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Content Support in Second Language Writing and Its Impact on Writing Performance and Writing Processes

Yanmei Li

CONTENT SUPPORT IN SECOND LANGUAGE WRITING AND ITS IMPACT ON WRITING PERFORMANCE AND WRITING PROCESSES

Tesi doctoral presentada per

Yanmei Li

Directors: **Dr. Roger Gilabert Guerrero**

Dr. Olena Vasylets

Tutor: **Dr. Roger Gilabert Guerrero**

Programa de doctoral: Ciència Cognitiva i Llenguatge

Línia de recerca: Lingüística teòrica i aplicada

Departament de Llengües i Literatures Modernes i d'Estudis Anglesos

2024

UNIVERSITAT DE BARCELONA

ACKNOWLEDGEMENT

It has been joyful, inspiring, and fulfilling but challenging to spend the last five years completing this dissertation. I would not have been able to achieve this without the support of great people along the way and the support from my research line. First and foremost, I would like to express my gratitude to my supervisors, Dr. Roger Gilabert and Dr. Olena Vasylets. I am truly thankful that Dr. Gilabert made time for a meeting with me one afternoon, discussing the idea of my proposed research and finally agreeing to supervise this doctoral dissertation. During my doctoral studies, he has always offered me a *map* of where we could start and to which destination we could reach with our research. His expertise in second language production and task design has led me all the way to investigate second language writing and task complexity. He has been very generous in sharing his insights and relevant second language acquisition literature, as well as information about conferences, academic events and positions. His support and guidance have led me to bring our findings to a wider audience. I would also like to thank Dr. Olena Vasylets, who said *yes* to my proposed research, listened carefully to my thoughts and provided her insights on second language writing during the first meeting. She has been constantly supportive for the past five years, patiently reviewing my progress reports, conference abstracts, posters, and dissertation chapters and giving detailed comments to help me improve my work as much as possible. Without her support and encouragement, I would not have been able to present my findings at conferences and complete this dissertation successfully. Again, I truly appreciate the effort and time they devoted to this research project.

I would also like to express my gratitude to Dr. Marije Michel, who brought me into the field of TBLT, supervised my master's thesis at Lancaster University, and generously included my research findings as part of the co-authored book chapter. I appreciated her thorough support and care for my PhD application after I obtained my master's degree. I would like to thank Dr. Diane Potts, who convinced me that I could be a successful educator and an excellent researcher. Without her, nothing would have been possible. Lastly, my special thanks go to my former

ABSTRACT

The study of writing as a site for language learning has led to the exploration of learning affordance of task complexity in second language (L2) writing, a task implementation feature that has received growing attention in task-based language learning and teaching (TBLT) literature. A key objective of this line of research is to investigate how the cognitive demands of tasks affect writing performance and language development of L2 writers based on the related hypothesis and the writing model (Kellogg, 1996; Robinson, 2001b, 2011a; Skehan, 1998). Given the complex, problem-solving nature of writing, one of the investigated task features is the provision of content support, which is expected to reduce the conceptual demands on the planning process and direct more attentional resources to the translation process. However, previous studies have offered little evidence of the effect of content support on L2 writing performance, and whether and how content support can affect the cognitive writing processes and learning is still an open question.

The current research adds to empirical evidence in its attempt to explore the potential role of content support, manipulated as a resource-dispersing task complexity feature, in L2 written production and writing processes. In this study, participants were Chinese learners of English as a Foreign Language (EFL) in their first year in high school (N = 24, lower-intermediate level, M_{age} = 16). They were divided into two groups: one performed the writing task with content support (CS group), and the other wrote without content support (NCS group). Participants in each group completed four writing tasks, including two argumentative tasks and two article-writing tasks, over four weeks. Immediately after each writing task, they reported their cognitive processes regarding thinking about ideas generation, ideas elaboration and ideas organisation, easy structure, and language aspects. In addition, semi-structured interviews tapping into writing processes were conducted with the sub-group of the participants (N = 12). Lastly, writing samples were transcribed and analysed for linguistic and propositional complexity, accuracy, fluency, and overall text quality. Interview data were coded in terms of writing processes (i.e., planning, translation and monitoring) and other meta-comments. Our

results reveal that content support elicited significantly higher lexical diversity and a tendency toward higher coordination, while the absence of content support showed a tendency toward more words generated. However, there were no significant differences between the groups in other performance measures. Regarding the within-group changes over time, the content support group produced longer, more meaningful and higher-quality texts at the expense of linguistic complexity. On the other hand, the absence of content support likely resulted in more stable writing performance over time. Regarding the cognitive processes of writing, L2 writers reported higher frequencies of engaging in the metacognitive processes under the condition when content support was absent. On the other hand, when content support was provided to reduce the conceptual demands in the planning process, L2 writers geared their attentional resources primarily to content planning rather than the lexico-grammatical concerns. Our findings suggest that content support offered favourable conditions for lower-intermediate-level learners to orchestrate cognitive processes to produce good writing in the longer term.

These findings allow us to understand the cognitive complexity involved in the writing tasks, expand the effects of content support on L2 writing performance and writing cognition to language learners at a lower proficiency level and fill the gap in longitudinal task-based investigations on L2 writing. This study also offers implications for explaining the focus of attention of lower-intermediate L2 writers in the planning, translation, and monitoring process and understanding how they manage the cognitive resources and select information to complete the writing tasks. Pedagogically, our findings provide EFL teachers with guidance on delivering effective content planning strategies to learners and designing writing tasks that engage learners in focusing on both the communicative requirements and language aspects of the task.

RESUMEN

El estudio de la redacción como un medio para el aprendizaje de idiomas ha llevado a la exploración de las posibilidades de aprendizaje de la complejidad de la tarea en la redacción en una segunda lengua (L2), una característica de implementación de tareas que ha recibido una atención creciente en la literatura de aprendizaje y enseñanza de idiomas basado en tareas (TBLT). Un objetivo clave de esta línea de investigación es analizar cómo las demandas cognitivas de las tareas afectan al rendimiento de la redacción y al desarrollo lingüístico de los escritores de L2 basándose en las hipótesis relacionadas y en el modelo de redacción (Kellogg, 1996; Robinson, 2001b, 2011a; Skehan, 1998). Dada la naturaleza compleja y de resolución de problemas de la redacción, una de las características observadas de la tarea es la provisión de apoyo al contenido, que se espera que reduzca las demandas conceptuales en el proceso de planificación y dirija más recursos atencionales al proceso de traducción. Sin embargo, estudios anteriores han ofrecido poca evidencia del efecto que tiene el apoyo al contenido en el rendimiento de la redacción en L2, y si el apoyo al contenido puede afectar a los procesos cognitivos de la redacción y al aprendizaje, y de qué manera, sigue siendo una cuestión abierta.

La presente investigación proporciona evidencia empírica al intentar explorar el papel potencial del apoyo al contenido, manipulado como una característica de complejidad de la tarea que dispersa recursos, en la producción escrita de L2 y en los procesos de redacción. En este estudio, los participantes fueron estudiantes chinos de inglés como idioma extranjero (EFL) en su primer año en la escuela secundaria superior (N = 24, nivel intermedio-bajo, Edad promedio = 16). Se dividieron en dos grupos: uno realizó la tarea de redacción con apoyo de contenido (grupo CS), y el otro escribió sin apoyo de contenido (grupo NCS). Los participantes de cada grupo realizaron cuatro tareas de redacción, incluidas dos tareas argumentativas y dos tareas de redacción de artículos, a lo largo de cuatro semanas. Inmediatamente después de cada tarea de redacción, informaron de sus procesos cognitivos en relación con el pensamiento sobre la generación, elaboración y organización de ideas, facilidad de la estructuración y los aspectos lingüísticos. Además, se realizaron entrevistas semiestructuradas sobre los procesos de redacción con el subgrupo de participantes (N = 12). Por último, se transcribieron muestras de

redacción y se analizó su complejidad lingüística y propositiva, su precisión, su fluidez y la calidad general del texto. Los datos de las entrevistas se codificaron en función de los procesos de redacción (es decir, planificación, traducción y supervisión) y otros meta-comentarios. Nuestros resultados revelan que el apoyo al contenido suscitó una diversidad léxica significativamente mayor y una tendencia hacia una mayor coordinación, mientras que la ausencia de apoyo al contenido mostró una tendencia hacia un mayor número de palabras generadas. Sin embargo, no hubo diferencias significativas entre los grupos en otras medidas de rendimiento. En cuanto a los cambios dentro del grupo a lo largo del tiempo, el grupo de apoyo al contenido produjo textos más largos, significativos y de mayor calidad a expensas de la complejidad lingüística. Por otro lado, la ausencia de apoyo al contenido probablemente dio lugar a un rendimiento de redacción más estable a lo largo del tiempo. En cuanto a los procesos cognitivos de la redacción, los escritores de L2 informaron de una mayor frecuencia de participación en los procesos metacognitivos en ausencia de apoyo al contenido. Por otra parte, cuando el apoyo al contenido se proporcionó para reducir las demandas conceptuales en el proceso de planificación, los escritores de L2 orientaron sus recursos atencionales principalmente a la planificación del contenido en lugar de a las preocupaciones léxico-gramaticales. Nuestros resultados sugieren que el apoyo al contenido ofrece condiciones favorables para que los estudiantes que poseían un nivel intermedio-bajo orquestaran procesos cognitivos para producir una buena redacción a largo plazo.

Estos hallazgos nos permiten comprender la complejidad cognitiva implicada en las tareas de redacción, ampliar el efecto del apoyo al contenido en el rendimiento de la redacción en L2 y la cognición de la redacción a los estudiantes de idiomas con un nivel de competencia inferior y llenar el vacío en las investigaciones longitudinales basadas en tareas sobre la redacción en L2. Este estudio también ofrece implicaciones para explicar el foco de atención de los escritores de L2 de nivel intermedio-bajo en el proceso de planificación, traducción y supervisión, así como para comprender cómo gestionan los recursos cognitivos y seleccionan la información para completar las tareas de redacción. Desde el punto de vista pedagógico, nuestros hallazgos proporcionan a los profesores de EFL una guía para ofrecer a los alumnos estrategias eficaces de planificación de contenidos y diseñar tareas prácticas de redacción que hagan que los

alumnos se centren tanto en los requisitos comunicativos como en los aspectos lingüísticos de

la tarea.

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CHAPTER 1 INTRODUCTION

1.1 Background of the study

Over the past decades, a considerable amount of L2 writing research has been carried out on the potential of L2 writing for language learning (Cumming, 1990; Manchón, 2011d; Manchón & Roca de Larios, 2007; Vasylets, Gilabert, & Manchón, 2017, 2019). The central tenet of the language learning potential (LLP) of L2 writing posits that performing writing tasks, such as writing an essay, is assumed to engage language learning mechanisms and advance general L2 proficiency in special ways. This prediction is premised on the idea that translating ideas into linguistic forms may enhance attention to language or linguistic processing, which is likely to lead to changes in the interlanguage system. More recently, L2 writing researchers have drawn on the cognitive models of L1 writing to account for the cognitive processes of L2 writers (Bereiter & Scardamalia, 1987; Hayes & Flower, 1980; Kellogg, 1996). During the writing process, writers have to manage various cognitive activities, such as planning, transcribing, revising and sub-processes of these operations, which place high demands on their limited working memory. In the context of writing in an additional language, there seems to be more pressure on L2 writers since they are required to employ their L2 knowledge to express the intended meaning, producing texts that contain the new or acquired language structure. Therefore, writing allows L2 learners to devote sustained focus on the language and its forms (Johnson, 2017).

Another focus of L2 writing research is on the learning-to-write dimension, aiming to provide accounts of what constitutes good writing and the writing development of L2 writers (Manchón, 2011a). L2 writing requires not only the conceptualisation of new ideas but also the higher-level thinking of knowledge transforming involved in the process of text production (Fayol, 1991; Flower & Hayes, 1980). Kellogg and Raulerson (2007) suggest that a higher level of writing performance can be achieved through deliberate practice, where writers reduce the demands on working memory during the writing process through repetitive writing practices,

thereby releasing their limited capacity to control text production. Given the importance and complexity of acquiring L2 writing, it is of high interest to explore the pedagogical techniques and tasks that can enhance the effectiveness of L2 writing instruction.

Task-based language teaching (TBLT) is an approach that provides learners with greater opportunities to use language holistically, including written production. TBLT has received growing attention from researchers in second language acquisition (SLA), leading to the exploration of how task design factors can affect the task complexity, allocation of limited attentional resources and written production, drawing on Robinson's (2001b, 2011a) Cognition Hypothesis and Skehan's (1998) Limited Attentional Capacity model. The recent investigations of task-based writing studies have highlighted the need to address the impact of task complexity on L2 writers' cognitive processes and learning opportunities (Byrnes & Manchón, 2014a; Manchón, 2022). One of the investigated features of task complexity is the provision of content support in writing tasks (Ong & Zhang, 2010; Révész, Kourtali, et al., 2017; Yoon, 2021), which is also a commonly used instrument for L2 writing instruction. However, previous studies have not offered clear evidence for the effects of the presence or absence of content support on L2 written production. Therefore, in order to fill the gaps in the TBLT literature, this dissertation aims to explore the potential effects of content support on the quality of L2 writing performance and the nature of writing processes. We aim to explore whether content support can be used as an instrument to create language learning opportunities during the whole writing process.

1.2 The significance of the current dissertation

This dissertation intends to make theoretical and pedagogical contributions to the TBLT-oriented L2 writing research. From the theoretical perspective, the potential contribution of this dissertation is to understand how task complexity manipulations along the resource-dispersing line work in L2 writing performance and the allocation of attentional resources in different stages of the writing process. In terms of the empirical contribution, given that existing writing studies on task complexity are mostly cross-sectional (Vasylets, Gilabert, & Manchón, 2017), we respond to the call for longitudinal investigations of task complexity (see Johnson, 2021),

thereby exploring the potential impact of task complexity on L2 writing performance and development in the longer term (Byrnes, 2014). In addition, we seek to expand the account of task complexity effects on L2 writing cognition to the lower-intermediate level learners, which will contribute to a more comprehensive understanding of the nature and deployment of cognitive processes involved in L2 writing. Lastly, the potential contribution of this dissertation is closely linked to the debate on L2 writing as a site of language learning (Manchón & Williams, 2016). From a pedagogical perspective, a greater understanding of content support can provide practitioners and syllabus designers with clearer constructs of writing tasks that can facilitate the development of L2 writing skills and language learning.

1.3 The structure of the current dissertation

This dissertation consists of nine chapters. From Chapter 2 to Chapter 4, we review the literature related to the perspectives in the study of L2 writing, writing models and the task-based language teaching approach. Chapters 5 and 6 provide the research objectives, hypotheses and methodology of our empirical study. The final chapters (Chapter 7 to 9) present the findings, discussion and conclusion of our empirical study.

Chapter 2 presents our understanding of the multifaceted nature of L2 writing by offering three complementary perspectives to the study of L2 writing. We place particular emphasis on the ways in which L2 learners can develop their writing skills (i.e., learning-to-write perspective), focusing on the writers and texts. We then discuss the writing-to-learn-language perspective with a special interest in the potential of L2 writing to support and improve language learning.

The next chapter explores the cognitive writing processes from a theoretical perspective. This chapter first introduces the models of language production and cognitive models of L1 writing, followed by the processes and knowledge involved in L2 written production. We present an overview of the planning process in L1 and L2 writing; grounded in the models of L1 writing, we provide a further cognitive account for ideas generation during the planning process. In

addition, we attempt to elucidate the potential impact of idea generation on L2 written production and offer research insights on L2 writing processes.

Chapter 4 presents the link between tasks and L2 writing. Firstly, it starts with introducing the theoretical foundations of TBLT and two competing conceptual frameworks, Robinson's (2001b, 2011a) Cognition Hypothesis and Skehan's (1998) Limited Attentional Capacity model, that inform this study. We highlight Robinson's Triadic Componential Framework and offer a theoretical base for the study of writing tasks, followed by the discussion of task complexity effects on L2 written production. In this chapter, we review the empirical studies that are highly related to the aims of this dissertation: (1) studies that explored the effect of content support as a resource-dispersing feature of task complexity on L2 writing performance and (2) studies that investigated content support as a resource-directing feature of task complexity. In addition, we provide a review of available empirical studies that investigated writing behaviours and the underlying cognitive processes of L2 writers, with a focus on the effects of task complexity on L2 writing cognition. From the analyses of previous studies, we identify the research gaps on the potential role of content support in L2 writing performance and writing processes that this dissertation intends to address.

Following previous reviews of empirical studies related to L2 writing, Chapter 5 introduces the research questions and corresponding hypotheses that framed our investigation. Chapter 6 addresses the methodology employed in this dissertation, which first comes with a detailed description of the participants' language learning background and the instruments designed and used in the study. We then present the coding procedures of interview data, rationales of measures used for analysing writing performance and the means of statistical analysis.

Chapter 7 reports the results obtained in relation to each research question among two aspects: the effects of content support on L2 writing performance in the order of complexity, accuracy, fluency and overall text quality and the impact of content support on L2 writers' perceptions of task and deployment of writing processes. In Chapter 8, we discuss the results by comparing them with previous studies and provide our knowledge regarding L2 written production and

writing cognition. The discussion is expanded to the potential role of content support in learning to write and language learning.

Finally, Chapter 9 presents the main findings and conclusion of the study, followed by the theoretical and pedagogical implications deriving from the results. This chapter ends with the acknowledgement of the limitations of the study and suggestions for future research.

CHAPTER 2 THE PERSPECTIVES IN L2 WRITING

2.1 Introduction

This chapter aims to advance our understanding of the multi-faceted nature of L2 writing, which is not only a skill to acquire, teach and assess but also serves as a means and context for learning both writing and language. The chapter offers a synthesis of three complementary orientations to the study of L2 writing, which are referred to as "learning-to-write" (LW), "writing-to-learn-content" (WLC), and "writing-to-learn-language" (WLL). The LW and some WLC perspectives put an emphasis on the *writing* aspect of L2 writing, while the WLL perspectives focus on the *language* aspect of L2 writing. In particular, this chapter focuses on the development of L2 writing capacity (LW) and the role of writing in L2 acquisition (WLL). The overview is enhanced by the review of theories, research, and educational practices on second language acquisition and composition. The chapter also sheds light on the language learning potential of L2 writing, based on the SLA theories (including both cognitive and sociocultural perspectives of L2 learning) and empirical writing research.

2.2 Three perspectives on L2 writing

Writing is an important productive skill that second or foreign language learners need to acquire in order to engage in effective written communication. It is considered a complex, variable, and multi-faceted phenomenon, which is achieved in various approaches by diverse groups of learners producing different types of texts under differing societal contexts and is performed for varying purposes (Cumming, 2016). In view of its potential for communicative language use and relevant learning processes, L2 writing constitutes one of the principal components of most language programs. The development of writing competencies, as learning objectives, has been incorporated into many language curricula, in which L2 users learn how to express themselves in writing (Manchón, 2014a). Writing may be instrumental in the acquisition of a second or foreign language in instructed settings, based on the recognition of the crucial role

that literacy plays in the language learning experience (Harklau, 2002). In addition to the learning of writing itself, L2 writing activities and practice may entail the objectives of learning the subject matter in the content areas and/or learning language knowledge.

Following the above, Manchón (2011a) proposed three complementary orientations that have been applied to L2 writing scholarship and practice, referred to as learning to write (LW), writing to learn content (WLC) or language (WLL), respectively. On the one hand, these three dimensions are ultimately associated with the variables of purposes in teaching and learning writing in L2; on the other hand, each orientation is closely related to the contexts where L2 writing is taught and learned. As noted by Ortega (2011), "writing is at stake in LW, content is paramount in WLC, and language is central in WLL" (p. 238). These dimensions constitute a comprehensive theory that allows for explaining the multi-faceted nature of L2 writing. We focus on the LW and WLL dimensions, aiming to establish the connection between language and L2 writing.

2.3 Learning to write in an L2

The study of the LW perspective (mostly related to writing courses) has been privileged in the L2 writing theory, research, and pedagogy. Much of what we understand today about what makes good writing, what it means to be a good writer and how writing can be taught effectively have been derived from L1 writing scholarship and practice. From this perspective, L2 writing instruction aims to develop good writing in more than one language, which accordingly leads to L2 writing research seeking to explain how multilingual writers develop their writing competencies (Ortega, 2011). The ability to write in an additional language is central to the literacy skills of a language; although students are evaluated by their control of writing, the complex nature of learning to write has not always been fully explained (Hirvela, Hyland, & Manchón, 2016). Derived from L1 composition research, LW in an L2 distinguished between approaches concerned with writers, texts, or readers (Hyland, 2011). The first approach focuses on the writers and the cognitive *processes* employed to generate texts; the second approach concerns the *products* of writing through the study of texts; the third approach deals with how

readers play a role in writing and how writers incorporate a sense of audiences into their writing. In the following sections, we will focus on writer-oriented and text-oriented approaches that are especially relevant to this dissertation.

2.3.1 Focusing on writers

The writer-oriented approaches aim to model what good writers do when composing and help L2 learners acquire these strategies. Such perspective has drawn on models of cognitive psychology and evolved from Flower and Hayes's (1981) model over decades. Writing has been explained by certain basic cognitive processes, which writers must adhere to for accomplishing the writing task. In this theory, writing is regarded as a problem-solving activity rather than a means of written communication; that is, the writer approaches a writing task as a problem and brings his/her intellectual resources to a solution. It highlights the importance of helping students become more adept at planning, defining rhetorical issues, and proposing and evaluating solutions.

Central to the process theory, writing is a non-linear, exploratory, and generative process whereby writers seek to approach meaning while discovering and reformulating their ideas (Zamel, 1983). Much emphasis is thus placed on the writer's cognition or thinking. According to the early models (Flower & Hayes, 1981; Hayes, 2006), composing processes such as planning, drafting, and revising were considered to occur recursively, interactively, and possibly simultaneously. The production of a text was thought to involve a dynamic and cyclical interaction in which writers are allowed to plan, review, evaluate, and edit at any point, even before producing any text (Hyland, 2011). However, the process of text generation is not automatic, as stated in the early L1 writing models. Previous research provided empirical evidence on the cognitive demands of the text generation process. It suggested the process of translating ideas into words may play a fundamental role in the cognitive writing process as it serves as an objective for planning and offers the written product that enables writers to review and revise (Fayol, Alamargot, & Berninger, 2012).

The exploration of writing processes has extended the research methods beyond early experimental techniques and text analyses to qualitative methods of social science (Hirvela et al., 2016). These studies aimed to describe writing from the writers' perspective by using 'think-aloud protocols or writers' verbal reports while composing (e.g., Manchón, Murphy, & Roca de Larios, 2005; Sasaki, 2009), task observation (Bosher, 1998), retrospectives interviews (e.g., Ferris, Liu, Sinha, & Senna, 2013) and keystroke logging of writers (Van Waes et al., 2009). Studies have been longitudinal, which track the development of a few learners' writing over a more extended period (cf., Sasaki, 2007, 2009) and employ multiple approaches. This extensive research has contributed to a deeper understanding of what writing is and how writers write. In contrast, there seems to be an incomplete understanding of how people learn to write. Although there is greater awareness among researchers of the complex nature of planning and editing activities, the impact of tasks on writing, and the importance of investigating writers' composing processes, as well as the small-scale studies (often with contradictory findings and challenges of accessing unconscious processing) may not help establish the models of learning to write (Hyland, 2011). It is also difficult to access many cognitive processes, given that they are routine and internalised operations.

Nevertheless, the process-writing perspective has an enormous influence on both L1 and L2 writing research and pedagogy. Cognitive-oriented studies of L2 writing have shed light on linguo-cognitive problem-solving activities during L2 composing, especially regarding how linguistic demands and other writing processes compete for processing resources during text production in L2 (Hirvela et al., 2016). Pedagogically, process theory has emphasised learning how to write by writing. It enables teachers to develop learners' metacognitive awareness of composing processes (e.g., planning, generating and revising texts) and their ability to reflect on the writing strategies used (Hyland, 2011). The teacher plays an important role in assisting writers in moving through different steps of writing and developing their strategies to generate, draft, and refine ideas. Teacher response is also crucial to this process, where the teacher intervenes most explicitly, as this individual attention may help motivate learners and provide correction and verbal language instruction (Hyland, 2004). Yet

there remains controversy regarding the role of feedback in process models and its effectiveness in improving writing over time (Ferris, 2006; Truscott & Hsu, 2008).

