produced more utterances in Zoom session 1 compared to Zoom session 2. This suggested that on the one hand, breakout room interactions were found to be more efficient than interactions in the main session. Students even with a limited language proficiency had potentials to independently manage the conversations in Zoom breakout room. On the other hand, the involvement of moderators had impacts on the quality and quantity of telecollaborative interactions. In terms of utterances in Chinese, Irish participants in both schools showed a tendency to ask questions in Chinese to their language partners in Zoom session 1. Students from Southview initiated more statements in Chinese compared to students from Riverdale in Zoom session 2. Moreover, the topics discussed in Chinese or translanguaging mainly focused on self-introduction, hobbies, and food preferences, which were previously practiced in the eBook activity. The familiarity of topics made participants feel more comfortable to speak Chinese in the interactions. Additionally, participants smoothly switched to using English when discussing unfamiliar topics or beyond their language repertoire.

The exploratory analysis of turn-allocations on Zoom showed that participants followed a similar hierarchy in turn taking techniques as in face-to-face conversations (Hoey & Kendrick, 2017): other-selection by current speaker > self-selection by others > self-selection by current speaker. However, when it came to multiparty communication environment, especially participants sitting in the same physical setting and sharing one device on Zoom, their enthusiasm and motivation for initiating turns declined in this study. As a result, conversations became moderator-led with evidence of passive participation among students. This suggested two implications: 1) telecollaboration

communication requested more facilitation and technology support to optimise participants' interaction experience. 2) interventions from activity moderators could encourage students to speak more but may disrupt the natural flow of conversation among students. Therefore, activity moderators need to carefully consider when and what extent they should intervene in student conversations.

The upcoming section will provide an overview of the challenges and difficulties experienced during the course of this study.

5.4. Reflective Feedback on Challenges and Difficulties

After discussing the significant findings of interaction analysis (Padlet and Zoom) in the previous sections, it is crucial to delve into the challenges and obstacles faced by participants in the various activities. Therefore, this section will exclusively present the thematic analysis results regarding the challenges and difficulties reported in the two datasets: interviews and open-ended questions in the questionnaires. Overall, participants encountered three primary difficulties in the course of telecollaboration project, which can be categorised as *language barriers*, *logistic issues*, and *affective factors* (see Figure 36).

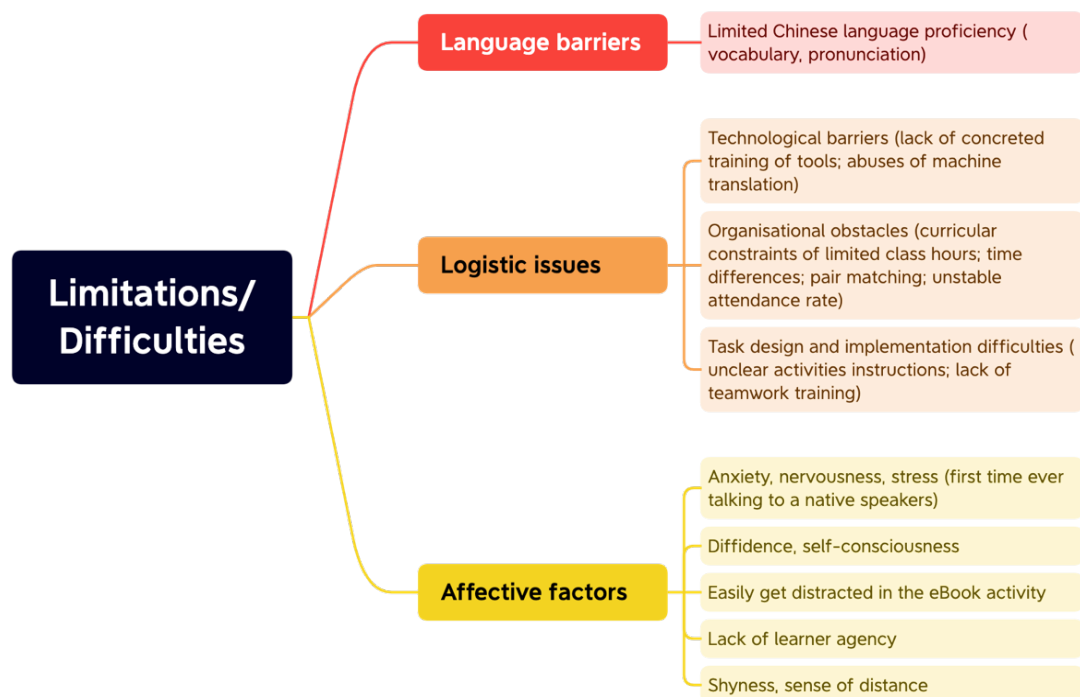


Figure 36. Three main difficulties synthesised from Cycle 2 data.

5.4.1. Language Barriers

Students were invited to answer the question about the factors which hindered their progress and communications, many of them demonstrated that they were incapable to extend topics during telecollaborative communications due to their limited proficiency in the Chinese language. This issue was also acknowledged by participating teachers, who observed that students relied on using English instead of Chinese due to insufficient repository of vocabulary in Chinese to continue communications.

“I don't actually speak Chinese, which is a major hindrance.” C2-R07

“I feel like I don't know enough about vocabulary to keep going. It's like I covered everything I already know how to say.” C2-S32

“Yeah, it is limited on what we can say, (C2-S47: echoed) like talking to them about in Chinese. (another two girls echoed as well). It is limited what we can talk to them in Chinese.” C2-S46

“I think the Padlet was excellent. The only thing that stops them from keep communicating was just that their own their language level. They were more inclined to type in English rather than Chinese.” Teacher Adam

Additionally, when Irish students spoke Chinese, their pronunciation were occasionally unintelligible to their Chinese counterparts. This increased nervousness among Irish participants and consequently it affected the quality of communication.

“Pronunciation wouldn't be understandable.” C2-S35

While participants appreciated the convenience of visual presence on Zoom, they expressed concerns about the accuracy of Chinese language outputs due to the spontaneous nature of online conversations.

*“The **Padlet** is easier to speak cause you can kind of think about it and like not making a mistake. But when you are doing on **Zoom** call, it's like you are doing on the spot. But I think **Zoom** call It's more fun because you are actually doing a face to face.” C2-S39*

In the eBook activity, participants highlighted pronunciation and spelling as challenges, particularly after receiving feedback from their teacher regarding group presentations. This might be explained by the fact that participants were not used to typing Chinese characters through Pinyin (Chinese alphabet pronunciation system) due to the

differences of writing system compared to English. In addition, a certain amount of typos was detected in the eBook content, such as tone differences: *和 (hé, and) instead of 喝 (hē, to drink), negative L1 interference: *吃床 (chīchuáng, eat bed) instead of 起床 (qǐchuáng, to get up), to name a few. However, participants indicated that their Pinyin spelling skills improved as one of the learning impacts after the eBook activity.

In summary, both Irish students and their Chinese teachers emphasised that the limited proficiency in the Chinese language had a negative impact on continuing the telecollaboration communications. In addition, the issue of pronunciation was reported in eBook and Zoom activities. The failure to understand each other increased participants' anxiety in speaking Chinese which in turn affected the quality of communication.

5.4.2. Logistical Issues

In terms of logistic issues, it includes three aspects: technological level, organisational level and task design level.

5.4.2.1. Technological Barriers

It is unavoidable to come across some technological problems when people utilise digital tools in daily life. In terms of eBook activity, the accuracy of online translations raised concerns among students and teachers. For instance, Riverdale participants wanted to enrich the content of eBooks by putting more elements in Chinese, however, participants were only informed by their teacher about the inaccuracy of certain translations towards the very end of group presentation.

“Forming sentences of topics such as Irish foods and cultures is the problem as translations can be misinterpreted and translated incorrectly”. Student group in Riverdale College

As underlined in red, Figure 37 illustrated an incorrect translation of ‘hurling’ in Chinese in a group’s eBook as “投掷” while the accurate translation in the context would be ‘爱尔兰式曲棍球/板棍球’.

Sports in Ireland (Ài'ěrlán de yùndòng)

Zài ài'ěrlán, wǒmen yǒu
zìjǐ de liǎng xiàng
yùndòng, gài ěr shì zúqiú
hé tóuzhí.

在爱尔兰，我们有 2 项自己的运动，盖尔式足球和投掷。



Tóuzhí yǒu sānqiānnián
de lìshǐ, shì yòng gùn zǐ
wán de.

投掷有三千年的历史，是用棍子玩的。

Figure 37. Screenshot of the eBook page.

As for Padlet, anonymity in Padlet resulted in repetitive self-introductions across groups (as discussed in Section 5.3). In addition, according to teachers, instant messages were only received by individuals who had downloaded the Padlet app and enabled notifications on their phones. This inconvenience led to Irish participants opting out from interacting with their Chinese counterparts on Padlet out of class time.

“WhatsApp is commonly used among Irish people. But people wouldn’t receive an instant message when sending on Padlet unless they download the Padlet app and turn on notifications on their phone. It is just not as convenient as WhatsApp or WeChat. To our students, they might prefer the most convenient way to communicate.” Teacher Bella

Regarding communication on Zoom, participants from Riverdale encountered sound distractions during Breakout room discussions (as discussed in Section 5.3.2.1). The utilisation of different modalities (asynchronous and synchronous) and tools helped students

facilitate their awareness of how technology-mediated communication influenced their behaviour when interacting with others.

*“The **Padlet** is easier to speak cause you can kind of think about it and like not making a mistake. But when you are doing on **Zoom** call, it’s like you are doing on the spot. But I think **Zoom** call It’s more fun because you are actually doing a face to face.” C2-S39*

*“The **Zoom** call is more like spontaneous, just came to you ahead the time.” C2-S35*

In summary, several technological barriers were identified by participants, including inaccurate machine translations, the semi-synchronicity of Padlet, sound distractions and the spontaneous nature of Zoom interactions.

5.4.2.2. Organisational Obstacles

At the organisational level, two main obstacles were identified: curricular constraints and inadequate facilities support. Curricular constraints refer to the limited amount of Chinese language class contact hours per week in both schools, which resulted in insufficient preparation time for both Irish students and their teacher to fully engage in each activity.

“because at the moment it, you know the kind of state of the language in the Irish system is such that it can't be delivered in the target language, for the first two years effectively....Unfortunately, we didn't plan for space between the calls and, as Chinese is only timetabled once a week, I was not able to mentally prepare my students for the tasks which occurred in each class...even if I if I saw them twice a week on two different occasions. I could have prepared the way better for them between each Zoom call you know and. It was another factor as well, where. not seeing them or met that.” Teach Adam

“Even though my students studied Chinese for two year, they had a very small amount of class hours over the past two years, like dozens of hours in total. Therefore, it was difficult for them to communicate in Chinese the whole time.” Teacher Bella

Additionally, the lack of collaboration among teachers was reported as another barrier by one of the teachers.

“There should be more connections made between Irish and Chinese teachers and like in an ideal world. The collaboration would happen in some kind of formal setting or semi formal setting through organisations, where people could meet and kind of and share resources, you know I think if there was a stronger kind of bond socially between the

Irish and Chinese teachers. And you have more of a long-term relationship between schools. Then you could really promote and help the students to feel more comfortable with one another and to identify more strongly with one another, then those kind of barriers to communication would fall down which more quickly.” Teacher Adam

In terms of inadequate facilitating support, Cycle 1 was implemented during the Covid-19 lockdown while each Irish participant had a personal portable device for Zoom sessions. However, Cycle 2 commenced when the schools reopened and students returned to physical classroom settings. This transition arose a practical issue where Breakout room discussions brought interruptions when Irish students stayed in the same classroom. Given that, adjustments were made to the following Zoom sessions in both schools.

“Zoom calls when too many people are talking at the same time. Hard to hear what they're saying.” C2-R08

“I think it was a little bit noisy, like for other groups are talking as well. It was like kind of hard.” C2-R14

Nevertheless, those adjustments made Zoom interactions more teacher-led which reduced the autonomy of Irish participants in actively taking turns (as discussed in Section 5.3.2.3). One teacher suggested conducting future telecollaborations in a computer room to improve this situation. Some students demonstrated that interactions would be improved by utilizing a bigger screen or accessing Zoom through their personal portable device and wearing headphones.

“They were unable to log into the Zoom call independently on Zoom. We walked around with my device and used it to enable students to talk one to one with their peers.

Conversations had to be mediated rather than being person to person, one to one. Because we had to use one device to connect students together, the interactions had to be guided and I think students lost some agency in the activity..... It might work better in a computer room, or a conference room in the school building which is dedicated for these activities.” Teacher Adam

“If it was on a bigger screen, it would be like much better because we could see like everything.” C2-R05

Furthermore, the existence of time differences resulted in communicative gaps among participants. This challenge unavoidably reduced participants’ motivation in telecollaboration communication. The delayed responses from each other on Padlet

prevented students from experiencing social media affordances because of different time zones and the inconvenience of message notifications on Padlet compared to other commonly used social media platforms such as WhatsApp or WeChat.

“I feel like the time difference, sort of. (other echoed) So if we were in the same sort of time zone, we could be talking to them at the same time that they're talking to us, but instead we're talking to them and they're both asleep. And then we go to sleep and then they start talking to us. So it sort of isn't as good as it would be.” C2-R04

“Whenever I said in school, they turned out to be asleep. Yeah. Right. Oh, we've got like activities on like, do them like, say, if it was like six o'clock for us, it's much later for them”. C2-R12

“So like isn't it gonna be quite hard to keep up conversations on Padlet? (C2-S30 & S32 echo with C2-S31 "yeah") since if we were talking on like at 5 o'clock in the afternoon, for them it can be like late night something going to bed. Isn't it can be kind of time issue to keep up conversations with them?” C2-S31 (C2-S30, S32, S45 agreed)

“WhatsApp is commonly used among Irish people. But people wouldn't receive an instant message when sending on Padlet unless they download the Padlet app and turn on notifications on their phone. It is just not as convenient as WhatsApp or WeChat. To our students, they might prefer the most convenient way to communicate.” Teacher Bella

Besides, the pair matching would require dedicated considerations. In the first cycle of this study, two groups of participants were at the equivalent level in the target language (both at the elementary level in speaking and listening). However, feedback from Cycle 1 participants were not fully positive as they struggled to maintain effective communication either in English or in Chinese. Given that, the pair matching strategy was adapted to recruit native Chinese teenagers who had an intermediate level of English or above in Cycle 2. While the quality of communication slightly improved in Cycle 2 (refer to the Section 5.3), it led to another affective obstacle for Irish participants who felt self-conscious and diffident. In addition, since English was primarily used in telecollaboration communications (as discussed in the Section 5.3), neither Irish participants would receive many opportunities to improve their Chinese nor Chinese teenagers improved their English. Hence, the reciprocal principle of telecollaborations was disrupted.

“Honestly, Zoom was quite good but too many students talking at the same time. It would be better to have one to one or two to two talk in the Zoom breakout room.” Teacher Bella

“I think in an ideal world, you would have yet like the language level would be identified as being similar between you know the native Chinese students, if they were kind of at a beginner level in English and the tasks were targeted up that particular level of language, like the way the Irish curriculum is at the moment. Basically, I suppose you feel a little bit like you're kind holding the better students back in a sense, because our language level is so much lower. You know you don't feel that the Chinese students are getting as much value, you know from the experience.” Teacher Adam

Moreover, the occasional low attendance rate from Irish participants not only slowed down the progress of e-book production (see the quote below from the focus group interview), but also affected the quality of telecollaboration communication. This impact was particularly significant when it occurred in Padlet chats among Group 3 from Riverdale (see Figure 15) as their language partner received no response in Week 2 because of the entire group of Irish students taking a class absence note. (see Section 0).

*“Team member absence was the difficulty we met.” Student group from Southview
Secondary school*

In summary, this study identified two primary organisational difficulties: curricular constraints and insufficient facilitation support. Overall, both teachers and students would need more preparation time between telecollaboration sessions. Additionally, time differences reduced participants' motivation for communication. The interruptions during group discussions in Breakout rooms suggested the need to improve physical settings or use headphones. Moreover, the attendance rate also played a crucial role in maintaining active participation.

5.4.2.3. Task Design and Implementation Difficulties

At the task design and implementation level, it should be noted that telecollaborative tasks require significant time for design. However, there were restrictions of Chinese class contact hours in both schools. One participating teacher reflected that he did not give clear activity instructions that each team member should contribute an equal amount to the eBook

presentation. Consequently, some participants received limited benefits for speaking because one student presented the eBook artefact on behalf of the whole group.

“I look for them to speak Chinese at the beginning and then what happened was when they're working as a group and in one group in particular like and C2-S31 end up making all voice recordings for the book and maybe I wasn't clear enough at the beginning, you know when setting out the tasks that everyone needed to include voice recordings and everyone needed to speak the same amount. So I think that was you know my fault for really for not being clear enough you know guiding the activity at the beginning.” Teacher Adam

In addition, unclear activity instructions led to the lack of constructive feedback among peers in the eBook activity.

“Students did not refer to the success criteria when providing feedback to their peers and did not ask and answer questions at the end of presentations.” Teacher Adam

Likewise, another participating teacher emphasised the importance of providing clear activity instructions and assignments to her students even at normal class time.

“My students need specific instructions so they can know what to do. Even when assigning homework to them, as a teacher, I have to explicitly tell them and make sure they understand every requirement and what they are expected to do.” Teacher Bella

Due to insufficient training in team task focus, some participants seemed to easily get distracted from new technologies and discussions when they had free time in the activity or out of scrutiny from teachers. This suggested that the necessity of teamwork training and groupwork reflections when it came to group activities in teaching practice.

“Students not focusing on tasks was a big challenge.” Teacher Adam

*“When it came into the third week of the eBook making activity, one group only finished one page.... Making a plan to complete the task was a big issue while creating eBooks.”
Teacher Bella*

In summary, task design and implementation challenges suggested the significance of clear instructions and teamwork training prior to activities.

5.4.3. Affective Barriers

The last category of obstacles in this study focuses on affective barriers reported by both students and teachers across all datasets. Table 29 presented seven main affective challenges with explicit quotes identified in this study. Overall, psychological distress was the biggest affective challenge with nine instances. This suggested that despite telecollaboration brought enjoyment and excitement, participants still possibly got some negative emotions such as anxiety and stress when they firstly interacted with Chinese teenagers. Apart from differences in individual personalities, the reasons behind diffidence and self-consciousness (6 occurrences) were attributed to the limited proficiency in the Chinese language among Irish participants and the shortage of preparation time between each telecollaboration session.

Affective Barriers	Quotes from participants
Worriedness, anxiety, nervousness, stress (9 instances)	<i>I was kind of worry about say something wrong. C2-S30</i> <i>I am part of Chinese even though Chinese is not my first language. I might get even more nervous because those guys they are look at me, a Chinese boy speaking in (unintelligible) Chinese. C2-S31</i>
Diffidence, self-consciousness (6 instances)	<i>During the Zoom call, I don't like the situation scare of (unintelligible) like hands up. And I was not confident with that. C2-S32</i> <i>I think there's also the Irish students were much more self-conscious and then I thought they would be in talking about themselves and and I think they were a little bit intimidated by the whole experience and they didn't know what to expect. Teacher Adam</i>
Easily get distracted (6 instances)	<i>They did not speak enough Chinese and the fun element of the presentation detracted from their focus, in my opinion. Teacher Adam</i> <i>My students need specific instructions so they can know what to do. ... I have to explicitly tell them and make sure they understand every requirement and what they are expected to do. Teacher Bella</i>

Affective Barriers	Quotes from participants
Lack of learner agency (5 instances)	<i>Very few students performed above expectations on the E-book presentation... They were reluctant to volunteer to speak on the (Zoom) call. Teacher Adam</i> <i>I think Zoom calls started messing because they felt like the teacher wasn't like going to look at you at the whole time. So they sort of didn't really pay attention to the Zoom calls. C2-R04</i>
Shyness, Sense of distance (4 instances)	<i>I was surprised, as well as well at how shy they became they just wouldn't answer questions you know from one another. Teacher Adam</i> <i>To be honest, the students here in Ireland are quite shy. If you don't contact them, they will never contact you. Teacher Bella</i>
Self-centredness (3 instances)	<i>They were like the things that they wanted to talk about were just so kind of self-centred in a way, like there were so kind of. You know, based on their own, like enjoyment and their own kind of experience of fun and things like. They didn't think in terms of, they didn't see it from the other person's perspective, as so what would be interesting, about Ireland to somebody from China, they didn't put any thought into it whatsoever, you know, which I was kind of quite surprised with. Teacher Adam</i>
Misbehaviour (1 instance)	<i>There was a danger of some students typing inappropriate messages. Teacher Adam</i>

Table 29. Examples of affective barriers identified in this study.