Overall, writer-oriented approaches shed light on the difficulties L2 learners can encounter during composing, given the complexity of the writing task. However, they may neither enable the prediction of the potential progress that L2 learners can make with certain kinds of instruction nor the relative difficulty of certain writing tasks. We now learn that the writing process is affected by many factors, and cognition is only one of them. L2 learners not only require assistance in how to write "but also in understanding how texts are shaped by topic, audience, purpose, and cultural norms so they can activate schemata, genre awareness, grammar proofing, and responsiveness to the particular audience" (Hirvela et al., 2016, p. 48). In the next section, we will discuss the role of language and context in the process of learning to write.

2.3.2 Focusing on texts

The second approach of LW research concerns the analysable aspects of writing, regarding it as a textual product, i.e., an outcome of writing activity. These approaches to writing focus on the linguistic or rhetorical resources that are available to writers in text production by examining the surface forms and consequently lowering the complexity of communication to words on a page and screen (see Hyland, 2010).

One way of the text-oriented theory views texts as autonomous objects that can be described and analysed independently of a given context, author, or reader. Texts have a structure, a coherent arrangement of words, clauses and sentences that are ordered according to grammatical rules, allowing writers to express their intended meaning. Learning to write refers to generating grammatically correct texts, and the development of learners' writing can be assessed by counting increases in certain salient features of texts (Hyland, 2016). As teaching is often informed by a behavioural and habit-formation theory, focusing exclusively on grammatical accuracy ignores that writing is a communicative response to a specific context.

Teachers play a role in passing on knowledge and correcting mistakes, and "writing is removed from context and the personal experience of writers and readers" (Hyland, 2011, p. 22). It ignores what writers take account of their readers and how they use the text. Accordingly, there is little evidence that learning to write or *good* writing can be best assessed by either grammatical accuracy or syntactic complexity. Many learners can construct syntactically accurate sentences but fail to generate appropriate texts.

A moderate way of the theory views texts as discourse, meaning that we use language to achieve purpose in social settings as part of communication. The writer is assumed to have particular goals and intentions (i.e., information to convey) and be clear about their relationship with the readers, and the ways they write are the resources used to complete these (Hyland, 2016).. Teaching writing is seen as a way to help learners link language forms to purposes and contexts. An offshoot to teaching writing as discourse is the genre approach. Genre refers to the classification of texts, which shows how writers typically respond to recurring situations through language use (Swales, 2004). The development of an authoritative pedagogy based on the research into texts and contexts has benefited from the investigation into the academic (Swales, 2004) and professional genres (Bhatia, 2008).

The English for specific purposes (ESP) and functional approaches to the genre, which place a strong focus on the successful communication and the formal qualities of texts, intend to yield substantial benefits for learners by bringing together language, content, and context and provide teachers with a way to give learners systematic explanations of how writing operates to communicate (Hyland, 2011). This explicitness promises the greatest learning advantages as it replaces the inductive methods of process-oriented approaches, which transform writing instruction from implicit and exploratory to conscious manipulation of language and choice (Hall & Harding, 2003). In this regard, writing teachers have to be teachers of language since the ability to practice different language alternatives in the ways they approach and address their themes for certain readers will assist learners in empowering their ideas (Hyland, 2011). Learning to write requires knowledge of grammar with an emphasis on how learners may codify meanings in recognisable and unique approaches. Accordingly, teaching methods generally

take into account how a text is organised according to its purpose, audience and message and then evaluate how linguistic elements contribute to effective written communication (Knapp & Watkins, 1994). The ESP approaches, generally, are more eclectic instructions and focus on raising learners' awareness of the function and move descriptions. Other methodologies adopt mixed-genre portfolios, cooperative pedagogies, learners' analyses of texts, and teaching the structure of important genres, which encourage learners to notice, reflect on, and generate appropriate texts by using genre patterns (see Hyland, 2011). Although genre approaches are critiqued for inauthentic contexts in the classroom and the constraint on writers' self-expression, choosing a particular genre to write entails employing certain patterns, indicating linguistic choices available to encourage expression in a given context. In the genre theory, what LW entails is understanding how texts are typically structured and how the conventional meaning of texts is communicated.

2.3.3 Summary of learning to write

The perspective of learning to write is concerned with learning and teaching writing with the ultimate goal of developing writing expertise. It involves three theoretical directions of writing, i.e., process, product, and readers, and each has a distinct focus. We specifically focus on how L2 learners can learn to gain greater control over the writing processes (focusing on writers) and learn to use specific text features to express their intended meaning (focusing on texts) in a classroom setting. In a process approach to writing, the planning, formulating, and revising processes are the most crucial to the completion of writing. As such, by focusing on the writing processes in the writing instruction, learners come to understand the importance of each stage in writing, so they have greater conscious control over their own thoughts. While the process theory has been influential in writing research, there is a call from L2 scholars to incorporate various cultural and social factors in theorising the L2 writing process rather than focusing on individual factors (e.g., Bhowmik, 2017). On the other hand, the product approach to writing focuses on the textual product. It highlights not only learners' ability to produce error-free and complex texts but also their responses to a specific communicative setting. From this

perspective, learning to write means understanding how texts are structured and expressed for a communicative purpose.

2.4 Writing to learn content

The second perspective of L2 writing identified by Manchón (2011b) is writing to learn disciplinary subject matter in the content areas. Several writing researchers have maintained that the production of written text, as a means of learning, enables learners to acquire the target language and content knowledge (Hirvela, 2011). In some cases, it also exposes learners to the process of negotiating meaning and helps them develop disciplinary knowledge. Pedagogically, WLC aims to develop good learning skills and promote academic achievement through activities in an additional language. In L2 writing research, the WLC perspective proposes that readers are of utmost importance in writing activities because readers, including projected and anticipated audiences of instructors, content experts and other gatekeepers, decide what content must be learnt and eventually are responsible for judging if the knowledge has been learnt appropriately through writing (Ortega, 2011). In the end, the WLC view enables learners to become emergent experts who employ writing to improve their expertise while learning and producing new content substantially. Despite the lack of a clear, concise description of the role that writing plays when L2 writers move across content domains, Hirvela (2011) identified an important development dimension to WLC. For some L2 learners or writers, the ability to successfully engage in WLC can occur gradually as they improve L2 writing skills. The development of a strong relationship between learners and WLC entails much more work in using writing as a means of learning and considerable support from writing instructors and content area experts. Furthermore, Hirvela et al. (2016) argued that WLC is fundamentally a transfer behaviour. It is intended for learners to employ the writing skills they have developed in writing courses in other writing contexts. In other words, learners will transfer knowledge and skills to various situations where writing is necessary. In a nutshell, the ultimate goal of L2 writing instructors is to assist learners in using their writing for significant purposes, such as learning certain content areas or heightening the learning of the target language (Hirvela et al.,

2016). The hope is that learners will view and employ writing as a means of learning while learning to transfer what they have learnt in writing classes in a meaningful way.

2.5 Writing to learn language

Another perspective proposed by Manchón (2011b) is WLL, which has delved into the potential for overall L2 development that learners can benefit from and resulted in a distinction between *learning-to-write* and *writing-to-learn*. Considering different contexts and scenarios in which individuals write and learn to write, many language learners may not need to 'learn to write' because of certain personal, academic and/or professional needs, and writing may be partially or entirely instrumental (Manchón, 2011c). For these learners, their purpose for learning may be closer to "writing-to-learn", i.e., using writing to acquire a second language. However, traditionally, the research on written language learning has not received enough attention from SLA scholars (see Ortega, 2012). As Harklau (2002) pointed out, the investigation of how learners learn to write and how writing might play a role in second language learning should be on the research agenda.

Writing is considered an efficient learning tool in SLA (Bitchener, 2012; Harklau, 2002; Wolff, 2000). Unlike WLC that views writing as a mode of negotiation in a specific context, the perspective of WLL highlights the potential of writing to support and improve language learning outcomes. In the view of WLL, the teaching and learning of L2 writing is regarded as a means of language learning; that is, a way of assisting learners in (i) acquiring the (explicit/implicit) knowledge of L2 and (ii) developing the ability to apply acquired knowledge (Manchón, 2014a). As such, the WLL perspective is the most explicitly L2-specific perspective of the three. Investigating the WLL dimension of L2 writing is also valuable, particularly in the discussion of FL settings, as the primary and secondary school FL classrooms provide the best conditions for writing to learn an additional language (Manchón, 2014a). In this section, we offer the theoretical tenets that support the language learning potential of L2 writing and summarise some strands of research to elucidate this issue.

2.5.1 Language learning potential of L2 writing: theoretical underpinnings

In terms of promoting L2 development through engaging writing activities, both individual writing and the processing of written feedback might benefit L2 learning by L2 writing scholars (Bitchener, 2012; Manchón, 2014a; Polio, 2012). On the other hand, the role of writing in language learning is inconsistent for various types of writing practices. As a result, any discussion of writing as an instrument of language learning must include a consideration of what L2 writing entails (e.g., individual and collaborative writing, time-limited and time-unlimited conditions, with and without the availability of external sources), according to (Manchón, 2014a, 2014c). In this dissertation, we intend to explore the language learning potential of individual L2 writing tasks, with and without the provision of writing content.

The rationale behind the language learning potential of writing was first articulated by Cumming (1990), who argued that writing might offer a condition of psycholinguistic output, wherein L2 learners analyse and consolidate their current linguistic knowledge that was previously but partially acquired. He suggested that writing draws attention to form-meaning relations that may push learners to improve their language expression, i.e., their control over linguistic knowledge in order to represent their ideas and standard usage of language more precisely. Cumming's claim was supported by the empirical evidence from his research and Swain and Lapkin's (1995) work. These pioneering studies have explored the language learning potential of the problem-solving dimension of writing, as "problems that arise while producing the second language can trigger cognitive processes that are involved in second language learning" (Swain & Lapkin, 1995, p. 371). Furthermore, Manchón and Roca de Larios (2007b) provided the psycholinguistic rationale behind the language learning potential of L2 writing in the framework of SLA, arguing that psycholinguistic mechanisms conducted by L2 writers when translating their ideas into language, such as lexical search, reformulation, may cause changes in their underlying linguistic systems.

The rationale of the language learning potential of L2 writing has proliferated, with many accounts based on the cognitive theories of writing in L1 and L2 as well as cognitive and

sociocultural explanations related to SLA (Manchón & Williams, 2016) and a growing research line on academic writing (Byrnes, 2014; Manchón & Roca de Larios, 2011). Moreover, an important line of inquiry (Byrnes & Manchón, 2014a; Manchón, 2014c; Williams, 2012) has looked into several characteristics unique to writing that potentially lead to L2 or foreign language (FL) learning and development. It is commonly acknowledged in the field that L2 writing offers the site of language learning as a result of (i) the availability of time (even more in academic settings), (ii) the visibility and permanence of written texts and feedback, (iii) the challenging, problem-solving nature of writing practices, (iv) the languaging, metalinguistic reflection, and noticing processes during writing (especially in collaborative conditions), as noted by (Manchón, 2014a). As Manchón further pointed out, due to the pace and permanence, L2 writers are allowed to control their attentional resources better, more likely to prioritise linguistic concerns (as opposed to speaking) and therefore more likely to focus on language in their writing practices and their processing the feedback received. This also applies to problem-solving activities during composing that entail decision making and in-depth language processing, which can benefit learning.

More importantly, many of these claims are associated with the Output Hypothesis (Swain, 1985, 1995, 2005). It is assumed that language output can be crucial in facilitating language development, in addition to representing the outcome of the language learning process. As language production (either speaking or writing) constitutes part of the learning process, L2 learners are pushed to convey information more precisely, coherently, and appropriately (Swain, 2005). Such pushed output induces (i) a noticing or triggering function that activates the cognitive process in L2 learning; that is, learners produce language that is new to them or consolidate their current knowledge (Swain & Lapkin, 1995) when they are aware of not being able to express themselves precisely. Additionally, the pushed output induces (ii) a hypothesis-testing functions, in which L2 writers can test their assumptions about L2, enabling them to compare L2 representations on their own with the feedback on their writing, and (iii) the metalinguistic (reflective) function, purporting that through the use of language, L2 learners can reflect on the language they have produced, thereby deepening their understanding of forms, rules and form-function relationship (Swain, 1985).

Another related theory is Skill Acquisition Theory (DeKeyser, 1998, 2001, 2015). According to DeKeyser (2015), language learning is postulated to be a new skill that undergoes three stages of development: declarative, procedural, and automatic. At the beginning of the learning process, L2 learners acquire declarative knowledge about skill (language), which is mostly achieved by observing and analysing the expert behaviours as well as verbal and explicit explanation (DeKeyser, 2015) rather than involving any form of language perception or output. Learners will likely start with forming behaviour that transforms declarative knowledge into procedural knowledge through the stage of proceduralization when they have acquired enough knowledge, which mainly involves much cognitive effort. Exposure to a large number of meaningful, contextualised practices is then required for learners to obtain proceduralized knowledge with spontaneous fluency. Language practice (including speaking and writing) in the consolidation and automation of language knowledge will also be essential to enhance task performance. Under this theory, learners cannot reach a practical proficiency level until they go through each developmental stage. Similar to the Output Hypothesis, the Skill Acquisition Theory is part of the output phase of the L2 learning process, in which L2 learners practice how to proceduralize their declarative knowledge in an internal system. Accordingly, Leow and Suh (2021) commented that this theory could be used to explain the language learning potential that may arise out of practice in the act of writing, even though it might be more applicable to higher-level courses rather than the language courses that only systematically practice the proceduralization of the declarative knowledge through writing.

Furthermore, current empirical instructed SLA studies have addressed *writing-to-learn* from a curricular perspective, which explores the role of the cognitive process employed in L2 written production in relation to L2 development (Manchón & Williams, 2016). Leow (2015) developed a new model of the L2 learning process with a focus on attention under the instructed settings (see Figure 2.1).

INPUT   { >   INTAKE >   INTERNAL SYSTEM   > }   OUTPUT

          Stage 1   Stage 2   Stage 3   Stage 4   Stage 5

(Product) (process)   (Product) (process)   (product)   (process)   (product)

(*input*)   (*input*)   (*intake*)   (*intake*)   (*L2 knowledge*)   (*L2 knowledge/output*) (*representative
                                                                                              L2 knowledge*)
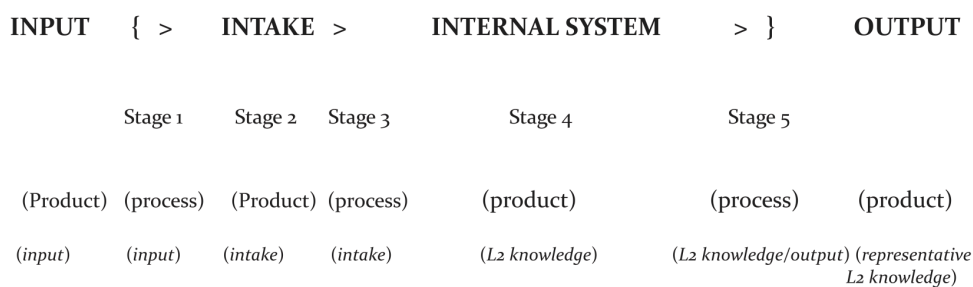
Figure 2. 1 The model of the learning process in SLA: of processes and products (from Leow, 2015, p. 49)

This model regards the process from input to output as a process of L2 learning, which contains cognitive processes that play a key role in tasks: input processing, intake processing, and knowledge processing. Drawing on Leow's (2015) model, Gilabert, Manchón and Vasylets (2016) further illustrated the link between tasks and the learning process. In the context of TBLT, input for the written tasks (usually in the shape of positive evidence of the target language or corrective feedback) can be offered in various forms, including reading or listening materials. The new forms from task input might get processed with attention and memory, while the features to be attended to are determined by the characteristics of the input as well as the individual factors learners bring into the task. During the intake processing stage, the attended features will be converted into the intake through the form-meaning connections established by the learner. In the case of writing tasks, the obtained written input may further facilitate intake processing mechanisms and release resources that can be used for hypothesis formation and cognitive comparison. Knowledge processing is the final processing stage before output, which deals with the internalisation, modification and consolidation of knowledge, according to Leow (2015). Knowledge processing in relation to TBLT is the reconstruction of the grammatization and syntactization in L2 (Robinson, 2011a), as well as the automation and consolidation of memories. Lastly, a written product is delivered through knowledge processing. In line with Swain's (2016) Output Hypothesis, Gilabert et al. (2016) noted that the process of output requires learners to pay attention to their own internal language and to analyse it in depth, and the TBLT paradigm provides optimal conditions for output practices. Written tasks contribute to learners' noticing linguistic forms and their further processing. This enables L2 learners to

try out new linguistic structures, test their hypotheses and reflect on the use of target language as a means of promoting language development. In the end, output practice contributes to the development of automaticity, whereby learners' control and consolidation of interlanguage will be potentially enhanced.

In short, the potential benefits of language learning afforded by writing activities can be both direct and indirect. It is proposed that engagement in learning processes, i.e., noticing, focus-on-form processes, formulation, hypothesis testing and metalinguistic reflection during L2 composing, can indirectly lead to the development of language competence (Manchón, 2014a). Writing is also assumed to have direct benefits for the underlying linguistic system in terms of developing fluency and automaticity as well as the expansion and consolidation of L2 knowledge as the result of the problem-solving nature in the writing practice (Hirvela et al., 2016; Manchón, 2014c). The efforts that L2 learners make to produce comprehensible language production in writing tasks may encourage them to engage in cognitive processes that are essential to language learning (Cumming, 1990). Our study aims to shed light on how pushed output serves as a context for language learning in L2 writing by increasing the task complexity and how it functions in terms of learners' attention to linguistic demands with and without content support.

2.5.2 Language learning potential of L2 writing: the overview of research

Although various perspectives can be taken to examine the relationship between writing and L2 learning, Manchón (2011d) identified two strands of studies in WLL that have informed our understanding of this field: *descriptive* and *interventionist*. *Descriptive studies* explain L2 writing as evidence that L2 learners engage in various psycholinguistic activities that are deemed to support L2 development (Manchón, 2011b; Manchón & Williams, 2016). For instance, as both the Noticing and Output hypothesis highlights the crucial role of attention in SLA (Schmidt, 2001; Swain, 1985, 1995) and learners' need to notice the gaps in their L2 knowledge resources, research into learners' attention in L2 writing process (individually and

collaboratively) is of great importance to writing scholars. The primary goal of these studies was to record L2 writers' attentional activity, hypothesis testing, meta-linguistics, and monitoring activities as they engage in writing and to elucidate the possible mediators of such noticing activity. What justifies this research is the acknowledgement that "more precise descriptions … of the metalinguistic thinking that second language learners use while they compose" (Cumming, 1990, p. 485) is required before any causal relationship between language learning and writing can be defined, so as to contrast these descriptions with the relevant SLA theoretical positions (Manchón, 2011d). This allows for indirectly determining whether the cognitive processes involved were likely to facilitate language learning. Additionally, it has been shown in empirical studies on this topic that writing behaviour is characterised by deeper language processing and meaning-making activities that facilitate psycholinguistic processes (i.e., attention and metalinguistic reflection) in L2 learning (Manchón, 2014a; Manchón & Roca de Larios, 2007b). Many other L2 learning processes are thought to be facilitated by writing, such as hypothesis formulations and hypothesis testing about various linguistic structures, the development of explicit and implicit L2 knowledge, as well as the reflection on the language practices of L2 learners (Manchón, 2011d).

On the other hand, *interventionist studies* have investigated the impact of L2 learners' linguistic processing, mediated by various interventions, during individual and/ or collaborative writing processes on L2 learning (Manchón, 2011d). L2 writing research of this paradigm has largely centred on feedback practices, which explores how input/feedback provided to L2 learners and processing such input individually or collaboratively can influence the improvement of grammar and lexis. It is also suggested that feedback can induce noticing processes, which in turn supports L2 learning. However, feedback has been researched regarding the benefits of mastering and controlling partially acquired linguistic knowledge (Bitchener, 2008). Another strand of research, i.e., input/output studies, sought to elucidate the acquisition of new knowledge by looking at how different task modalities, including written output (e.g., writing) and non-output (e.g., reading comprehension) tasks, may mediate learners' attention on grammar learning (Manchón, 2011d). To explore the potential of output activities to process input in grammar learning, such studies compared output learning conditions with input

learning conditions that contain input enhancement and input processing. These studies have provided information on how various interventions support L2 learning and how teachers can apply this knowledge to their instruction in the classroom.

Whether or not these empirical investigations were originally driven by the WLL paradigm, they have looked into what specific language learning advantages may derive and offered empirical evidence concerning the purported language learning potential of L2 writing. Coupled with the debates regarding language learning benefits from the act of writing itself, increasing empirical research has been conducted to explore several basic and applied concerns that are relevant to the purposes of our dissertation. To be specific, they concern learners' perception of the language learning potential of L2 writing (see Manchón & Roca de Larios, 2011) and task-related and task-implementation effects, including task complexity factors, on language learning (Ong & Zhang, 2010, 2013). Much more future research is still needed to explore the task issues, either in relation to the language learning potential linked to task repetition (see Manchón, 2014b) or the effect of task modality on learning processes and products (see Byrnes & Manchón, 2014). In addition, Manchón and William (2016) call for a greater in-depth exploration of the linguistic processing associated with writing in the future study of L2 writing as a site for language learning.

2.6 Chapter Summary

This chapter presents a comprehensive overview of theories and research on the "learning-to-write", "writing-to-learn-content", and "writing-to-learn-language" perspectives in L2 writing. Among these perspectives, we specifically discuss the learning-to-write dimension (i.e., the development of L2 writing skills) and the writing-to-learn-language dimension (i.e., the role of writing in L2 learning), which are highly relevant to this dissertation. For the former dimension, the chapter highlights the importance of learning how to control the writing processes (focusing on writers) and how to use language to achieve a particular purpose (focusing on texts). For the latter dimension, we stress the language learning benefits from writing activities. The chapter closes by providing an overview of research on the language learning potential of writing and

raises issues worth exploring in future research, including task-related issues and extensions to

the L2 writing research agendas.

CHAPTER 3 WRITING PROCESSES: THEORETICAL BASIS AND EMPIRICAL RESEARCH

3.1 Introduction

In the previous chapter, we emphasised the importance of teaching and learning L2 writing as a means of language learning. In particular, process and product are the primary concerns of learning to write. We highlighted the language learning potential of individual L2 writing tasks, in which L2 learners' efforts to produce comprehensible language may contribute to language development. Given the specific characteristics of writing, L2 learners are thought to have greater control over language production processes. This leads to the need for an in-depth understanding of the models of written output and cognitive activities of L2 learners.

This chapter aims to provide descriptions of L2 writing processes by drawing on cognitive models of the L1 writing process, as well as to capture the specificity of L2 writing activities. Firstly, we review the models of speech production in order to understand the information processing involved in the language production. This is followed by an overview of the L1 writing models, along with the definitions of specific subprocesses and written operations. Grounded in the L1 writing theories and models, we highlight the processes and knowledge involved in text production in L2 and describe the information processing demand in L2 writing. Given the lack of linguistic and metacognitive knowledge, we anticipate that writing in L2 would be more cognitively demanding. Thus, we explore the role of planning in writing, arguing that learners can overcome the limits in working memory capacity through planning. We then provide a cognitive account of idea generation as a priority in the planning process. Inferences are also made about how idea generation in planning may influence L2 written performance and the potential impact on language learning. Lastly, we point out the limitations of the existing research and the need for empirical evidence on the idea generation and production process.

3.2 Models of language production

Before presenting models of L1 and L2 writing, we need to understand how language production works in the first place. Over the past decades, many psycholinguistic models have been proposed to explain how language operates from "mind to mouth" and specifically provide accounts for the efficiency and accuracy of the language system. Although this dissertation is mainly concerned with L2 written production, we believe an overview of models of speech production in L1 and L2 can be useful for providing a broad perspective on the writing process. Among those models, Levelt's (1989, 1993) model of L1 production, as the most influential and widely accepted model, has been used as the basis for L2 production (Figure 3.1). The model is modular and consists of several autonomous components for different speech aspects: the *conceptualizer, formulator, articulator, and speech comprehension system*. Levelt assumed that different components can process specific information independently, and they can occur simultaneously.
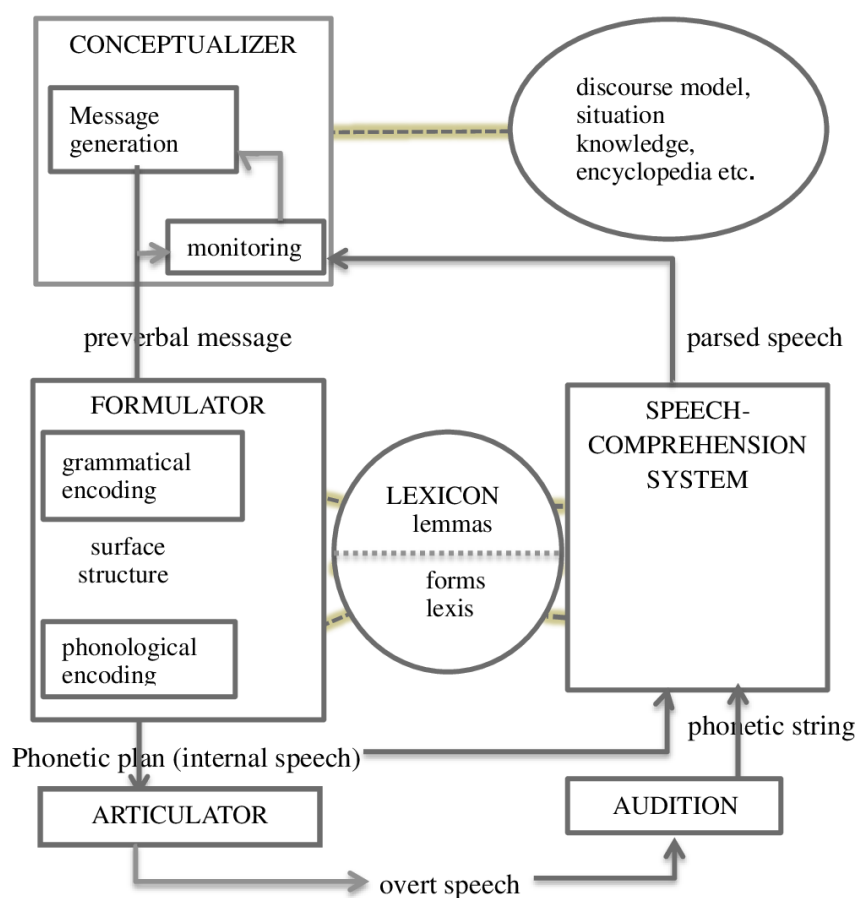
Figure 3. 1 Levelt's (1989) model of speech production

Speech production starts with the *conceptualizer*, responsible for generating and monitoring the message. In order to generate conceptual content, the conceptualizer retrieves domain knowledge from Long-Term memory and transforms it into a preverbal plan. Such a transformation is realized through macroplanning and microplanning. To be specific, macroplanning involves the elaboration of communication goals and the retrieval, selection and organisation of domain knowledge to realise the communication goals. On the other hand, microplanning involves deciding how the content is to be conveyed. Consequently, a preverbal plan is developed upon what message can be formed, though it is not yet linguistic. It is worth noting that the message conceptualisation demands conscious attention. The preverbal plan activates the *formulator*, which allows the phonological encoding and grammatical encoding of the message and gives it the linguistic form. At this stage, grammatical encoding is achieved through lexical access and syntactic procedures. Specifically, a number of relevant lexeme in the lexicon will be activated by a chunk in the preverbal plan, and the lexeme with the highest activation will be chosen. Similarly, when a lemma is retrieved due to its match with the preverbal message, the syntactic construction procedure will be triggered. The message reaches the next component, the *articulator*, which produces overt speech. Lastly, Levelt's model includes a Self-Monitoring control process that is assimilated into the *Speech Comprehension System*.

However, when applying the L1 speech model to explain L2 production, the particularities of L2 speech need to be taken into account: (1) the limited lexicon and grammar knowledge of the L2, (2) the lack of automaticity of L2 production and (3) the presence of traces of the L1 in L2 production (Poulisse, 1997). Based on Levelt's (1989) model, Kormos (2006) proposed a bilingual and L2 speech model with four components: *conceptualisation, formulation, articulation and self-monitoring* (Figure 3.2). Kormos (2006) argues that while some differences exist between L1 and L2 speech production, the psycholinguistic mechanisms involved in different stages of production appear to be very similar. Yet, this model demonstrates several distinctions between L1 and L2 production. Firstly, Kormos (2006) identifies the declarative knowledge store for the syntactic and phonological L2 rules within

the Long-Term memory. When these L2 rules are not part of the encoding system, they have to be retrieved separately. In addition, the conceptualization stage of the L2 production model involves language control, deciding on the language in which the message is to be spoken. There is also competition between L1 and L2 during linguistic encoding, and more intensive cognitive effort may be needed to work out the conflict. Finally, Kormos argues that the workings of L2 production can be affected by the level of proficiency.
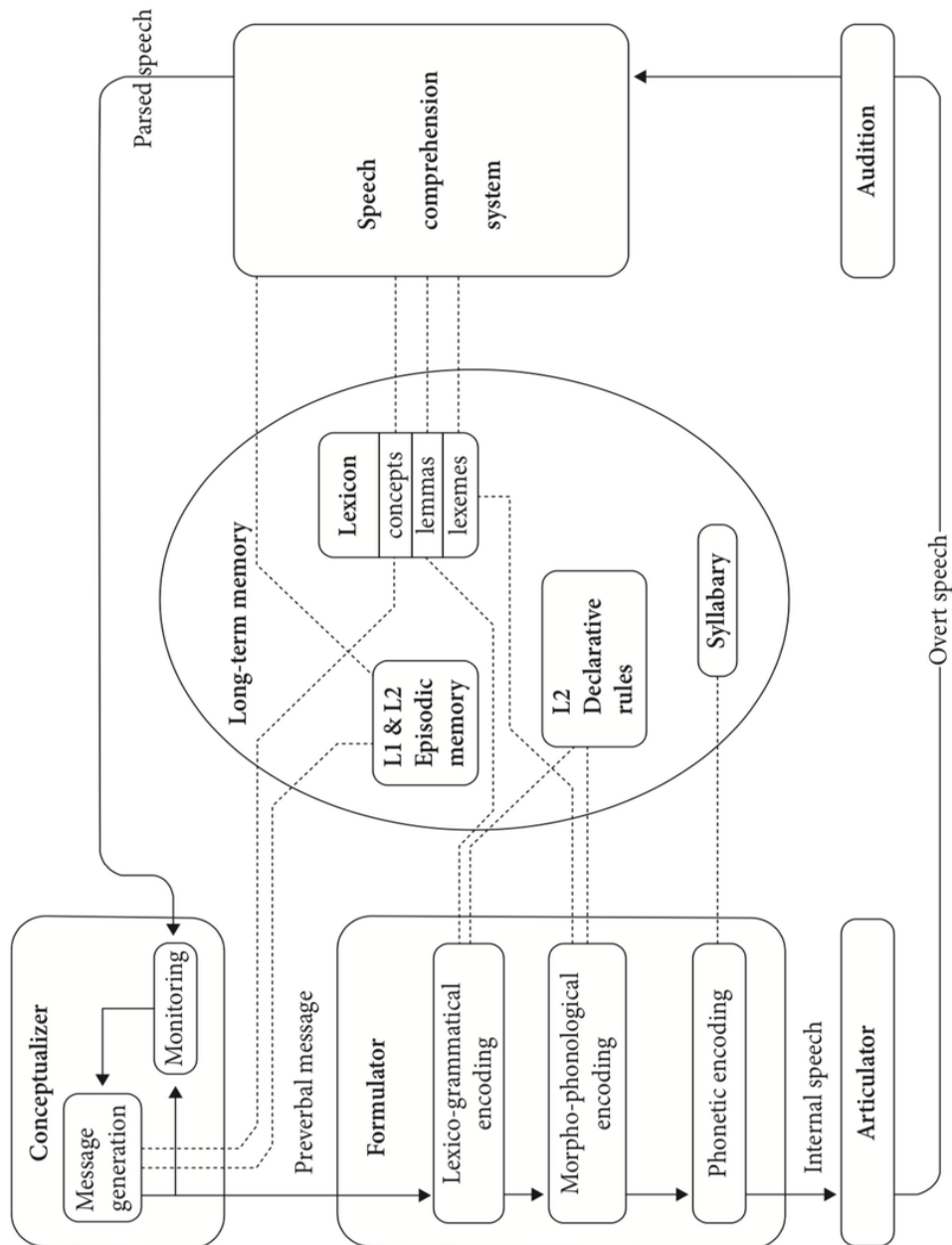
Figure 3. 2 Kormos's model of bilingual speech production

3.3 Models of L1 writing

Traditional paradigms and practices of L1 writing were mainly embodied in rhetorical research. The stage models of writing were widely accepted in early studies, which consider the process of writing as the growth of the written product through three stages: pre-writing, writing and rewriting (Rohman, 1965). Yet, the linear stage model did not explain writers' inner psychological and intellectual processes of writing. In the 1960s, the development of cognitive psychology has shifted the research focus to the internal psychological processes that underlie an individual's representation, processing, and transformation of information. Writing was then described as a non-linear, complex and recursive process. The classic cognitive models of writing were gradually formed and developed by Hayes and Flower (1980, 1986), Kellogg (1996), and Bereiter and Scardamalia (1987), which served as a prominent theoretical basis to account for L1 writing.

3.3.1 Flower and Hayes' cognitive process model

The cognitive model of writing by Hayes and Flower (1980) has provided a theoretical foundation for posterior models and studies on the writing processes. From their perspective, writing is understood as mental activities that represent problem-solving processes oriented toward the writer's ongoing goals. Their model was elaborated by the verbal protocol analysis of an individual's underlying mental process of text composing. Hayes and Flower (1980) distinguished three significant units—*task environment*, the *writer's long-term memory* and the general writing processes—that intertwine as the composing proceeds (Figure 3.3).

The *task environment* contains the writer-external features that affect task performance, including the *writing assignment* and *text produced so far*. The former covers the description of the topic, the communicative goal (intended audience) and motivation factors (motivating cues), while the latter serves as a reference for revision and can be drawn on with further decisions during the process of composition. The *writer's long-term memory* refers to the writer's stable knowledge repository: *knowledge of topics*, *knowledge of audience* and *stored*

writing plans. The ongoing text writing requires considerable time and attention from the writer, which completes with the writer's long-term memory and plans that could and should guide the writing process (Flower & Hayes, 1981).
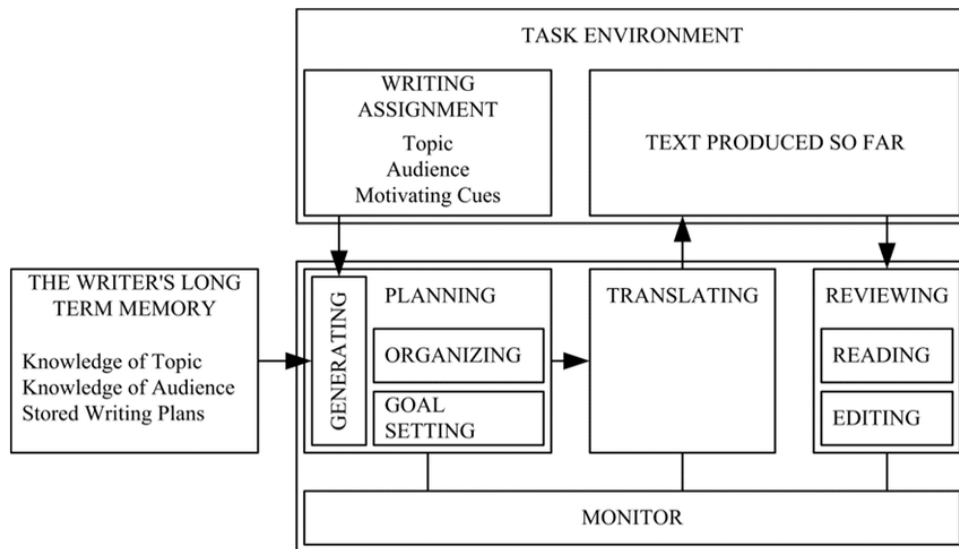
Figure 3. 3 Hayes and Flower's (1980) process model of writing

The writing processes present the writer's procedural knowledge of how to write, which comprises *planning, translating and reviewing. Planning* operates as a set of sub-processes (i.e., generating, organising and goal setting) to create ideas by retrieving domain knowledge from the task environment and the long-term memory. *Planning* is also used to set goals and establish a writing plan, guiding the text production and organising meaningful ideas and new concepts to achieve those goals. It should be noted that the generation, development and revision of the writing goals can be creative or stick to the pre-defined plans. It goes on throughout the writing process, where the writer would consider the audience or rhetorical problem. The role of *translating* is to transform ideas into visible language. *Reviewing* consists of reading and editing, aiming to evaluate and correct the written text or compare the ongoing text or unwritten thoughts and ideas with one's own plan. As the writing proceeds, the writer would manage the continued progress of *planning, translating and reviewing* by a control process, *monitoring,* and regulate the transitions between processes, depending on one's writing style and defined goals.

The subsequent efforts in studying the writing process have led to the gradual evolution of the writing models. Hayes (1996, 2012) supplemented and revised the original Hayes & Flower's (1980) model, focusing on several substantial factors that influence the writing process (Figure 3.4). Hayes (1996) made changes in the individual dimension in terms of the writer's motivation-affects, working memory and the reorganisation of the elements inherent to cognitive processes. Moreover, Hayes (2012) constructed a writing model with three levels: control level, process level (i.e., it covers writing processes and task environment) and resource level. The model was further refined by adding the components of the motivation and transcription process and removing the monitor, planning and revision/reviewing process.
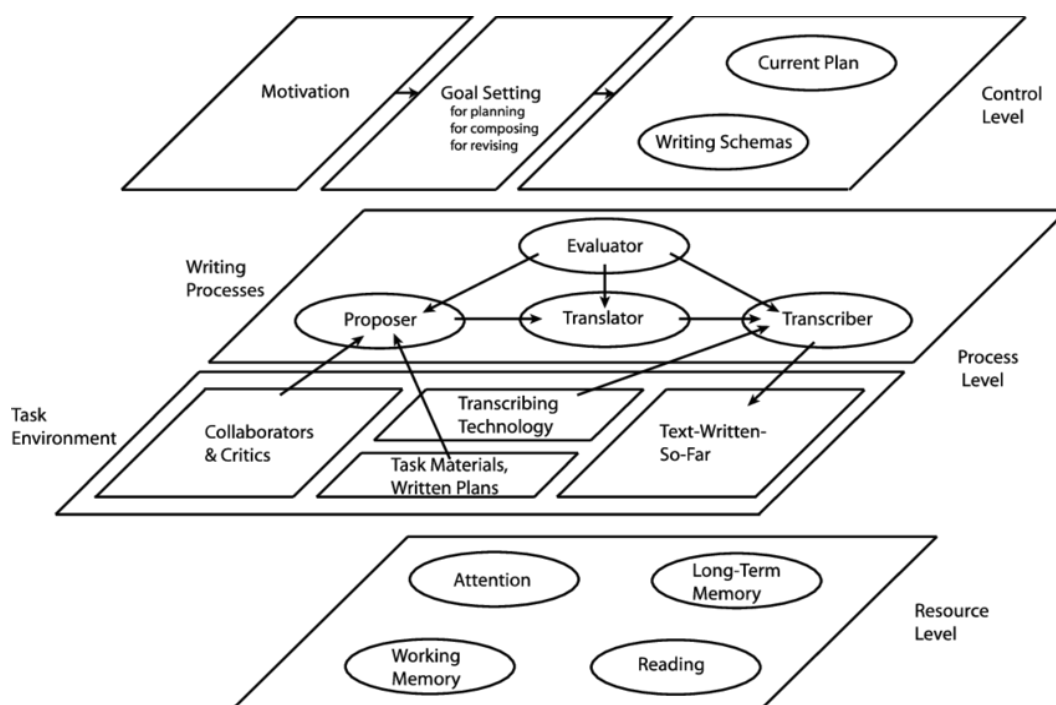
Figure 3. 4 Hayes's (2012) revised model of the writing process

First of all, Hayes (2012) explored the combination of motivation and cognitive processes in his model and assumed that motivation affects people's willingness to engage in writing (i.e., writers who have a strong motivation tend to concern more with the text quality) as well as their goal setting. In addition, Hayes (2012) stressed the significance of transcription when studying the L1 writing model, given that adult's transcription has been believed as thoroughly

automated and its influence on other writing processes could be ignored. In his revised model, transcription was considered to "compete with other writing processes for cognitive sources in both adults and children" (Hayes, 2012, pp. 371–372). Unlike the original model, Hayes (2012) regarded planning, composing, and revision as a special application of the writing model rather than a separate writing process parallel to others. In general, writing is a specialised activity aimed at creating text for the intended audience; therefore, creating a writing plan should also be seen as a specialised activity that involves a complete writing process to produce a text that contributes to planning for another text. From this perspective, the function of revision is to identify problems in an existing text, plan a solution to the problem, and translate and transcribe the corresponding language into a new text to replace the old one.

Although Hayes and Flower's (1980) writing model shaped a non-linear conception of the writing process, the described processes and representations failed to distinguish the planning and revision stages. Another limitation is that such a global view of writing processes did not discern between less-skilled writers and skilled writers. This has prompted Bereiter and Scardamalia (1987) to propose a developmental perspective of such expertise in writing that reflects the distinctions between writers in their writing processes and strategies.

3.3.2 Kellogg's writing model

Regarding the allocation of cognitive resources to processes from Hayes and Flower's (1980) model and the architecture of the writing model, Kellogg (1996) proposed another classic model that matches text production and working memory, which has been widely accepted in L1 and L2 writing studies. In his model, writing consists of three interactive and recursive processes— formulation, execution, and monitoring—each including two basic processes (Figure 3.5). The model of how working memory supports the ideas planning, the translation of ideas, and the revision of ideas and texts already produced are indicated by arrows between different components.
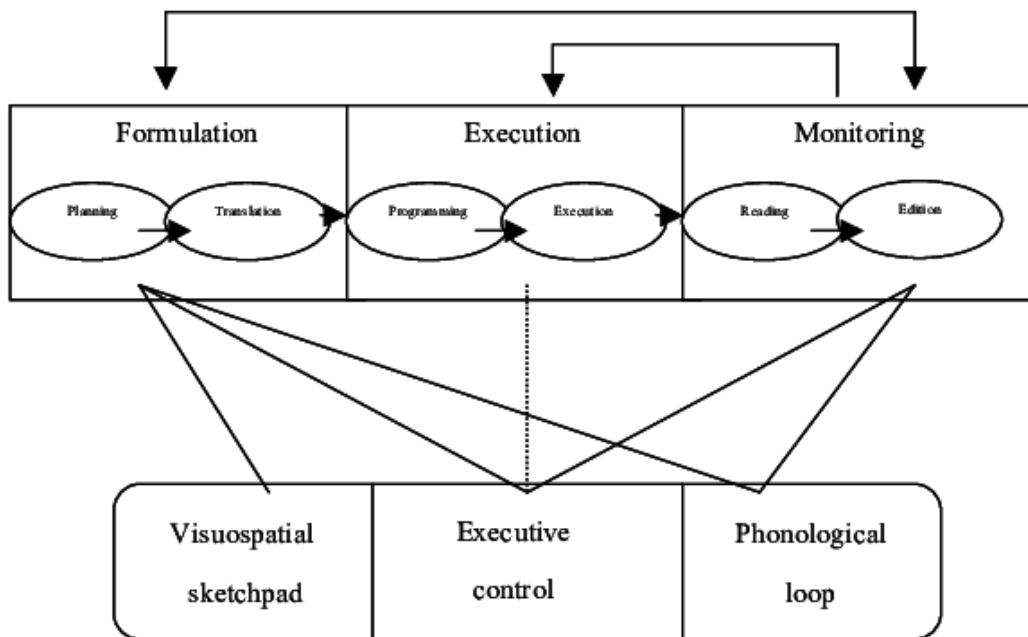
Figure 3. 5 Kellogg's (1996) model of working memory in L1 writing

Formulation involves *planning* (ideas retrieval from long-term memory or the input provided in the task) and *translating* (encoding ideas into linguistic structures). The output of formulation is fed forward for execution, which comprises *programming* (preparing for proper motor systems—handwriting or typing) and *executing* (physical realisation of the message). Monitoring consists of *reading* and *editing*, in which the writers are allowed to re-read the message during and after the text elaboration and then detect, diagnose and correct the problems in their texts.

Besides drawing from the model of working memory developed by Baddeley (1986), Kellogg (1996) postulates that different components of working memory are responsible for the writing processes. Baddeley's (1986) model of Working Memory posits two specialised slave registers or limited-capacity systems that are controlled by a single attentional controller—Central Executive, globally dedicated to complex processes. One slave register, the phonological loop, contains speech-based representations, while the other, the visuospatial sketchpad, stores and processes encoded visual data. In Kellogg's (1996) view, formulation is a critical but costly process that takes priority over execution and monitoring, as it necessitates all the sub-components to hold, store, and process information. Execution is the least costly process since

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typing or graphic realisation only needs the resources of the central executive. Lastly, the reading process of monitoring solicits the resources of the phonological loop and central executive, which is also a taxing process. Overall, in theory, Kellogg's (1996) model precisely locates different stages of writing within the working memory registers and highlights the limitation of processing capacities in the writing activity.

It can be noticed that Kellogg's (1996) writing model is similar to Levelt's (1989) model of L1 speech production. In particular, the components of *planning, translation,* and *execution* in Kellogg's model correspond to the elements of *conceptualization, formulation,* and *articulation* in Levelt's model. Both models take into account the *monitoring* process. Compared to speech production, written production enables more time and control over formulation and monitoring.

3.3.3 Bereiter and Scardamalia's developmental process model

Bereiter & Scardamalia (1987) developed two main writing processing models—Knowledge Telling and Knowledge Transforming—to account for different strategies used by novice writers and expert writers. Writers at the level of Knowledge Telling tend to produce a text by generating ideas related to a particular topic from long-term memory but not revise beyond the word level. Yet, more skilled writers involved in Knowledge Transforming tend to conduct re-adjustments of the conceptual content based on the writer's intentions and communicative goals, as well as the text produced so far.