In addition, participants easily diverted their attentive away from the communicative tasks (6 occurrences). This distraction could be attributed to various factors, such as a lack of task focus training (discussed in Section 5.2.2.1), technological obstacles (refer to Section 5.4.2.1) and language barriers (refer to Section 5.4.1). This suggested that the learning outcomes and overall effectiveness of telecollaborations would be negatively affected if students could not fully engage in the tasks.

Moreover, the lack of learner agency may be attributed to various factors, such as the extent of interventions from the activity moderators (refer to Section 5.3.2.3), language barriers (refer to Section 5.4.1), and technological obstacles (refer to Section 5.4.2.1), to name a few. The decrease of the mean score in relation to motivation intensity (Section 5.1.1,

Table 21) among participants in the post-survey of learning motivation may also suggest a lack of learner agency.

Furthermore, according to feedback from one participating teacher, the reticence observed among his students was associated with a cultural inclination in Irish society to maintain a certain distance from unfamiliar individuals. In order to foster successful personal connections, the teacher suggested that students from China take the initiative in telecollaboration communication.

In summary, the majority of affective barriers in this study can be attributed to other challenges discussed in the previous sections, including language restrictions, technological obstacles and organisational challenges.

5.4.4. Summary

This section overviewed and detailly discussed a range of challenges and barriers encountered by participants in this study. Firstly, the limitations of language proficiency were identified as a significant hurdle, which affected the effectiveness of telecollaboration communication and increased anxiety among participants. Additionally, pronunciation issues were reported, which often led to misunderstandings between Irish students and Chinese teenagers and negatively impacted the overall quality of interactions.

Secondly, technological barriers were also prevalent, with participants highlighting inaccuracies in machine translations in the eBook activity, the inconvenience of responding on Padlet and sounds distractions in the Breakout room discussions on Zoom.

Thirdly, curricular constraints and insufficient facilitation support were identified as key organisational difficulties. Both teachers and students expressed the need for more preparation time between telecollaboration sessions. In addition, time differences further affected participants' motivation for communication. Furthermore, task design and implementation challenges suggested the significance of clear instructions and teamwork training prior to engaging in telecollaboration activities. The affective barriers identified in this study stemmed from various challenges discussed above.

5.5. Chapter Summary

This chapter presented the key findings of the second DBR cycle organised by research instruments. The Chinese language motivation questionnaires highlighted the positive influence of telecollaboration intervention on participants' motivation to engage in conversations with native Chinese speakers. The overall high scores on the intercultural sensitivity scale suggested that young Irish participants held an open mindset and a

willingness to embrace cultural diversity in telecollaboration activities. In addition, a positive relationship between Chinese learning motivation and intercultural sensitivity was observed.

The thematic analysis of interviews suggested that both students and teachers appreciated the significance of task sequences and the structured affordances provided by Book Creator, Padlet and Zoom. Improvements in Chinese language competences such as Pinyin typing skills and identifying characters were emphasised in the eBook activity. Padlet played a facilitating role in enhancing students' intercultural awareness by providing a relaxed communication environment. Additionally, Zoom meetings afforded Irish students with authentic and visual interactions with native speakers, resulting in an increase in confidence in speaking Chinese.

A comprehensive analysis of the utilisation of Chinese language on Padlet and Zoom demonstrated that Irish participants were more comfortable with using Chinese while talking on familiarised topics despite their limited language proficiency. However, participants frequently switched to using English due to unclear activity instructions as well as the restrictions of language barriers.

The synthesised challenges and difficulties of implementing telecollaborations in the Irish secondary educational context suggest the need to align telecollaboration tasks with the language proficiency of participants on both sides. Moreover, logistic and technological issues were reported such as time differences, curricular constraints, the inconvenience of responding on Padlet and sounds distractions in the Breakout room discussions on Zoom. Furthermore, task design and implementation challenges suggested the significance of clear instructions and teamwork training prior to telecollaboration activities. Those challenges led to some psychological distress among students. As a result, the quality of telecollaboration communications were negatively influenced. These important findings will be critically discussed in the next chapter to address the research questions outlined for this study.

6. Chapter 6 Discussion

The previous chapter focused on illustrating key findings of both qualitative and quantitative datasets extracted from the second iteration. This chapter will structure the discussion based on the research questions (listed below) to highlight and compare important results with the existing literature.

1. What was the impact of Computer-Mediated Communication (CMC) activities on young Irish learners of Chinese as a Foreign Language (CFL)?
2. How did the choice of CMC technologies contribute to the CFL learning process?
3. What were the characteristics of ‘successful’ and ‘failed’ task design in the course of telecollaboration learning for the beginner Chinese language course?

6.1. RQ1: What was the impact of Computer-Mediated Communication activities on young Irish learners of Chinese as a Foreign Language?

To address the impacts of CMC facilitated activities on Irish young learners of Chinese language, the changes of language learning motivation, linguistic and intercultural communicative competence as well as social and digital competence achieved throughout this study will be respectively discussed.

6.1.1. Chinese Linguistic Competences Development

According to Carson et al. (2019), Irish students encountered difficulties in both producing and identifying Chinese characters. However, participants in this study reported that the accuracy of character typing and recognition widely improved through completing the eBook activity facilitated by Book Creator, which echoes the findings of the previous research that learning activities facilitated by technological tools help enhance Chinese character input skills and text recognition (Huang et al., 2010; Luo & Yang, 2016; Wong et al., 2011; Zhang & Lu, 2014). Similar to Huang et al. (2010), the Chinese character input software integrated into the technological platform assisted CFL beginners in constructing essential knowledge of Chinese characters. Students involved in this study indicated that during the eBook activity, they not only had the opportunity to practice Pinyin spelling but also had to type Pinyin and locate the correct characters from the keyboard results (see Section 5.2.1.1).

Similar to the results of existing studies (Luo & Yang, 2016; Tang et al., 2016; Tian & Wang, 2010), evidence indicative of new vocabulary emerged while Irish participants interacted with native Chinese teenagers in the telecollaboration activities on both Padlet and Zoom (refer to Section 5.2.2.2). Additionally, corroborating the result of Chen (2013), telecollaboration “elevates the students’ abilities to use Chinese in authentic interaction communication” (p. 35), Irish students received opportunities to apply the Chinese linguistic knowledge they had learned in class and extend their language learning by engaging in conversations with native Chinese in the real life situation. However, this study was unable to demonstrate the diversity of words in the online text-based chatting environment that would enhance learners’ language production (Sauro & Smith, 2010) as the diversity of vocabulary usage was not indicated. The lack of vocabulary diversity may contribute to the language barriers reported in Section 5.4.1, which will be discussed further in the Section 6.3.3.

Moreover, the quantity and quality of telecollaboration exchanges conducted in Chinese varied among groups in both participating schools (refer to Section 5.3). Overall, students from both sides selected English as the primary communication language, although Irish participants made efforts to use Chinese when it came to familiar topics such as greetings and hobbies. Without a doubt, the restraint of Chinese language proficiency prevented Irish students from maximising the positive impact of telecollaboration on language learning especially on speaking practice. Akin to Ryder and Yamagata-Lynch (2014), achieving a balance of two languages usage (English and Chinese) in telecollaboration was not achieved between the usage of the two languages (English and Chinese) in telecollaboration was challenging due to differences in language proficiency.

On the other hand, the standard language patterns simplified in the textbook differs from real life speech, and it is important for students to “notice how their own language varies from native speaker practices” (Godwin-Jones, 2013, p. 2). Although the focus of telecollaboration is not to achieve linguistic accuracy either in Chinese or English, providing participants an authentic communication environment broke boundaries of physical language classroom and enabled learners to make full use of their Chinese language knowledge in a real conversation setting.

6.1.2. Chinese Learning Motivation Changes

Apart from linguistic development, online exchanges impacted the participants’ motivation to some extent (see Section 5.1.1). Comparing the pre-motivation results to the

post one, participants held slightly higher learning motivation after this study. Overall, the high values across many variables in the motivation survey indicated Irish learners had a generally positive attitude toward learning Chinese, which aligns with the study conducted by Carson et al. (2019) in the Irish Junior Cycle context. However, the mean scores across most variables in both pre and post surveys (see Section 5.1.1) are higher compared to Carson et al. (2019). The score differences could be explained by complex reasons, such as influences of Chinese language teachers, learning styles of individual learners, differences of language study period, to name a few.

In addition, the findings of motivation enhancement after CMC facilitated activities in this study are consistent with the previous research (Lan et al., 2013; Luo & Gao, 2022; Luo & Yang, 2016, 2021; Sugie & Mitsugi, 2014; Tseng et al., 2020). The enjoyable and relaxing environment established through technological tools contributed to activity engagement among participants. However, participants demonstrated a severe anxiety level in taking the Chinese language course after the telecollaboration, which has also been addressed in previous studies (Ji & He, 2020; Sugie & Mitsugi, 2014; Zhang, 2016).

Moreover, in comparison to Padlet interaction, participants did not have a very strong motive in the Zoom meeting, which resulted in a more passive role in the activity (refer to Section 5.3.2.3 Turn allocation). The reasons behind this increased communication apprehension and passive participation can be explained by individual and social factors, which will be addressed in the Section 6.2.2 and Section 6.2.3. Nevertheless, Ji and He (2020) suggested adjusting tasks when students reported a high level of anxiety in telecollaboration communication.

6.1.3. Intercultural Sensitivity and Awareness Development

It should be noted that one of key findings that distinguish this study from previous ones is that a positive correlation observed between Chinese learning motivation and intercultural sensitivity. As opposed to Qu and Hagley's positive findings (2021), this study found no significant difference across the five categories of intercultural sensitivity scales before and after the telecollaboration. The possible reasons behind this discrepancy could be attributed to variations in sample size, intervention period and individual profiles. While it was not evident to document the developmental progression among participants in terms of intercultural communicative competence in this small-scale study, participants did, to some extent, develop a sense of awareness toward individuals from the target culture and their perspectives (Furcsa, 2009; Ware & Kramsch, 2005). Jin and Erben's study (2007) reported

a consistent increase in the scores of five CFL participants over the course of a two-month telecollaboration, particularly in terms of two ISS factors: intercultural interaction engagement and attentiveness. However, the overall results (refer to Section 5.1.2.1) indicated that Irish CFL participants had a relatively high level of intercultural sensitivity and showed positive improvement in the post-survey of intercultural sensitivity scale, particularly in terms of the other three ISS factors: Intercultural Confidence, Respect for Intercultural Differences, Interaction Enjoyment. In addition, focus group interview results suggested that Irish participants were open-minded and willing to understand their counterparts' explanation by reflecting on cultural and behavioural differences during intercultural interaction, which aligns with the findings that telecollaboration helped increase intercultural understanding of the participants (Angelova & Zhao, 2016; Furcsa, 2009; Jin & Erben, 2007; Liaw & Master, 2010; Menard-Warwick et al., 2013; Schenker, 2012). According to Chen and Starosta (2000), "the willingness to recognize, accept and appreciate diverse views and ideas embedded in open-mindedness cultivates the ability of sensitivity" (p. 5). In this case, this telecollaboration project opened a door and enable cultural learning and intercultural interaction to occur in an authentic communication setting beyond the classroom. In addition, questions initiated on Padlet and Zoom indicated the curiosity of Irish participants. However, Koester and Lustig (2015) critiqued self-reported scales regarding intercultural communicative competence for not effectively addressing the appropriateness of ICC, as the latter aspect was evaluated by counterparts from the intercultural interaction.

The development of intercultural awareness is ongoing process (Chen & Starosta, 1998). Hanvey (1987) categorised this process into three levels: awareness of superficial cultural facts, awareness of significant and subtle cultural characteristics, and awareness and empathy of cultural understanding from counterpart's side. Considering the findings of focus group interview (refer to Section 5.2.1), Irish participants seemed to be situated at the first level of intercultural awareness development, where they accepted and recognized more similarities between two cultures, particularly in terms of individual young people's lifestyles. However, one of the teachers involved in this study emphasised that he was surprised that his students showed egocentrism in the intercultural communication, as they were not proud of showcasing Irish culture to their counterparts. This shyness of Irish students as CFL learners contradicts the findings of Oakley et al. (2018), where Chinese peers were shy and more reserved in the telecollaboration communication. Furthermore, the findings of interaction analysis in Section 5.3 are consistent with other research which

found some intercultural exchanges were fact-based and superficial (Keranen & Bayyurt, 2006; Liaw & Master, 2010; Liaw, 2006; Oakley et al., 2018). Similarly, O'Dowd (2003) cautioned both researchers and practitioners that telecollaboration could end up with meaningless and superficial interchanges. Nevertheless, the development of those peripheral cultural understanding was still valuable for learners to investigate the target culture which was not available in the textbooks (Ducate & Lomicka, 2008) and to establish the understanding in line with this shallowness (Keranen & Bayyurt, 2006). For example, reflecting on the cultural differences and similarities was crucial to participants (refer to Section 5.2.1.2) to grow interculturally and develop understanding of intercultural contacts (Angelova & Zhao, 2016; Canto et al., 2013; Menard-Warwick et al., 2013; O'Dowd, 2007).

Overall, given the short period of telecollaboration communication, it would be arbitrary to indicate whether Irish participants were clinging to either ethnocentric orientations or situated in ethnorelative orientations, as “acceptance does not mean agreement” (Hammer et al., 2003, p. 425). Additionally, the simplified cultural discussions that occurred in telecollaboration rarely involve any in-depth content-related questions or cultural conflicts (Oakley et al., 2018). Therefore, longitudinal research about the impact of telecollaboration on CFL learner’s intercultural communicative competence would be suggested (refer to Section 7.2 Limitations of this study and Section 7.3 Recommendations for future practice).

6.1.4. Social and Digital Competence Changes

Irish participants addressed the enhancement of both internal and external connections through social interactions in this study, which echoes the findings of most studies (Ji & He, 2020; Jin, 2013; Luo & Yang, 2021; Tang et al., 2016; Wang et al., 2013; Wang & Vásquez, 2014; Wang et al., 2016; Yang, 2018). Regarding the internal connection, it refers to peer collaboration within classroom. The design of eBook activity was embedded in the Bridge 21 learning model, which aims to create a collaborative learning environment mediated by technology and transform teacher-dominated instructions into student-centred learning (Byrne et al., 2019; Lawlor et al., 2018; Sullivan et al., 2015). In addition, the eBook activity required peer collaboration to brainstorm ideas and construct pages. Clear role assignments allowed Irish participants to actively engage in the group discussion (see Section 5.2.1.1) where learners were responsible to content and gained a sense of ownership of artefacts (Huang et al., 2010). As addressed by Lawlor et al. (2018), the project-based learning feature of Bridge 21 model not only requires collaborative teamwork but also

establishes an open and flexible space for students to take control of the learning process and be accountable to themselves and other team members.

In terms of external connections, it refers to friendship and learner community in this context. Although some Irish participants reported the contribution of telecollaboration communication to social skills and friendship development (see quotes below), this study is unable to demonstrate the establishment of learner community between Irish students and their counterparts from China, which is frequently described in the previous CFL telecollaboration studies (Ji & He, 2020; Luo & Yang, 2022; Tang et al., 2016; Wang et al., 2013).

“I would say there’s a lot of similarities which build up an internet friendship.” C2-R02

“We got to socialize with the other pupils from the other side of the world, they are also in high school. We use to talk to them and see what their interests are. It’s good to look like if you meet new people, not just from China or online. Just like anyone in general, you can talk to improve your social skills.” C2-R14

In addition, Lai (2017) found Padlet is a good platform for CFL learners to generate new knowledge and reduce the communication gaps. Although participating teachers provided positive feedback on the implication of Padlet and its social impacts on students’ daily lives (refer to Section 5.2.2), the social nature of Padlet was not fully explored by participants (see Section 5.3.1.3 the usage of multi-modes on Padlet). The factors and reasons behind will be discussed in Section 6.3.

As for communication confidence, similar to previous studies (Guo & Möllering, 2017; Ji & He, 2020; Zhang, 2019), Irish participants gained a slight increase in confidence at the end of this project (refer to Section 5.1.2.1). However, the relatively low mean scores of Factor Interaction Confidence in Intercultural Sensitivity Scale (ISS) indicated that many participants still felt occasional lack of confidence when communicating with individuals from different cultures, which is consistent with Lan et al. (2013) who found beginner CFL learners easily lacked confidence in communicating with native Chinese in the target language despite a gradual increase in confidence during the study. In addition, while enjoyment and positive attitude has been identified by language learners from previous telecollaboration studies (Helm, 2015; Spring et al., 2019; Sugie & Mitsugi, 2014; Zhang, 2016), the significant mean differences in the scores of Chinese course anxiety (Section 5.1.1.3) has once again confirmed the presence of relatively high-level anxiety in synchronous communication with native speakers, especially among CFL beginners (Ji &

He, 2020). Regarding digital competence development, similar to Qu and Hagley (2021), participants from this study also reported that their soft skills, such as online searching and research filtering, improved while completing the eBook activity.

6.1.5. Summary

This section addressed the first research question which discussed the impacts of CMC facilitated activities on Irish CFL learners, focusing on Chinese linguistic competences, learning motivation changes, intercultural sensitivity, and social and digital competence development. The findings showed improvements in Chinese character typing and recognition skills through the eBook activity facilitated by Book Creator, which aligns with previous research (Huang et al., 2010; Luo & Yang, 2016; Wong et al., 2011; Zhang & Lu, 2014). Additionally, the telecollaboration activities led to the emergence of new vocabulary and opportunities for authentic language use with native Chinese peers, corroborating findings from other studies (Chen, 2013; Luo & Yang, 2016; Tang et al., 2016; Tian & Wang, 2010). The study demonstrated a positive correlation between Chinese learning motivation and intercultural sensitivity, indicating that engaging in telecollaboration positively influenced both areas. Moreover, the study highlighted the enhancement of internal connections through peer collaboration and external connections through social skills and friendship development, consistent with findings from other studies (Ji & He, 2020; Jin, 2013; Luo & Yang, 2021; Tang et al., 2016; Wang et al., 2013; Wang et al., 2016; Yang, 2018).

Overall, this telecollaboration project provided valuable opportunities for language learning, intercultural interactions, and social skill development, contributing to a more holistic approach to Chinese language education for Irish learners. The next section will discuss the second research question, which focus on the contribution of selected CMC tools to the learning process from sociocultural theory perspective.

6.2. RQ2: How did the choice of CMC technologies contribute to the CFL learning process?

The theoretical foundation of telecollaboration is rooted in sociocultural theory which explores the connection between learners and their social context. The language learning process evolves through interactions with individuals within the social environment. The promotion of telecollaboration in foreign language education values the benefits of interaction opportunities with native speakers and the authentic environment.

This section will explore the process of learning from a lens of sociocultural theory interrogating how mediation and environment afford learning and interactions in each CMC facilitated activity.

6.2.1. Mediation

Overall, the integration of CMC tools into the CFL classroom has contributed to a shift in the learning environment from traditional textbook-based practice to authentic daily communication, which is consistent with the previous literature. According to Lantolf (2000), social mediation refers to mediation by others through social interaction. In this study, there are two dimensions of social mediation by More Knowledgeable Others from both native Chinese speakers and teachers.

The findings of the current study suggested that teachers mainly took roles as scaffolders, facilitators, activity cheerleaders and cross-cultural mediators in the technology-mediated activities (refer to Section 5.2.2.3), which echoes previous literature (Çiftçi & Savaş, 2018; Kramsch, 2004; Scarino, 2014). Pedagogical mentoring, which refer to “the guidance by a teacher or facilitator during a virtual exchange to support student engagement, collaboration and learning” (Fernández Gutiérrez et al., 2022, p. 152), has been explored in the field of virtual exchange (Dooley, 2011; Fernández Gutiérrez et al., 2022; Kramsch, 2014; O'Dowd et al., 2020). For instance, teachers provided Irish students with language assistance and feedback in the creation of eBook content. As indicated in Section 5.4.2.1, students reflected on the aspect of language learning in eBook contents based on their teacher's feedback after the group presentation, where they realized the mistranslation of “hurling” from the online translation tool. Swain and Lapkin (1998) emphasised the importance of teacher feedback in addressing learner uncertainty and identifying incorrect solutions to linguistic problems. Additionally, Shooshtari and Mir (2014) suggested that teacher feedback, as one form of scaffolding, can be used to scaffold future writing. Furthermore, the eBook activity (as illustrated in Section 4.5.2.2 and Section 5.2.1.1), which aligned with the key principles of the Bridge 21 learning model emphasising student-centred and project-based learning, led teachers to opt for indirect participation in the activity. In addition, this eBook activity took place within the confines of the physical classroom, which is the customary venue for teachers to deliver Chinese language classes. Consequently, teachers were adept at overseeing the collaborative process of eBook content creation and offering assistance whenever necessary. The above statements emphasised the central role of teachers

as mediators requires them to understand the process of learning and facilitate interactivity(Scarino, 2014).

However, in the context of Zoom interaction, the analysis of language functions (refer to Section 5.3.2.2) indicated an increase in intervention frequency from the teachers, leading to teacher-initiated conversations rather than student-led interactions. This shift was primarily attributed to the practice of having a single login device for Irish students to avoid the distractions of sounds and echo. Additionally, Hampel's study (2006) explained that the absence of immediacy of face-to-face contact in the videoconferencing environment made it challenging for teacher to know when to intervene. Moreover, Ware and Kramsch's research findings (2005) indicated that the level of teacher involvement in the telecollaboration process influenced the degree of L2 exposure among participants: the greater the independence in telecollaboration exchanges, the higher the L2 exposure. Nonetheless, teachers faced greater challenges in controlling interventions when their primary concern was the efficiency of technology-mediated activities (Lai et al., 2011).

Apart from language assistance, teachers also provided students with scaffolding to gradually develop their skills in navigating the platforms and completing the activities (refer to Section 5.2.2.3), which echoes with the suggestion that teachers also needed the digital competence and obtained essential training in technology in the literature (O'Dowd, 2007, 2015; Oakley et al., 2018; Xu & Moloney, 2011). In brief, there are many factors impact on the decision of teachers whether they directly participate in telecollaboration communications. The CMC tool dictated the need for scaffolding but also simultaneously changed the demands on teachers as this was evident that teacher involved in this study were more flexible to switch between intervener and observer in the eBook and Padlet activities comparing to telecollaboration facilitated by Zoom.

As for mediation from native speakers, Irish participants in this study highlighted the development of intercultural awareness through engaging in conversations with partners from China. This echoes findings from previous telecollaboration studies in general foreign language learning (Antoniadou, 2011; Chun, 2011; Godwin-Jones, 2019; Lee & Song, 2019; Lee & Markey, 2014; O'Dowd & Dooly, 2020) and in the field of CFL (Luo & Gao, 2022; Luo & Yang, 2021; Sugie & Mitsugi, 2014; Tian & Wang, 2010; Tseng et al., 2020; Zhang, 2016). The exchanges of information related to personal interests and school life bridged the gap between the participants, enabling them to discover them find commonalities and gradually boosting their communication confidence from Padlet chats to Zoom talks (refer to Section 5.2.1.2). The role of linguistic authority taken by native speakers as MKOs

(Godwin-Jones, 2019; Hampel, 2006; Jin, 2013; Kramsch, 1997) was not straightforward in this study, given English served as the primary language in telecollaboration communication. Additionally, it should keep in mind that taking the native speaker as a model is problematic for L2 learners because on the one hand, it is unjustifiable to require L2 learners to master over a language as a native speaker. On the other hand, the nature of interaction requires intercultural individuals are capable of engaging with different cultures and understanding of diverse viewpoints through the target language rather than becoming a perfectly fluent native speaker (Byram, 1997; Byram et al., 2001; Kramsch, 1997).

During the focus group interview, Irish students expressed surprise at their language partners' fluent English and felt conscious of their limited Chinese language. This finding further supports the notion that an imbalance in language proficiency not only creates a tension for participants with lower proficiency to take on the role of a MKO to partners (Ryder & Yamagata-Lynch, 2014), but also reinforces the position of Irish participants as learners and makes them opt for English to remain within their comfort zone. Similar to the results of Renner (2017), novice CFL learners tended to use their L1 in telecollaboration, English was primarily selected by Irish CFL learners in this study (see Section 5.3). As addressed in the previous study (Antón & Dicamilla, 1999), it is necessary for low L2 proficiency learners to deploy L1 as it provides scaffolding in the learners' ZPD and aids in understanding the meaning of the text in L2.

However, when the language used by the native speakers is beyond the learners' ZPDs, L2 learners are not able to benefit fully from native speakers although telecollaboration can help learners improve their L2 abilities by interacting with more capable speakers of the language (e.g., native speakers) who offer assistance in various ways (Kington et al., 1999). In addition, Storch (2008) advised that the types of task may affect the role relationship adopted by the participants. For example, Irish participants demonstrated a sense of ownership in the eBook activity when collaborating with their familiar classmates. However, they transitioned into roles as novice language learners when engaging in communication with native Chinese partners during telecollaboration. Furthermore, the passive turn taking and the low number of conversations among interlocutors on Zoom corroborated the statement that motivating every student to engage in the telecollaboration was challenging (Hampel, 2006), despite the innovative aspect of technology brought to the language classroom.

6.2.2. *Affordances*

The concept of affordance was coined by Gibson (1979) to address the relationship between the characteristics of an object or environment and an individual capability. It enables researchers to investigate how interactions are influenced by and directed towards particular technological and task attributes. In this study, interactions mediated by technology tools and the task were explored (refer to Section 5.3) and the challenges were discussed in Section 5.4. From the SCT perspective, CMC environments are not rigid artefacts but are underwent rapid changes due to the engagement of users and their choices (O'Rourke, 2005; Thorne, 2003). Those choice decisions can be influenced by the characteristics of pedagogical tasks and technological features which in turn impact on the interaction. Moreover, the intertwined relation between technology and TBLT is vital in language learning (Lai & Li, 2011). According to Thorne (2003), technological tools are not neutral media as they can have both affordances and hurdles. Hutchby (2003) also pointed out that the features of technology can both provide opportunities for and impose limitations on the potential for interaction. Therefore, the following section will be set out to discuss both the perceived and potential affordances of each technological tool integrated in the tasks involved, along with the constraints caused by the technology as well as the tasks.

Based on the observation and evaluation of Cycle 1 telecollaboration failures, it became evident that adequate scaffolding for CFL beginners prior to official online meetings is needed (refer to Section 4.4.5). To improve Irish students' interaction experience with native Chinese, eBook collaboration among Irish students and text-based chat with native Chinese teenagers were included in Cycle 2. The results of Cycle 2 confirmed that the completion of the eBook on Book Creator afforded CFL learners to consolidate previous linguistic knowledge and facilitated their transition to text-based communication with native speakers on Padlet (refer to Section 5.2.1.1). Irish students appreciated the facilitation of eBook activity in Chinese writing, especially in character recognition (see Section 5.2.1.1), which echoes the findings that the integration of technology improved "students' Chinese writing ability, engagement, and motivation" (Eubanks et al., 2018, p. 362). Additionally, this eBook activity adapted from the Bridge 21 learning model also enabled Irish students to collaborate with peers for meaningful discussion and learning. Similar to the previous studies using the Bridge 21 model in other subject domains (Byrne et al., 2019; Lawlor et al., 2018), the design of project-based task empowered participants with ownership of the learning and team development through brainstorming and decision making. The tutorial of Book Creator and explicit activity instructions gradually facilitated Irish participants in

completing the eBook activity and reflecting on the learning experience (Lawlor et al., 2018). Additionally, team members were assigned one or more roles according to their expertise, which contributed to collaboration learning within the ZPD (Vygotsky, 1986). However, teachers participating in this study reported that some students became distracted by the tool Book Creator, causing them to fall behind other groups (see Section 5.2.2.1). This observation aligns with the finding that integrating new technology into the learning task could have adverse effects on learning (Lan, 2014). Furthermore, Cycle 1 feedback and a previous study (Ji & He, 2020) have addressed that the unfamiliarity of counterparts can hinder engagement in telecollaboration communication. As a facilitating activity prior to online meeting on Zoom, Padlet affords communication with others using common features of text-based communication, such as sending messages, emojis and pictures to interlocutors (as illustrated in Section 5.2.1.2). As reported in previous studies (Qian & McCormick, 2014; Sugie & Mitsugi, 2014; Tseng et al., 2018; Zhang, 2016), text-based chat provided participants with a relaxing space where they had the freedom of expression and experience less anxiety. In addition, Irish participants reported that fewer interruptions occurred on Padlet when expressing opinions comparing to face-to-face discussions, which echoes previous studies (Chin et al., 2008; Guo & Möllering, 2017). As a result, text-based CMC also afforded democratization of participation in the multiparty communication (Warschauer, 1997) as “all participants can compose and post messages simultaneously” (González-Lloret, 2011, p. 312). The affordance of equity on Padlet was appreciated by Irish participants (refer to Section 5.2.1.2). The scenario of interruption is related to disrupted turn adjacency (See Excerpts in Section 5.3.1.2) where one participant (first-pair part) composed and sent unrelated conversation threads to another participant (second-pair part). As addressed by González-Lloret (2011), adjacency pairs are not always next to each other in the text-based CMC. According to Herring (2007), the receiver cannot interrupt while the sender is composing the message in the one-way CMC message transmission because turn transition relevant place (TRP) cannot be projected in the text-based CMC environment due to lack of verbal and nonverbal cues comparing to face-to-face conversation (Garcia & Baker Jacobs, 1999; Schönfeldt & Golato, 2003). However, the persistent presence of chat logs on Padlet not only afforded participants to resume unfinished topics but also facilitated reflection on the communication by providing more reaction time (Sung & Poole, 2017; van Compernelle & Williams, 2013) and the opportunity to track and engage in the multiple conversational threads (Herring, 1999; Herring, 2007; Meredith, 2019). Yet, misunderstandings may occur because of the farther location of a message from its referent (González-Lloret, 2011).

Additionally, the preferences of emojis and short turn length on Padlet can be viewed as the creative techniques taken by participants to resolve disrupted adjacent pairs and ensure the coherence of interaction on text-based CMC (González-Lloret, 2015).

As stated in Section 5.3.1.4, the anonymity of Padlet protected the privacy of interlocutors and reduced their communication anxiety. However, it also increased the frequency of identification and recognition with repeated greeting and self-introduction dialogues. Obviously, identifying and addressing the interlocutor in the multiparty communication environment is significant because “the visibility of the names of the participants in the chat window affords the possibility of knowing that the chat starter is interacting with their intended interlocutor” (Meredith, 2017, p. 52). In addition, the imbalanced target language outputs among Irish participants and their counterparts corroborate the statement that computer-mediated communication is largely influenced by a variety of technical and situational factors (Herring, 2007). The occasional low response rate on Padlet echoes the existence of a big chance for turn taking failures and lack of responses in multiparty environment (Rintel et al., 2001; Schönfeldt & Golato, 2003). In contrast to the study González-Lloret (2011), where participants set up a chat date and time in advance, such practices were not found among participants involved in this study. Additionally, participating teacher highlighted the role of Padlet as mimicking a social medium for Irish young learners, enabling students to share audios, videos, hyperlinks and other modes. However, the social affordances of Padlet were not fully perceived by both Irish students and their counterparts due to a shift to an unfamiliar social platform, which echoes the notion that multimodality afforded by technology does not guarantee multimodal interaction occurs or increases (Meredith, 2017) especially if students are not sufficiently familiar with the new technology and its functions (Lan, 2014). As commented by Meredith (2019), the existence of an affordance hugely depends on the relationship between the user (learner) and the object (technological tool).

After engaging in text-based chat on Padlet, participants exchanged information with each other and began to get to know their counterparts. Subsequently, videoconferencing on Zoom was chosen as the final telecollaboration activity in this study. The visualization of their counterparts was highlighted by Irish participants (refer to Section 5.2.1.2), which aligns with the previous research (Fischer & Tenbrink, 2003). However, technological issues such as transmission delays of both audio and video may lead to unsuccessful turn-takings due to the lack of nonverbal clues such as gestures and gazes (O'Malley et al., 1996). Although the institutional and technological limitations shorten the period of Zoom

interaction, the authentic oral communication environment provided some valuable conversation practice that facilitated the development of Irish CFL learners' confidence and cultural learning, which echoes the findings (González-Lloret, 2015; Jin, 2018). Participants shared the screen to display sightseeing and travel photos on Padlet while using Zoom. However, the spontaneity of oral interaction on Zoom required interlocutors to react almost immediately during the rapid interaction. This immediacy also caused anxiety among Irish CFL beginner learners, although they reported the increase of communication confidence in speaking Chinese (refer to Section 5.4.3). The fear of making errors combined with the demand for immediate responses in target language may lead to cognitive overload among Irish CFL learners, which is consistent with the previous research (Guo & Möllering, 2017; Luo & Yang, 2016; Palomeque & Pujolà, 2018).

In addition, although the quantity and quality of Zoom interactions were not very encouraging in this study (refer to Section 5.3.2), the option of breakout room on Zoom afforded Irish students a safe and relaxing place to actively engage in the conversation comparing to the larger group size of interactions in the main session. This finding confirmed the importance of space in videoconferencing interactions as “the communicative space is not shared unproblematically, participants appear spatially distant, and the communicative floor has to be negotiated explicitly and with great effort, or even moderated” (Fischer & Tenbrink, 2003, p. 189).

Regarding turn allocation techniques, unlike the potential for democracy afforded in Padlet, other-selection by the current speaker was the most frequently technique through addressing participants' names (as illustrated in Section 5.3.2.3). This finding aligns with the findings of the research (Fischer & Tenbrink, 2003) and complied with one speaker at a time turn-taking principle (Sacks et al., 1978). However, the interventions of teachers on Zoom led to the tendency of passivity in turn-taking, which echoes with the study (Zhang & Lu, 2014) that teacher involvement restricts the use of the affordances in the social networking site.

6.2.3. *Summary*

This section explored the learning process by investigating the relationships between CMC tools and learners as well as affordances of CMC facilitated activities through the lens of sociocultural theory. Although the level of telecollaboration participation in this study was rather low, the combination of technology in Cycle 2 was beneficial, offering valuable

insights for authentic cultural learning and intercultural interactions, collaboration, and team development. As addressed by González-Lloret (2011), language learning not only encompasses linguistic aspects but also considers the social context and sequential development of interactions. The quantity and quality of telecollaboration are conditioned by the characteristics of the technology used for communication as well as the features of pedagogical task design. The next section will discuss the characteristics of successful telecollaborative tasks and the factors that led to failure, as found in this study.

6.3. RQ3: What were the characteristics of ‘successful’ and ‘failed’ task design in the course of telecollaboration learning for CFL beginners?

Section 2.4.2.1 reviewed the existing literature concerning telecollaboration task design and the importance of task sequencing in practice. In line with addressing Research Question 3, this section will comprehensively discuss the success and failure encountered in this telecollaboration project through the lens of the four levels outlined by O'Dowd and Ritter (2006). These impact factors can be systematically categorised into two overarching dimensions: macro-level and micro-level considerations. The macro-level dimension encompasses socioinstitutional influences and classroom-related aspects which will be respectively discussed in Section 6.3.1 and Section 6.3.2. On the other hand, the micro-level dimension entails individual attributes as well as interactional dynamics which will be explored in Section 6.3.3.

6.3.1. Socioinstitutional Level

The term “socioinstitutional level” refers to general organisational factors and technology impacts (O'Dowd & Ritter, 2006). Specifically, these organisational factors include education policies, curriculum and syllabus requirements, school calendars and time differences. As highlighted in Section 1.1, Ireland’s new strategy for foreign language education, *Languages Connect*, identifies the inclusion of Mandarin Chinese as a curricular language subject for Irish Senior Cycle students in the coming years. Within the curriculum specifications for Mandarin at Junior Cycle, “using digital technology is identified as a core component: the student uses technology and digital media to learn, communicate, work and think collaboratively and creatively” (NCCA, 2016, p. 6).

This national language educational policy addressed the significance of developing digital competence in language education for secondary school students who are growing up with new technology and they are referred as “digital natives” (Prensky, 2001). However,

opportunities facilitated by telecollaboration activities has not been taken into account as a possible choice to raise both motivation and interest of Irish adolescent learners in studying Chinese, especially since they are beginners of this language and lack an authentic communication environment. O'Dowd (2022a) emphasised the necessity of incorporating virtual exchanges (which is a broader concept encompassing telecollaboration) into educational policy documents and curricula as a means to encourage the practical implementation of these activities.

Additionally, the adaptable and flexible nature of Chinese course syllabi within JC empowers Chinese language instructors to introduce innovative pedagogical activities in their language classroom. Therefore, the success of eBook activity adapting Bridge 21 learning model facilitated by Book Creator not only fostered the development of linguistic proficiency among Irish CFL learners (particularly in Chinese character recognition and production), but also nurtured peer collaboration (refer to Section 5.2.1.1). However, a range of challenges were identified in the context of online exchanges with native Chinese speakers (refer to Section 5.4.2). Firstly, the limited class contact hours allocated for Chinese language teaching in JC secondary schools (see Section 1.1) resulted in insufficient language practice and restricted language proficiency among Irish CFL learners. This limitation further impeded the effective implementation of synchronous telecollaboration communications within the classroom. As addressed in Section 5.4.2.2, both Irish students and teachers reported inadequate preparation time for engagement in each telecollaboration activity. In fact, the core concept of telecollaboration is project-based collaboration learning. However, this innovative pedagogical approach to connecting with native speakers is currently excluded from the CBA in JC Chinese specification (NCCA, 2016) because teachers need to prepare their students for the terminal examinations (Mulcahy, 2022).

Additionally, the misalignments of school calendars and time differences exacerbated the difficulties of scheduling videoconferencing interactions and maintaining active participation on text-based CMC platform Padlet, which aligns with the previous studies (Belz, 2003; Lai et al., 2011; Luo & Gui, 2021; Oakley et al., 2018; Zhang, 2016). As demonstrated by O'Dowd (2022a), the success and promotion of virtual exchange rely on not only classroom-based practice but also the support of institutional management boards and policy makers.

As for the two video meetings held on Zoom, they were conducted in the Irish CFL class during afternoon hours in Ireland but late at night in China. This scheduling discrepancy led to certain native Chinese students participating in Padlet conversations sent

absence notes to the researcher with the short notice of Zoom meeting. Consequently, the number of participants from the Chinese side reduced to engaging in Zoom interactions. Nevertheless, it is noteworthy that the identical schedules set for both Padlet and Zoom engendered distinct attitudes and participation behaviours. This discrepancy may be attributed to the nature of Padlet as a text-based platform, which affords greater accessibility and has lower prerequisites for engagement. This accessibility allows individuals to engage with their personal technological device within the classroom setting. Conversely, videoconferencing demands more stringent conditions for participation and environment, particularly to mitigate disruptions in audio quality and to ensure stable video bandwidth when dealing with a larger number of participants in the same physical classroom. Moreover, according to many participants from this study (see Section 5.4.2.2 and interview quotes below), the delayed responses from each other on Padlet prevented students from experiencing social media affordances due to different time zones and the inconvenience of message notifications inherent to Padlet when juxtaposed with more commonly used social media platform such as WhatsApp in Ireland or WeChat in China. These results are consistent with those of Jiang (2014) who found that the more frequently a technological tool is used, the higher the rates of familiarity and effectiveness are.

*“I feel like the **time difference**, sort of. (other echoed) So if we were in the same sort of time zone, we could be talking to them at the same time that they're talking to us, but instead we're talking to them and they're both asleep. And then we go to sleep and then they start talking to us. So it sort of isn't as good as it would be.” C2-R04*

“Whenever I said in school, they turned out to be asleep. Yeah. Right. Oh, we've got like activities on like, do them like, say, if it was like six o'clock for us, it's much later for them”. C2-R12

“So like isn't it gonna be quite hard to keep up conversations on Padlet? (C2-S30 & S32 echo with C2-S31 "yeah") since if we were talking on like at 5 o'clock in the afternoon, for them it can be like late night something going to bed. Isn't it can be kind of time issue to keep up conversations with them?” C2-S31 (C2-S30, S32, S45 agreed)

In terms of technology impacts, it pertains to the medium itself and the accessibility (O'Dowd & Ritter, 2006). Technology difficulties are common in telecollaboration communication despite students' familiarity with the tools (Çiftçi, 2016). The selection of technological tools has been carefully considered and optimised (refer to Section 4.2). The affordances of each CMC tool have been illustrated in Section 5.2.1.2 and further discussed

in Section 6.2.2. This section will address the challenges and limitations encountered in utilizing technological tools, Padlet (text-based CMC) and Zoom (videoconferencing), in this study.

Firstly, Padlet was selected due to its straightforward registration process. As highlighted by O'Dowd and Ritter (2006), the setup of the tool can significantly impact telecollaboration exchanges. Students can readily join conversation threads on Padlet via a shareable but closed-access link, without the need for account registration using an email address. In addition, eliminating the registration process has eased the technological burden particularly for young learners, and alleviated security concerns among schools and parents (refer to Section 5.2.1.2). However, this ease of access on Padlet increased the potential for identity ambiguity, leading to a higher occurrence of repeated dialogues. As Herring (2007) emphasised, the degree of anonymity influences participation structures in computer-mediated discourse.