The Knowledge Telling model

The architecture of Knowledge Telling model consists of three main components: the mental representation of instruction, two types of knowledge in Long-term memory and writing processes. The model begins with the writer's *Mental Representation* of the instructions, followed by the identification of topics and genres. The writing activity proceeds with the clues from the *Content Knowledge* (topic knowledge) and the *Discourse Knowledge* (text knowledge)

retrieved from long-term memory. The former enables the writer to elaborate the text content, while the latter involves linguistic knowledge (i.e., lexical and syntactic knowledge), knowledge of the genre and the use of text scheme. The extracted information interacts closely with the third component of the model—*Knowledge Telling Process*, where the writer elaborates various memory probes and examines the appropriateness of the retrieved knowledge with the content and text nature. Once approved, these contents will be translated into notes or drafts via the 'Write' operation. If the test fails, the writer will be guided by 'Locate Topics Identifiers' and 'Locate Gender Identifiers' and reconstruct some memory probes. The last operation, 'Update mental representation of text', enables the writer to analyse the written text and the contents to be written and possibly re-access the 'Construct memory probes' operation to elaborate new memory probes (Figure 3.6).
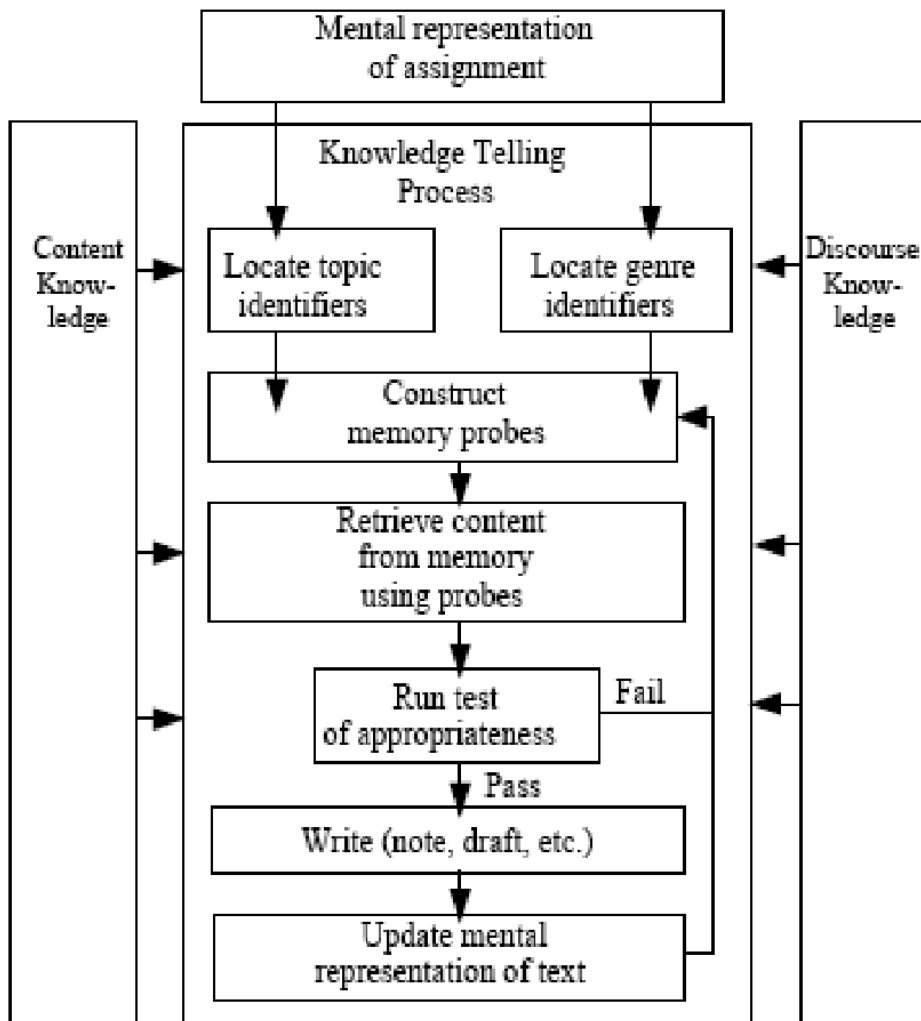
Figure 3. 6 Bereiter & Scardamalia's (1987) Knowledge Telling model

The novice writers adopt the Knowledge Telling model when writing alone without external resources, which requires neither preliminary planning nor goal setting. Writers conduct a simple and effective strategy controlled by their long-term memory and the text genre but do not take into account the intended reader and the consistency of the whole text.

The Knowledge Transforming model

Scardamalia and Bereiter (1987) found that expert writing involves much more complex mental activities compared to novice writing, which cannot be described as Knowledge Telling model solely. The Knowledge Transforming model accords with expert writing, which comprises not only processes at the level of Knowledge Telling (i.e., the retrieval and the linguistic translation of the text content) but also the problem-solving system.

The problem-solving process was identified as three specific components: *Problem analysis and Goal Setting*, and two different *Problem Space*. After operating the *Mental Representation of Assignment*, the expert writer is able to conduct an elaborate analysis of the task, goals and critical approaches to achieving the goals based on the writing instructions. This operation serves as the planning activity on the task, which contains content planning and rhetorical process planning that are managed in two distinct spaces. The *Content Problem Space* processes the domain knowledge (i.e., what to tell in the text), while the *Rhetorical Problem Space* concerns the pragmatic and rhetorical issues related to discourse knowledge (i.e., to whom and how to tell). The content and rhetorical spaces closely interact with each other via the operation of problem translation, where the constraints or goals elaborated in one problem space can be transferred into another. The whole problem-solving activity allows the expert writer to consider all the content and rhetorical constraints of the writing task and subsequently elaborate on the contents before operating the Knowledge Telling process (Figure 3.7).
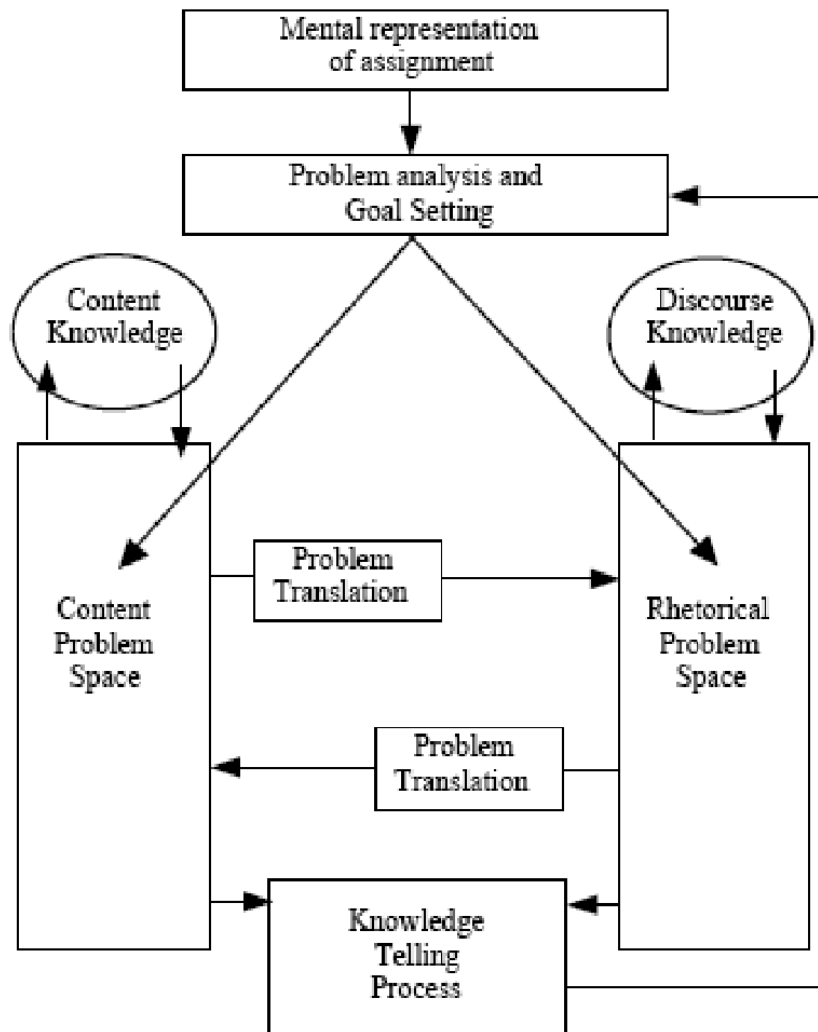
Figure 3. 7 Bereiter & Scardamalia's (1987) Knowledge Transforming model

The content transformation proceeds when the following linguistic products transcribed from the above operations flow back to the problem-solving process. The problem analysis of written text provides feedback that enables the expert writer to compose a text according to the planned intentions and the review of appropriateness between the text and intentions. Overall, the existence of planning activities, goal setting, as well as the management of problem-solving activities, suggest reasons for the differences between the Knowledge Transforming model and Knowledge Telling model. Importantly, these labels reflect how knowledge is involved differently in the writing process between skilled and less-skilled writers and what happens to knowledge subsequently. It should be noted that the development from Knowledge Telling to Knowledge Transforming needs to be regarded as a progressive change; that is to say, writers could adhere to the intermediate strategies (Bereiter, Burtis, & Scardanalia, 1988). However,

these dual models did not provide an explanation of the development of expertise knowledge and even the final stage of expertise knowledge.

3.3.4 Summary of the writing models and writing expertise

The models of L1 writing introduced above are useful since they propose a simplified outline of the written production system with relatively specific definitions of subprocesses and operations involved in writing. It should be noted that these models, concerning different but complementary aspects, are still entirely compatible with the existing theories—Hayes and Flower's (1980) model concerned the cognitive processes of writing; Kellogg's (1996) model highlighted the integration of the writing process and working memory; Bereiter and Scardamalia elaborated the models on the development of writing expertise. In general, they postulate that writing processes entail receiving and transforming information, which is subordinated to an instance of control, regulating information and evaluating the outcome (Alamargot & Chanquoy, 2001).

At least three major processes are identified in the general models of writing: (1) planning for content, (2) translating message into linguistic structures, and (3) revising this content or the structures. These activities are always situated within the framework of short-term memory (Bereiter & Scardamalia, 1987; Hayes & Flower, 1980) or working memory (Hayes, 1996; Kellogg, 1996). Given the limitation of cognitive capacity leading to the fragmentation of processing, writing processes are usually considered sequential and possibly recursive. The recursion is managed by a specialised process, controlling the progress of processes and testing whether the written product or the writer's attention is appropriate. Lastly, these models address the holistic dimensions of language production, for instance, the presence of the monitoring process, three major production processes, or the consideration regarding the limited processing capacity. Despite the common aspects, each model demonstrates insightful and important differences, which are grounded in the diverging theoretical conceptions that concern the nature and the functioning of operations in writing. These variations allow for an evaluation and

analysis with respect to each of the main writing processes, addressing the architecture of these processes and modes of process functioning.

In short, writing is a highly complex and problem-solving activity that entails the coordination of different processes and numerous constraints. As proposed in Hayes and Flower's (1980) model, much mental effort is invested in the elaboration, coordination and execution of complex goals and subgoals during composing. However, despite the acquisition of expert levels of domain-relevant competence, writing is not perceptibly easier for experts than novices. In Scardamalia and Bereiter's (1987) view, novice or less-skilled writers are likely to engage in the Knowledge-Telling process, which involves text generation in a straight-ahead fashion that conforms to the requirements of topic and genre without the need for an overall plan or goal or problem-solving procedures. Accordingly, solving rhetorical problems can only overload the novice and texts produced under this circumstance often stay on the topic automatically. In contrast, expert or skilled writers can simultaneously handle content and rhetoric problems at the level of Knowledge Transforming. This recursive process entails greater cognitive efforts to express and create new knowledge. The greater sophistication in one's rhetorical knowledge will lead to more investment into solving rhetorical problems and more challenging problems fed back into content space (Scardamalia & Bereiter, 1991). During these continuous processes, the competence of expert writers on both sides will be improved. Therefore, differences in writing expertise are reflected in which problems are tackled and in the degree of interaction among levels—less-skilled writers may fail to solve certain high-level problems but can address the issues of syntax, organisation and content relatively in isolation, whereas skilled writers can handle these issues with an integrated approach (Bryson, Bereiter, Scardamalia, & Joram, 1991).

3.4 Theoretical and empirical perspectives on the L2 written production

Informed by L1 writing theories and models, L2 writing research has systematically adopted the process-oriented theory to describe the processes and knowledge involved in text generation in L2. The underlying assumption of L2 writing is that it employs similar cognitive mechanisms as L1 writing and utilises the same knowledge resources in L1. However, it neglects the specific

linguistic problems in L2. Given that L1 writing is viewed as a controlled and rationale process in which writers work out what they want to achieve with the texts and decide how to do it, the subprocess of translating ideas into words is often separated from the text generation and formulation has thereby received scant attention compared to planning and revision in L1 writing research (Roca de Larios, Marín, & Murphy, 2001). By contrast, L2 writing shows its speciality in which writers attempt to translate ideas, presumably structured in a sophisticated network, into linear written language. The lack of access to linguistic knowledge and metacognitive knowledge in L2 will make writing even more demanding.

3.4.1 Zimmermann's model of L2 writing

Considering the distinct nature of L2 writing processes, there were several attempts to develop the L2 writing processing model, such as Börner's (1987) model, Krings's (1989) problem-solving model, and Zimmerman's (2000) formulating model. Among these, Zimmerman's (2000) model distinguished planning, formulation and reviewing in the overall model, with a specific interest in the problem-solving activities of L2 writers (Figure 3.8). Although these writing components are structured in a linear fashion, they are considered overlapping and recursive, following the principle that any sub-process can occur at any time.
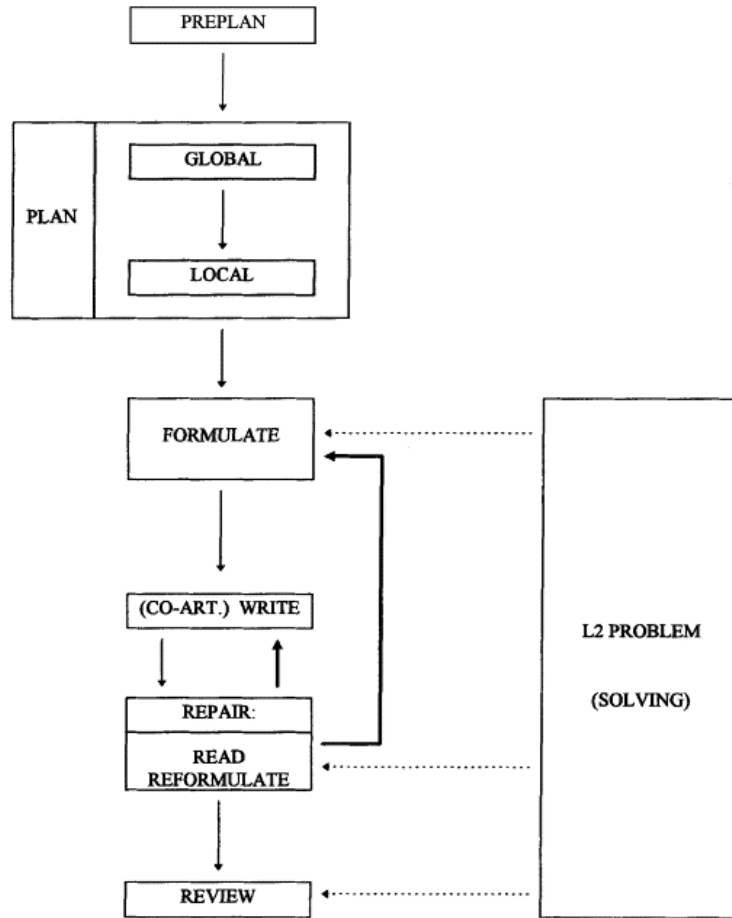
Figure 3. 8 Zimmermann's (2000) model of L2 writing

Notably, *formulation* (i.e., linguistic encoding) was placed between *planning* and *reviewing*, showing where L2 problem-solving activity typically occurs (Zimmermann, 2000). In Zimmermann's think-aloud protocol research design, tentative formulations (i.e., pre-texts) were more visible in L2 writing than in L1 writing. This suggests that the working of formulation in L2 involves much more language processing, which will pose problems for learners in text production. It is also mediated by language proficiency, as Manchón, Roca de Larios, and Murphy (2009) added that the more proficient L2 learners will be more likely to attend to higher-level concerns in writing, and this applies to the problems occurring in the processes of planning, formulation, and revision. In short, Zimmermann (2000) acknowledged Flower and Hayes's (1981) claim on writing processes and the more prominent role of linguistic formulation in L2 writing. It does not imply that the other two components are not essential, but writers may or may not substantially plan or revise when composing in L2.

3.4.2 Cognitive processes of L2 writing

A shared characteristic of Flower and Hayes's (1981) and Bereiter and Scardamalia's (1987) models is the general emphasis on high-level reflective thinking involved in writing, with the implication that L1 and L2 writing share similar thought processes in terms of setting goals and generating content (Galbraith, 2009). Based on the models of L1 and L2 writing described above, L2 writers are assumed to engage in the complex and recursive processes of planning, formulation, and revision under the constraints of a monitor. They are postulated to manipulate all three macro-processes and their corresponding mental representations, which involve those of content, lexical, syntactic, discourse, or rhetorical nature to realise the specified goals. However, in Zimmermann's (2000) model of L2 writing, the working of each component was not described in detail. The descriptions of L2 writing processes regarding either the *whole* composition processes or *one* macro-writing process (i.e., planning) were further provided in the first research strand into L2 writing (Roca de Larios, Nicolás-Conesa, & Coyle, 2016). Bereiter and Scardamalia's (1987) distinction between knowledge-telling and knowledge-transforming approaches was also confirmed in L2 writing research. That is, L2 writers demonstrate less and more skilled composing behaviours to a differential degree depending on their writing expertise. Subsequent findings on the allocation of attentional resources (Manchón & Roca de Larios, 2007a; Roca de Larios et al., 2001, 2006) can be interpreted as the dynamic character of composing activities. In general, previous studies in L1 and L2 writing found that planning dominates in the early stage of writing and becomes less important over time; formulation occupies the middle part of the writing process; what follows is revision, which becomes dominant in the final stage (Kellogg, 1987; Roca de Larios et al., 2001, 2008; van den Bergh & Rijlaarsdam, 2007).

The planning process involves the sub-operations of ideas and organisation generation, and goal setting, which divide the production task into subtasks to help learners overcome the limitations in attentional resources (Ellis, 2005). *Planning* serves as a possible route about how the writing task can be accomplished in relatively inexpensive cognitive terms and provides flexibility in handling the ideational, linguistic, and rhetorical constraints in the course of composition. By

means of *planning*, writers retrieve information from the task environment and long-term memory, which is used to set goals and develop plans for the text that will meet those goals (Hayes & Flower, 1980). Planning does not necessarily take place as pre-task activities. It is assumed to be conducted in two distinct approaches —framing their writing in advanced or enhancing their mental presentations while composing— controlled by the skilled L2 writers (Cumming, 1989). The higher proficiency of L2 will allow writers to spend more time in constructing their pragmatic and ideational representations and to have a greater ability to integrate them into the texts; more skilled L2 writers also were found to elaborate more on the plans, compared to their less skilled counterparts who engaged less in planning (e.g., Cumming, 1989; Manchón & de Larios, 2007; Raimes, 1987)

The process of *formulation* (i.e., linguistic encoding) is where L2 writers translate plans and ideas into linguistic form. The term *translation* in L1 writing models "seems to associate formulation with the process of matching a set of conceptual elements organised as propositions to sequences of syntactically organized linguistic units" without referring to the complexity of operations included (Roca de Larios et al., 2001, p. 499). Instead, *formulation* generally requires both the conjugation of goals and ideas limited by lexis and syntax, which is seen to be not necessarily linked to specific language representations (Fayol, 1991), as well as the connection between sentence generation and their integration into the textual framework (Roca de Larios, Murphy, & Manchón, 1999). It implies that the generation of texts must involve the decision-making and problem-solving behaviours of L2 writers. Formulation plays a dominant role in L2 composition and takes up most of the writing time regardless of the proficiency level of L2 writers (Roca de Larios et al., 2001, 2006)). Unlike *planning and revision*, more proficient L2 learners indeed place *formulation* in the central stage of composing, spend less time on formulating, and coordinate their efforts to other processes compared to their less proficient counterparts. Increased L2 proficiency would allow for greater efforts to improve the expression of meaning or discover a better match between intention and expression, thereby reducing the amount of composing time spent to compensate for inadequate linguistic resources (Roca de Larios et al., 2008).

Lastly, *revision* is a recursive, ongoing, and problem-solving process that seems to play a limited role in the composition of unskilled L2 writers. The process of revision includes the sub-operations of editing and reading the evolving text. The *revision* of the written texts in relation to task requirements and their writing goals and audience can be perceived to be challenging by unskilled L2 writers as its performance relies on the interplay of the writer's knowledge and intention (Flower et al., 1986). Also, the evaluation of the plans and texts or actual diagnosis of a problem is determined by the writer's expertise and the nature of the problem (e.g., spelling problems, style) (Hayes et al., 1987). L2 writers were found to use two differentiated approaches — revising after texts are written immediately or postponing all the revisions to the final draft (Victori, 1999). The modification of the produced texts can be either rewriting the text with the ideas preserved or revising the text based on the needs. Unlike L1 users, L2 writers tend to devote more time to revising and focus more on the linguistic issues because they must intensify attempts to make their texts reflect their writing goals and/or because they lack knowledge and resources in L2 (Roca de Larios, Murphy, & Marín, 2002). More skilled L2 writers tended to revise more, consider audience awareness more, and evaluate their texts more frequently compared to their counterparts, who are more concerned with local issues (Barkaoui, 2007).

The adaption of L1 writing models to L2 context highlights the main differences in written production regarding how the outcomes of these processes are linguistically formulated and how the content-generation process might be influenced. The cognitive processes of L2 writing have stressed more the cognitive operations of converting ideas into written texts, as the empirical evidence suggested that text production in L2 is less automatic and often requires more effort for L2 writers (see Roca de Larios et al., 1999). Therefore, more attentional resources are required for lexical retrieval, syntactic encoding and possibly orthographic transcription in L2 writing, which may exceed the processing limits in working memory and be more likely to produce errors (see Roca de Larios et al., 2016).

The recent models of writing (Galbraith, 2009; Hayes, 1996; Kellogg, 1996, 2001) have also placed emphasis on cognitive overload since a complex set of processes involved in writing

must proceed within a limited capacity of working memory. Working memory is a construct that interrelates with attention and awareness processes. Although writing is less time-compressed than speaking, Kellogg (2001) pointed out that the specific components of working memory play a role in almost all phases of writing, from planning to editing. It should be noted that the critical role of working memory has also been confirmed in a few studies on L2 writing (Kormos, 2011; Révész, Kourtali, et al., 2017). In Kellogg's view, all the cognitive operations can occur in parallel in L1 writing. However, they may function serially in L2 written production as L2 writers have to prioritise their attentional resources on one system over others, particularly when constrained by time. In particular, linguistic demands of L2 composition may consume cognitive resources for higher-level planning. Except for the advanced ones, most L2 writers make much more effort into the processes of execution and monitoring than L1 writers. Insufficient knowledge of L2 or FL can completely immerse writers in the struggles with language and inhibit their attention to conceptual aspects such as planning and monitoring (Schoonen, Snellings, Stevenson, & van Gelderen, 2009). As such, Manchón, Roca de Larios, and Murphy (2009) argued that increased L2 proficiency is a critical prerequisite for the automatization of language skills, freeing up cognitive resources for the solutions of higher-level writing problems. Having good language skills and fluent writing will also lead to less cognitive load and more available resources for retrieving content from long-term memory (Galbraith, 2009).

3.4.3 Summary of L2 writing processes

The process-oriented models of L1 writing have been widely used in our current conceptualisation and theorisation of L2 writing processes. Based on Hayes and Flower (1980) and Flower and Hayes (1981), L2 writing involve the processes of planning, formulation, and revision. In general, the planning process consists of goal setting, suboperations of conceptualisation and organisational generation, as well as the division of the production task to support L2 writers in managing their limited attentional resources. Ideas are generated by retrieving domain knowledge from the task and long-term memory. Formulation is the process

by which writers translate plans and ideas into linguistic form. Since L2 writers' knowledge of vocabulary and syntax can limit their writing goals and ideas, the development of the text then must involve their decision-making and problem-solving behaviours. Lastly, revision contains reading and editing the written texts in response to task requirements and writing goals, and its performance depends on the interplay of the L2 writers' knowledge and intentions. In terms of the cognitive processes of L2 writing, empirical evidence suggests that text production tends to be more demanding for L2 writers. Following Kellogg's (1996) model, a balanced combination of numerous cognitive writing processes relies on the efficient allocation of working memory resources. When the writing activity exceeds the working memory load, one or more writing subprocesses are assumed to be paused or terminated, resulting in priority processing for the specific writing subprocess. Of particular interest to the current research is the planning process. In what follows, we will provide the details of the planning process in L1 and L2 writing, the cognitive account of idea generation, and empirical evidence on the interactions between idea generation and writing quality.

3.5 Planning in L1 and L2 writing

The conventional view holds that good writing and careful thinking are complementary. The problem-solving nature of the process models of writing revealed that planning requires higher-level cognitive efforts and plays a crucial role in the writing process (Alamargot & Chanquoy, 2001; Flower & Hayes, 1981). In Hayes and Flower's (1980) model, the activities of planning involve idea generation, organising and goal setting, in which the writer identifies information to be expressed in response to the given topic and retrieves such information from long-term memory, guiding the content and formal structures to achieve the communicative goals. Thus, planning is an ongoing and recursive activity throughout the writing process. Hayes and Nash (1996) regarded planning as a preparatory reflection. They first distinguished process planning (i.e., how the writer tends to carry out the writing task) from text planning (i.e., what is written, including its content, form and its influence on the audience); within text planning, it contained conceptual or content planning, in which the writer proposed ideas for the text without limiting the language used, and language planning that generated grammatical texts.