Secondly, the accessibility of technology beyond the classroom also affected participation. Participants were assigned in a closed-access Padlet board and each participant had their own device to post messages on Padlet. The affordances of Padlet as a text-based CMC fostered a free and relaxed communication environment (see Section 5.2.1.2), which echoes with the literature (Chin et al., 2008; Huang et al., 2010; Jiang, 2011; Jin, 2013; Lai et al., 2011; Li & Jiang, 2017; Luo & Gui, 2021; Zhang, 2016). In addition, Irish students were more accustomed to the social medium WhatsApp in their daily life while Chinese natives were familiar with another social medium WeChat. Obviously, the utilisation of Padlet among participants in this study was not a common occurrence in their daily lives. As reported by participating teachers (refer to Section 5.2.2.2), the social nature of Padlet was not fully explored by participants, which echoes the findings of the previous research that the pedagogical nature of the activity can lead students to adhere to the institutional nature of the activity and hinder their initiation of casual conversations as they normally would do with peers (González-Lloret, 2009, 2011, 2015; Jenks, 2009; Tudini, 2012). Moreover, while Zoom met the financial concerns as the selected videoconferencing platform, it raised another issue of interactional interruptions among groups in the Breakout room while participants physically shared one common space. The alternative approach of sharing a single device in the physical classroom resulted in passive participation and fewer interaction occurrences (as illustrated in Section 5.3.2). As demonstrated in Section 5.4.2.1 and the student's reflection below, the different modalities of tools facilitated their awareness of how

technology-mediated communication influenced their behaviour when interacting with others (Fernández Gutiérrez et al., 2022).

*“The **Padlet** is easier to speak cause you can kind of think about it and like not making a mistake. But when you are doing on **Zoom** call, it’s like you are doing on the spot. But I think **Zoom** call It’s more fun because you are actually doing a face to face.” C2-S39*

Furthermore, the lapse of time caused by internet during Zoom sessions were accustomed to videoconferencing communications, as reported in the literature (Lai et al., 2011; O'Rourke, 2005).

In summary, structural factors situated on the peripheral edge of telecollaboration merit specific attention for evaluating the feasibility of telecollaboration and CMC tools. Given the restricted CFL class contact hours in Irish secondary schools, the incorporation of asynchronous CMC tools beyond the classroom would be suggested to compensate the limitation of language proficiency. When it comes to text-based CMC communication, the utilisation of dyad interactions may effectively mitigate the shortcomings of anonymity, however it will require gradual scaffolding along with explicit activity objectives and instructions. As for synchronous videoconferencing communication, the facilitation support from the local school, such as conducting sessions in a computer lab, is significant to reduce sound interruptions. Nevertheless, active communication requires careful task design in order to maximise the affordances of CMC tools in the telecollaboration. Therefore, the next subsection will delve into the pedagogical task design and arrangement of tasks at the classroom level.

6.3.2. Classroom Level

According to O'Dowd and Ritter (2006), the classroom level is allocated between the socioinstitutional level and the individual level. This level includes factors such as task design, participant matching, teacher rapport, pre-exchange briefing and group dynamics. From a pedagogical perspective of task cycle, participant matching and pre-exchange briefing are situated in the pre-task design phase. Meanwhile, task design, teacher rapport and group dynamics play significant roles throughout the pre-task, task and post-task phases while clinging to the stages of pre-task and task. One of the biggest challenges encountered during Cycle 1 was participant matching. To adhere to the principle of reciprocity in telecollaboration and to mitigate the negative effects of language proficiency gap (Little et al., 1999), Cycle 1 participants at the elementary level of the target language from both

countries were recruited. However, it eventually led to the misunderstandings and unsuccessful telecollaboration communications. To address this issue, the participant matching strategy was adjusted for focusing on recruiting more proficient English learners from China in Cycle 2. In addition, a pre-survey was distributed among participants to collect information about their age, gender, hobbies, favourite school subjects and Chinese culture topics, sports interests. This step aimed to compensate for the variations in language proficiency. Despite taking additional matching techniques, the challenge of mismatched language proficiency levels caused self-consciousness among Irish CFL learners and in turn “have a massive effect on the results of the cooperation” (O'Dowd & Ritter, 2006, p. 631). Moreover, dyad pairing was not considered in Cycle 2 to avoid extra stress it may cause. While small groups align with common practical recommendations, the appropriate group size can differ across various types of CMC tools as well as participants' language proficiency level. Additionally, the concept of pre-exchange briefing is crucial in providing participants with a chance to encounter technical issues and adjust their expectations (O'Dowd & Ritter, 2006). There could have been more rehearsal practice using selected tools to address the drawbacks of anonymity in Padlet and the issue of sound distractions in Zoom breakout room discussions. Furthermore, the findings suggested that implementing dedicated scaffolding and project-based learning could stimulate students' interests and foster more student-centred discussions, which echoes with the literature (Kurek & Müller-Hartmann, 2017; Meskill, 1999; O'Dowd, 2022a, 2022b).

In terms of task design, the participating teachers from both countries aimed to create authentic communication environment and meaningful activities to achieve dual goals of telecollaboration: linguistic development and intercultural communicative competence. However, particular attention and additional efforts would be suggested, especially when executing telecollaboration activities with beginners of the target language. This study encompassed two types of tasks: project-based collaboration (eBook activity with Book Creator) involving Irish CFL learners and information exchanges (Padlet chat and Zoom talk) between Irish CFL learners and Chinese natives in the context of telecollaboration. The latter task type often involves fact-based exchanges (as illustrated in Section 5.3) which are integrated in icebreaking activities (Keränen & Bayyurt, 2006; Liaw & Master, 2010; Liaw, 2006; O'Dowd & Ware, 2009). According to the feedback received, the level of overall satisfaction with the activities among Irish participants approximately followed the order of eBook, Padlet chat, and Zoom talk. Additionally, the scaffolding of the eBook activity proved largely successful (see Section 5.2.1.1), as a “pushed output” activity prior to

telecollaboration, which aims to mitigate the negative effect of the unavoidable mismatched language proficiency gaps (O'Rourke, 2005). The transition from Book Creator to Padlet appeared seamless (as discussed in Section 5.2.1.2) for Irish participants. However, the negative perceptions and passive engagement observed during Zoom interactions (refer to Section 5.3.2) highlighted a gap in pedagogical design, which necessitates dedicated task design and adjustments in task sequencing when transitioning from text-based to synchronous video-based communication. This also supports previous research which suggested meticulous task design is crucial to ensure successful telecollaboration communication (Furcsa, 2009; Hauck, 2007; O'Dowd & Ware, 2009). The frequency and objectives of information exchange activities would require thorough consideration, given the constraints imposed by the technological tools in practical use as well as the monologic nature of information exchange tasks where involve limited negotiation of meaning (O'Dowd, 2022a). For instance, reflection on the online exchange in the post-task phase would compensate the short period of videoconferencing, which is also suggested in the literature (Lai & Li, 2011; Levy & Kennedy, 2004; O'Dowd, 2022a; Skehan, 2003; Thorne, 2006; Ware & O'Dowd, 2008). Setting up doable learning objectives (Tseng et al., 2020) and giving overt instructions to both sides (Zhang, 2016) are paramount, such as the use of language for each information exchange activity. While Kurek and Müller-Hartmann (2017) emphasised the significance of open-endedness and choice as key criteria in telecollaboration task design, this study suggested that the core learning outcomes should be attainable and aligned with learners' abilities, in addition to allowing freedom of expression. In other words, task design should be considered to be situated within participants' ZPD (as discussed in Section 2.2.3 and Section 2.5.1.1), and as a potential promising result, learners are capable to effectively communicate with intercultural contacts in a stimulating environment (Çiftçi, 2016; Menard-Warwick et al., 2013). As Ryder and Yamagata-Lynch (2014) addressed, "a balance should be struck between discussion topics chosen by students and thematic content designed by instructors" (p. 216).

Furthermore, findings (refer to Section 5.3.2.3) suggested pedagogical mentoring is demanded to ensure conversation flow and task completion at different stages of telecollaboration communications especially in the improvisational conversations at the start (Fernández Gutiérrez et al., 2022). As Çiftçi (2016) demonstrated, telecollaboration communication may not be successful without the presence of facilitators or supervision of mature cross-cultural mediators. In order to yield effective communication, teachers play a significant role to mediate communications and provide guidance whenever necessary

(Angelova & Zhao, 2016; Menard-Warwick et al., 2013; O'Dowd, 2007a, 2022b; Schenker, 2012; Ware & Kramsch, 2005). However, Tudini (2007) suggested students' ICC could be developed more in an authentic environment comparing to the teacher-mediated context. Çiftçi (2016) suggested a moderate involvement of instructors or researchers in the telecollaboration process.

As for the establishment of teacher rapport, it has been addressed in the previous telecollaboration studies (O'Dowd & Eberbach, 2004; O'Dowd & Ritter, 2006). Although collaboration between teachers is the key characteristic of this DBR study and teachers were involved in the co-design phase, participating teachers reported that their busy teaching schedules did not afford them sufficient time to collaboratively design tasks (see Section 5.4.2.2). This finding is consistent with previous studies which addressed the aspect of intensive preparations being identified as a challenge for teachers in telecollaboration practice (Lai et al., 2011; Luo & Gui, 2021; Luo & Yang, 2016; Zhang, 2016). Nevertheless, O'Dowd and Ritter (2006) emphasised that "A first step to deal with this source of difficulty is the awareness that telecollaboration is indeed a form of virtual team teaching that requires thorough consensus on all the facets of the cooperation" (p. 630). In practice, it may be more viable for teachers who are new to telecollaboration to be allocated ample preparation time in advance, given the heavy workload associated with designing telecollaboration activities (Luo & Gui, 2021; Luo & Yang, 2016). Additionally, technology-mediated task requires teacher to fully aware of the specific characteristics of the chosen technology (Oakley et al., 2018; Xu & Moloney, 2011), as those features have impacts on various aspects of interaction (such as timing, multimodality, feedback) prior to task designation (Belz & Müller-Hartmann, 2003; Chappelle, 2001). Therefore, many studies suggest telecollaboration training is necessary and it should be integrated within language teacher education (Baroni, 2019 #1462; Dooly, 2011; Fuchs et al., 2017; O'Dowd, 2007, 2015, 2020; O'Dowd & Eberbach, 2004; Wach et al., 2022).

6.3.3. Individual Level and Interaction Level

In O'Dowd and Ritter's inventory of failed communication factors (2006), they emphasised two aspects within the individual level: learner's current level of ICC and learner's motivation and expectation. In addition to these aspects, another crucial factor influencing the quality of telecollaboration interaction in this study was the learner's language proficiency level (refer to Section 5.4.1). This factor significantly impacted the nature of interactions, as outlined in Section 5.3. Overall, Irish participants showed distinct

preferences regarding language functions between text-based interactions on Padlet and synchronous videoconferencing interaction on Zoom. With the exception of moderator-led synchronous communication during Zoom session 2, Irish CFL learners displayed a tendency to ask questions of their language partners during Zoom session 1, compared to a preference for responding on Padlet. This inclination could be attributed to the spontaneous nature of synchronous videoconferencing, which motivates participants to initiate conversations to prevent silence and embarrassment. However, as demonstrated in Section 5.3, Irish participants were only capable to utilise Chinese language in the simple conversations such as greetings, self-introductions, food, hobbies, and school subjects. When the conversation shifted to more complex topics or when responding to follow-up questions from their language partners, Irish participants had to switch to English. This pattern resonates with the finding that limited language proficiency impacted participants' ability to engage effectively in online interactions and led to cognitive overload during conversations (Luo & Gui, 2021; Spring et al., 2019; Sugie & Mitsugi, 2014; Tian & Wang, 2010; Tseng et al., 2020). Similarly, the uneven language proficiency levels among participants had two notable effects. Firstly, it led to imbalanced use of the target language, which disrupted the fundamental principle of reciprocity in telecollaboration, as highlighted by Ryder and Yamagata-Lynch (2014). Secondly, it resulted in unequal contributions to online communication, with one side assuming a dominant role in turn-taking, as observed in the study by Kazuko Sunaoka (2018). In addition, the misunderstanding caused by pronunciation errors reported in Section 5.4.1 which echoes the finding that inappropriate pronunciation resulted in communication breakdowns (Guo & Möllering, 2017). Although there were occasional grammar and typing errors in Padlet chats, Chinese teenagers were still able to comprehend these expressions (as discussed in Section 5.3.1). This aligns with the finding of O'Rourke study (2005) that "faulty NNS (non-native speaker) spelling is inherently less problematic than NNS pronunciation" (p. 459). Additionally, training in communication skills and clear guidance on the role of both NNS and NS are suggested to deal with emerging misunderstandings and breakdowns (Elola & Oskoz, 2008; Furcsa, 2009; Hauck, 2007; Lee, 2011). It would be valuable to explore the strategies that CFL learners employ to overcome such communication challenges in the future research.

In terms of the current level of ICC among learners, Section 5.1.2 highlighted Irish participants demonstrated a high degree of intercultural sensitivity, as evidenced by their high mean scores of Factor Respected Cultural Differences. However, their negative responses regarding Factor Interaction Engagement and Factor Interaction Attentiveness

reinforced the link between ICC and the level of engagement during interactions. Moreover, this study was the first time ever online intercultural communication to Irish CFL participants. Lacking such experience in the online environment attributed to the breakdown of in-depth exploration during telecollaboration and called for dedicated task design.

Regarding the awareness of expectations, one limitation of this study was the absence of measures to collect and exchange expectations between both groups of students. This finding further supports Ryder and Yamagata-Lynch (2014), who suggested that clashes in expectations may affect telecollaboration communication. Participants found it challenging to actively engage in telecollaboration communication and remain focused on the designated tasks (as discussed in Section 5.4). Aligning with the recommendations of O'Dowd and Ritter (2006), facilitating mutual awareness of expectations among both teachers and students can enhance their understanding of the potential communication scenarios and help mitigate potential technological and practice issues.

6.3.4. Summary

This section reviewed the intricate factors influencing on telecollaboration for CFL within the context of Irish secondary schools. The discussion was divided into two dimensions: macro-level and micro-level through the lens of O'Dowd and Ritter (2006) inventory of failed factors in telecollaboration. At the macro dimension, the adaptability inherent in the Chinese curriculum serves as a catalyst which empowers CFL teachers to implement innovative pedagogical approaches facilitated by technology. However, the challenges arose from restricted CFL class hours, misalignments of school calendars, unstable quality of the network connection, time differences, mismatched language proficiency required teachers from both sides to tailor task designs which align with learners' needs and ability. Additionally, the need for smooth transitions between various types of CMC tools and the encouragement of holistic communication within and beyond the classroom is emphasised. At the micro level, the importance of addressing Intercultural Communicative Competence (ICC) training and fostering mutual awareness of expectations among students is highlighted. The study recommends asynchronous tools for language practice and gradual interaction scaffolding. Furthermore, the key characteristics of telecollaboration tasks for CFL beginner learners are identified as follows: 1) clear and achievable goals that align with CFL beginners' language proficiency; 2) an element of project collaboration that enables both CFL beginners and their native Chinese partners to co-create and work on the same product or artifact.

7. Conclusion

Drawing together the development of Chinese as a curricular language subject in Ireland and the most advances in technology enhanced language learning, this doctoral study took place during the Covid-19 pandemic to investigate an innovative pedagogical approach which combined various modalities of CMC types to facilitate Irish adolescent learners of Chinese in telecollaborative exchanges. The thesis presented two iterative cycles with in total 45 Irish secondary school students. Overall, the findings suggested that both students and teachers appreciated the significance of task sequences and the structured affordances provided by Book Creator, Padlet and Zoom. Improvements in Chinese language competences among participants such as Pinyin (the phonetic symbols for Chinese characters) spelling, character typing and identifying were emphasised in the eBook activity. Padlet played a facilitating role in enhancing students' intercultural awareness by providing an authentic and pleasant communication environment. Additionally, although the authentic and visual interactions with native speakers on Zoom increased overall confidence in speaking Chinese, anxiety and pressure arising from limited language proficiency and logistical issues among young Irish students of the Chinese language cannot be neglected. While there were many challenges and constraints in implementing telecollaboration projects for young CFL beginners, this doctoral study demonstrated a feasible path forward for Chinese language learning and practical guidance for telecollaboration with native Chinese speakers. The concluding chapter firstly highlights contributions of this study in Section 7.1. Limitations of this study are then presented and discussed in Section 7.2. In addition, recommendations for practice in the context of Irish secondary schools are presented in Section 7.3. Section 7.4 outlines future work and research directions before providing a chapter summary.

7.1. Thesis Contributions

This thesis makes several noteworthy contributions to the field of CMC, specifically implementing telecollaborative exchanges in CFL in pre-university contexts. These contributions have been disseminated in various publications and conference presentations, as detailed on page vi.

- The systematic review identifies a clear research gap in relation to young CFL learners in the field of CMC research, with a paucity of studies on telecollaboration

with CFL beginners. In addition, the review highlights both key affordances and challenges of using CMC technologies in a CFL context (see Section 2.4.1 and also Wang & Devitt (2022)).

- A state of the art review of technology and the technology selection process based on two DBR iterations examined and synthesised the affordances and limitations of different CMC modalities (see Section 4.2, Section 5.2.1.2 and Section 5.4.2.1).
- Student voice is crucial to help educators better understand and address their learning needs. This study consulted with adolescent CFL learners at the beginning stage of this DBR study and identified clear learning needs related to demanding authentic communication opportunities as well as interests in Chinese culture (refer to Section 4.4.1.2 and also Wang et al., (2019)). The needs analysis also added practical value on the choices of technology and task design in telecollaboration in the secondary school context.
- The successful implementation of Bridge 21- a project-based collaboration learning model- within the CFL classroom provided insights into its potentials to enhance young Irish CFL learners' linguistic knowledge development in relation to Pinyin and Chinese characters practice (see Section 4.3.2.1, Section 5.2.1.1 and also Wang et al., (2022)).
- This doctoral study highlighted the importance of teacher facilitation and how their roles and the challenges of the role differ according to technologies in use, such as scaffolding support to the transition from text-based chat to videoconferencing (see Section 5.3 and Section 6.3). A step-by-step telecollaboration activity design leaflet (pre-task, task, post-task) was created for teachers and attached in Appendix P.
- Two iterative cycles identified constraints and opportunities for successful telecollaboration, largely depending on the proficiency level of the target language among native speakers. Cycle 1 found that having equivalent beginner language proficiency of the target language could not promote telecollaborative communications (see Section 4.4.4.2). The revisions made during Cycle 2, including intentional recruitment of more fluent English speakers from China as part of the language matching techniques, improved communication to some extent. Nevertheless, the exploration of the telecollaboration process highlighted the importance of providing explicit instructions for language usage in cases of mismatched language proficiency (see Section 6.3). In addition, both Cycle 1 and

Cycle 2 addressed that the English proficiency levels of native Chinese speakers are important but neither an advanced nor a beginner level is necessarily optimal.

- The analysis provided insights into the processes at play during CMC interventions in the CFL beginner classroom (see Section 5.3). While the learning outcomes are also important, this study allows an in-depth investigation on how all aspects of the learning experience (task, tool, setting, teacher facilitation etc.) interact to facilitate or hinder learning (see Chapter 0 and Chapter 0). The analytical approach enabled researchers to conduct in-depth analysis, which contributes to empirical research evidence for sociocultural theory in the field of CMC.

7.2. Limitations of the Research

Chapter 0 has presented the methodological approaches adopted in this doctoral research. While this study provides rich insights into CMC utilisations with adolescent CFL learners in the context of Ireland, several limitations needed to be acknowledged.

Firstly, the scope and sample scale are relatively small. This study is interpretive in nature to investigate what the learning process of various CMC tools and involves a relatively small number of participants, it is challenging to generalize findings to a larger population or broader context. However, given it is difficult to access a large number of young Irish CFL learners, this small-scale research is more feasible within a limited timeframe of this doctoral study. The depth of exploration equips this study to provide a comprehensive understanding of what the young beginner CFL can do and how they think of integrating CMC technologies into their Chinese learning journey. In addition, the adoption of DBR approach makes it readily evaluate and optimise the study design to another iteration.

Additionally, sampling bias may not represent the population of young Irish CFL learners. As highlighted in Section 1.1, some schools have Irish teachers teaching the Chinese language subject, and the others recruit native Chinese teachers. Examining both teaching scenarios would provide valuable insights. Therefore, an extra consideration was given in Cycle 2 to recruit one Irish teacher of the Chinese language and one native Chinese, to comprehensively understand the learning dynamics among young CFL learners in Ireland.