In the earlier L2 writing research, the predominant objective was to determine whether L2 writers deployed writing processes in the same systems as Flower and Hayes suggested. The extensive research conducted by Kellogg (1987, 1988, 1990) has allowed for a better understanding of each writing system and process. In Kellogg's (1996) writing model that involved the components of working memory, there are three central systems — formulation, execution, and monitoring. The restricted capacity of the central executive would cause a trade-off of attention to different processes when writers are under pressure to generate texts quickly. The prioritization of formulation has been demonstrated in previous studies (Brown, McDonald, Brown, & Carr, 1988). The processes of planning and translation (i.e., encoding ideas into language) involved in the formulation system are assumed to place the greatest demand on the working memory resources. As such, these two distinct processes are thought to compete for working memory capacity. Kellogg's (1990) Overload Hypothesis postulated that planning would lessen the demands on writers' working memory. His earlier studies explored the effects of pre-task planning, notably outlining, on writing fluency and overall writing quality. In particular, Kellogg (1988) found that outlining strategies allowed for more attentional resources to the translation process and significantly improved the writing quality.

Planning is a means of helping L2 learners overcome the limitations of their working memory (Ellis, 2005). It enables the writing task to be simplified by setting goals and allows for flexibility in problem-solving strategies. The potential benefits of planning have received increasing attention in L2 writing research (Ellis & Yuan, 2004; Ong & Zhang, 2010, 2013; Skehan, 1998). Planning is found to allow L2 writers to focus more on the translation process and produce texts with higher quality, as it would lessen the pressure on working memory capacity (Ellis & Yuan, 2004; Johnson, Mercado, & Acevedo, 2012). L2 writers are assumed to concentrate on language when composing if they have clear ideas about the content and organisation of the texts during planning. On the other hand, writing without plans can result in a trade-off of attention among the processes of planning, translation, execution and monitoring. Despite the similarity of planning behaviours in L1 and L2 writing, L2 writers were found to employ less holistic planning due to the linguistic demands in L2, thereby reducing

their planning activities (Jones & Tetroe, 1987). In addition, it appears challenging for L2 writers to maintain their goals and implement most of their ideas from the plans into their writing (Moragne e Silva, 1988). Ong and Zhang (2010, 2013) found that planning requires more cognitive effort than free writing, and too much planning and continuous planning may hamper the fluency and lexical complexity of L2 texts.

In the planning process, L2 writers can address both the content (i.e., retrieving relevant information from long-term memory) and organization (i.e., structuring their ideas and making decisions on the presentation and ordering of the text). However, they were thought to prioritise content and organisation over language when writing. Due to a lack of linguistic knowledge and working memory limitations, most L2 writers struggle to encode their ideas into form (Hinkel, 2004; Kormos, 2014). Given that content planning and translation processes are interrelated, L2 writers would likely confront the difficulty that some ideas are more easily translated into linguistic form than others. To our knowledge, previous studies have not isolated and examined the specific effects of idea generation, organising and goal setting in the planning subprocesses (see Johnson, 2014). The specific focus of this dissertation is planning for ideas. In the following section, we will describe the process of idea generation from theoretical and empirical perspectives.

3.6 Idea generation in written production: theory and empirical findings

The generation of ideas is a continuous cognitive activity that dominates the first stage of the writing process. In the traditional models of L1 writing (Bereiter & Scardamalia, 1987; Hayes & Flower, 1980; Kellogg, 1996), generating content or idea was explained as a part of planning processes and considered to be the effortful activity that requires writers to search ideas strategically. In Hayes and Flower's (1980) model, the generating sub-process consists of three steps—knowledge retrieval, testing the appropriateness of retrieved elements, and evaluating the usefulness of retrieved knowledge units. If the retrieved contents are not suitable for the theme of the text, writers can elaborate on some new memory probes and generate contents; if the output of memory is considered relevant and important, writers will write it down. Writers

can also develop their clues to meet the rhetorical needs. The generating sub-process may be regarded as either automatic or controlled processing (Alamargot & Chanquoy, 2001), which is recursive until the writer generates enough content to complete the task.

In Bereiter and Scardamalia's (1987) two processing configurations, the functioning of the Knowledge Telling model is relatively similar to the generating sub-process conceived by Hayes and Flower (1980). On the other hand, the Knowledge-Transforming model proceeds to an important planning of the text content, which is mediated by a problem-solving system that takes into account all rhetorical and content constraints of the writing task (Alamargot & Chanquoy, 2001). In this respect, the topic, task environment and interconnection of the units in a semantic memory network appear to be highly limiting factors in L1 writing models, making the generation of new ideas seem to be a relatively static process. However, Galbraith (1999, 2009) proposed the Knowledge Constituting model, which was informed by the connectionist principles. He argued that in addition to task specification that offers input and assesses the written sentences, feedback from writers' discourse on their dispositions could be the form of input. Writers can discover ideas when they produce content to achieve their rhetorical goals or when they do not. With the translation process, it is possible to change the pattern of activating the units in the semantic memory network and further develop new ideas. Accordingly, it becomes crucial to investigate how the writer's ability to constitute his ideas in L2 can be affected by linguistic fluency and language structure (Galbraith, 2009).

In the context of L2 or FL writing, L2 writers often begin with considering "what to write" before thinking about "what language to use". Although L2 writers were found to devote a good deal of attention to planning content for writing (see Roca de Larios, Manchón, Murphy & Marin, 2008), such a process is challenging and much of the ideas developed may not be adopted in the written text. Many L2 writers struggle with generating ideas for the task, particularly for less skilled writers. It is suggested that less skilled writers deployed their attentional resources to low-level linguistic and text production processes (e.g., transcription and lexical retrieval) while sacrificing higher-level activities, including idea coordination, planning and evaluation (Kellogg, 2001; Kellogg et al., 2013). On the contrary, the lower-level

processes could often be automated by more skilled writers, allowing attentional resources to be devoted to the high-level ones. With the subtle transition from the perspective of writing processes to delving into the potential for learners' overall L2 development (Manchón, 2011d), idea generation is not only the priority in second language production but also a catalyst for language learning (Ong, 2013).

As discussed above, idea generation is an important planning component that may influence writing quality. Galbraith et al. (2005) provided some evidence of the positive correlation between various elements of planning (including the amount of content generated during outlining, the number of new ideas added and old ideas removed, and the rhetorical organisation of content) and writing quality. Galbraith and his colleagues found the number of ideas was associated with writing quality. Crossley, Muldner and McNamara (2016) investigated the extent to which idea generation is related to human judgments of L1 writing quality. The results showed that the greater number of ideas that were flexible (i.e., how different the ideas are from others), original and elaborated contributed to the higher quality of the text and linguistic features are powerful indicators of successful idea generation. The elements of idea elaboration and fluency were found to be strong predictors of the quality of the idea. Thus, L2 writing teachers should provide students with effective strategies to generate and elaborate on ideas.

Numerous L2 writing studies have been guided by the task-based theories of L2 acquisition, in which the Limited Attentional Capacity Model (Skehan, 1998, 2014) and Cognition Hypothesis (Robinson, 2001a, 2011a) have made predictions on how planning conditions as task variables affect L2 production. However, few studies have been conducted to explore the connection between idea or content generation and L2 writing. Ong (2013) reported how planning time conditions (no planning time, planning time, extended planning time) and task conditions (topic given; topic and ideas given) affect the quality, quantity and rate of ideas generated in argumentative writing. The results showed that the number of ideas generated in the no planning conditions was significantly greater than those in other conditions, and no trade-off effect was spotted between the quality of ideas and the outburst of ideas. On the other hand, the provision of topic and ideas was found to produce significantly higher quality of ideas in the written

production than the condition of providing topic only, although there was no significant difference in the total number of ideas. Ong (2013) suggested that the production of more ideas may not necessarily compete for a similar pool of working memory resources, and it may be less cognitively demanding on EFL learners; however, developing *good* ideas would place higher cognitive demands on EFL learners (see Robinson & Gilabert, 2007). In addition, the advantages of providing ideas were evident at the translation stage because the topic and ideas given condition allowed for a higher quality of ideas generated in the essay.

In the subsequent study, Ong (2014) explored whether and how planning time conditions and task conditions (i.e., topic given; topic and ideas given; and topic, ideas, and macro-structure given) influence Chinese EFL writers' metacognitive processes (e.g., generation, elaboration and organisation of new ideas) during composing. The results showed that compared with other conditions, the topic given condition guided more writers' attentional resources to generating and organising new ideas during the planning and elaborating and organising new ideas during composing. In other words, providing topics only in the task would put pressure on ELF writers to generate, elaborate, and organise new ideas. Ong's (2013, 2014) studies suggested that writers must allocate their attentional resources to coordinating and managing the writing processes (Roca de Larios et al., 2016) to meet the demands that task conditions place on the different stages of written production (Kormos, 2011). Future research is still needed on how the processes of text production and thinking of ideas interact in the context of L2 writing.

3.7 Research insights on L2 writing processes

The process of writing is regarded as being equivalent to high-level reflective thinking in the L1 writing models (Galbraith, 2009). It is hypothesised that similar thinking processes are involved in both L1 and L2 writing, where the primary difference lies in how the outcomes of these processes are represented in language. Roca de Larios et al. (2016) pointed out that one of the main limitations of existing research from a cognitive perspective is that most studies presumed writing is a top-down process with the pre-establish content either translated into words or inhibited from being written down due to the writer's limited access to L2 linguistic

resources. As a result, they call on writing researchers to be more concerned with how thinking interacts with the production process and the text produced. In addition, what we discussed above on the task environment and planning suggested that task conditions influence the writer's cognitive processes of writing (Roca de Larios et al., 2008), especially the process of idea generation, which can have an impact on the quality of writing. It is worth noting that the initial goal of L2 writers in a writing task is not to focus solely on performance-related metrics but to deploy and manage the cognitive processes required for task completion. Of special interest to this dissertation is whether providing L2 writers with content support is a favourable condition that activates new ideas from writers' long-term memory. In light of previous empirical evidence (Ong, 2013, 2014), there is also the possibility that content support makes L2 writers cognitively overloaded and incapable of integrating the ideas given to the idea units in their long-term memory. One of the purposes of this dissertation is to determine, with or without content support, which cognitive processes would be prioritised by L2 writers and which processes would receive less attention.

3.8 Chapter summary

This chapter introduced the models of writing in both L1 and L2, which generally include three macro-stages: (1) content and organization planning, (2) translating the plan into linguistic form, and (3) reading and revising the written texts. The theoretical perspective of L2 writing highlight the information processing demands in the written production and the limitation of L2 writers' processing capacity. However, the deployment of numerous cognitive writing processes relies on the efficient allocation of working memory resources. Following this, we described the planning process of L1 and L2 writing. We argued that planning can help L2 writers overcome the limits in working memory capacity, simplify writing tasks by setting goals, and facilitate the problem to be solved. From the literature review on the planning process, we found that L2 writers put a great deal of effort into planning what to write and generating new ideas. Idea generation is believed to be a priority for language production. We then explored the relationship between idea generation and writing quality by reviewing previous studies. To be specific, Galbraith et al. (2005) and Crossley et al. (2016) suggested that various planning

operations and elaborated ideas contributed to the higher text quality. For this reason, we are concerned with the potential role of content support in writing processes and writing quality. In the next chapter, we will further explore the effects of content support on L2 writing by introducing task-based language teaching approaches and the manipulation of task complexity in writing tasks.

CHAPTER 4 TASK-BASED LANGUAGE TEACHING APPROACH

4.1 Introduction

This chapter introduces the theoretical foundations of task-based language teaching (TBLT) and the definitions of tasks from a psycholinguistic perspective, highlighting task characteristics and cognitive demands in task-based practice. It reviews the tenets of two cognitive TBLT models—Skehan's Limited Attentional Capacity Model and Robinson's Cognition Hypothesis. These two influential but rival frameworks are concerned with how tasks influence the way that resources are allocated and describe how the task features interact with learners' cognitive/behavioural responses during task completion. We summarize the predictions proposed by these two models, followed by a discussion on the applicability of the TBLT theoretical predictions to writing and a review of the empirical investigations that are relevant to the current research. The chapter specifically focuses on the Cognition Hypothesis that distinguishes between resource-directing and resource-dispersing features of task complexity, accounting for the effect of increased cognitive demands on language production. In particular, we analyze the previous empirical studies exploring the task complexity effects on L2 written production. Within this line of research, one of the researched features of task complexity is +/- content support, which has been manipulated along both resource-directing and resource-dispersing dimensions. We first look at the previous studies that manipulated task complexity along the resource-dispersing dimension and its impact on L2 writing performance. We then discuss the few available studies that have investigated the effects of providing content support on L2 writing, which is the most relevant to this dissertation. We also review the empirical work that examines the impact of content support, as the resource-directing feature of task complexity, on L2 written performance. In order to address the second aim of this dissertation, we also look at the existing studies that investigated the task complexity effect on the cognitive writing processes. The review of the empirical studies intends to illustrate an interaction between cognitive task complexity (operationalized as +/- content support) and L2 writing performance and processes.

4.2 Theoretical background of TBLT

TBLT is an approach to L2 or FL teaching that brings together the theoretical and empirical foundations for effective pedagogy by focusing on tangible learning achievement (i.e., what learners are able to do with the language) in the form of *tasks*. TBLT entails the use of meaning-focused and real-life communicative tasks that lead to optimal L2 learning (Ellis, 2003; Long, 1985; Skehan, 1998). More specifically, a task provides learners with greater opportunities for developing any of the four language skills. However, theories of TBLT have predominantly focused on oral production, though they were applied to teaching and learning writing skills.

The task-based approach was first presented in the 1980s, focusing on the rationale for a task-based syllabus (Breen, 1987; Candlin, 1987). Tasks were used as the syllabus content, including a series of progressively complex activities and materials carried out by teachers and/or students either in the classroom or other instructional settings. TBLT proposed tasks as the unit of analysis throughout the design, implementation, and assessment, including the approach to evaluating student achievement. It is an analytical teaching approach with a *focus on form*, which offers learners actual target language samples and requires them to analyse the input, inducing knowledge about linguistic components and grammar rules (see Wilkins, 1976). TBLT has the advantage of providing a reason for communicating with meaningful and holistic language beyond practicing to do so. In the late 1990s, in contrast, tasks were understood as classroom tasks in the form of activities and exercises that were not associated with real-life activities outside the classroom. These tasks were used for practices of isolated linguistic structures with an overt or covert grammatical syllabus, which are associated with *focus on forms*, also called synthetic. This synthetic syllabus requires learners to re-synthesize the language into a large number of linguistic units (Wilkins, 1976), such as words or grammar rules, which is distinct from a task-based perspective. In view of the issues associated with the traditional synthetic syllabi, a shift to an analytical approach has been called for by L2 researchers, in which the syllabus is constructed in a more learner-centred manner and is based on psycholinguistic rather than purely linguistic criteria (Long, 1985; Skehan, 1998).

Among the analytical approaches, learners are encouraged to use the target language to negotiate meanings. Their attention is directed to specific aspects of language in use and how the target language might fulfil the communicative functions (Long, 1998). TBLT highlights the focus-on-form methodology that allows learners to associate the form-focus with meaning, which has been promising in raising noticing and learning. In addition, the learner-centredness of TBLT respects learners' interests and motivation in the process of using language (Breen, 1987; Prabhu, 1987). It implies that learners should be invited to determine the instruction content and integrate various subskills and linguistic knowledge in task performance (Van den Branden, Bygate & Norris, 2009).

4.3 Tasks from a psycholinguistic perspective

The TBLT literature has defined the construct of tasks in a number of ways: from activities posing problems (Candlin, 1987) to goal-oriented, purposeful activities derived from the collaboration between teachers and learners(Swales, 2009) to devices raising learners' awareness of a functional sense of language use (Norris, 2009). Table 4. 1 presents several key concepts of the task definitions. Several common characteristics can be identified regardless of the diversity of task definitions. A task should be meaningful and goal-oriented, create an authentic language learning environment involving both oral and written language use, and motivate learners to participate in task completion and the production of output. As such, tasks are considered the primary site for L2 performance and development.

Table 4. 1 Key concepts of the definition of tasks

Authors	Key concept
Long (1985)	By tasks are what people do in everyday life, at work, at play and in between.
Breen (1987)	Task refers to a range of work plans that aim to facilitate language learning, from simple exercises to more complex activities, such as problem solving or simulations and decision making.
Willis (1996)	A classroom undertaking in which learners use the target language for a communicative purpose in order to achieve an outcome.
Skehan (1998)	A task is an outcome-evaluated activity when meaning is primary; there is a real-world relationship and a goal that needs working toward.
Bygate *et al.* (2001)	An activity that requires learners to use language, emphasising meaning, to achieve an objective.
Ellis (2003)	A work plan that involves a primary focus on meaning and requires learners to process language to achieve a communicative outcome.
Bygate & Samuda (2009)	A pedagogical activity that requires communicative language use to attain pragmatic outcomes rather than practise language, but with the aim of promoting language learning.

From the psycholinguistic perspectives of TBLT, the process by which learners complete a task is often perceived as the mental processing of input information. As Ellis (2000) put it:

> (A task) guides learners to engage in certain types of information processing that are believed to be important for effective language use and/or for language acquisition from some theoretical standpoint. This perspective is predictive, and, in some cases, deterministic. That is, it assumes that there are properties in a task that will predispose, even induce, learners to engage in certain types of language use and mental processing that are beneficial to acquisition. (p. 197)

In other words, the psycholinguistic approach allows for identifying the features of task design and task implementation that are posited to potentially have a direct and predetermined impact on the quality of second language production and learning. Proponents of the psycholinguistic tradition (e.g., Skehan, Foster & Menhert, 1998) also stressed the importance of inherent task properties for the nature of performance. The interaction between the task and learners'

cognition (or cognitive processing) has been of interest to the TBLT researchers. A number of studies in the psycholinguistic strand are concerned with task characteristics that engage learners in certain types of cognitive processing, guiding them to language use and language acquisition. The TBLT literature has then used the concept of *cognitive load* from Sweller's (1988) Cognitive Load Theory, referring to the amount of cognitive processing required for a task. The Cognitive Load Theory explains how human process information and attempts to make prescriptions for effective instructional design. One of the main assumptions of the theory is that human's capacity for processing information is limited, and holding too much information would reduce working memory and learning. When it comes to task design, we should consider the cognitive load imposed on learners.

An underlying assumption of the current task-based research is that task characteristics or task conditions may influence learners' language performance. In the context of writing, tasks with varied characteristics might pose multiple demands on learners during the writing process and require different levels of cognitive resources from learners. Central to task-based learning is the need for learners to allocate their attention so as to fulfil the linguistic demands of tasks successfully, which also relates to learning how to write in L2. There are two influential theoretical frameworks in this field that have emerged as the general operational principles for task-based instruction: the Limited Attentional Capacity Model (Skehan, 1998, 2001; Skehan & Foster, 2001) and The Cognition Hypothesis (Robinson, 2001b, 2005, 2007). These two models consider tasks as the devices that affect the manner of resource allocation and the way that learners acquire and use language. In Skehan's view, L2 learners possess a limited processing capacity controlled by a single mechanism while form and content compete for these finite cognitive resources. On the other hand, Robinson proposed an alternative explanation for the learning demand of tasks that learners possess multiple attentional pools of resources, which are viewed as flexible and manipulable rather than limited. These two competing models differ in understanding the systematic impact of tasks upon performance and how learners deploy their attentional resources. Notwithstanding their differences, Skehan's and Robinson's frameworks are complementary in some aspects as they contribute to our understanding of the nature of tasks and cognitively oriented studies of TBLT. In the following sections, we first

provide further details on these two competing positions.

4.4 Skehan's cognitive approach to tasks

Skehan (1996b, 1998) proposed a cognitive, informative processing perspective on the impact of tasks on performance and development. Drawing on previous theories (Candlin, 1987; Nunan, 1989), Skehan(1998)provided a relatively comprehensive account of task characteristics, highlighting the priority of meaningfulness and the assessment based on task completion. In other words, tasks prioritise how learners process information rather than what forms of language they use. This approach is grounded on cognitive differences in how learners represent L2 knowledge, classified as a rule-based system or an exemplar-based system.

In this theoretical perspective, learning is seen as a rule-based system that consists of abstract representations of underlying rules of the language. Rules enable the precision of the meaning expressed by language users. Under this system, rules are primarily important, which can be filled in with lexical indices to produce language since constructing sentences that adhere to the grammar in question is a priority (Skehan, 1998). The rule-based interpretation implies that restructuring the linguistic material would result in the development of interlanguage. This system will likely be organised in an economical and elegant manner where the rules are compactly structured. The advantage of a rule-based system is that it enables the greatest creativity and flexibility while placing little demand on memory storage. However, as the implementation of the rule-based system requires more processing and control, learners would have a heavy processing burden, especially on speech production. On the other hand, Skehan claims that the exemplar-based system consists of discrete lexical items and ready-coded chunks of language. They are stored in a redundant unstructured memory system in advance and can be accessed easily and quickly, which is ideal for occasions requiring fluent oral performance. In earlier terms, with formulaic items, this system is assumed to be less generative and lack parsimony, while it requires little excessive internal computation. The advantage of the exemplar-based system is that it avoids overtaxing cognitive resources and spares the

available attention of learners for language communication. However, given that exemplar-based interpretations focus on the accumulation of exemplars and their use in performance, this system would be limited in its ability to express precise meanings and would be unlikely to lead to the restructuring of interlanguage.

Skehan (1998) points out that either the rule-based or exemplar-based system has its own costs and benefits—the former emphasizes the restructuring and controlled processes in language generation, while the latter concerns the representation at the cost of processing. As neither of these systems works perfectly, it is necessary to explore how learners can combine the two systems during ongoing communication to achieve greater fluency and control. In this respect, learners can draw on one system based on their communicative needs—the exemplar-based system can be fast accessed by learners with high communicative pressures, and the rule-based system can be used when there is available time, and precision or creativity is important. Regarding language development, learners' access to both systems would enable complementary outcomes in language use and interlanguage development. The exemplar-based approach takes greater fluency and real-time processing as a result, which will improve learners' capacity for controlling the underlying system. The rule-based approach is seen to be associated with interlanguage changes, with generativity and flexibility that occur in language use. Therefore, task-based instruction attempts to establish an effective balance between the two systems.

Task-based instruction has received considerable attention in linking the authenticity and acquisitional accounts of language development. However, this approach has its limitations as it may over-emphasize meaning at the expense of attention to form. Learners (and native speakers) put primary emphasis on the satisfactoriness of the flow of the conversation (communicating meanings) rather than the correctness or completeness of the language (the form they use). In this regard, the priority to extracting meaning from language processing neither guarantees automatic sensitivity to form nor leads to interlanguage development. Learners might even feel encouraged to adopt overly and prematurely lexical modes of communication that draw upon a rapid and capacious memory system. On the contrary, if there

is pressure on exactness and creativity, then form, syntax, and planning will be the primary concerns. These two possibilities suggest that language users have dual processing modes (see Widdowson, 1989) in which they can take account of the most urgent processing need and switch between two modes. Regarding task-based approaches, the meaning-focused and outcome-evaluated properties defined in tasks may predispose learners to engage in immediate communication for task completion, regardless of the precision and accuracy of the language used (Skehan, 1996a). As such, task-based instruction needs to find ways to direct learners' attention through task design and balance the demands on the desired aspects of performance. To that end, Skehan argued that there is a need for criteria on how tasks can be designed and implemented in a more principled way. Such standards can potentially infiltrate a focus on form into task completion and lead to interlanguage development while guaranteeing task authenticity and its communicative value.

4.4.1 A framework for task implementation

Skehan (1996a, 1998) distinguishes a scheme that contributes to task-based instruction in terms of three dimensions: (1) *code complexity* (language required to complete the task); (2) *cognitive complexity* (thinking skills required to complete the task); (3) *communicative stress* (conditions under which the task is to be completed) (Table 4. 2).

Table 4. 2 Skehan's (1996a, 1998) cognitive framework of task-based instruction

Code Complexity
Cognitive Complexity
Cognitive processing
Cognitive familiarity
Communicative Stress
Time pressure
Modality
Scale
Stakes
Control

Code complexity concerns the traditional areas of syntactic and lexical demands (linguistic complexity) a task places on learners. Cognitive complexity concerns the content of what is said and the clarity and structure of information to process, which links to Levelt's (1989) Conceptualisation stage in speech production. It is divided into two areas—*cognitive familiarity* and *cognitive processing*. Familiarity refers to the extent to which relevant aspects of background knowledge are available. It concerns whether the topic, genre and task are familiar (or predictable); if a type is less predictable, learners are less likely to employ the communicative strategies acquired earlier. With regards to processing, it relates to the amount of real-time processing required for task performance and completion. It concerns whether the amount and sufficiency of given information would increase task processing demand and cognitive complexity.

Lastly, communicative stress refers to performance conditions in terms of five potential sources of stress: *time pressure, modality, scale, stakes, and control*. It concerns a group of factors unrelated to linguistic code or meaning that play a role in communicative pressure. *Time pressure* is related to the speed and urgency of task completion on the part of learners. When the task is presented under time pressure, the processing and task completion would be more taxing. Despite this, learners can choose the speed at which tasks can be completed. If a task demands more complicated and timely responses, learners are less capable of allocating their attention to form. Modality is concerned with the speaking/writing and listening/reading contrast. Among these modes, it is posited that learners will be under more pressure in speaking than writing and listening leads to more pressure than reading (Ellis, 1987). As regards *scale*, it concerns the factors related to task-based instruction, such as the number of participants and relationships. Stakes concerns how important it is to complete the task in a correct manner. Few consequences of poor performance following the task led to low stakes, while the negative consequence led to high stakes. Lastly, *control* concerns the extent to which task participants can play a role in how the task can be performed. Task goals can be negotiated—if learners can reduce the speed of the input presented, they have higher control, which correspondingly leads to lower task difficulty.

Skehan (1996a) admits that language learning is not a simple, linear and cumulative process but involves cycles of analysis and synthesis, with which learners can develop their interlanguage system. The proposal of cognitive framework attempts to provide a system that enables the analysis, comparison, and sequencing of tasks within such a complex learning process, which facilitates the decisions on task design and implementation. The framework also aims to free up learners' spare attention and allows for newly acquired structures to be employed in real-time production through proper sequencing of tasks. The well-chosen tasks will lead to greater benefits in the outcome and an effective balance between fluency (meaning) and accuracy (form), and it also provides a chance for the previous structuring to be used (Foster & Skehan, 1999; Skehan, 1996b). Overall, the cognitive framework aims to synthesise how task variation is assumed to impact learning and performance. In the next section, we will introduce Skehan's predictions on how task factors make separate demands, leading to influences on L2 linguistic performance.

4.4.2 The Limited Attentional Capacity Model

The fundamental assumption underlying Skehan's (1996a, 1998) cognitive account for task implementation is that attentional resources and working memory capacity are limited. From an information processing perspective, real-time communication engages learners in a certain level of cognitive processing. At the same time, task characteristics and conditions will pose differential attentional and linguistic demands, thereby affecting learners' allocation of attention and language production in different aspects. As such, Skehan (2009, 1998) proposed the Limited Attentional Capacity Model (LAC), predicting that there is competition for attentional resources during language production, and learners are pushed to prioritise one performance area over the other. Skehan (1996b) and Skehan and Foster (1999) distinguish three areas of performance to characterize learners' production: complexity, accuracy, and fluency (CAF). Complexity relates to the restructuring, the stage and the elaboration of the underlying interlanguage system. It represents a learner's capacity to employ more advanced language, yet

such language may not be effectively controlled. The use of advanced language may also involve a greater willingness to take risks and employ language subsystems with less control. Accuracy concerns the learners' capacity to address any problem regarding the level of interlanguage complexity they have achieved. It represents the learner's capacity to avoid errors in performance with the possibility of revealing higher levels of control in the language and avoiding using challenging structures that cause errors. Fluency refers to the learner's capacity to call for the interlanguage system to emphasise meanings in real time, which possibly relies on a more lexicalized language.

Under the ideal circumstance, ongoing performance would be produced with fluency, error avoidance, and employment of any necessary but complex structures in order to attain precision during communication. Given that the attentional capacity is limited, learners are unlikely to attain all three areas of performance simultaneously and tend to show evidence of trade-off effects between complexity, accuracy, and fluency. Van Pattern (1990) points out that learners tend to prioritise meaning over form due to the difficulty they have in attending to both form and meaning. Similarly, Skehan (1996b) argues that form (represented by accuracy and complexity) and meaning (represented by fluency) enter into the competition for attentional resources — learners are predisposed to engage in real-time communication with the priority of fluency, compromising the restructuring and accuracy. Two aspects of form, complexity and accuracy, will also compete with each other by default. With limited attention to form, attention can be directed to using complex language (complexity) in contrast to conservative, less advanced, but more accurate language (Skehan, 1998). The Trade-off Hypothesis describes these natural tensions and predicts that all areas of performance being equal, allocating attention to one area would deplete the performance in other areas. Skehan and Foster (2001) posit that, with cognitively demanding tasks, learners would have less attention available for language production, leading to the prioritisation from form to meaning. The increase in fluency can lead either to greater complexity or greater accuracy, but not to both. This trade-off effect is viewed as the most salient in demanding tasks. As such, the actual performance may depend on a learner's decision on prioritisation and may be influenced by the task characteristics and conditions.

In addition to the prediction and one-time analyses of task performance, it is important to take into account the performance over time, which means its potential influence on long-term development. Given that task-based instruction attempts to balance the demands on the desired aspects of performance, from the pedagogical perspective, there is a need to establish a balance among the performance areas in terms of complexity, accuracy, and fluency but to avoid compromising the development in any dimensions. In addition, as Samuda and Bygate (2008) concluded:

> Consistent prioritisation of fluency might lead to over lexicalised performance, and performance in which fossilised language may be difficult to change; consistent prioritisation of accuracy might lead to (a) lack of fluency and (b) avoidance of engagement with "cutting edge" language; and consistent prioritisation of complexity might lead to a wide range of structures but a failure to move toward accuracy and control. (p. 175)

If the assumption is accepted, task-based research aims to determine how the balance of the performance areas (i.e., CAF) can be achieved and how the task characteristics and conditions would affect performance and play a role in achieving the balance between goals. Through the lenses of the LAC approach, task characteristics and conditions can be manipulated to induce attention to be allocated more or less to any of the performance areas. Empirical studies have adopted this approach as a basis for determining the impact of cognitive demands of a task on L2 learners' language production.

4.5 Robinson's Cognition Hypothesis

Another theoretical rationale accounting for the effect of task demands on linguistic output was proposed by Robinson (2001b, 2011a), which is known as Cognition Hypothesis. From the multiple-resources perspectives of processing, Robinson (1995) posits that learners can have the capacity to access multiple resource pools and attend to different modes of language processing simultaneously. This rationale is grounded in the cognitive-functional linguistics (e.g., Givón, 1985, 1995; Talmy, 2000), the conceptual and linguistic development in L1 (e.g., Cromer, 1991; Slobin, 1993), and SLA research (Doughty & Williams, 1998; Perdue, 1993;

Schmidt, 2001) (see Robinson, 2003). Central to the constructs of Cognition Hypothesis is the cognitive task complexity, the amount of cognitive processing required for task performance. From the pedagogic perspective, the hypothesis claims that the increased cognitive complexity of pedagogical tasks informs the task sequences in task-based syllabi (which mirror the sequence where children can meet the cognitive demands during L1 acquisition), and such a sequence would support L2 learners in better meeting the processing and performance demands of the real-world target task (Robinson, 2001a). Additionally, drawing from Noticing Hypothesis proposed by Schmidt (1990; 2001) that cognitive demands are closely linked to what learners notice, and noticing is crucial for L2 learning, Robinson predicts that the more cognitively demanding or complex tasks would require learners to pay more attention to input or output, and stimulate rule and instance learning, thereby allowing learners to incorporate input and achieve better performance.

To sum up, Cognition Hypothesis attempts to account for how task complexity may contribute to L2 production (performance) and acquisition (development) and how they interrelate. According to Robinson (2003, 2011a), the increased cognitive task demands would (a) trigger higher accuracy and complexity (but lower fluency) of L2 production when complexity is made along resource-directing dimensions, (b) progressively promote greater attention to, elaborative processing, and long-term retention of input, (c) promote greater efforts at conceptualisation and elicit more complex linguistic structures, and (d) encourage faster and more automatic access, and use of L2 with the simple to complex sequencing of tasks; (e) individual differences in cognitive and affective factors would play a more prominent role when the complexity increase. Notably, Robinson's predictions with regard to the greater accuracy and complexity in production are distinct from those proposed by Skehan, who argues that accuracy and complexity compete for resources. Drawing from the theories on attention and dual-task performance (Wickens, 1992, 2002), Robinson(2001a) claims that "where tasks are made increasingly complex simultaneously along dimensions which draw on different resource pools, and there should be no competition for attentional resource" (p. 307). Thus, under favourable conditions, higher accuracy and complexity of production can be achieved by manipulating the dimensions of task complexity. To better guide pedagogy and research into these claims,

Robinson (2001b) proposes a Triadic Componential Framework, which distinguishes between three dimensions of task demands applied to real-world task performance: t*ask complexity, task condition and task difficulty* (see Table 4.3). This framework provides a manageable approach to analyse complex language learning and establishes the relationship between complexity, learner's factors and task performance.

Table 4. 3 The Triadic Componential Framework for task classification — categories, criteria, analytic procedure, and design characteristics (from Robinson & Gilabert, 2007)

Task Complexity (Cognitive factors)	*Task Condition* (Interactive factors)	*Task Difficulty* (Learner factors
(Classification criteria: cognitive demands) (Classification procedure: information-theoretic analyses)	(Classification criteria: interactional demands) (Classification procedure: behavior-descriptive analyses)	(Classification criteria: ability requirements) (Classification procedure: ability assessment analyses)
(a) Resource-directing variables making cognitive/conceptual demands	*(a) Participation variables* making interactional demands	*(a) Ability variables* and task-relevant resource differentials
+/− here and now +/− few elements −/+ spatial reasoning −/+ causal reasoning −/+ intentional reasoning −/+ perspective-taking	+/− open solution +/− one-way flow +/− convergent solution +/− few participants +/− few contributions needed +/− negotiation not needed	h/l working memory h/l reasoning h/l task-switching h/l aptitude h/l field independence h/l mind/intention-reading
(b) Resource-dispersing variables making performative/procedural demands	*(b) Participant variables* making interactant demands	*(b) Affective variables* and task-relevant state-trait differentials
+/− planning time +/− single task +/− task structure +/− few steps +/− independency of steps +/− prior knowledge	+/− same proficiency +/− same gender +/− familiar +/− shared content knowledge +/− equal status and role +/− shared cultural knowledge	h/l opennes to experience h/l control of emotion h/l task motivation h/l processing anxiety h/l willingness to communicate h/l self-efficacy

4.5.1 Task complexity

The dimension of *task complexity* refers to the intrinsic cognitive demands on memory, attention, reasoning and other information processing placed by tasks. The term *complexity* is similar to "cognitive complexity" proposed in Skehan's (1998) framework. Specifically,

Robinson (2001b; Robinson & Gilabert, 2007) distinguishes between two directions of task complexity, i.e., the resource-directing dimension and the resource-dispersing dimension, which differentiate the resource allocation to specific aspects of L2 production. The resource-directing/dispersing distinction is also considered to have a differential impact on learner's performance and learning. Manipulating task complexity along the resource-directing dimension would allow learners to intentionally process and analyze the language to meet the conceptual or functional demands, thereby promoting the accuracy and complexity of production. However, manipulating task complexity along the resource-dispersing dimension would induce learners to draw on the current interlanguage system automatically rather than focus on the linguistic aspects, which would tax learners' attention and negatively affect task performance. It should be noted that Robinson's (2001b) list of task complexity factors is not exhaustive but open to potential new factors. Of special interest to this dissertation is [+/- content support] factor, which will be discussed in detail in a separate section.

Resource-directing variables

According to the construct of task complexity, resource-directing variables include the task characteristics based on the concepts that a task requires to express. The task demands include whether a task requires learners to (1) make reference to events in relative time [+/- here and now], (2) reference to few or many elements [+/- few elements], (3) reference to easily identifiable landmarks or location without support [-/+ spatial reasoning], (4) simple information transmission or reasoning about causal events and relationship [-/+causal reasoning], (5) simple information transmission or reasoning about people's intentions [-/+ intentional reasoning], (6) whether to take a first-person perspective on an event or multiple perspectives [-/+ perspective-taking] (Robinson & Gilabert, 2007). Manipulating cognitive complexity along these variables would engage learners in complex thinking and draw learners' attention to L2 forms with higher or lower efforts at conceptualization and means to express in L2, thereby leading to L2 development (Robinson, 2011a).

With regards to performance, tasks including more complex concepts will trigger more linguistically elaborated structures and diverse lexis since more elements involved need to be compared and distinguished. Following the arguments by Givon (1985, 1995), functional complexity tends to be associated with structural complexity, and formal communicative tasks with higher demands will induce a syntactic mode of production with certain contexts, which features greater use of morphology and syntactic structures, compared to the simple, pragmatic mode. In the case of [+/- here and now], the [- here and now] (or [+ there and then]) condition would enable the use of past tense morphology to refer to the past event, which would impose more attentional and memory demands on learners and facilitate the form-function mapping in the L2 (Robinson, 2001a). Likewise, the increased cognitive demand on reasoning is assumed to involve the greater use of cognitive state terms (e.g., think, expect, know) to refer to other minds and lead to greater complex syntax in L2 (Robinson & Gilabert, 2007). With more attention allocated to relevant L2 forms along this dimension, learners tend to produce more accurate production. However, given that tasks with complex demands require more conscious and explicit language processing, procedural performance like fluency would be affected (Robinson & Gilabert, 2007).

In terms of second language development, Robinson (2001b) claims that tasks with increased complexity along the resource-directing dimension are more likely to elicit the uptake and incorporation of forms as the learner's attention is directed to the target output, thereby facilitating language learning. During the task completion, learners may recognize the deficiency in their language (i.e., the lack of language available for coding the task-relevant conceptual/ communicative demands in terms of tense and aspectual distinctions); they will be more open to noticing and subsequently using feedback on their production that enables the provision of such L2 information for successful task performance (Robinson, 2021). Such selective attention and noticing could accelerate the grammatization in conceptual domains. In many cases, the grammatization of L2 in adulthood that marks conceptual distinctions in language resembles the trajectory in child L1 development; presenting L2 tasks in the order of increasing conceptual complexity is considered to recapitulate the order of the conceptual/linguistic development in L1, which may be beneficial to L2 learners (see Gilabert,

2007). In Robinson's view, increasing cognitive complexity would enable natural contexts for form-function mappings and promote interlanguage development.

Overall, Robinson posits that increasing cognitive demands along the resource-directing dimension would trigger greater conceptualization efforts and noticing toward L2 forms, which benefits the accuracy and linguistic complexity of production and the interlanguage system of L2 learners. It should be noted that increasing complexity along the resource-directing lines would lead to the parallel accuracy-complexity enhancement of production rather than a trade-off between the two. However, Robinson and Gilabert (2007) point out that cognitive task complexity along the resource-directing and resource-dispersing dimensions simultaneously would lead to synergetic effects on the learner's production, in which the advantages of increasing complexity along resource-directing lines are likely to be weakened or negated.

Resource-dispersing variables

Resource-dispersing variables concern those task characteristics that place performative and procedural demands on cognition but disperse learners' available attentional resources. The task demands include whether the tasks (1) give planning time (and so increasing resource availability) to learners or not [+/- planning time], (2) provide background knowledge or not [+/- prior knowledge], (3) require only one thing to be completed or multiple things simultaneously [+/- single task], (4) provide a clear structure to make decisions on which steps are needed to complete it or not [+/-task structure], and (5) require one or few steps are needed to complete it or many steps [+/-few steps], (6) and whether there is no necessary sequence where steps are followed or a strictly chained sequence where one step must be performed before another [+/-independency of steps] (Robinson & Gilabert, 2007). In other words, tasks will be considered to be complex if learners are given neither enough time for planning nor prior knowledge or required to perform multiple tasks. Increasing cognitive complexity along these lines would not direct learners' attention and efforts at conceptualization to specific language forms. Instead, it would deplete their cognitive resources over many linguistic and

non-linguistic features that need to be addressed simultaneously, thereby adversely affecting task performance (CAF). Importantly, Gilabert (2007) argues that attention may not be effectively allocated to linguistic aspects when tasks are made to be more complex along resource-dispersing lines. As a result, performing such complex tasks would promote the consolidation and fast access to current L2 knowledge rather than facilitating noticing to linguistic code and the interlinguistic development of new linguistic, conceptual-formal-functional mappings (Robinson, 2011a). Following the claim by Bialystok (1994), the increase in task demands along the resource-dispersing dimension would eventually lead to learners' greater control over and faster and more automatic L2 access and use.

The predictions made by Robinson regarding the impact of resource dispersion agree with Skehan's (1998) Limited Capacity Hypothesis, which suggests that increasing cognitive demands by manipulating planning time and support of task structure would deviate cognitive resources from linguistic aspects. Robinson (2003) argued that the loss of control over attention in resource-dispersing tasks leads to decreased complexity, accuracy and fluency of production, which might not be linked to the learners' limited capacity. The difference between the two hypotheses mainly lies in the prediction concerning the favourable effects of increasing complexity along resource-directing lines on accuracy and complexity. However, Skehan (2009, 1998; Skehan & Foster, 2001) does not distinguish between resource-directing and dispersing factors and, therefore, fails to take into account the benefits of cognitive variables that direct learners' attention to linguistic aspects.

4.5.2 Task condition

The second category in Robinson's framework is the *task condition*, which concerns the interactive demands of tasks. Robinson (2001a, 2001b) distinguished between participation factors (e.g., the direction of information flow, the communication goal) and participant factors (e.g., gender and proficiency level). To be specific, examples of participation factors include: (1) whether the solution to the task is open or closed [+/- open solution], (2) whether the

information is passed from one person to another or equally distributed [+/- one way], (3) whether the communication goal is convergent or divergent [+/- convergent solution]; (4) the number of participants [+/- few participants]. Participant factors related to participants' characteristics also include their familiarity with each other and with task roles, their relative status and the extent to which they shared content knowledge and cultural knowledge.

It is assumed that increasing the number of task conditions practised in the pedagogic version will induce more elaborate and consolidated scripts in real-world performance, allowing a successful transfer outside the classroom (Robinson, 2007). However, cognitive demands of tasks are sequenced and graded, in which tasks with lower cognitive demands are performed first and then those with gradually increased cognitive demands. In this case, task conditions should remain constant and be replicated each time the complex pedagogic version is performed to ensure the successful transfer of the same schemata and related performance scripts to real-world contexts (Robinson, 2011a).

4.5.3 Task difficulty

The third category in Robinson's framework is *task difficulty*, which refers to learners' perceptions of task demands that are expected to affect the performance and learning of the task. Robinson (2001a, 2011b) distinguished between (1) ability factors that learners bring to the task, such as working memory, reasoning, task-switching, aptitude, and (2) affective responses that may have a temporary influence on the task performance, such as openness to experience, control of emotion, motivation, anxiety. In general, task difficulty is expected to explain the between-learner variation in the success of L2 task performance, and their impact may be particularly noticeable when differentiating learners' performance on complex tasks (Robinson, 2011a). In other words, these variables help explain why two learners may perceive the same task as more or less difficult. For instance, learners with higher aptitude or working memory capacity are likely to perceive the same tasks as less difficult than others.

In Robinson's (2007) view, information on learner factors, as well as their relationship to successfully meeting the cognitive and interactive task demands, is essential to provide the optimal chance of success with learners and for the decisions about individualizing instruction made at a program level. However, there are few studies in this field. In general, ability factors may be strongly associated with the perceived *difficulty* of performing cognitively demanding tasks. On the other hand, the perceived *difficulty* of interactive tasks is more likely to be predicted by affective factors, which are described as high (h) or low (l). Robinson (1999) posits that learners' affective responses to tasks could not be predicted by the syllabus designer and may temporarily affect the capacity of cognitive resources. For instance, learners with lower output anxiety were found to produce more complex speech as predicted in response to cognitively complex task demands (Robinson, 2007). With increased task complexity, individual differences in both factors can be expected to differentiate between learners' performance and learning outcomes.

4.6 Application of task-based learning approach to L2 writing

TBLT research agenda has sought to offer an avenue for incorporating different dimensions, including language, social context, and individual learners' mental processes, that are crucial to learning (Van Den Branden et al., 2009). Importantly, the account of writing helps develop the construct of a task. Inspired by TBLT, the construct of task has offered a framework that allows for testing the theoretical tenets, hypotheses and informal assumptions on the language learning potential of L2 writing in a more rigorous way than that in previous writing research (Byrnes & Manchón, 2014b). A number of studies have applied the predictions of TBLT to L2 writing and explored the relationship between "task—language performance—language development" (Byrnes & Manchón, 2014b). Under Robinson's (2001b, 2007, 2011a) Cognition Hypothesis and Skehan's (1998, 2003) Limited Capacity Hypothesis, previous research has contributed to a better understanding of task characteristics and task performance.

The construct of the task has been used to frame the purported language learning potential of writing regarding larger and deeper language processing. As mentioned in the previous chapter,

several characteristics unique to writing that potentially contribute to language learning (Byrnes & Manchón, 2014a, 2014b; Manchón, 2014c; Williams, 2012): (i) the availability of time (even more in academic settings); (ii) the visibility and permanence of written texts; (iii) the problem-solving nature of writing practices. The off-line nature of writing and the permanence of written texts enable L2 learners to develop an ability to allocate cognitive resources to language problems (Williams, 2012), allowing more sustained attention to language and its form. Previous findings have provided empirical evidence that language outcome is more complex in writing tasks, notably in terms of lexical complexity and grammatical complexity (e.g., Ellis & Yuan, 2004; Kormos, 2014). Additionally, tasks performed in the written mode were found to induce the generation of more complex, informationally dense ideas and linguistically complex language (Vasylets et al., 2017).

4.7 Task complexity effects on L2 written production: Empirical research

There have been voices questioning the conceptualization of task complexity in its application to writing (Manchón, 2014c), given that the oral mode has historically dominated the research on task complexity (Carless, 2012). To date, one of the central concerns in task-based research has been exploring the effects of task complexity on L2 writing performance and learning. Given the unique characteristics of writing, the manipulation of cognitive task complexity is assumed to be more pronounced in the written mode (see Vasylets et al., 2017). In this research domain, numerous task characteristics or conditions have been employed to increase or lower the cognitive demands of tasks on the writers, and a wide variety of potential effects have also been examined. As an independent variable, task complexity has been manipulated along resource-directing and resource-dispersing dimensions within Robinson's (2003, 2011a) Triadic Componential Framework in previous studies. Increasing task complexity along the resource-directing dimension is assumed to place higher cognitive/ conceptual demands on learners, whereas increasing task complexity along the resource-dispersing dimension is expected to diffuse learners' attentional resources, which makes the task more difficult to complete. However, given the large number of variables investigated in existing empirical studies, L2 writing research regarding cognitive task complexity is mixed and inconclusive.

In order to compare L2 writing studies that investigated the effects of cognitive task complexity, Johnson (2017) synthesized and meta-analyzed the available studies on the overall effects of increased resource-directing and resource-dispersing features on L2 written performance. The meta-analysis includes 20 studies on task complexity, in which the most common manipulations of cognitive task complexity along the resource-directing dimension are +/- elements and +/- reasoning demands, and along the resource-dispersing dimension are in the form of the +/- planning time (or different planning conditions) and +/- topic familiarity. The results of Johnson (2017) found no clear support for the cognition hypothesis. However, the meta-analysis suggested that increased resource-directing complexity may lead to more complex, more accurate language as well as higher writing fluency. For the between-learners research, task complexity manipulated as +/- here and now was assumed to induce learners' increased attention to the formulation or monitoring systems from the perspective of L1 writing models. For the within-learners research, the meta-analysis revealed that manipulating +/- reasoning demands had significant effects on lexical complexity and accuracy. Such a task feature might cause a trade-off effect that benefits lexical complexity. On the other hand, the results of the meta-analysis on resource-dispersing complexity are consistent with the predictions of the Cognition Hypothesis. Decreasing task complexity through the provision of planning, as a resource-dispersing feature, was found to have positive effects on syntactic complexity and accuracy in between-learners research, while its effect on lexical complexity was more pronounced in within-learners research.