Moreover, the relative short intervention time is another limitation of this study, where Cycle 1 lasted four weeks and Cycle 2 was extended to seven to nine weeks. The limited number of Chinese language class contact hours per week in both schools made it more challenging to design a longer intervention, which resulted in insufficient preparation

time for both Irish students and their teacher to fully engage in each activity. Specific challenges and difficulties of implementing telecollaboration in Irish secondary schools were presented in Section 5.4 and then discussed in Section 6.3. Recommendations are provided in Section 7.3 to address those challenges arising from this doctoral study.

In addition, employing quantitative pre-post surveys for a study of this scale and duration may offer limited value. The short period of this study restricts the potential for observing substantial changes over time. While statistical significance can be measured with a small sample, the practical significance or generalisability of such changes is also limited.

As with any qualitative data analysis, the findings may have introduced a degree of subjectivity into the interpretation of the data. However, the second iteration of this study was optimised to analyse interaction records, which aims to triangulate the validity of both quantitative dataset (questionnaires) and qualitative dataset (interviews). In addition, interaction analysis enables the author to understand the process of CMC activities. However, deletions and repairs of texts before sending out cannot be recorded or traced in the Padlet chat logs, which may have an impact on understanding of language input process. It also increases the difficulty to observe self-repairs occurring in the editing phase before sending messages.

Furthermore, there was an oversight regarding the design of Likert-scale points within the Chinese language learning motivation questionnaire in Cycle 2. This questionnaire was designed as a 7-point Likert scale in the initial research work (Carson et al., 2019). However, it was inadvertently distributed as a 5-point Likert scale to Cycle 2 participants. This error was identified and rectified during the data analysis phase, where a linear transformation was performed in SPSS to convert the 5-point Likert scale back to the intended 7-point Likert scale before comparing Cycle 2 results with Carson et al. (2019). It is important to note that this correction did not impact the main findings or conclusions of the study. The author appreciates the reader's understanding in this matter.

7.3. Recommendations for Practice

This study contributes to address the research gap in secondary school settings while the main trend of telecollaboration lies in higher education. Given the complexity and logistic challenges of conducting telecollaboration projects in pre-university contexts, some recommendations for practice targeted young learners of Chinese arising from this study are outlined below. In addition, a handbook for teachers who intend to conduct a

telecollaboration project for young beginner learners of any target languages (Chinese, in this case) can be found in Appendix P.

7.3.1. Suggestions to Different Parties Involved

From a socioinstitutional level, organisational factors and technological selections merit thorough attention to evaluate the feasibility of telecollaboration and CMC tools in the context of Irish secondary schools.

7.3.1.1. Policymakers and School Management Boards

Dedicated class contact hours are essential for enhancing young Irish CFL learners' language communication competence in a meaningful way. Currently, the limited number of class contact hours is a crucial issue that prevents students from getting sufficient exposure to Chinese language at school (refer to Section 5.4.2.2 and Section 6.3.2). The lack of meaningful and authentic communication environment for students is prevalent in most Irish secondary schools. However, having meaningful communications is also identified as a key need for learners in this study. In this context, the combination of both synchronous and asynchronous communications is recommended for both in and beyond class hours. This approach aligns with Çiftçi (2016) who suggested combining diverse modalities and technological tools to maximise the effectiveness of intercultural communication experiences. Furthermore, both the literature (Kling, 2018; O'Dowd, 2022a) and this study strongly recommend integrating telecollaboration into curriculum for internationalisation purpose.

7.3.1.2. Teachers and Students

Substantial scaffolding and preparation time before engaging in a telecollaboration project are recommended by participants in this study.

1. Preparations for *teachers* include establishing rapport with teachers on both sides to collaboratively design tasks and fully understand their needs (O'Dowd & Eberbach, 2004; O'Dowd & Ritter, 2006). As illustrated in Appendix P, teachers from both sides exchange ideas and information about students including learning needs, language proficiency and curriculum requirements (such as class contact hours per week, covered topics, assessments). It is important for both sides to agree on the frequencies of having telecollaboration. In addition, they also need to check on the conditions of technology facilitation and support at school, such as technological equipment in the classroom, frequently deployed software etc. Once agreed on the technological tools,

training in technology and telecollaboration rehearsals are suggested to be scheduled between teachers before introducing it to students. Moreover, it is suggested to implement regular telecollaboration on a long-term basis among schools, especially by providing sufficient preparation time between two synchronous videoconferencing sessions. Integrating project-based collaboration based on common issues in the curricula from both sides are also recommended (Helm, 2018; O'Dowd, 2022a; Warschauer, 1995).

2. Preparations for *young beginner CFL Learners* include adding peer-review activities focused on analysing language outputs before sending out; starting with text-based communication activities before videoconferencing; providing training in communication strategies and introductory session of technology.

The logistic challenges (see Section 5.4.2 and Section 6.3) and the literature suggest that essential training in technological tools is demanding for both teachers and students (Jiang & Li, 2018; Renner, 2017; Sung & Poole, 2017). As demonstrated in Section 5.4.2.1, different modalities of tools facilitated students' awareness of how technology-mediated communication influenced their behaviour when interacting with others. Training in communication strategies (students) and facilitation (teacher) to ensure conversation flow and task completion is highly recommended (Elola & Oskoz, 2008; Furcsa, 2009; Hauck, 2007; Lee, 2011).

In addition, the selection of technology is suggested by this study and literature (O'Dowd & Ritter, 2006) to include rehearsal practice to address potential technical issues and manage participants' expectations in advance. Overall, the choice of technology largely depends on its availability and accessibility in and beyond school. For example, in terms of text-based CMC communication, using dyad interactions can effectively address the challenges of anonymity. However, dyad matching demands a high level of learner autonomy and active participation, which may pose difficulties for shy learners. Therefore, prompts and help from interlocutors are of importance. Due to the limited CFL class contact hours in Irish secondary schools, incorporating asynchronous CMC tools outside the classroom is recommended to compensate for language proficiency limitations. As for synchronous videoconferencing communication, the facilitation support from the local school, such as conducting telecollaborative sessions in a computer lab, is significant to reduce sound interruptions.

Moreover, project-based collaboration learning, guided by the Bridge 21 learning model, is a good practice for reinforcing the language knowledge of young Irish CFL

learners before they interact with their intercultural contacts from China. As reported in Section 5.2.1.1, the collaboration learning experience positively impacted on the perceptions of language learning among young Irish CFL learners, which echoes with the literature (Byrne et al., 2019). The adaptable and flexible nature of Junior Cycle Chinese short course syllabi empowers Chinese language instructors to introduce innovative pedagogical activities in their language classroom (refer to Section 6.3.1). Although project-based learning faced many implementational challenges in secondary schools, its potential benefits for young beginner CFL learners in the context of Ireland are significant. Additionally, the learning artifacts created by young Irish students could be used as discussion materials in subsequent telecollaborative sessions and in turn enhancing students' intercultural learning experiences.

In addition, it is essential to provide gradual scaffolding through meticulous task design to mitigate communication misunderstandings and breakdowns. The following section will illustrate key principles for task design generated from this study.

7.3.2. Fundamental Principles for Task Design

While the quality of interactions in this study may not be promising, “failures” in telecollaborative communication does not necessarily imply negative outcomes as “the malleability of this pedagogical activity increases its potential usefulness in different learning contexts” (O'Dowd, 2022a, p. 13). This doctoral study has generated fundamental principles for designing telecollaboration tasks with young CFL beginner learners, providing suggestions for future practice:

1. Given students' preliminary language proficiency, it is important to establish achievable and clear learning goals for various task types while also encouraging freedom of expression. Explicit requirements and exemplars for learning artefacts are suggested to be provided to students in the pre-task stage.
2. Providing explicit instructions for language use in different task types and clear parameters on Chinese language usage and translanguaging, especially being open to the use of English by both groups of students in the (inter)cultural discussions.
3. Designing group-based reflection activities for students to critically review their telecollaboration communication experience in the post-task phase can compensate for the short period of videoconferencing sessions (Lai & Li, 2011; Levy & Kennedy, 2004; O'Dowd, 2022a; Skehan, 2003; Thorne, 2006; Ware & O'Dowd, 2008).

4. Preparing young Irish CFL students with some project-based collaboration learning experience prior to telecollaboration. Assigning telecollaboration tasks that involve expanding and discussing their learning artefacts which created during previous project-based collaboration with classmates.
5. Designing activities with the intentional role of native speakers as cultural learners and non-native speakers as cultural experts in telecollaboration communication (Van der Zwaard & Bannink, 2018).
6. Paying attention to the frequency and objectives of information exchange activities, considering the constraints imposed by the practical use of technological and the superficial nature of information exchange tasks which involve limited negotiation of meaning (Çiftçi, 2016; O'Dowd, 2022a).

7.4. Future Research

This doctoral study employed two DBR cycles. The findings of Cycle 2 and the limitations related to practical logistic issues have been discussed separately in Chapter 5 and Chapter 6. While this study provides an in-depth exploration of CMC utilisations with adolescent CFL learners in Ireland, its scope and scale are limited, as discussed in Section 7.2. The iterative nature of DBR approach enables both researchers and CFL instructors to implement a further iteration based on the Cycle 2 findings. The optimising research methodology of the third iteration would aim to:

1. Extend the duration of telecollaboration to assess its impacts on the development of language competences and intercultural communicative competence among young CFL learners.
2. Enlarge the participant pool to quantitatively examine their telecollaboration learning process.
3. Explore the use of various ICC models and inventories to diversify data sources, ensuring a more comprehensive assessment of intercultural communicative competence and robust outcomes.
4. Combine the analysis of young Irish CFL learners' self-reported ICC scales with feedback from native Chinese students to effectively address the appropriateness of ICC, as this aspect shall be evaluated by their intercultural counterparts.
5. Pay attention to analysing communication strategies when CFL learners negotiate meaning with their intercultural contacts in telecollaboration communication.

This study highlights how and where beginner learners of Chinese are most likely and comfortable when using their limited language resources during telecollaborative communication. The findings of this study provide clear indications for future research direction in the field of CFL telecollaboration with young beginner learners. Although young CFL beginner learners have expressed their learning needs to involve in authentic interactions with native speakers, they encountered more difficulties in achieving efficient communication. Telecollaboration with beginner learners is highly complex and demands not only significant scaffolding but also dedicated task design. Research in the future that delves into the design of telecollaboration tasks for young CFL beginners would make a meaningful contribution to the research field. Furthermore, conducting a multimodal analysis of a CMC intervention among young learners would provide valuable insights into the technology-mediated learning context.

7.5. Chapter Summary

This chapter has overviewed the significance of this doctoral study in the Irish secondary school context, and in the broader domains of telecollaboration and CALL. It offers valuable recommendations for practice. Additionally, this study highlights various research avenues that can contribute to addressing the multiple challenges in CFL, which is considered as a less commonly taught language in Irish secondary educational settings.

Although the study was relatively small in scope, the in-depth exploration offers key insights into young Irish CFL learners' communication experiences with native Chinese in the telecollaboration environment facilitated by (a)synchronous CMC tools. By implementing the recommendations outlined in this thesis, it is possible to meet the needs of young CFL learners and improve their learning experience of Chinese in an authentic communication environment.

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9. Appendices

Appendix A. Summary of Selected Papers from the Systematic Review

2008-2011 (12 studies)

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Chin et al., 2008)	ASCMC	Discussion forum	Primary	Both	Asia (Singapore)	NI	29 (8M, 21F)	NI	Qual (case study)	Multiple data sources	Short (2 weeks)	Mix (writing, reading, communicative competence)
(Jin, 2008)	SCMC	Social network (MSN: Instant messaging)	Higher Education	NI	North America & Asia (USA & Mainland China)	Beginner	14 (7NN S, 7NS)	NI	Mixed-method (quasi-experimental design)	Multiple data sources	Short (8 weeks)	Intercultural sensitivity
(Zhang, 2009)	ASCMC	Discussion forum (WebCT)	Higher Education	Formal	North America (USA)	Intermediate	16	Mix of SC and SCT	Mixed-method	Multiple data sources	Medium (1 semester)	Writing (essay)
(Chen, 2010)	SCMC	Virtual Environment (Second Life)	Higher Education	Informal	North America (USA)	Beginner	26	NI	Qual	Questionnaire	Medium (1 semester)	Speaking
(Grant & Huang, 2010)	SCMC	Virtual Environment (Second Life)	Higher Education	Formal	Oceania (Australia)	Beginner	112	NI	Quan (descriptive)	Survey	Medium (1 semester)	Mix

<i>CMC Profile</i>			<i>Participant Demographics</i>				<i>Study Design</i>					
<i>Ref</i>	<i>Type</i>	<i>Tool</i>	<i>Level of Education</i>	<i>Conte xt</i>	<i>Continent (Country/Region)</i>	<i>Chinese Proficiency Level</i>	<i>Sample</i>	<i>Theoretical Framework</i>	<i>Methodology</i>	<i>Data sources</i>	<i>CMC Intervention Duration</i>	<i>Competence Foci</i>
(Huang et al., 2010)	Both	Mix of web 2.0 tools (blogs, discussion forum, VoiceThread, wikis)	Higher Education	Formal	North America (USA)	Beginner	21 (12M, 9F)	NI	Mixed-method	Multiple data sources	NI	Mix (speaking, writing)
(Tian & Wang, 2010)	SCMC	Video-conferencing tool (Skype)	Higher education	Formal	Oceania & Asia (Australia & Mainland China)	Mix (beginner to intermediate)	30 (15 NNS, 15 NS)	NI	Mixed-method	Multiple data sources	Short (9 weeks)	Intercultural communicative competence
(Huang & Lin, 2011)	ASCMC	Mix of web 2.0 (blogs, Vokis, wikis)	Higher Education	Formal	North America (USA)	Mix (intermediate to advanced)	14	Blended learning	Qual	Interview	NI	Mix (speaking & writing)
(Jiang, 2011)	Both	Mix of web 2.0 -web-based platform (China-USA Business Café)	Higher Education	Formal	North America & Asia (USA & Mainland China)	Mix (intermediate to advanced)	Trial 1: 17 (10N NS, 7NS); Trial 2: 33 (18N NS, 15NS)	NI	NI but extrapolated as Qual from data collection instruments and analysis procedures	Multiple data sources	NI	(Inter)cultural competence
(Lai et al., 2011)	Both	Mix of web 2.0 tools (discussion form embedded in Blackboard, videoconferencing)	Post-primary	Both	North America (USA)	Beginner	38 (18M, 20F)	Task-Based Language Teaching	Mixed-method (experimental)	Multiple data sources	Medium (1 semester)	Mix

<i>CMC Profile</i>			<i>Participant Demographics</i>				<i>Study Design</i>					
<i>Ref</i>	<i>Type</i>	<i>Tool</i>	<i>Level of Education</i>	<i>Context</i>	<i>Continent (Country/Region)</i>	<i>Chinese Proficiency Level</i>	<i>Sample</i>	<i>Theoretical Framework</i>	<i>Methodology</i>	<i>Data sources</i>	<i>CMC Intervention Duration</i>	<i>Competence Foci</i>
<i>(Wong et al., 2011)</i>	ASCM	Wikis	Primary	Both	Asia (Singapore)	NI	18	SCT, Krashen's i+1, autonomous learning	Mixed-method (quasi-experimental design)	Multiple data sources	Medium (28 weeks)	Writing
	SCMC	Interactive Whiteboard	Post-primary	Formal	Oceania (Australia)	NI	18 (All female)	NI	Mixed-method (case study)	Multiple data sources	Medium (4 months)	Mix

2013-2017 (33 studies)

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Chen, 2013)	ASCMC	Discussion forum (embedded in Moodle)	Higher Education	Informal	North America (USA)	Mix (beginner to intermediate)	NI	Mix of IT & SCT	NI but extrapolated as Qual from data collection and analysis procedures	Discussion logs	Short (9 weeks)	communication (text-based)
(Lan et al., 2013)	SCMC	Virtual Environment (Second Life)	Higher Education	Formal	Asia (Taiwan)	Beginner	12 (case 1: 8 ; case 2: 4)	case 1: NI case 2: IT	Qual (case study)	Multiple data sources	Short (case 1: two months, case 2: 2 months)	Speaking
(Jin, 2013)	Both	Mix of web 2.0 tools (email, MSN messenger, Skype)	Higher Education	NI	North America & Asia (USA & Mainland China)	Beginner	20 (10 NNS: 6M,4F, 10NS)	SCT	Mixed-method	Multiple data sources	Short (10 weeks)	Mix
(Wang et al., 2013)	ASCMC	Wikis	Higher Education	Both	Europe & Asia (UK & Mainland China)	NI	48 (24 NNS, 24 NS)	NI	Mixed-method (Quant: descriptive)	Multiple data sources	Medium (1 semester)	Intercultural communicative competence
(Wong, 2013)	ASCMC	Wikis (on mobile, MALL)	Primary	Informal	Asia (Singapore)	NI	34	NI,	Mixed-method (Design-based Research)	Multiple data sources	Medium (11 months)	Mix

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Hsiao & Broeder, 2014)	ASCMC	Social Network (Twitter/Group Tweet) Mix of web 2.0 tools (blog, discussion board, email, journal, videoconferencing, VoiceThread, Wikis embedded in the Blackboard)	Higher Education	Informal	Europe (Netherlands)	Beginner (HSK Level 1-2)	30 (18M, 12F)	NI	Quan	Multiple data sources	Short (7 weeks)	Communication (text-based)
(Jiang, 2014)	Both		Post-primary	Both	North America (USA)	Beginner	107	NI	Quan (case study)	Multiple data sources	Long (5-year longitudinal study report, case study: two-semester)	Mix
(Lan, 2014)	SCMC	Virtual Environment (Second Life)	Higher Education	Formal	Asia (Taiwan)	NI	Stage 1: 20 (10F&10M); Stage 2: 24	NI	Quan (Stage 1: experimental; Stage 2: quasi-experimental)	Multiple data sources	Short (stage 1: 2 weeks; stage 2: 9 weeks)	Mix (stage 1: speaking; stage 2: writing)
(Qian & McCormick, 2014)	ASCMC	Discussion forum	Higher Education	Formal	Europe (UK)	Beginner	467	NI	Mixed-method	Multiple data sources	Long (1 year)	Mix
(Ryder & Yamagata-Lynch, 2014)	Both	Mix of web 2.0 tools (email, discussion forum and videoconferencing)	Higher Education	Both	North America & Asia (USA & Mainland China)	Intermediate	14 (7 NNS: 6M, 1F, 7 NS)	SCT and Activity theory	Qual	Multiple data sources	Medium (16 weeks)	Mix

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Sugie & Mitsugi, 2014)	SCMC	ce-Skype, Wimba embedded in Blackboard) Social Network (QQ)	Post-primary	Informal	Asia (Japan & Mainland China)	Beginner	9 NNS	Blended learning	Mixed-method (quasi-experimental design)	Survey (Pre & Post)	Long (1 year)	Mix
(Wang & Vásquez, 2014)	ASCMC	Social Network (Facebook)	Higher Education	Formal	North America (USA)	Intermediate	18 control group: 9 (4F,5M) and experimental group: 9 (8F,1M)	NI	Quan (quasi-experimental design)	Multiple data sources	Medium (1 semester)	Writing (literacy)
(D. Zhang, 2014)	SCMC	Video-conferencing tool (Adobe Acrobat Connect Pro)	Higher Education	Formal	North America & Asia (USA & Mainland China)	Beginner	39 (14 NNS, 25 pre-service teachers)	NI	Quan (descriptive)	Chat logs	Medium (1 semester but 5 times online chats)	Communication (text-based)
(Zhang & Lu, 2014)	ASCMC	Social Network (Facebook group)	Higher Education	Formal	Europe (Ireland)	Beginner	41	NI	Quan	Multiple data sources	Short (12 weeks)	Writing (characters, text-based)