Within this line of research, one of the investigated factors of task complexity is the provision of content support in the writing task. In previous research, content support has been operationalized as different forms: providing a story plot with ordered pictures (Kormos, 2011; Yoon, 2021), providing pre-writing questions and ideas (Révész, Kourtali, & Mazgutova, 2017) and providing ideas and/or macro-structure (Ong, 2014; Ong & Zhang, 2010). According to Robinson's (2001b, 2005) Componential Framework, the provision of supporting ideas is regarded as the resource-dispersing feature of task complexity since it provides the background knowledge of the topic (+/- prior knowledge). On the other hand, the manipulation of ordered

pictures vs. unrelated pictures in the work by Kormos (2011) and Yoon (2021) has been categorized as the ± reasoning demands along the resource-directing line (Johnson, 2017). In this dissertation, task complexity is operationalized as the presence vs. absence of supporting ideas in the written task, which is similar to Ong and Zhang (2010) and Révész et al. (2017). Content support is expected to reduce the conceptual demands on the planning process and direct more resources to translation operations (Révész, Kourtali, et al., 2017). This dissertation aims to explore the effects of content support on L2 written production. The following section will review the empirical studies investigating the effects of content support on L2 writing performance. First of all, we will focus on several L2 writing studies that have investigated resource-dispersing task complexity and its effects on L2 written production. We will specifically review the empirical studies that manipulated content support as the resource-dispersing feature of task complexity, which is the most relevant to this dissertation. In addition, we will take into account two empirical studies that manipulated content support as +/- reasoning demands along the resource-directing line. The review will be limited to studies concerning individual writing.

4.7.1 The resource-dispersing manipulations of task complexity

There are three variables commonly employed to manipulate resource-dispersing task complexity in the studies associated with task planning: (a) provision of planning time [+/- planning time], (b) provision of background knowledge [+/- prior knowledge], (c) provision of task structure for task completion [+/-task structure] according to Robinson's (2011b; Robinson & Gilabert, 2007) taxonomy. Along the resource-dispersing dimension, tasks are taken to be complex if learners are given neither enough time for planning, prior knowledge, nor a clear structure to make decisions. In Robinson's (2011b) view, such tasks are expected to exploit the processing support for access to current interlanguage and practising with these increased demands would require learners to have more automatic L2 access and use. The provision of planning time has been the most common implementation of task complexity (e.g., Abrams & Byrd, 2016; Ellis & Yuan, 2004; Johnson, 2017; Meraji, 2011; Mohammadzadeh

Mohammadabadi et al., 2013; Ong & Zhang, 2010). Previous studies have manipulated the amount of planning time into pre-task planning, online planning, and control conditions. In the pre-task planning, participants were often given 10 minutes to plan their performance; in some cases, they were given 5 minutes (e.g., Mohammadzadeh Mohammadabadi et al., 2013) or 20 minutes (e.g., Ong & Zhang, 2010) for planning.

The other line of research manipulated the provision of different planning foci (e.g., language, content, structure) as one of the independent variables of resource-dispersing complexity. With regard to L1 writing (Kellogg, 1996), the written production is supported by learners' efforts in collecting and planning ideas, translating ideas into text and reviewing ideas and the already written texts. Kellogg (1990) investigated the effects of planning strategies in the form of outlining and clustering under three sub-planning conditions (topic given; topic and ideas given; topic, ideas, and organization given). In the topic given condition, the writing task instruction was provided only; in the topic and ideas given condition, 14 relevant ideas, which can be grouped into pros and cons ideas, were provided for possible use in the essay; in the topic, ideas, and organization given condition, the topic and ideas were provided in a suggested organizational scheme which divides the essay into *introduction, arguments,* and *conclusion.*
The results showed that outlining significantly increased the overall text quality, with the highest quality in the topic given condition. The benefit to text quality was less strong in the topic and ideas given condition and topic, ideas, and organisation given condition. Kellogg's (1990) findings run counter to the prediction of the cognitive demand of a task on task performance. Still, further empirical evidence is needed to determine whether the provision of writing support would exert the same effect on L2 writing quality as it does on the L1 writing.

4.7.2 The effect of content support on L2 written production

Of particular interest to this study is the effects of the provision vs. no provision of content support on L2 writing. Ong and Zhang (2010) and Révész et al. (2017) adopted the task manipulation similar to Kellogg (1990) and examined the effects of writing support on L2

argumentative writing. Ong and Zhang (2010) classified the manipulation of supporting ideas and organisation as the +/- prior knowledge feature under the resource-dispersing dimension. To date, there has been a growing interest in the role of content support in L2 task-based writing. Content support has also been provided in the form of pre-viewing and reading activities (Abrams, 2019) and example storylines for narrative writing (Yoon, 2021). Accordingly, content support can be constructed as the means to provide writers with the relevant ideas or information that are expected to activate their prior knowledge and lower the cognitive/conceptual demands on writing processes. However, Kormos (2011) pointed out that the content provision condition can be complex, as specifying the content in written texts entails using complex lexical and syntactic structures, which makes avoidance difficult. Following Révész et al.'s (2017) study, we acknowledge that the generation of text content plays a crucial role in planning processes and exploring the effects of content support will contribute to testing the predictions of cognitive models of writing and task complexity to L2 written tasks. In the next section, we will review the empirical studies that have explored the effects of content support on L2 writing performance (see Table 4.4 for the summary of the relevant studies).

Table 4. 4 Empirical studies that have explored the effects of content support on L2 written production

Study	Participants				Task	Measures	Findings
	N	Age	L1	L2			
Ong and Zhang (2010)	108	16 to 19	Chinese	English (low, average, high)	Argumentative essay	Lexical complexity: 1) Word types squared divided by the total number of words Fluency I: 1) mean number of words produced per minute of transcription Fluency II: 1) mean number of words produced per minute out of the total time on task)	Higher lexical complexity (diversity) in the task with content support
Ong and Zhang (2013)	108	16 to 19	Chinese	English (low, average, high)	Argumentative essay	Writing quality rating scheme: content, organization, vocabulary, language use, and mechanics	Higher overall quality in the tasks with content support and content and organization support
Révész, Kourtali and Mazgutova (2017)	73	Mean= 20.09	Chinese, other Asian, European, African	English (advanced level)	Argumentative essay	Lexical Complexity: 1) K1 words, K2 words, academic words, off-list words 2) MTLD 3) D value 4) LSA Overall syntactic complexity: 1) Words/T-unit Subordination complexity: 1) Clause/T-unit Phrasal complexity: 1) Modifiers per NP Syntactic sophistication: 1) Structural similarity Fluency: 1) Minutes/word 2) Minutes/character	Higher lexical sophistication and overall complexity in the task with content support

Jung (2017)	44	Mean= 23.37	Korean	English (advanced level)	Argumentative essay	See Révész, Kourtali and Mazgutova (2017)	Higher lexical sophistication, overall complexity, phrasal complexity and higher fluency in the task with content support
Jung (2020)	34	Undergraduate	Korean	English (high-intermediate to low-advanced level)	Integrated reading writing, argumentative essay	Lexical Complexity and syntactic complexity: See Révész, Kourtali and Mazgutova (2017) Fluency: 1) Minutes/word 2) Minutes/character 3) Word/minute 4) Character/minute General quality	Higher lexical sophistication and phrasal complexity in the task with content support
Yoon (2021)	76	18-27 (Mean= 19)	Chinese, Arabic, Korean, Japanese, Portuguese, Malay, Thai, Turkish, and French	English (high-intermediate level)	Narrative and argumentative writing	Lexical complexity: 1) Vocd-D 2) Word frequency (WF) Length of unit: 1) Mean length of sentence (MLS) 2) Mean length of clause (MLC) 3) Clauses per T-unit (C/T) 4) Nominal clause density (NOMC) Subordination: 1) Adverbial clause density (ADVC) 2) Adjectival clause density (ADJC) 3) Coordinate phrases per clause (CP/C) Phrasal complexity: 1) Coordinate phrases per clause (CP/C) 2) Complex nominals per clause (CN/C) 3) Left embeddedness (LEFT) 4) Modifiers per noun phrase (Modifiers/NP)	Higher clausal subordination but lower lexical sophistication in the task with content support. Lower noun phrase complexity in the narrative with content support, but higher in argumentative with content support.

Ong and Zhang (2010) sought to examine the effects of writing support on lexical complexity and fluency of L2 written production as part of a more extensive study. This complex study involved 108 EFL Chinese EFL tertiary students (M_{age} = 18) who performed an argumentative essay under one of the three conditions (topic given; topic and ideas given; topic, ideas, and organization given). Ong and Zhang hypothesized that the task would be the least complex when the most writing support was provided, while it would be incrementally more complex when writing support was removed. Lexical complexity was measured by word types squared divided by the total number of words, and fluency was calculated by two metrics: Fluency I (mean number of words produced per minute of transcription) and Fluency II (mean number of words produced per minute out of the total time on task). The results revealed that the provision of writing support exerted a significantly positive effect on lexical complexity but no impact on the fluency measured by writing time. It is suggested that the level of topic knowledge possessed by writers did not significantly result in differences in writing fluency. In the subsequent study, Ong and Zhang (2013) further looked into how the planning time conditions, subplanning conditions and revising conditions affect the text quality of Chinese EFL learners' argumentative writing. Their investigation on subplanning conditions is highly relevant to our study, in which learners performed an argumentative essay under one of the three conditions — task-given, task-content-given, and task-content-organization-given. The overall quality of learners' essays was rated by an analytical rating scheme in terms of content, organization, vocabulary, language use, and mechanics. The results revealed that the availability of writing support significantly produced higher-quality texts as the cognitive load of the task was successfully reduced under these conditions. In addition, the authors pointed out that Chinese EFL learners benefited from the content and organizational support regardless of whether extra planning time was given.

The study by Révész et al. (2017) took into account various indices for assessing the linguistic complexity of the products, which enables researchers to identify the subtle effects of content support on L2 writing performance. A total of 73 EFL university learners at the advanced level were divided into two groups: one group was given content support (the simple task version), while the other group was given a topic (the complex task version). Both groups of participants

performed an argumentative essay on the computer, and their writing behaviours were captured by a keystroke logging software. The written texts produced by participants were assessed for lexical sophistication, lexical diversity, and syntactic complexity; the keystroke log files were assessed for speed fluency. The results showed that the provision of content support had its main effects on lexical sophistication (measured by the use of low-frequency words and high-frequency words) and syntactic complexity (measured by t-unit length). However, the two types of tasks did not differ in writing fluency.

The study by Jung (2017), who replicated Révész et al.'s (2017) investigation, examined the effects of content support on the linguistic complexity of L2 writing. Jung's study involved 44 Korean EFL university learners at the advanced level, divided into two groups. Participants performed in argumentative writing with or without content support, which contained sub-topics and examples in complete sentences. The results confirmed that the lack of content support led to decreased lexical complexity and syntactic complexity. In contrast to Révész et al. (2017), Jung (2017) found that content support promoted writing fluency, suggesting that the more concrete and detailed information involved in content support might better reduce the cognitive demand in the planning stage.

The exploration of the effects of content support has expanded to the research with different task types. Jung (2020) explored the effects of content support in an integrated reading-writing task on L2 writing performance. Thirty-four Korean EFL university learners at the high-intermediate to low-advanced level were involved in the study. They were required to read an opinion essay and write an argumentative essay that refutes the view. Participants were randomly divided into two conditions: participants under the simple condition were provided content support that included ideas for supporting and refuting a statement, while those under the complex were asked to write independently. Following Révész et al. (2017) and Jung (2017), the study assessed participants' written texts with a wide range of indices, including lexical diversity, syntactic complexity, and general quality (measured by an analytic scoring rubric); keystroke logs were analysed for writing fluency. In line with previous studies, content support was found to elicit increased lexical complexity (regarding the use of 2K words) and syntactic

complexity (regarding the phrasal complexity). However, other measures of linguistic complexity, the general quality of the written products and writing fluency were comparable between the two conditions. It is suggested that the lack of content support led to the higher cognitive load placed on the participants who may rely more on the task input (i.e., reading passage) in order to produce useful ideas.

One of the most relevant studies to our research is Yoon (2021), which examined the effects of content support on linguistic complexity across two genres, narrative and argumentative writing, as well as learners' perceptions. Seventy-six high-intermediate learners of English as second language (ESL), who were preparing for the university-level academic courses, were recruited in the study and divided into four groups. Each group performed four essays (narrative and argumentative writing in both the simple and complex versions) with the order of the topics counterbalanced. In the complex narrative prompts, participants were asked to narrate a personal story about foreign language learning and use, while the simple version provided example storylines as the content support. The complex version of argumentative prompts required participants to make logical arguments on a similar topic, while the simple version listed supporting reasons as the content support. The data were collected at the one-week interval, and participants' essays were analyzed for various measures of lexical and syntactic complexity. Results of learners' perception of the writing tasks revealed that two genres were perceived as similar cognitive demands. On the other hand, tasks provided with content support were perceived to be less cognitively demanding. However, content support seems to have a limited influence on the linguistic complexity of the written production: content support promoted the writers' use of clausal subordination but reduced the lexical sophistication. Additionally, content support in narrative writing resulted in decreased noun phrase complexity, while content support in argumentative writing elicited a significant increase (with a small effect size). Yoon (2021) argued that linguistic complexity might not strongly relate to cognitive task complexity, and the use of syntactic structures in writing may depend on genre-specific communicative requirements.

4.7.3 Critical analysis of the effects of content support on L2 written production

The above-reviewed studies employed a relatively consistent construct of content support, which was operationalized as the provision of additional information on the topic, i.e., example storyline for narrative or supporting or refuting ideas for argumentative. These approaches to providing content support operate along the resource-dispersing dimension and are assumed to reduce the processing demands at the conceptualization level. Two studies have explored the role of content support in different task types—argumentative vs. narrative writing (Yoon, 2021) and integrated reading-writing tasks (Jung, 2020), while other studies mainly focused on argumentative writing. There was not much variation in the participants: most of the studies involved participants who were EFL university learners at a high-intermediate to advanced level, while the study by Ong and Zhang (2010) was the only study that contained mixed-level EFL learners. There were some variations in terms of the procedure. Three of these studies (Révész et al., 2017; Jung, 2017; Jung, 2020) required learners to complete the writing task either in simple or complex condition under the time limit and word limit. However, Ong and Zhang (2010) manipulated task complexity in terms of multiple factors and the degree of complexity, in which participants were asked to complete writing tasks under one of the three conditions (topic given; topic and ideas given; topic, ideas, and organization given). Also, the study by Yoon (2021) required participants to write four essays, including both simple and complex tasks, over a longer time frame.

The majority of the studies employed diverse production measures in terms of lexical and syntactic complexity and fluency. However, Ong and Zhang (2010) had a narrower focus, using only three metrics for lexical complexity and fluency. According to Révész et al. (2017), content support is anticipated to lower cognitive demands on the planning processes and direct writers' attentional resources to translation operations (e.g., lexical retrieval and grammatical encoding), thereby resulting in a parallel increase in lexical and syntactic complexity. Regarding the effects of content support on L2 written production, their findings indicated that content support exerted its major impact on lexical sophistication. In other words, participants with content

support were found to use more sophisticated vocabulary in their writing. Jung (2017) reported that the absence of content forced writers to rely more on the more frequent words and resulted in decreased lexical complexity. However, Yoon (2021) found that content support might be detrimental to lexical sophistication. In terms of the effects on syntactic complexity, these studies have improved overall syntactic complexity and phrasal complexity of production. Lastly, only the study by Jung (2017) found an improvement in writing fluency when writers were given content support, while no task complexity effect was detected in other studies. As suggested by Révész et al. (2017), variations in the results of writing fluency can be attributed to the learners' linguistic proficiency rather than task differences.

The overall findings illustrate an interaction between task complexity (operationalized as +/- content support) and linguistic complexity. However, the exploration of the role of content support was less likely to address the accuracy of L2 performance. Considering the limited number of available studies on content support, the inconsistency in the obtained results and the variance in participants' language proficiency, more research is still needed to elucidate the role of content support in L2 writing performance.

4.7.4 Conceptualization of content support as a resource-directing task complexity factor

Within the line of task complexity research, a few of studies conceptualized content support as a resource-directing factor. In particular, two studies (Kormos, 2011; Shajeri & Izadpanah, 2016) that employed picture-based tasks to manipulate cognitive complexity are highly relevant to our research purposes. According to Johnson's (2017) research synthesis and meta-analysis, the conceptualization-level manipulations of these two studies (unrelated pictures vs. coherent pictures) were classified as +/- reasoning demands. As mentioned previously, Robinson (2001b, 2011a; Robinson & Gilabert, 2007) distinguished three kinds of reasoning demands. (1) Spatial reasoning requires learners to make a reference to easily identifiable landmarks or locations without support. For example, Gilabert (2007) manipulated spatial reasoning through a "map task", in which physical location serves as the task component. (2) Intentional reasoning requires learners to explain behaviour referring to the intentions, motives, and mental states of

a character in a story. (3) Causal reasoning is related to straightforward information transmission or explaining why an event occurred according to people's intentions, beliefs, relationships, and cause-and-effect associations. In Kormos's (2011) study, writing tasks with random, unrelated pictures are considered more cognitively complex by placing high reasoning demands on learners to create a coherent story. According to the above definitions and examples, manipulating the reasoning demands in written tasks often features the number and intensity of mental operations that a task requires from learners. Accordingly, increasing the intensity of mental operations along the reasoning demand is assumed to lead to greater syntactic and lexical complexity and probably greater accuracy of L2 production at the expense of fluency (see Rahimi, 2018; Robinson et al., 2013). In what follows, we will review the two empirical studies that have explored the effects of content support with the manipulations of reasoning demands (see Table 4.5 for the summary of the studies).

Table 4. 5 Empirical studies that have explored the content support effects with the manipulations of reasoning demands

Study	Participants				Task	Measures	Findings
	N	Age	L1	L2			
Kormos (2011)	44	17-18	Hungarian	English (intermediate level)	Narrative of a picture sequence	Lexical variety: (1) D-value Lexical complexity: 1) Lexical range 2) Log. frequency of content words 3) Concreteness Syntactic complexity: 1) Clause length 2) Ratio of subordinate clauses 3) Words before main verbs 4) Modifiers per NP Accuracy: 1) Ratio of error-free clauses	Higher lexical sophistication in the content-given task
Shajeri and Izadpanah (2016)	44	16-25	Iranian	English (upper-intermediate level)	Narrative of a picture sequence	Lexical complexity: 1) Word types per square root of two times the words Structural complexity: 1) Average number of clauses per T-unit Accuracy: 1) The proportion of error-free T-units to T-units Fluency: Average number of words per t-unit	Higher lexical and syntactic complexity, higher fluency but lower accuracy in content-absent task

Kormos (2011) looked into the effects of conceptual demands, operationalized as learners' access to content, on the linguistic complexity and discourse structures of writing performance. Her study involved 44 intermediate EFL learners at a Hungarian secondary school. Participants were asked to complete one written narrative task on a comic strip consisting of six ordered pictures and then the other with random, unrelated pictures. Kormos (2011) speculated that learners' access to a given plot of the pictures would ease their cognitive load in the planning stage, while the absence of a story plot would make the task more complex as writers need to conceptualize their message. On the other hand, the content prescribed by the task was expected to pose a greater cognitive load on FL writers in the transcribing stage. The written performance of the participants was assessed for lexical variety, lexical complexity, syntactic complexity, accuracy, cohesion and frequency of connectives. Results showed that narrating the given content exerted its major effect on lexical sophistication but no impact on syntactic complexity. In other words, the predetermined content provided in the task was found to elicit more abstract words in the written products. Kormos (2011) argued that the two types of complexity demand—free to plan vs. given content—might neutralize each other's impact. The fact that L2 writers had higher processing pressure on the planning process in the narrative tasks would not result in the avoidance of using more sophisticated words. The results suggest that allowing learners to generate their own content can be more motivating and engaging.

Similar tasks were employed in the study by Shajeri and Izadpanah (2016). Participants were 48 Iranian EFL learners at the upper-intermediate level, divided into two groups: simple task group and complex task group. The simple task group were asked to narrate a story in the ordered sequence, while the complex task group were asked to order the picture sequence before writing. The written compositions were analysed in terms of lexical and structural complexity, accuracy, and fluency. This study showed a different pattern of results from Kormos (2011). The increased task complexity exerted significant positive effects on lexical and structural complexity, as well as fluency, while it was detrimental to the measure of accuracy. Shajeri and Izadpanah (2016) argued that with the limited cognitive resources, the increased task complexity pushed learners to draw their attention toward content, meaning, and fluency at the expense of accuracy of their language. They suggested that participants given the complex task

were engaged in deeper semantic processing, which leads to the complexification of the written output.

These two studies explored the reasoning demands of writing tasks by manipulating the picture sequence, in which the task with unrelated pictures was assumed to increase the intensity of mental operations by learners. These two studies were concerned with the written production of EFL learners at the intermediate level, whose backgrounds are similar to the participants in our study. It must be taken into account that these two studies employed different production measures. Kormos (2011) focused on the effects of task complexity on linguistic complexity and accuracy, while Shajeri and Izadpanah (2016) employed only one metric for lexical complexity, syntactic complexity, accuracy and fluency. These studies provided empirical evidence that the availability of content as the manipulation of reasoning demands yields mixed effects on the linguistic complexity. It is also noteworthy that among those studies that defined content support as the resource-dispersing variable, the availability of content support produced greater linguistic complexity. The inconclusiveness of the results from Kormos (2011) and Shajeri and Izadpanah (2016) can be explained by their differences in the metrics of written output and participants' proficiency level (intermediate level vs. upper-intermediate level). There is a possibility that the manipulation of task complexity along the resource-directing dimension did not align with participants' proficiency. Given that unrelated pictures require higher processing demands on the conceptualization level, L2 writers may have to prioritize one dimension of the performance when the cognitive demand exceeds a certain level. In Kormos's (2011) study, regardless of whether writers had to invent the storyline, both narration tasks with pictures imposed high processing demands on the FL writers in a different way. On the other hand, Shajeri and Izadpanah (2016) suggested that the requirement of ordering the pictures in the complex task allowed writers to overcome the cognitive load and direct their attention to the complexification of the written output. To sum up, the review of these two studies suggests that both task conditions (i.e., inventing the story plot vs. encoding the given content) may impose different cognitive demands on L2 writers, and their writing performance can be influenced by the proficiency level.

4.8 Task complexity effects on L2 writing processes

The second aim of this dissertation is to explore further whether and how the provision of content support would influence the underlying cognitive processes in L2 writing. A number of studies (see, for example, Manchón & de Larios, 2007; Roca de Larios et al., 2006) have explored different factors that influence the writer's effort in the planning and formulation processes. In addition, it is argued in some studies that task environment and L2 writers' perceptions of the task may also affect their deployment of cognitive processes (Roca de Larios et al., 2008; van den Bergh & Rijlaarsdam, 2007). However, previous research on task complexity and L2 writing has been mainly concerned with the writing product, where we can only infer a writer's attentional focus from the differences in the writing performance measures.

To date, a few studies have investigated the online writing behaviours and the underlying cognitive processes of L2 writers (Jung, 2017; Michel et al., 2020; Ong, 2014; Révész, Kourtali, et al., 2017). In terms of research methodology, keystroke logging (coupled with verbal protocols) has been employed increasingly to investigate the cognitive demands and processes of writing (see Barkaoui, 2019; Van Waes & Leijten, 2015). Keystroke logging registers both high-order and low-order processes. In particular, high-order processes (e.g., planning, revision) have to be inferred from the keystroke data. When tasks are thought to be more cognitively demanding, a higher level of attentional control will be required. In recent years, a few keystroke studies have explored the link between keystroke features and cognitive demands of the task in order to infer the corresponding cognitive writing processes. Conijn et al. (2019) investigated the differences of keystroke features in L1 writing across different task types. They found that temporal keystroke features related to words and sentences were affected by the tasks that require higher cognitive demands. Their results also suggested that features associated with tasks as a whole (e.g., amount of revision, writing time, and time between words) could be used to determine the cognitive load of the tasks. In L2 writing research, Zarrabi et al. (2022) investigated the relationship between pausing features and cognitive writing processes, as well as the effects of pausing behaviours on writing performance. They employed four task types with diverse degrees of task complexity to explore the pausing behaviours of L2 writers. Their

results suggested that the temporal indicators of pausing, as the signs of writers' cognitive efforts, are moderated by task complexity. In more complex tasks, short pauses at the early stage of writing account for the planning process, while longer pauses at later stages reflect the need for cognition and reasoning, all contributing to successful writing performance.