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Xu, 2015)	Review paper	CALL in CFL										
(Cappellini, 2016)	SCMC	Video-conferencing tool (not specified)	Higher Education	formal	Europe & Asia (France & Mainland China)	Intermediate (CEFR B1-B2 Level)	8 (4NNS, 4NS)	Mix of IT & SCT	Mixed-method	Video recordings	Medium (15 sessions)	Speaking
(Guo & Möllerin g, 2016)	SCMC	Video-conferencing tool (Blackboard Collaborate, embedded in Blackboard)	Higher Education	Formal	Oceania (Australia)	Beginner	8	Mix of IT and SCT	Mixed-method (Quant: descriptive)	Video recordings	Short (2 weeks)	Mix
(Hung & Higgins, 2016)	SCMC	Mixed of web 2.0 tools (social Network: MSN, videoconferencing: Skype)	Higher Education	Formal	Europe & Asia (UK/Ireland & Taiwan)	NI	12 (6NNS, 6NS)	IT	Mix (quasi-experimental design)	Multiple data sources	NI	Mix
(Lan, 2016)	SCMC	Virtual Environment (Second Life)	Higher Education	Formal	Asia (Taiwan)	Beginner (CEFR A1 Level)	30	NI	Quant (experimental design)	Multiple data sources	Short (9 weeks)	Speaking (oral accuracy)
(Lan & Lin, 2016)	ASCMC	discussion forum-MALL-a mobile seamless learning platform	Higher Education	Both	Asia (Taiwan)	Beginner	34	SCT	Mixed-method (experimental design)	Multiple data sources	Short (4 weeks)	Speaking

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Luo & Yang, 2016)	Both	Social network (WeChat)	Higher Education	Both	North America (USA)	Mix (beginner to intermediate)	22	NI	Mixed-method	Multiple data sources	Medium (1 semester)	Mix
(Sunaoka, 2016)	SCMC	videoconferencing (not specified)	Higher Education	Both	Asia (Japan, mainland China, Taiwan)	NI	18 (9 NNS, 9NS)	NI	NI but extrapolated as Mixed-method (Quant part descriptive)	Video recordings	Short (once 90 mins as analysed in this paper)	Intercultural communicative competence
(Tang et al., 2016)	SCMC	Virtual Environment (Second Life)	Higher Education	NI	North America & Asia (USA, Canada, Japan, Taiwan)	NI	11 (5 Students, 5 Pre-service Teacher, 1 Researcher)	NI	Qual (action research)	Multiple data sources	Medium (4 months)	Mix (listening and speaking)
(Wong et al., 2016)	Both	Social Network (MyCLOUD, MALL)	Primary	Both	Asia (Singapore)	NI	37	SCT	Quan (corpus-based analysis)	Chat logs	Long (13 months)	Vocabulary growth (communicative competence aspect)
(Wang et al., 2016)	Both	Social Network (WeChat)	Higher Education	Both	Oceania & Asia (Australia & Taiwan)	NI	34 (30 Students: 14F, 16 M; 3 Teachers;	Community of Inquiry	Qual	Multiple data sources	Medium (1 semester)	Writing

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Zhang, 2016)	Both	Social Network (Skype, QQ, WeChat)	Higher Education	Informal	North America & Asia (USA & Mainland China)	Beginner	13	Multiliteracies theory	Qual	Multiple data sources	Short (4 weeks)	Intercultural communicative competence
(Guo & Möller, 2017)	SCMC	Video-conferencing tool (Blackboard Collaborate, embedded in Blackboard)	Higher Education	Formal	Oceania (Australia)	Beginner	16	Mix of IT and SCT	Mixed-method (case study)	Multiple data sources	Short (10 weeks)	Mix
(Lai, 2017)	NI	Mix of Web 2.0 tools (specific web-based tools: ThinkLink, Padlet, Homestyler)	Higher Education	Formal	North America (USA)	NI	10	SCT	Qual	Multiple data sources	NI	Mix
(Li & Jiang, 2017)	Both	Mix of Web 2.0 tools (Blackboard, VoiceThread, Adobe Connect, Flipgrid, Padlet)	Higher Education	Both	North America (USA)	Beginner	31	Active Learning, Bloom's Taxonomy, Communicative Language Teaching	Mixed-method (Quant part: descriptive)	Survey	Medium (20 weeks)	Mix
(Renner, 2017)	SCMC	Video-conferencing tool (ooVoo)	Higher Education	Informal	Oceania & Asia (Australia & New Zealand)	Mix (beginner to intermediate)	12 (6NNS, 6NS)	IT	Quant (descriptive)	Video recordings	Medium (1 semester)	Speaking

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Sung & Poole, 2017)	SCMC	Social Network (WeChat)	Higher Education	Both	Mainland China)	Beginner	10 (7M, 3F; 5 NNS, 5NS)	SCT	Mixed-method (Quantitative: descriptive)	Multiple data sources	Short (7 weeks)	Mix
(Thomsen et al., 2017)	ASCMC	Discussion forum and digital annotation tool embedded in a virtual learning environment called eComma	Higher Education	Informal	North America (USA)	NI	11 (4M, 7F)	SCT	Qual	Multiple data sources	Medium (1 semester)	Reading
(Xu & Peng, 2017)	ASCMC	Social Network (WeChat)	Higher Education	Formal	Asia (Mainland China)	Advanced (advanced-mid to high)	13 (5M, 6F)	NI	Mixed-method	Multiple data sources	Short (12 weeks)	Speaking

2018-2022 April (26 studies)

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Cohen & Ezra, 2018)	Both	Mix of web 2.0 tools (MALL, internet websites, applications)	Higher Education	Both	Asia (Israel and Taiwan)	Mix (beginner to intermediate)	53	SC	Quan	Multiple data sources	NI	Mix
(Eubanks et al., 2018)	SCMC	Book Creator on iPad	Primary	Formal	North America (USA)	NI	24 (23 NNS, 1 heritage speaker), 7 M 17 F	NI	Mixed-method	Multiple data sources	Short (3 weeks)	Writing
(Jiang & Li, 2018)	Both	Social Network (WeChat)	Higher Education	Informal	Oceania (Australia)	Intermediate (HSK 3, lower-intermediate)	15 (8F, 7M)	Task-Based Language Teaching	Mixed-method (Quan: descriptive)	Multiple data sources	Short (10 weeks)	Speaking
(Jin, 2018)	SCMC	Social Network (WeChat)	Higher Education	Both	Asia (students from USA studied in Mainland China)	Mix (beginner & advanced)	2	SCT & ET	Qual	Multiple data sources	Short (7 weeks, immersive)	Mix
(Lan et al., 2019)	SCMC	Virtual Environment (Second Life)	Post-primary	Formal	Asia (Singapore)	Advance	60	NI	Mixed-method (quasi-experimental research)	Multiple data sources	Short (5 weeks)	Writing
(Luo & Yang, 2018)	Review paper	Telecollaboration										
(Oakley et al., 2018)	Both	Mix of web 2.0 (Teachers: emails, videoconference, Students activities: Wikis)	Post-primary	Both	Oceania & Asia (Australia & Mainland China)	NI	14 Teachers	SCT	Qual	Multiple data sources	Long (1 year)	Mix
(Shi & Stickler, 2018)	SCMC	Video-conferencing tool (Elluminate)	Higher Education	Formal	Europe (UK)	Beginner	NI	NI	Qual	Multiple data sources	Medium (10-month course - data is 3 out of 10 recorded sessions)	Speaking
(Kazuko Sunaoka, 2018)	SCMC	Video-conferencing tool (supplemented with WeChat or	Higher education	Formal	Asia (Japan, Mainland China, Taiwan)	Intermediate (CEFR B1-B2 Level)	13	NI	Qual	Video recordings	Long (but data for this paper is 170 minutes session)	Speaking

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Tseng et al., 2018)	Both	LINE to decide topics) Mix of web 2.0 tools (Twitter, Quizlet, Flipgrid, Padlet, WizIQ, Zaption)	Post-primary	Formal	North America (USA)	Mix (Beginner to Intermediate-low)	35	SCT	Mixed-method	Multiple data sources	Short (12days ,immersive, four hours a day)	Mix
(Yang, 2018)	SCMC	Social network, WeChat (text-based)	Higher Education	Informal	North America & Asia (USA & Mainland China)	NI	12 (6 NNS, 6 NS)	SC	Quan	Chat logs (WeChat)	Short (6 weeks)	Intercultural communicative competence
(Zhang, 2019)	SCMC	Mix of Web 2.0 tools	Higher Education	Both	North America (USA)	Beginner	33	SCT	Mixed-method (quasi-experimental research)	Multiple data sources	NI	(inter)cultural
(Chen, 2020)	ASCMC	Discussion forum (embedded in Moodle)	Higher Education	Informal	North America (USA)	Intermediate	95 (77NNS, 18 heritage speakers, 41M, 54F)	Mix of IT & SCT (Long's Interaction Hypothesis, Communicative Language Teaching Approach, SCT, Bloom's Taxonomy)	Mixed-method	Multiple data sources	Short (6 weeks)	Communication (text-based chat)
(Huang, 2020)	Both	Mix of Web 2.0 tools (Blackboard, Slack, Zoom, Classkick, ThinkLink, Quizlet, Flipgrid)	Higher Education	Both	North America (USA)	Beginner	13	NI	Quan (descriptive)	Multiple data sources	Short	Mix
(Ji & He, 2020)	Review paper	Social Network (WeChat)										
(Ruan & Medwell, 2020)	Both	Mix of web 2.0 tools (social Media: Edmodo forum, WeChat, videoconferencing: Skype)	Post-primary	Formal	Europe (UK)	NI	9	Byram's Intercultural Communicative Competence and Community of Inquiry framework	Qual: longitudinal exploratory case study	Multiple data sources	Long (2 academic years)	Intercultural communicative competence

CMC Profile			Participant Demographics				Study Design					
Ref	Type	Tool	Level of Education	Context	Continent (Country/Region)	Chinese Proficiency Level	Sample	Theoretical Framework	Methodology	Data sources	CMC Intervention Duration	Competence Foci
(Tseng et al., 2020)	SCMC	Video-conferencing tool (Zoom)	Higher Education	Formal	North America & Asia (USA and Taiwan)	Mix (intermediate to advanced)	11 (6F, 5M)	SC, Multiliteracies theory	Mixed-method (quasi-experimental, Quantitative: descriptive)	Multiple data sources	Medium (1 semester immersive program)	Speaking
(Chen et al., 2021)	Both	Mix of Web 2.0 tools (Blackboard Collaborate, Discussion forum, Wikis, quizzes embedded in Blackboard, email, Social Network: WeChat)	Higher Education	Both	Oceania (Australia)	Mix (beginner to advanced)	63	NI	Mixed-method	Multiple data sources	Medium (two semesters)	Mix
(Luo & Gui, 2021)	Both	Mix of Web 2.0 tools (videoconferencing: Skype, social network: WeChat)	Higher Education	Both	North America & Asia (USA & Mainland China)	Mix (beginner to intermediate)	42 (21 NNS, 21 NS)	SCT	Mixed-method (action research)	Multiple data sources	Medium (15 weeks)	Mix
(Qu & Hagley, 2021)	ASCMC	Discussion forum (embedded in Moodle)	Higher Education	Formal	Asia (Japan & Mainland China)	Beginner (CEFR A1-A2 Level)	38 NNS & NS (32M,6F)	Blended learning	Mixed-method (quasi-experimental)	Multiple data sources	Medium (15 weeks)	Intercultural sensitivity
(Xie et al., 2021)	SCMC	Web 3.0 tool-Virtual Reality (Google Cardboard and Expeditions)	Higher Education	Formal	North America (USA)	Advanced	12	Hypothetical Model of Immersive Cognition (HMIC), and Communicative language teaching approach	Mixed-method	Multiple data sources	Short (8 weeks)	Speaking
(Wang et al., 2020)	SCMC	Virtual Environment (Second Life)	Higher Education	Informal	Oceania (Australia)	Mix	28	NI	Mixed-method	Multiple data sources	Medium (1 semester)	NI but focuses on learners' experience with Second Life
(Luo & Gao, 2022)	Both	Social Network (WeChat)	Higher Education	Both	North America & Asia (USA & Mainland China)	NI	22 (11 NNS: 6M, 5F; 11 NS)	NI	Qual	Multiple data sources	Medium (1 semester)	Intercultural communicative competence

<i>CMC Profile</i>			<i>Participant Demographics</i>				<i>Study Design</i>					
<i>Ref</i>	<i>Type</i>	<i>Tool</i>	<i>Level of Education</i>	<i>Context</i>	<i>Continent (Country/Region)</i>	<i>Chinese Proficiency Level</i>	<i>Sample</i>	<i>Theoretical Framework</i>	<i>Methodology</i>	<i>Data sources</i>	<i>CMC Intervention Duration</i>	<i>Competence Foci</i>
<i>(Luo & Yang, 2021)</i>	Both	Mix of Web 2.0 tools (videoconferencing: Skype, Social network: WeChat)	Higher Education	Formal	North America & Asia (USA & Mainland China)	Mix (beginner to intermediate)	42 (21NNS, 21NS)	NI	Mixed-method	Multiple data sources	Medium (15 weeks)	NI but focus on students' perception of telecollaboration
<i>(Tong et al., 2022)</i>	SCMC	Social Network (WeChat)	Higher Education	Informal	Oceania (Australia)	Beginner	81 (49F, 42M)	NI	Mixed-method (case study, Quantitative: descriptive)	Multiple data sources	Short (11 weeks)	NI
<i>(Wang & Jiang, 2022)</i>	SCMC	Social Network (WeChat)	Higher Education	Both	Asia (students with different country backgrounds studied in Mainland China)	Mix	48 (24 NNS, 24 NS)	SCT & ET	Mixed-method	Multiple data sources	Short (3 weeks)	Cultural knowledge

Notes:

ASCMC = asynchronous computer-mediated communication

SCMC = synchronous computer-mediated communication

NI = not indicated

Appendix B.

Chinese Language Learning Motivation Questionnaire

1. How would you respond to each of the following statements? Choosing numbers on a scale from 1 to 5, where **1 means VERY LOW/WEAK** and **5 means VERY HIGH/STRONG**.

Statement	1	2	3	4	5
1. My motivation to learn Chinese in order to start interacting with Chinese-speaking people is:	1	2	3	4	5
2. My interest in languages other than Chinese is:	1	2	3	4	5
3. My desire to learn Chinese is:	1	2	3	4	5
4. My overall attitude toward learning Chinese is:	1	2	3	4	5
5. My attitude toward the teaching of Chinese in this particular course is:	1	2	3	4	5
6. If I were to rate my feelings about learning Chinese for practical purposes such as to communicate with other family members, college study, I would say that they are:	1	2	3	4	5
7. I would characterize how hard I work at learning Chinese as:	1	2	3	4	5

2. Rate each item on a 1-5 scale by circling the appropriate number, where **1 means a VERY SMALL degree** and **5 means a VERY LARGE degree**.

Item	1	2	3	4	5
1. My anxiety in speaking Chinese is:	1	2	3	4	5
2. My attitude toward this Chinese course is:	1	2	3	4	5
3. My anxiety level in this Chinese course is:	1	2	3	4	5

3. How would you rate your interests in communication with Chinese native speakers?
Choosing numbers on a scale from 1 to 5, where **1 means VERY LOW/WEAK** and **5 means VERY HIGH/STRONG**.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

4. Do you have any other comments or suggestions?

Appendix C.

Intercultural Sensitivity Scale

Dear all,

Thanks again for your participation. Below is a series of statements concerning **intercultural sensitivity**. There are no right or wrong answers. Please work quickly and to rate each statement to indicate how it applies to you. Thank you for your cooperation.

5= strongly agree 4=agree 3=uncertain 2=disagree 1=strongly disagree

Be aware that cultural-distinct counterpart in Q19, Q21, Q23, Q24 refers to people from different cultural backgrounds.

_____	1. I enjoy interacting with people from different cultures.
_____	2. I think people from other cultures are narrow-minded.
_____	3. I am pretty sure of myself in interacting with people from different cultures.
_____	4. I find it very hard to talk in front of people from different cultures.
_____	5. I always know what to say when interacting with people from different cultures.
_____	6. I can be as sociable as I want to be when interacting with people from different cultures
_____	7. I don't like to be with people from different cultures.
_____	8. I respect the values of people from different cultures.
_____	9. I get upset easily when interacting with people from different cultures.
_____	10. I feel confident when interacting with people from different cultures.
_____	11. I tend to wait before forming an impression of culturally-distinct counterparts.
_____	12. I often get discouraged when I am with people from different cultures.
_____	13. I am open-minded to people from different cultures.
_____	14. I am very observant when interacting with people from different cultures.
_____	15. I often feel useless when interacting with people from different cultures.
_____	16. I respect the ways people from different cultures behave.
_____	17. I try to obtain as much information as I can when interacting with people from different cultures.
_____	18. I would not accept the opinions of people from different cultures.

- _____ 19. I am sensitive to my culturally-distinct counterpart's subtle meanings during our interaction. (cultural-distinct counterpart refers to someone from different cultural backgrounds)
- _____ 20. I think my culture is better than other cultures.
- _____ 21. I often give positive responses to my culturally-different counterpart during our interaction.
- _____ 22. I avoid those situations where I will have to deal with culturally-distinct persons.
- _____ 23. I often show my culturally-distinct counterpart my understanding through verbal or nonverbal cues.
- _____ 24. I have a feeling of enjoyment towards differences between my culturally-distinct counterpart and me.

Appendix D.

Focus Group Interview Questions and Protocols

Welcome and introduction.

Hello, everyone and welcome to our session. Thanks again for taking the time to join us to share your experience and thoughts about all activities we have been done with your classmates and language pals from China.

Today, we would like to know:

- what you think of this whole project (likes and dislikes about Book Creator, Padlet and Zoom calls),
- what helps you learn Chinese language and Chinese culture,
- what hinders you and how this project might be improved.

You were invited because you gave consent and have participated in each activity.

We want to draw your attention that:

1. This focus group interview will take about 20 minutes.
2. There are no right or wrong answers, only differing points of view.
3. You talk to each other not only to me. I will ONLY guide the discussion when it's needed or change to another question.
4. You don't need to agree with others, but you must listen respectfully when others share their views.
5. You've probably noticed the video and audio recorders in this room. The whole discussion will be recorded because we don't want to miss any of your comments. We have placed name cards on the table in front of you to help us remember each other's names.
6. We will be on a first name basis today but we won't use any names in our final report. So don't be shy and feel free to share your opinions and feelings if it differs from what others have said or even they are negative.
7. We are just as interested in negative comments you may have as positive comments and sometimes the negative comments are also valuable and helpful.

Well, let's begin. So firstly, (LIST activities on the whiteboard IN ADVANCE)

What do you think of this whole project? For example, what OVERALL outcomes you achieved from all activities? (Zoom call, Padlet, Book Creator)

Maybe we start with two rating scales about Padlet and Zoom first.

Section 1: Telecollaboration activities on Zoom and Padlet (15 minutes)

Part A: PADLET & ZOOM

1. How do you feel about communicating **on Padlet/Zoom**? (enjoyment, attitudes)
(what do you like best about this Padlet/Zoom)
2. How do you feel you improved through using Padlet/Zoom?
3. What is useful in the Padlet/Zoom environment to **help** that outcome?
Examples, positive experiences
4. Overall, what **stops** you communicating with Chinese pals on Padlet/Zoom?
Difficulties you faced, disappointments you've had
5. How do you feel about these two tools together?

Language skills: Speaking, listening, typing characters/Pinyin, reading,

Prompts: how have they improved?

- Can you recall any NEW words/sentences you learned from your Chinese pals? What were they?
- Were there any words/sentences you learned in class and did you get an opportunity to practice with Chinese pals? If so, what are they and how do you feel about them?
- What's the difference between practicing with Chinese pals and with your own classmates/teacher?

Social skills: confidence, sharing info, cooperation.....

Prompts: do you have any examples to share?

Intercultural awareness development: engagement, respect for cultural differences, confidence, enjoyment

Prompts:

- What aspects of Irish culture/yourself you did share with your Chinese pals? How did they react to your sharing? What do you think about their reaction?
- What was the most interesting thing you found/learned from your Chinese pals?
- Have you encountered or noticed any interesting cultural differences? What did you think? What did you do?

Technical skills: creative design on bookcreator, padlet, Zoom

6. What kind of **difficulties** did you meet while talking with YOUR Chinese pals on Zoom?
 - Shyness? Stranger silence? Limited language knowledge? Cultural difference? Technological issues?
 - How did you overcome them?

Part B: Task design & Continuous telecommunication interests

1. Which **activity/task** did you find most helpful for your Chinese language learning? and why? (prompts: clear/ambiguous instructions, low/high requirement of target language, specific activity goals or not)
2. Which **tool** (ZOOM/Padlet) did you find most useful for your Chinese language learning? and why?
3. Would you like to continue to chat and practice your Chinese with your pals?
 - If so, which tool would you consider using? Padlet, Zoom call or both? Or other tools? Why?
 - Do you prefer to chat in class or out of class? How often would you like to chat?

Section 2: E-book activities (5 minutes)

1. What do you think of the CHECKLIST your teacher shared during e-book design activities?

Prompts:

- Helpful? (Could you easily focus on task?)
 - Stressful? (Too many steps to follow?)
2. In which way, do you feel you improved most through completing the Ebook activity? (typing, speaking, confidence, creative design, teamwork: brainstorm, cooperation, leadership)

Section 3: Further suggestions (3 minutes)

1. What would you like to see happen in the next Zoom call/Padlet Discussion?
2. Do you have any suggestions for this project or the research team?

Appendix E.

Semi-structured Individual Interview Questions and Protocols (for teachers)

Welcome and introduction.

Thanks again for your time and support during the whole project. Today, our interview will focus on three main aspects:

- Firstly, from your point of view, your students' learning outcomes from different activities? (Book Creator, Padlet, Zoom) and what helps or stops them communicating with their Chinese pals.
- Secondly, your views and suggestions for the whole project and the task design, as well as specific language scaffoldings you offered to your students in each activity.
- Thirdly, discuss about your students' suggestion for the future activity design.

PART 1

1. What outcomes do you think your students achieved in different activities?
(BookCreator, Padlet, Zoom)
Prompts: language, intercultural, social, tool
2. How do you feel Padlet and Zoom call arranged together?
3. From your opinion, what is useful from each tool to help your students achieve those outcomes?
4. From your opinion, what stops your students communicating with Chinese pals?

PART 2

1. Which **task design** do you think **helps/hinders** your students and Chinese pals communication?

Padlet:

Topic 1: hey, what's up? Topic 2: your favourite festivals Topic

3:recommended places.

Zoom 1: one like and one dislike; school life in Ireland/China

Zoom 2: recommendations and Q&A

2. What kind of **language prompts** did you provide for your students in each activity? Any examples?

3. What are your **anticipations** for your students in each activity (e-book, Padlet, zoom call)? Did this project reach your anticipations or not? In which way?
4. What are you going to take away from this experience?
5. What do you think of reflection forms shared with you after each activity?
 - Did you write teaching reflection notes very often for your Chinese class?
 - How does the reflection note help you organize classes in the future?
6. **Suggestions** for the activity design (Padlet chat, Zoom call, eBook activity on Book Creator)
 - What do you think of the application of this project in your future Chinese language teaching?
 - From your points of view, how to make it more feasible for the teacher and students?

PART 3

Do you have **any comments on your students' suggestions** for the future telecommunications?

- 1) Task design
- 2) Continuous teamwork on eBook
- 3) Talk in English when it comes to culture discussions.

Comparing to the first research cycle we did last year, in which way do you feel the activity and project get improved?

Appendix F.

Thematic Analysis Coding Schema

Theme 1: Students' outcomes	Linguistic development/aspect	Anything to do with Chinese/English language knowledge, i.e. pronunciation improvement, new/review vocabs learning and using, listening, speaking (daily life activities), writing, reading etc.
	Intercultural awareness	The understanding of culture conventions that affect how we think and behave (cognitive aspect of intercultural communicative competence).
	Intercultural sensitivity	Active desire to motivate themselves to understand, appreciate, and accept differences among cultures. (affective aspect of ICC). Interaction engagement: participants' <u>feelings of participation</u> in intercultural interactions. Respect for cultural differences: reactions to their counterparts' culture and opinions, either respective or tolerant. Interaction confidence: the extent of participants' confidence. Interaction enjoyment: either <u>positive or negative reaction</u> toward communicating with people from difference cultures. Interaction attentiveness: participants' endeavours and efforts made by participants in intercultural interactions.
	Social connections	Make new friends with natives. Teamwork (either with own classmates or with natives). social skill development (presentation).
	Creativity	Any creative designs emerged in the learning artefacts.
	Research and information filter	Required by eBook design activity.
	Language barriers	1) Limited language level • Vocab shortage

Theme 2: Difficulties and obstacles		• Pronunciation • Sentences forming 2) Unmatched language levels between pairs
	Affective factors	• Shyness • Self-conscious • Diffidence • nervousness • anxiety • scary • stress • worriedness • lack of initiative/agency • cultural difference: keep a distance • easily get distracted • misbehaviour • self-centred (egotistical) • teamwork (lack of training)
	Logistics	1) Technological issues (wifi quality, internet/tool accessibility, accessibility to tech tools, not familiar with tools, lack of trainings on tools, machine translation reliability). 2) Organizational issues (time differences, time/curricular constraints, pairing match, facilities support, participant attendance rate). 3) Task design (too complex, unclear instructions, lack of trainings on how to focus on task completion).
Theme 3: Sociocultural theory	Mediation	The relationship mediated through the use of tools/human/learning activity. • human mediation: teacher's feedback or peers collaboration

		• symbolic tool mediation: technology support • designed activity: class tasks
	Affordance	What the environment offers the individuals and the possibility of an action on an object: • technology support • task/activities
	Scaffolding	The assistance/help from adults or experts or more competent peers in the process of learning: • instructor's assistance • MKO/peer support learning through interactions
	ZPD	ZPD refers to “the difference between what someone can do alone and what he or she can do with mediation” To help learners to obtain ZPD, three essentials are advised: • The presence of someone with knowledge and skills beyond that of the learner (MKO). • Social interactions with a skilful tutor that allow the learner to observe and practice their skills. • Scaffolding, or supportive activities provided by the educator, or more competent peer, to support the student as he or she is led through the ZPD.
	Context	• Physical classroom • Online environment
Theme 4: Technological tools	Specific tools	Book Creator, Padlet, Zoom, Email
	Advantages/affordance of tech	Language learning/consolidation, enjoyment, confidence, motivation, authentic environment, socialisation, develop tech skills, socialisation.
Theme 5: Task-based language teaching	Task design/features	Goal-oriented Meaning communication Use the target language

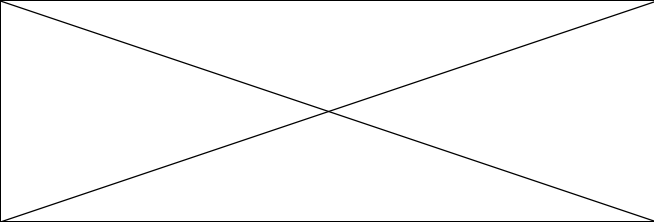
		Included grammars if needed
	Task sequences/interconnections	Tasks have interconnections with each other. The inner links among serial tasks offer learners scaffoldings to reach the final goal by completing tasks step by step. As a result, the sequence of tasks is important to determine the extent of learners' motivation and engagement to complete tasks and learning.
	Instructor role	Roles and responsibilities of the participating teachers
	Learner role	Parts played by student participants
Theme 6: Feedback and suggestions	Students	Technological tools
		Emotional feelings (positive or negative) There are four kinds of basic emotions: happiness, sadness, fear, and anger, which are differentially associated with three core affects: reward (happiness), punishment (sadness), and stress (fear and anger).
		Task design/activity organization (has some commons with the concept of collaboration)
	Teachers	Technological tools
		Task design/activity organization
		Students' performance/outcomes 1) Linguistics development 2) Intercultural awareness 3) Intercultural sensitivity - Interaction engagement: participants' feelings of participation in intercultural interactions. - Respect for cultural differences: reactions to their counterparts' culture and opinions, either respective or tolerant. - Interaction confidence: the extent of participants' confidence. - Interaction enjoyment: either positive or negative reaction toward communicating with people from difference cultures. - Interaction attentiveness: participants' endeavours and efforts made by participants in intercultural interactions.

		Social connections (including social skills development)
		Creativity
		Tech skills: get to know and grab new app/platforms

Appendix G.
The Codebook of Language Functions

Categories	Language functions	Definitions (Li & Kim, 2016)	Language functions	Definitions (this study)	Short codes	Examples
Initiating (Proposing new ideas or initiating group interaction.)	Greeting	Greeting group members.	√	Greeting group members. <u>Bid farewell</u>	IG	Hey, guys. Hola
	Eliciting	Inviting or eliciting opinions, comments, etc. from group partners.	Questioning	<u>Asking/probing NEW questions to continue the conversation;</u> <u>Ask a question in reply</u>	IQ	emm, a rich place? But why capital? anyone agree? What are ur favourite sports? what is ranelagh? Are you sleepy? have you ever visited Ireland before? Me?
	Questioning	Asking questions that one is not clear about.				

Categories	Language functions	Definitions (Li & Kim, 2016)	Language functions	Definitions (this study)	Short codes	Examples
	Requesting	Making direct requirements or requests.	√	Making direct requirements or requests (<u>including ask for clarifications for any unclear statements/questions</u>).	IR	I don't get it. Can you explain more? I don't understand your character, can you type pinyin Plz tell me a good story that you're fond of :D Sth about Celtic myths plz :D (Padlet)

Categories	Language functions	Definitions (Li & Kim, 2016)	Language functions	Definitions (this study)	Short codes	Examples
	Stating	Stating one's ideas and the ideas groups have discussed earlier; posting writing contents or sharing information.	√	Stating one's ideas and the ideas groups have discussed earlier; posting <u>sharing information</u> ; <u>emphasizing some information</u> .	IS	Wo xihuan cristiano Ronaldo. (I like Cristiano Ronaldo)
	Suggesting	Offering suggestions/recommendations about writing contents, structure, format etc.	√	Offering suggestions/recommendations about <u>communicative</u> contents, (<u>Grammar</u>) structure, format etc.	ISU	
			Informing (Emergед)	Giving/telling (someone) facts or information (occurs in Zoom interactions)	INFO	

Categories	Language functions	Definitions (Li & Kim, 2016)	Language functions	Definitions (this study)	Short codes	Examples
	Justifying	Defending one's own ideas/comments by giving reasons.				
Responding (Reacting to others' ideas.)	Acknowledging	Recognizing or praising others' ideas, comments, helpfulness, and capabilities.	√	Recognizing or praising others' ideas, comments, helpfulness, and capabilities.	RA	Great! Oh, well. hhhh Wow! This is interesting, I usually don't get this kind on INFORMATION :D Glad I asked.
	Agreeing	Expressing agreement with others' viewpoints.	√	Expressing agreement with others' viewpoints.	RAG	I know right it is funny.
	Disagreeing	Expressing disagreement with others' viewpoints.	√	Expressing disagreement with others' viewpoints.	RD	

Categories	Language functions	Definitions (Li & Kim, 2016)	Language functions	Definitions (this study)	Short codes	Examples
	Elaborating	Extending and elaborating on self or others' ideas about writing.	√	Extending and elaborating on self or others' ideas in terms of discussion topics.	RE	
	Greeting	Greeting group members.	√	Greeting group members. <u>Bid group members farewell</u>	RG	great! Tired of homework (to answer "how are you") Hello, everyone! (to reply "hello" from the other side)

Categories	Language functions	Definitions (Li & Kim, 2016)	Language functions	Definitions (this study)	Short codes	Examples
	Stating	Stating one's ideas and the ideas groups have discussed earlier; posting writing contents or sharing information.	√	Stating one's ideas and the ideas groups have discussed earlier; posting <u>sharing information</u> ; <u>emphasizing some information</u> .	RS	Grape juice tea with cheese on top (this statement was to answer the question of personal favorite food)
	Suggesting	Offering suggestions/recommendations about writing contents, structure, format etc.	√	Offering suggestions/recommendations about <u>communicative</u> contents, (<u>Grammar</u>) structure, format etc.	RSU	In fact the correct form is 印象 yin xiang (CN student did a self-correction on grammar) I recommend belfast if ya want to visit

Categories	Language functions	Definitions (Li & Kim, 2016)	Language functions	Definitions (this study)	Short codes	Examples
			Apologising (Emerged)	Express apology/regret for something that one has done wrong.	RAP	sorry mistype (Padlet)
			Emerged	Repeating what has said by the others	RRE	

Appendix H.

Study Information Leaflet and Consent Forms (students and parents, teachers, school principals).



Study Information Leaflet (Students and Parents)

Dear Student and Parent(s),

My name is Mengdi Wang, and I am currently a PhD student in the School of Education, Trinity College Dublin. I am writing to invite you and your Chinese language teacher to participate in a study conducted in Technology Enhanced Chinese as L2 Language Learning. My research is under the supervision of Dr. Ann Devitt from the School of Education, Trinity College Dublin.

Research Introduction

This project aims to develop a computer-mediated and task-based collaborative initiative for adolescent learners of Chinese language in the Irish post-primary school system. This project seeks to find a sustainable solution for a lack of sufficient spoken communications in Mandarin. The learning artefacts produced from collaborative tasks will provide learners with authentic Mandarin learning materials in and out of class, such as short videos, e-books, posters etc.

The whole project adapts the Bridge 21 collaboration learning model (introduction link: <http://tft-project.eu/index.php/the-bridge21-model/>) for use in Mandarin Short Course. Communicative collaborative tasks will be taken between paired groups of Irish students learning Chinese in greater Dublin area or Irish students with Chinese heritage/native speakers (age 12-16) in China with the assistance of technology tools, such as Zoom, Padlet, Book Creator etc.

If Parent(s) and you agree to take part in this study, you will be invited to take:

- 1) closed-access questionnaires for pair-matching, learning experience, project reflection etc,
- 2) collaborative works to create artefacts of the learning experience with your classmates (i.e. collaborative e-books, videos. etc),
- 3) audio recorded focus group interviews (and individual interview if needed),

- 4) video-recorded online interactions with Chinese heritage/native speakers (age 12-16)
- 5) class observations (either **remotely** or **on-site classroom**, following *the COVID-19 governmental guidelines and school policy for visitors* if on-site observations are required).

In the process of class observations, interactions between you and your classmates/teachers may be audio-recorded or video-recorded. These data will be only for anonymous transcription purpose.

This study is planned to be conducted during academic year 2021-22 in regular classes.

- Phase 1- teamwork with classmates, which is proposed in late Nov,
- Phase 2-telecollaboration learning connections with native Chinese, which will be arranged in late Jan or early Feb 2022 if possible.

Information for student participants

- There are no risks for your participation in this project beyond those encountered in everyday life.
- Your participation are voluntary and you can withdraw from this study anytime without giving a reason.
- These research activities will mostly occur in your school and class time. If you do not want to take part in this research, your study in the Chinese language class will not be disrupted and your data will not be collected for this research.
- No individual information regarding you will be revealed in the research.
- All data will be securely stored in this project Trinity Teams account with accordance with the General Data Protection Regulation (GDPR). Access to raw data will be limited to the research team (only me and my supervisor).
- If you have any questions or do not understand something just ask the research team to explain it for you.

Finally, I would like to thank you for taking the time to consider my research. Your participation in this project is sincerely appreciated.

Kind regards,

Mengdi Wang

Email: wangm3@tcd.ie

Dr. Ann Devitt

Supervisor Email: DEVITTAN@tcd.ie

Student Consent Form (Under 18)

You are under **no** obligation to participate in this study. If you agree to participate, but at a later stage feel the need to withdraw, you are free to do so.

Please **answer all** of the following statements (**tick the appropriate box**):

	Yes	No
I have read and understood the information sheet.	☐	☐
I understand what the project is about, and what the results will be used for.	☐	☐
I am fully aware of all of the procedures involving and of any risks and benefits associated with the study.	☐	☐
I know that my participation is voluntary and that I can withdraw from the project at any stage without giving any reason up until the data is fully anonymised.	☐	☐
I understand and consent to participate in the audio-recorded focus group workshop.	☐	☐
I am aware that this study will involve structured class observations. I agree to be involved in the class observations.	☐	☐
All data collected from focus group workshop and structured class observation will be anonymised either as it is collected or as soon as it is transcribed.	☐	☐

I agree to participate in the above study.

Signature of Student Date

Signature of Researcher Date

RETURNING THE CONSENT FORM: We would ask you please return the attached information sheet and consent form to the research team.

Parent/Guardian Consent Form

Your child is under **no** obligation to participate in this study. If you agree for child to participate, but at a later stage feel the need to withdraw, you/your child are free to do so. It will not affect them in any way.

Please answer **all** the following (tick the appropriate box):

	Yes	No
I have read and understood the information sheet.	☐	☐
I understand what the project is about, and what the results will be used for.	☐	☐
I am fully aware of all of the procedures involving and of any risks and benefits associated with the study.	☐	☐
I know that my child's participation is voluntary and that we can withdraw from the project at any stage without giving any reason up until the data is irrevocably anonymised.	☐	☐
I understand and agree my child to participate in the audio-recorded focus group workshop.	☐	☐
I am aware that this will involve structured class observations. I consent my child to be involved in the class observations.	☐	☐
All data collected from focus group workshop and structured class observation will be anonymised at the point of either data collection or transcription.	☐	☐

I agree for my child to participate in the above study.

Signature of Parent/Guardian Date

Signature of Researcher Date

RETURNING THE CONSENT FORM: We would ask you please return the attached information sheet and consent form to the research team.

Study Information Leaflet (teachers)

Dear Teacher,

My name is Mengdi Wang, and I am currently a PhD student in the School of Education, Trinity College Dublin. I am writing to invite your Chinese language teacher(s) and your students to participate in a study conducted in Technology Enhanced Chinese as L2 Language Learning. My research is under the supervision of Dr. Ann Devitt from the School of Education, Trinity College Dublin.

Research Introduction

This project aims to develop a computer-mediated and task-based collaborative initiative for adolescent learners of Chinese language in the Irish post-primary school system. This project seeks to find a sustainable solution for a lack of sufficient spoken communications in Mandarin. The learning artefacts produced from collaborative tasks will provide learners with authentic Mandarin learning materials in and out of class, such as short videos, e-books, posters etc.

The whole project adapts the Bridge 21 collaboration learning model (introduction link: <http://tft-project.eu/index.php/the-bridge21-model/>) for use in Mandarin Short Course. Communicative collaborative tasks will be taken between paired groups of Irish students learning Chinese in greater Dublin area or Irish students with Chinese heritage/native speakers (age 12-16) in China with the assistance of technology tools, such as Zoom, Padlet, Book Creator etc.

If you agree to take part in this project, you will be invited to:

- 6) co-design collaborative tasks with the research team,
- 7) take questionnaires on experience and impact of teaching approaches in Chinese employed in this study,
- 8) classroom observations,
- 9) reflective diary (written or audio recorded according to the teacher preference),
- 10) individual interview.

This study is planned to be conducted during academic year 2021-22 in regular classes.

- Phase 1- teamwork with classmates, which is proposed in late Nov,

- Phase 2-telecollaboration learning connections with native Chinese adolescents, which will be arranged in late Jan or early Feb 2022 if possible.

Information for Teacher Participation

I would greatly appreciate your assistance with this project. There are no risks for you and your students in this project beyond those encountered in everyday life.

- Participation is on voluntary basis.
- Confidentiality and anonymity will be assured for all participants at any stage of this project.
- All data will be securely stored in a private channel of MS Teams in compliance with GDPR.
- Access to raw data will be limited to the research team and examiners.
- The duration of data retention will be 10 years.
- The anonymised results from the study will be included in a thesis and may be discussed at conferences or published in a book or journal.
- As your school would be the site for data collection, a copy of the results can be made available to you if requested.

Finally, I would like to thank you for taking the time to consider my research. Your participation in this project is sincerely appreciated.

If you have further questions regarding this research please feel free to contact the researcher team using the email addresses listed below.

Kind regards,

Mengdi Wang

Email: wangm3@tcd.ie

Dr. Ann Devitt

Supervisor Email: DEVITTAN@tcd.ie

Teacher Consent Form

You are under **no** obligation to participate in this study.

Please answer all of the following (tick the appropriate box):

	Yes	No
I have read and understood the information sheet.	☐	☐
I understand what the project is about, and what the results will be used for.	☐	☐
I am fully aware of all of the procedures involving and of any risks and benefits associated with the study.	☐	☐
I know that my participation is voluntary and that I can withdraw from the project at any stage without giving any reason up until the data is irrevocably anonymised.	☐	☐
I understand and agree to participate in an audio-recorded individual interview.	☐	☐
I understand and agree to classroom observations of my Chinese classes.	☐	☐
I am aware that my data will be kept anonymous at the point of either collection or transcription.	☐	☐

I agree to participate in the above study.

Signature of Teacher Date

Signature of Researcher Date

RETURNING THE CONSENT FORM: We would ask you please return the attached information sheet and consent form to the research team.

Study Information Leaflet (Schools)

Dear Principal and Board of Management,

My name is Mengdi Wang, and I am currently a PhD student in the School of Education, Trinity College Dublin. I am writing to invite your Chinese language teacher(s) and your students to participate in a study conducted in Technology Enhanced Chinese as L2 Language Learning. My research is under the supervision of Dr. Ann Devitt from the School of Education, Trinity College Dublin.

Research Introduction

This project aims to develop a computer-mediated and task-based collaborative initiative for adolescent learners of Chinese language in the Irish post-primary school system. This project seeks to find a sustainable solution for a lack of sufficient spoken communications in Mandarin. The learning artefacts produced from collaborative tasks will provide learners with authentic Mandarin learning materials in and out of class, such as short videos, e-books, posters etc.

The whole project adapts the Bridge 21 collaboration learning model (introduction link: <http://tft-project.eu/index.php/the-bridge21-model/>) for use in Mandarin Short Course. Communicative collaborative tasks will be taken between paired groups of Irish students learning Chinese in greater Dublin area or Irish students with Chinese heritage/native speakers (age 12-16) in China with the assistance of technology tools, such as Zoom, Padlet, Book Creator etc.

Research Consent

We wish to seek permission for your students and teacher(s) to participate in this study. No data will be collected until we receive all signed consent forms from you, Chinese language teacher(s), student participants and their parent(s)/guardian.

If student participants and their parents agree to take part in this project, **students will be invited to take:**

- online closed-access questionnaires for pair-matching, learning experience, project reflection etc,
- collaboratively creating artefacts of the learning experience (i.e. collaborative e-books, videos. etc),

- an audio recorded focus group interview (and individual interview if needed),
- a video-recorded online interactions with Chinese heritage/native speakers (age 12-16)
- class observations. (interactions among students/teachers may be audio- recorded or video-recorded. These data will be only for anonymous transcription purpose.)

The **Chinese language teacher(s)** will be invited to participate in:

- 11) co-design collaborative tasks with the research team,
- 12) questionnaire on experience and impact of teaching approaches in Chinese employed in this study,
- 13) classroom observations,
- 14) reflective diary (written or audio recorded according to the teacher preference),
- 15) individual interview.

This study is planned to be conducted during academic year 2021-22 in regular classes.

- Phase 1- teamwork with classmates, which is proposed in late Nov,
- Phase 2-telecollaboration learning connections with native Chinese adolescents, which will be arranged in late Jan or early Feb 2022 if possible.

Data Collection and Handling

I would greatly appreciate your assistance with this project. There are no risks for students or teacher(s) participation in this project beyond those encountered in everyday life.

- Participation is on voluntary basis.
- Confidentiality and anonymity will be assured for all participants at any stage of this project.
- All data will be securely stored in a private channel of Teams in compliance with GDPR.
- Access to raw data will be limited to the research team and examiners.
- The duration of data retention will be 10 years.
- The anonymised results from the study will be included in a thesis and may be discussed at conferences or published in a book or journal.
- As your school would be the site for data collection, a copy of the results can be made available to you if requested.

Finally, I would like to thank you for taking the time to consider my research. Your participation in this project is sincerely appreciated.

If you have further questions regarding this research please feel free to contact the researcher team using the email addresses listed below.

Kind regards,

Mengdi Wang

Email: wangm3@tcd.ie

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Principal/Board of Management Consent Form

The board has been provided with an information sheet which outlines the activities students and teachers will take part in, how data will be collected, stored and used and how it can contact the research team.

The board understands that it may withdraw the school from the project at any time should it wish to do so for any reason.

Principal's signature	
Date	
Name of the school	

Researcher's signature	
Date	

RETURNING THE CONSENT FORM:

We would ask you please return the signed consent form by email to the researcher team (wangm3@tcd.ie) or contact person in school.

Appendix I.
Cycle 1 Needs Analysis Activities (for students)

Activity 1: think-pair-share

Question: What would you love to learn about Chinese or China? List two things you want to learn most.

Activity 2: 3-step interview

Question: Your best learning experience about Chinese or other languages (you really enjoy it)

- Where, who, why, what
- What your favourite part of Chinese?
- Would you recommend Chinese to a friend?
- How are you feeling about Chinese language?
- What would be your favourite part of doing Chinese project?
- What part of Chinese you did not like?

Activity 3: focus group interview questions

Q1: When do you get to use your Chinese language- in class or outside of the class?

Q2: Imagine that right now, if a Chinese young person at your age and came up to you,

- What do you think you could talk to them about?
- What would you like to talk to him/her about? Would you like to be able to talk with him/her in Chinese?
- What would you be most interested to ask them/to find out about?

Q3: What tech do you use to communicate with people generally? (skype, WhatsApp, facetime, snapchat)

Appendix J.

Cycle 1 Needs Analysis Interview Questions (for teacher)

1. Expectations/aspirations for students
 - What do you want your students to be able to do in Chinese language from this short course? (after 1 year studying? or 2 years studying?)
 - What would you like to see as success for your students
2. Proud moment of your students
 - Could you please think about a time in your class you felt your students were really engaging/did very well/improved their communication competence? And why was that successful/work well?
 - What was going on then?
3. Teaching strategy/collaborative activities conducted in the class
 - What collaborative activities do you design and use to students' practice communication competence? Does it work well? How and why?
 - Which collaborative activities do you like most? Which one do you think your students like most? And why?
4. Tech applied in the class
 - Please rank those techs below from the most frequently to less you used in your class
(Quizlet, Gimkit, Kahoot, Audacity (audio recorded software), Microsoft teams/ppt/OneNote, YouTube)
 - Please rank them from the most efficient to less for improving your students' communication competence
 - What will you expect for e-twining between your students and Chinese native teenagers?
 - What's the weight of using tech in your class?
5. Meaningful teaching for students
 - Do you think there is any opportunity for your students to use Chinese in a meaningful way in your school/ Ireland?
 - How would you try to provide your students with a meaningful context?
6. Class Design and Assessment

- For your Chinese class, what's the weight/proportion of formative and summative assessments?
- Could you please give some example of formative and summative assessments in your class?
- Which assessments will student need to complete with tech support?
- If you ranked CEFR skills concerning about your class, how would it looks like in reality/ ideally? And why?

7. Challenging/barriers of teaching Chinese

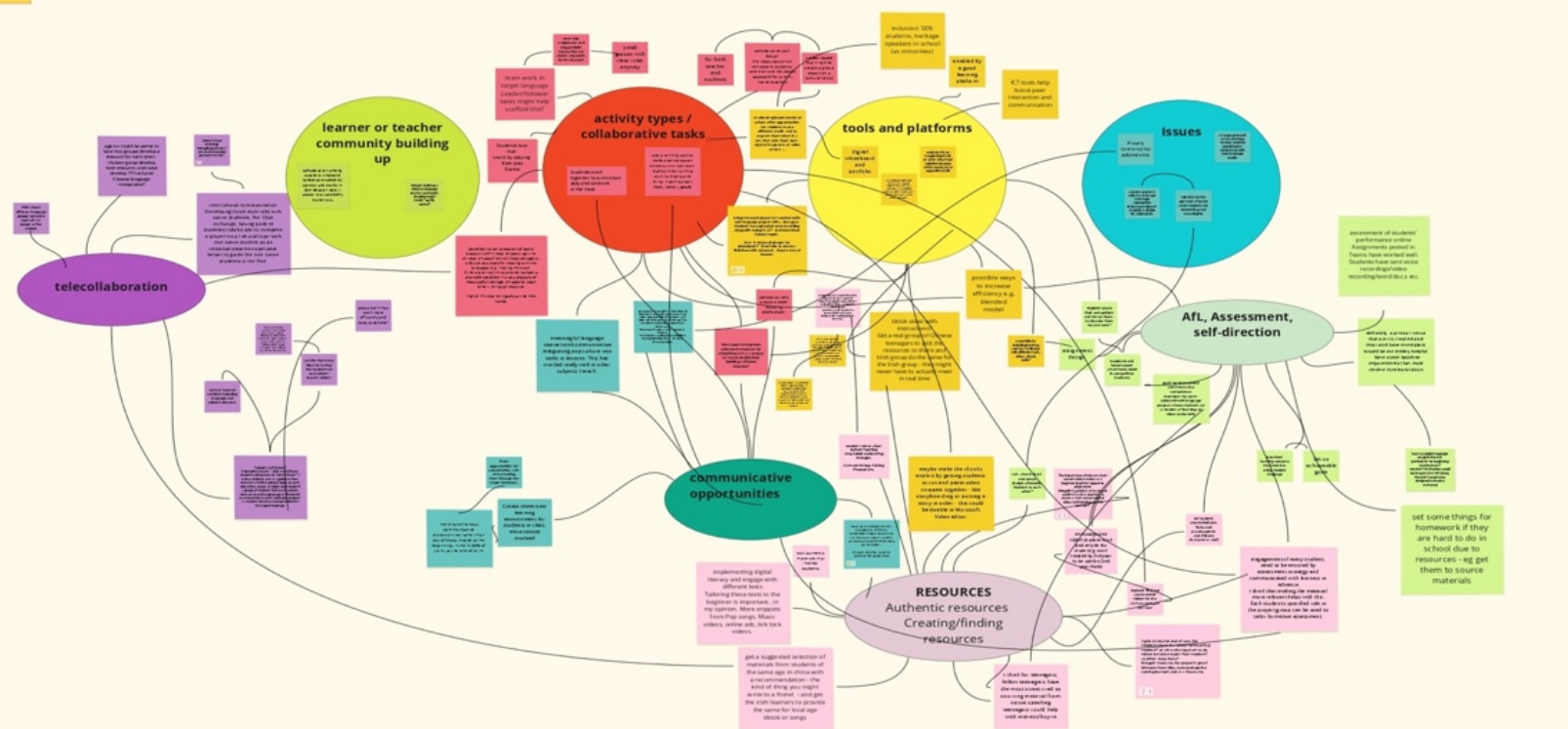
- For tech application
 - What are they? Why? How did/will you tackle them?
- For collaborative learning
 - What are they? Why? How did/will you tackle them?
- For providing meaningful context to you students
 - What are they? Why? How did/will you tackle them

Appendix K.

Cycle 1 Consultation Activity Themes

Theme 1	task types including collaborative tasks
Theme 2	feasible technology tools and platforms in school
Theme 3	communicative opportunities
Theme 4	learning resources
Theme 5	telecollaboration
Theme 6	translanguaging
Theme 7	assessment for learning and self-direction
Theme 8	practical issues
Theme 9	learner/teacher community

A screenshot of consultation notes is attached in the next page.



Appendix L.

Language Proficiency Self-assessment Grid.

	A1.1	A1	A2	A2+	B1
Listening	I can understand short, simple instructions for actions such as 'Stop,' 'Close the door,' etc., provided they are delivered slowly face-to-face, accompanied by pictures or manual gestures and repeated if necessary.	I can understand some words and expressions, when people are talking to me about my family, school, my free time or my surroundings but only if they are talking slowly and clearly.	I can understand simple phrases, questions and information relating to basic personal needs (e.g., shopping, eating out, going to the doctor).	I can usually identify the topic of conversation around me when people speak slowly and clearly.	I can understand when people speak at normal speed on familiar or carefully prepared subjects.
Reading	I can read and understand familiar words and sentences when written in Pinyin with tone marks .	I can understand simple forms well enough to give basic personal details (e.g. name, address, date of birth).	I can understand short, simple texts containing the highest frequency vocabulary.	I can read basic information in routine letters/emails and messages (e.g., hotel reservations, personal telephone messages).	I can understand texts of varying lengths in which words are used which are familiar to me from my daily context or because they concern my main areas of interest (for example, music, sport, travelling).
Spoken Interaction	I can ask and answer questions about myself and daily routines, using short expressions and relying on gestures to reinforce the information.	I can ask and answer simple questions, initiate and respond to simple statements, e.g. school, family, greeting, apologies).	I can handle short social exchanges and make myself understood if people help me.	I can participate in short conversations in routine contexts on topics of interest.	I can understand everyday conversations, but I sometimes have to ask for some words and phrases to be repeated.
Spoken Production	I can greet someone with simple words and I can say "yes", "no", "sorry", "please" and "thank you".	I can give basic information about personal details (e.g. name, age, gender, birthday, birth/home place, nationality, family).	I can answer simple questions about home and country, school and free time, likes and dislikes.	I can express simple feelings (e.g. physical and psychological reactions).	I can express my opinion on subjects with which I am familiar (for example school, music, sport, television, fashion, look) and ask for other people's opinions

	A1.1	A1	A2	A2+	B1
Writing Character	I can write down any character by hand after slow visual instruction (stroke by stroke).	I can write down my gender, nationality and any date in characters by hand.	I can copy short phrases on everyday subjects by hand without hesitation e.g. names of institutions.	I can write down simple connected texts in characters on a range of topics within my field of interest.	I can write personal letters giving news, describing experiences and impressions, and expressing feelings.
Pinyin	I can write down words and short sentences in Pinyin with mostly correct tone marks.	I can write down most syllables in Pinyin including tone marks with reasonable accuracy . I can read out most Pinyin syllables correctly.	Can read out any Pinyin syllable with correct pronunciation.	Not available	Not available

Dear all,

This grid is about self-assessment of Chinese language learning.

It is divided in SIX parts -listening, reading, spoken interaction, spoken production, writing characters and Pinyin. There are 5 level of descriptions from A1.1(basic) to B1 (independent level).

Please read the grid completely and use a pen to draw a tick (✓) in the description box regarding each language skill which best describes your current Chinese language learning. Please write your name at the top of this page. Thanks for your time.

Appendix M.

Cycle 1 Telecollaboration Reflection Questions (for students)

1. What did you expect yourself to achieve in this project? (in terms of language skills, intercultural awareness, sharing Irish culture making friends etc).
2. What are your overall impressions of the experience?
3. What did you find helpful for your Chinese language skills? E.g. anything about the tools (Zoom, Padlet) or anything about how the activities were set up?
4. What did you find helpful for your Chinese cultural awareness? E.g. anything about the tools (Zoom, Padlet) or anything about how the activities were set up?
5. How do you feel about communicating in Chinese now? better? worse? more confident?
6. What was the most interesting thing you learnt about Chinese culture from peers?
7. What are the biggest obstacles for you in the telecollaboration learning with Chinese students?
8. What would have helped the conversation with the Chinese students flow more?
9. What would you see happen in the next telecollaboration?
10. Any suggestion to this project or the research team?

Appendix N.
The Checklist of the EBook Activity



“Creating an eBook” Checklist

Our Book’s title is: _____

WARM UP

Team NAME:

Note: each role can be taken by more than one member; each member can take more than one role as well.

The five/six people in our group are:

1. Team leader (make sure your team complete the task & as a turn-taking propter): _____
2. Note taker (write down discussion & brainstorm ideas): _____
3. Resource investigator (s) (visual, audio elements design and edit): _____
4. Proof-reader(s) (Chinese language input and grammar check) : _____

Please tick upon completion

We have completed:

- ☐ Page(s) of the contents
- ☐ Visual elements
- ☐ Sentence structures

Tick - Considering the topic, We choose to create and upload relevant sentences and images of:

- selfie
- name, age, birthday
- family/siblings
- school routine/ classmates
- food
- sports
- favourite (things)
- hobby
- languages we can speak
- Others which we have learned so far...

INVESTIGATE

Timeline for completion of project

☐ We have read the assessment rubric which is how our teacher will assess our work – please tick.

We expect to complete:

- Pages number: _____
- Topics about: _____
- Voice recording on: _____
- Section of the video on (optional): _____

After our teacher explained the project to us, this is what we expect to happen during this project:

PLAN

Here is the information which we believe we should include about our assigned topic:*

1. *
2. *
3. *
4. *

Here are the two things that we would like our audience to learn about the topic from our e-book:

1. *
2. *

CREATE

At least 5-page e-book

Our e-book uses this music (optional):

This storyboard contains sketches and descriptions of the order of what I will show in our e-book.

Storyboard Template

Name:
Project:













Two questions will be given to the audience regarding our e-book content in the end of presentation

Question 1

Question 2

PRESENT

We emailed e-book to our supervising teacher on this date:

We decide to present our e-book by: (Tick the box which applies)

☐ group presentation

☐ individual presentation

presenter(s)'s name: _____

Feedback for other groups work

That Group name: _____ Their E-book name: _____

This is what we said to the other group's e-book. Two best parts are

1. *

2. *

One suggestion is

1. *

REFLECT

Look at the assessment rubric for this project and tick the appropriate box.

I think that our team will be marked in this band for each section – please tick:

	Below Expectations (1-5 points)	In Line with Expectations (5-10 points)	Above Expectations (10-15)	Exceptional (15-20)
OUR CONVERSATIONS				
OUR BRAINSTORM				
OUR TEAMWORK				
OUR REFLECTIONS				
OUR PRESENTATION				

Looking back at this project, the best thing about it was:

The worst thing about it was:

One thing we would like to improve about ourselves/our e-book is:

Appendix O.

Communication Task 1-Meet your pals on Padlet!

- Use your real/nickname if choosing to register a Padlet account. No one can guess who you are if you are anonymous on Padlet.
- Don't be shy to ask your pals if you want to know some words either in Chinese or in English. I bet you all are good helpers!
- Afraid of missing your pals' questions? You won't. You can always check them by scrolling down the page.
- To save the space, you can answer each other by using 'ADD COMMENT' button under each post!

	Person 1	Person 2	Person 3	Person 4
Name/nickname				
Age				
Family				
Hobbies				
Favourite sports				
School life				
Type any other interesting information you get from your pals....				

Appendix P.

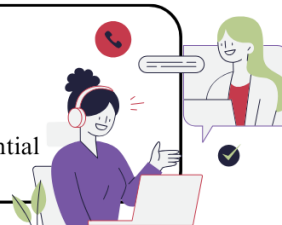
Telecollaboration Design and Implementation Leaflet for Teachers (pre-task, task, post-task)

HOW TO START

PRE-TELECOLLABORATION PREPARATION

TEACHER RAPPORT BUILD-UP

- Exchange ideas and information about students, curriculum requirements, technology facilitation at school.
- Understand learning needs and language proficiency.
- Agree on the frequencies for telecollaboration and discuss potential technological tools.



STUDENT PREPARATION

- Manage expectations with telecollaboration partners.
- Discuss potential communication challenges and conflicts by presenting simulated scenarios in class.
- Complete a group-matching form.
- Practice navigating the selected technological tools (software installation, registration etc.).



TASK DESIGN (FOR BEGINNERS)

- Provide clear activity instructions (language requirements, expected outcomes etc.).
- Decide on group size (with a maximum of 4 people in each group) and finalise group matching.
- Task sequence: **project-based collaboration within the classroom** (adapted from Bridge 21 learning model) → **information exchange** (which might conclude at this stage) → **project clinic and sharing with partners..**



COMMENTS

Selection criteria of technological tools include **multimodality support, privacy and security, free or low cost**, for example:

- Book Creator, Microsoft PowerPoint, or Google Slides for project-based collaboration.
- Padlet, WhatsApp, or WeChat for text-based chat.
- Zoom, Microsoft Teams, or video calls on WhatsApp/WeChat for videoconferencing meetings.



HOW TO FACILITATE?

TELECOLLABORATION IN PROCESS

PROJECT-BASED COLLABORATION

- Clarify the project objectives and language learning goals.
- Provide activity guidance by offering a checklist and language assistance.
- Provide constructive feedback on language use, content, and collaborative skills.
- Facilitate and monitor project progress.



INFORMATION EXCHANGE (ICE-BREAKING)

- Set clear objectives, frequencies and language usage proportion.
- Provide language support (vocabulary lists, language structures, and language models relevant to the topics of discussion).
- Encourage them to use the target language expressively.
- Keep track of students' progress, provide support as needed, and intervene to address any challenges or issues that arise.



VIDEOCONFERENCING

- Set up a timer for each activity and work as the timekeeper.
- Provide discussion prompts to guide the video conferencing sessions and keep the conversation flowing.
- Encourage equal participation from all students and intervene if necessary to address any challenges or issues that arise.
- Open breakout rooms and help find a leader for group discussions.



SUGGESTION

- Maintain contact with partner teachers and adjust plans as needed.
- Include breaks between video conferencing meetings.
- Recommend wearing headphones for clear communication in Zoom Breakout rooms.
- Be patient with shy students and encourage gradual progress.



HOW TO FACILITATE REFLECTION?

POST-TELECOLLABORATION

REFLECTION ON THE *PROCESS*

- Consider whether initial expectations and goals were met and how their perceptions may have changed throughout the process.
- Reflect on communication experiences interacting with peers and strategies used to overcome communication barriers and difficulties.
- Reflect on cultural awareness and sensitivity towards peers from different cultural backgrounds
- Reflect on experiences working collaboratively with peers on shared tasks or projects, including the distribution of responsibilities and the effectiveness of teamwork.
- Summarise overall reflection on the telecollaboration process, highlighting key insights, lessons learned, and areas for further growth and development.



REFLECTION ON THE *LEARNING*

Using three-step interview techniques to foster group reflections on:

- The content knowledge acquired and the development of language skills achieved through telecollaboration activities.
- how exposure to different perspectives, values, and communication styles enriched their cultural awareness and understanding.
- the collaborative skills developed through teamwork and cooperation with telecollaboration partners, if applicable.