Taking into account the limitation in cognitive resources, we intend to investigate which cognitive processes L2 writers would prioritise and which they would trade off when the content support was provided or absent. This dissertation attempts to provide empirical evidence on the relationship between writing processes and writing performance. In what follows, we will review several studies to provide predictions for our study.

Following Ong and Zhang (2013), Ong (2014) utilized a retrospective questionnaire to examine the effects of the amount of planning time and provision of ideas and macro-structure on the frequency of metacognitive processes. A total of 106 Chinese pre-university students were involved in her study and were required to write an argumentative essay under the planning time conditions and one of the three task conditions (topic given; topic and ideas given; topic, ideas, and organization given). Immediately after the writing session, participants were required to report their metacognitive processes while composing (i.e., generation of new ideas, organization of new ideas, elaboration of new ideas, thinking about the essay and the language aspects of the task). Ong hypothesized that with the writing support, L2 writers might allocate less attentional resources to the planning processes but more resources to the structure organization and language aspects of text production. Results revealed that L2 writers who wrote without content and macro-structure support dedicated more attentional resources to generation and organization of new ideas during planning and elaboration and organization of new ideas during writing, compared with their counterparts who received writing support. It suggests that the topic-given condition would increase the cognitive demands placed on the L2 writers and require their constant effort on generating, organizing and elaborating new ideas for the writing task. On the other hand, the provision of ideas and macro-structure was thought to lower the cognitive demand placed on the writers, thereby producing a higher text quality.

In addition to investigating the effect of task complexity on linguistic complexity, Révész et al.

(2017) adopted keystroke logging and stimulated recall to examine how content support influences the writing behaviours of L2 writers and related cognitive processes. Seventy-three advanced L2 writers participated in this study and performed the argumentative writing task with or without content support. The keystroke logging data revealed that the provision of content support resulted in less pausing and revising behaviours, thereby allowing for increased text sophistication. Results from the stimulated recall suggested that the absence of content support put a higher processing burden on planning processes, leading to fewer attentional resources allocated to translation and monitoring. Participants provided with content support were found to engage more in translation, followed by the planning operations. In contrast, the absence of content support led to more comments in the planning process than translation. However, regardless of the provision or absence of content support, the distribution of sub-processes associated with planning (e.g., planning content) and translation (e.g., lexical retrieval and syntactic encoding) was similar. Most planning comments reported by participants were concerned with content planning, while most formulation-related comments referred to linguistic aspects.

The study by Michel et al. (2020) explored the cognitive processes of L2 writing across independent and integrated tasks by utilizing a mixed-methods approach, including eye-movement captures, keystroke logging and stimulated recall. A total of 60 L2 writers were recruited and completed two independent tasks and two integrated tasks. In their study, independent tasks required L2 writers to write an argumentative essay by relying on their own resources. In contrast, L2 writers needed to incorporate the substantive content provided in the source material in the integrated task. The stimulated recall comments were transcribed and grouped into four categories: planning, translation, monitoring, and resource use. Results showed participants' writing behaviours and cognitive processes were comparable across the two task types, apart from the resource use in integrated tasks. From the stimulated recall data, participants mentioned the translation process the most and monitoring was the least in both task types. As for planning, the independent task produced more comments related to planning than the integrated task. With the provision of content resources, participants were found to describe more the use of content in the initial stage, which decreased from the beginning to the

later stages of writing; in the middle stages, they dedicated more to their text construction. On the other hand, the independent tasks resulted in more comments on planning, which decreased slightly over time.

Overall, previous studies primarily employed stimulated recall and retrospective questionnaires to elicit the cognitive processes of L2 writers, and some combined the use of eye-tracking and keystroke logging to provide a more comprehensive insight into the processes that take place during text production in L2. Although the above-reviewed studies adopted different process measures, they shed light on the cognitive efforts involved in the writing tasks and contributed to the methodology for investigating the writing behaviours and processes of L2 writers. Previous findings suggest that task complexity would influence L2 writers' deployment of the processes of planning and translation. Compared to the simple condition when additional resources were available, the complex condition placed higher processing demands on L2 writers in the planning process. As for translation, the availability of content support showed a different pattern in the distribution of translation operations. In addition, L2 writers reported a similar distribution of the sub-operations of planning and translation regardless of whether the supporting content was available, in which they were more aware of content planning during the planning process and focused more on linguistic encoding during formulation. Drawing from Ong's (2014) and Révész et al.'s (2017) results, we believe the planning process would be more cognitively demanding for L2 writers who wrote without content support. The presence of content, on the other hand, likely allowed writers to focus more on translation rather than on the operation of planning. In order to further explore the role of content support in L2 writers' deployment of cognitive writing processes, future studies need to examine the within-learners changes and involve more writing tasks.

4.9 Chapter Summary

This chapter first reviews the theoretical underpinnings of TBLT and the main tenets of Skehan's (1998, 2009) Limited Attentional Capacity Model and Robinson's (2001a, 2011a) Cognition Hypothesis. They provide competing accounts of how task characteristics may affect

L2 performance and learning. In this chapter, we focus on Robinson's (2007; Robinson & Gilabert, 2007) triadic componential framework for task classification and the discussion on the task complexity effects on L2 written production. Informed by TBLT, the construct of task has offered a framework for examining the theoretical principles and assumptions regarding the language learning potential in L2 writing and exploring how it may contribute to L2 performance, development, and interconnections between them.

This dissertation aims to explore the impact of task complexity (operationalized as the provision vs. no provision of content support) on the L2 written production and writing process. This chapter critically reviews the empirical work relevant to our purposes. Previous studies conceptualized content support as a resource-dispersing variable (+/- prior knowledge) or a resource-directing variable (+/- reasoning demands). We started with reviewing studies that have explored the effects of content support, as the resource-dispersing feature of task complexity, on L2 writing performance. The results suggest that content support, which is expected to reduce conceptual demands on writing processes, may promote lexical complexity, syntactic complexity and fluency in written production. Yet, these studies did not find parallel increases in accuracy and complexity of the output under the complex condition when content support was absent. Next, we reviewed two empirical studies which examined the effects of content support, conceptualized as a resource-directing task feature. The results of the studies showed that the provision vs. no provision of content might put independent cognitive demands on L2 writers in different ways. In addition to coping with the demands of text production, L2 writers need to manage the cognitive demands of writing systems and processes, which entail varied levels of attention to formulation, execution, and monitoring.

To address the second aim of the dissertation, we also reviewed three empirical studies that investigated the effects of task complexity on the cognitive processes of L2 writing. These studies mainly employed stimulated recall and retrospective questionnaires to elicit data on L2 writing processes. The results suggest that the absence of content support in the writing tasks would place greater cognitive demands on L2 writers in the planning process, which required them to constantly engage in idea generation, elaboration, and organization. On the other hand,

the provision of content support was thought to reduce the conceptual demand in planning and allow L2 writers to focus on the use of provided content in the initial stage and text construction in the later stages. However, there is still a lack of empirical evidence on the effect of content support on the nature and deployment of L2 writing processes. No clear conclusion can be drawn in this regard. In addition, the critical review of previous research suggests that the role that content support plays in L2 written production and learning can be attributed to learners' proficiency level. There is a need for further research to include L2 learners at different language proficiency levels. Lastly, content support is assumed to be involved in the planning process and influence the conceptualization stage of language production (Robinson, 2011a). Further research is also needed to explore the impact of content support on the production of idea units (see Vasylets, 2017).

CHAPTER 5 AIMS AND RESEARCH QUESTIONS

This chapter aims to identify the research questions and hypotheses that framed our investigation. We first describe the background and purpose of the current study based on the literature review on L2 writing in the previous chapters. Following this, we formulate specific hypotheses for each research question informed by the writing models, the theoretical underpinnings of TBLT and the available empirical evidence on task-based writing.

5.1 The aims of the study

The study of L2 writing as a site for language learning has attempted to elucidate how writing tasks can facilitate L2 writers' learning to write and language learning. Within this line of research, one of the central concerns in recent task-based research has been the exploration of the effects of task manipulations on the language use of L2 writers. Informed by Kellogg's (1996) cognitive model of writing, the lack of second/foreign language knowledge and limited working memory resources can place significant cognitive demands on writers during the writing process, who may need to sacrifice attention during planning and monitoring. In this regard, previous empirical studies have examined the effects of writing assistance (i.e., topic given; topic and ideas given) on the cognitive writing processes, particularly idea generation, and text quality. However, uncertainty surrounds whether and how the supporting ideas or content can reduce the cognitive load on L2 writers. We seek to identify which cognitive processes L2 writers prioritise and which receive less attention when content support is available or absent. The provision of content support in written tasks is one of the researched features to manipulate task complexity. Based on the Cognition Hypothesis (Robinson, 2001b, 2011a), the manipulation of task complexity along the resource-directing and resource-dispersing dimensions will have different effects on the cognitive demands imposed on L2 writers and language performance. This study aims to explore whether content support is an effective task design feature that helps improve writing performance and provides favourable conditions for language learning.

Regarding the research design, we adopt a mixed methods approach to better understand L2 learners' written products and writing processes. Following the research design by Révész et al. (2017), we provide content support in the form of questions and supporting ideas, which is expected to reduce the conceptual demands to generate content of the composition. This research answers the call for longitudinal investigations of task complexity and exploring the potential role of content support in learners' underlying cognitive processes and writing performance over time. We seek to account for the interaction between writing processes and writing performance through the provision or absence of content support. In what follows, we will present the research questions and hypotheses that frame our study.

5.2 Research questions and hypotheses

The current research aims to address the following questions:

> *Research Question 1: What are the effects of the presence or absence of content support on L2 writing production, operationalised as complexity, accuracy and fluency?*

Hypothesis 1:

Regarding lexical complexity, we predicted higher values when content support was provided. This hypothesis was based on the previous findings that content support produced increased lexical complexity (Jung, 2017, 2020; Kormos, 2011; Ong & Zhang, 2010; Révész, Kourtali, et al., 2017). On the other hand, previous studies have shown mixed results on syntactic complexity, among which higher overall syntactic complexity was found in Révész et al. (2017), Jung (2017) and Yoon(2021). Given that reducing task complexity along the resource-dispersing dimension has also been found to have a positive effect on the syntactic complexity in the existing studies (Johnson, 2017), we predicted higher syntactic complexity when content support was provided in writing tasks. To the best of our knowledge, few empirical studies are available on task conditions and propositional complexity; thus, we proposed a non-directional

hypothesis for the number of idea units and the length of ideas.

As for accuracy, while Kellogg's (1996) model of writing allows for the prediction that content support would produce more revisions, existing studies have offered little evidence for the effect of content support on accuracy. Based on Johnson's (2017) research synthesis that found a small positive effect of resource-dispersing features of task complexity on the accuracy of the L2 written production, we predicted higher accuracy in the condition when content support was available. In terms of fluency, both Robinson (2003, 2011a) and Skehan (1998) proposed that increasing task complexity along the resource-dispersing dimension would reduce the fluency of learners' language production because of the depletion of their attentional resources. When reducing the cognitive demands of tasks with respect to the resource-dispersing dimension, previous empirical studies revealed that content support did not have an impact on writing fluency (Ong & Zhang, 2010 & Révész et al., 2017; Jung, 2020). Following this, a null hypothesis was advanced for the differences between the two task conditions. Lastly, we hypothesised that content support produces higher overall text quality based on the theoretical models of writing (Kellogg, 1996) and empirical evidence on idea generation, text quality and writing (Crossley et al., 2016; Ong & Zhang, 2013). Given the lack of empirical evidence on the effects of providing content support on L2 written production over time, a non-directional hypothesis was advanced concerning the within-group changes in the performance measures. We hypothesized that the provision or absence of content support would produce different effects in L2 writing performance over the four weeks.

Research Question 2. What are the effects of content support on the nature and deployment of L2 writing processes?

Hypothesis 2:

Building on Ong's (2014) results, we hypothesised that the lack of content support in writing tasks would lead to higher conceptual demands placed on L2 writers during the planning process, causing them to engage more frequently in metacognitive processes of writing,

including idea generation, elaboration, organisation, thinking about text structure, and thinking about language aspects, compared to the condition when content support was available. Drawn on Kellogg's (1996) model of writing, previous studies suggested that reducing the conceptual demand by the provision of content in planning processes would allow more attentional resources to be allocated to the translation operations. However, previous studies have demonstrated mixed findings on the effect of content support on the writing processes (Michel et al., 2020; Révész, Kourtali, et al., 2017). Given the lack of empirical evidence, we proposed a non-directional hypothesis regarding the effect of content support on L2 writers' deployment of the writing process. We hypothesised that the provision or absence of content support would lead to different effects in separate stages of the writing process.

In the next chapter, we will describe the methodology employed to answer the research questions guiding this dissertation.

CHAPTER 6 METHODOLOGY

6.1 Introduction

This chapter is to address the experimental part of this dissertation. In previous chapters, we reviewed the theoretical background and existing studies manipulating the provision of content support and raised questions that guided this dissertation. This empirical study intends to investigate the effects of the provision or absence of content support on L2 learners' writing performance and processes. First, we introduce the participants and contexts as well as the instruments used in the current research. We present the instruments of the study in terms of the description of content support, the design of writing tasks, the rationale of using retrospective questionnaires on metacognitive processes in writing as well as the semi-structured interviews. Next, the procedures, data coding and data analysis are presented. In particular, we include the transcription and coding guidelines of the interviews from participants in the study. We also provided comprehensive explanations of task performance measures regarding lexical, syntactic and propositional complexity, accuracy, fluency and overall text quality. Lastly, a description of the statistical analysis employed in this dissertation is presented.

6.2 Participants and contexts

There were a total of 25 EFL Chinese learners recruited for the study. One of them withdrew from the study before the third writing session due to health problems. Participants (N = 24) were in their first year of high school in the southern China, aged between 16 and 17 years old. They were enrolled in the International Department and had to select between AP and A-Level programmes in their first year (Grade 10). They had studied English as a compulsory subject for an average of about nine years and had passed the high school entrance examination before enrolling into the International Department. In the first year of high school, these participants received 2.25 hours of L2 writing instruction per week during an 18-week-long semester. The

main objective of the writing courses was to prepare learners for the writing session of the main English language proficiency tests accepted at universities. It is worth mentioning that the target learners of this study had to be streamed at different levels (A, B, and C) depending on their language proficiency and the different orientations (i.e., AP or A-Level programme) in their first year of high school, which made it difficult to include a stable writing group and greater number of participants in a longer term. Participants were from one of the writing groups (level A); they were at similar writing proficiency and attended writing classes taught by one teacher three times a week.

All the participants were administered the Oxford Placement Test (OPT, Allan, 2004) one week before the writing sessions as a proxy of general L2 proficiency. The OPT test pack contains two main sections, Listening and Grammar, each of 100 items. Participants' scores of two sections were added up to produce a total score out of 200. According to the OPT standard, scores of 105-119 represent elementary users, scores of 120-134 represent lower-intermediate users, and scores of 135-149 represent upper-intermediate users. The mean scores of our participants were 129.46 (SD = 8.84), ranging from 113 to 145. Out of a total of 24 participants, there are 4 at the elementary level (A2), 14 at the lower-intermediate level (B1), and 5 at the upper-intermediate level (B2) based on the levels defined by the Common European Framework of Reference for Languages). In general, we considered our participants as lower-intermediate learners. Participants were assigned equally to two groups according to their scores—one group (N = 11) was provided with content support during writing (CS group), and the other group (N = 13) was not provided with any writing assistance (NCS group). Table 6.1 presents the descriptive statistics for the OPT results between the two groups. Finally, we ensured that both groups did not differ in terms of their OPT scores, t (22) = .138, p = .892.

Table 6. 1 Descriptive statistics for the OPT scores

Group	n	M	SD	95% Confidence Interval	
				Lower Bound	Upper Bound
No CS	13	129.69	8.60	124.50	134.89
CS	11	129.18	9.54	122.77	135.59

6.3. Instruments

6.3.1 Content support

Previous studies manipulated the amount of content support by providing a story plot (Kormos, 2011; Yoon, 2021), pre-writing questions and ideas (Révész, Kourtali, & Mazgutova, 2017) and ideas and/or macro-structure (Ong, 2014; Ong & Zhang, 2010). According to Robinson's (2001b, 2005) Componential Framework, we regard the provision of content support in the form of ideas as the resource-dispersing feature because content support includes the background knowledge of the topic (+/- prior knowledge). To be specific, ideas are presented in the form of subtopic keywords and complete sentences that contribute to responding to some general questions, which are expected to help learners focus on meaning but generate specific examples or details on their own. Therefore, content support is expected to activate learners' prior knowledge and lower the cognitive/conceptual demands posed on the planning process (Ong & Zhang, 2010; Révész et al., 2017). On the other hand, the absence of content support requires writers to create their own content, which may place higher pressure on the planning process. However, previous research did not account for the design of content support intensively.

In L2 writing pedagogy, the design of writing prompts and writing tasks are central to the success of writers' performance. Ferris and Hedgcock (2014) suggested that more targeted instruction might be necessary for novice L2 writers to cultivate their linguistic awareness, rhetorical skills and text development strategies. Besides, Hyland(2003) discussed the linguistic and rhetorical resources in the writing task design. He considered language support as both input and instruction under specific target contexts that support and challenge the writers to work down from the entire text rather than the bottom up. In particular, the invention technique of questioning (i.e., ideas for writing generated by who, what, where, when, how, and why questions) is proposed as one of the pre-writing activities that facilitate novice L2 writers' organized planning. Inspired by Révész et al.'s (2017) research design, we adopted pre-writing

questions as part of the content support and provided distinct types of wh- and how questions according to specific genres. Besides, given that L2 writers might see those ideas provided by complete sentences as one-right-way of writing (c.f., Hyland, 2003), the current research offers L2 writers additional keywords as ideas, allowing them to formulate a sentence with their own linguistic resources. In order to ensure that the content support matches authentic English writing instructions and meets the needs of L2 writers, we invited five local teachers, who have 3 to 10 years of experience teaching English in the international curriculum (i.e., A-Level/AP), to comment on and modify the content support.

6.3.2 Writing tasks

The writing tasks were selected and adapted from Trinity Integrated Skills in English (ISE II), the Extended Writing designed for the CEFR B2 level. ISE features the assessment of authentic communicative and transferable skills of English learners, which aligns with the definition of a task in TBLT literature. In this study, we selected two writing genres: Argumentative essay and Article, of which topics are familiar to the learners. The argumentative prompts required participants to make arguments on the controversial topics (e.g., sport should be a compulsory subject), while those for article writing involved the description with examples or anecdotes (e.g., someone I admire). For both task types, similar topics were selected in an attempt to eliminate the potential influence of the unfamiliar topic on language use; the potential effect of task repetition was minimized by the task sequence. According to the Trinity exam specification, participants were required to complete the tasks in no more than 40 minutes under the pen-and-paper condition, and the word limit for both genres was 150-180 words (see Appendix A.1 & A.2). Table 6.2 presents the writing genres as well as the original task prompts and content support.

Table 6. 2 Examples of task prompts in complex and simple conditions.

Genre	Target reader	Original writing prompts (complex task)	Content support (provided in the simple task)
Argumentation	A teacher or tutor	Write an essay (150–180 words) for your teacher on whether or not sport should be a compulsory school subject. Give your opinion with reasons and arguments.	If you agree with the statement, include the following information: What are the benefits of having sport as a compulsory school subject? For example, about • students' health and overall fitness • students' lifestyle • learning skills for life • building a future career If you disagree with the statement, include the following information: What are the benefits of not having sport as a compulsory school subject? For example, about • available time resource • students' limited physical ability • students' various interests • fewer bullying incidents
Article	A reader of newspapers, magazines, or websites	Write an article for your college magazine with the title: 'Someone I admire'. Choose a public figure from the past or present and write an article (150–180 words) about what qualities you admire in that person.	What qualities do you admire in that person? For example, • determination to succeed • commitment to helping others • his/ her talent or skills • strong courage • his/her knowledge of … • wealth or power What examples can you give about his/her qualities? What do you learn from that person? How does he/she affect you?

In this study, the original writing prompts of the Trinity Integrated Skills in English (ISE II) were employed as the complex condition of writing tasks, and participants assigned to the

complex task were instructed to plan and write independently. Participants under the simple condition were provided with content support in the writing task. The content support for argumentative writing included questions and useful subtopic keywords for agreeing or refuting the given statement, while the content support of article writing involved what or how questions and examples, by which participants were allowed to select and expand on the topic. As discussed above, the rationale for providing content support was to lower the cognitive demands on the planning stage, directing more of the learners' mental efforts to linguistic encoding (Kellogg, 1996; Révész, Kourtali, & Mazgutova, 2017). It is hypothesized that the absence of content support was more cognitively demanding, given that participants in such a condition needed to allocate more cognitive resources to the planning and translation processes (e.g., thinking about content, organization and language of the essay).

6.3.3 Retrospective questionnaire on L2 writers' metacognitive processes

Given that writing is a cognitively demanding and complex process that contains a series of metacognitive and cognitive activities (Flower & Hayes, 1981), learners have to choose and use effective strategies in order to organize all these cognitive activities and manage the learning environment. It should be noted that, traditionally, studies on the writing process have taken into account learners' use of *writing strategy* and looked into writing behaviours and mental processes of writers while composing (Manchón, 2001; Petric & Czárl, 2003). In this dissertation, the investigation of what strategies are employed by L2 writers is not a central question. Nonetheless, the Writing Strategies Questionnaire was employed to understand the ways in which learners manage their cognitive activities, aiming to provide complementary information for the writing performance and writing processes (see Appendix B). The results of the between-groups comparison revealed that content support did not yield effects on participants' use of writing strategies. However, this dissertation would not discuss the effect of content support on L2 writing strategies as it is not a central research question to this dissertation.

To investigate L2 writing processes and shed light on L2 writing models, the majority of existing studies have focused on capturing the online behaviours of L2 writers (i.e., duration of pauses and the nature of revision) and provided evidence on associated cognitive operations. Current studies are mostly observation-oriented and concerned with writers' thinking process during writing and their real-time L2 writing processes, measured by think-aloud protocols (e.g., López-Serrano, Roca de Larios, & Manchón, 2019), keystroke logging and/or eye movements (e.g., Barkaoui, 2019; Chukharev-Hudilainen, Saricaoglu, Torramce, & Feng, 2019; Révész, Michel & Lee, 2017, 2019; Révész, Kourtali, & Mazgutova, 2017). However, Galbraith and Vedder (2019) suggested that although findings of online measures have demonstrated the systematic and dynamic interaction between the writing process and product, they might not directly point to single indicators of the cognitive processes. Instead, in order to assess the distribution of cognitive activities and individual factors, a few of previous studies employed traditional approaches such as questionnaires and stimulated recall to engage writers in reporting their perceptions of the task. It is suggested that both concurrent and retrospective verbal reports can better tap into the writing cognition of L2 learners (Manchón & Leow, 2020).

Indeed, self-reported measures predominate in educational and psychological research, which are believed to efficiently afford more evidence about learners' perceptual, cognitive, and affective experiences and processes and their decisions on monitoring and controlling during cognitive and metacognitive processes (Barone, Maddux & Snyder, 1997; Greene & Azevedo, 2010). In particular, questionnaires have been widely employed to examine a number of topics related to cognitive processing, such as the strategic processing in reading situations (e.g., Samuelstuen & Bråten, 2007), the self-regulated learning in MOOCs (e.g., Wong, Baars, de Koning & Paas, 2021), and the cognitive load, motivational and cognitive processing in online game-based and computer-assisted learning (Huang, 2011; İlic & Akbulut, 2019). Although the use of questionnaires has been questioned for its accuracy in reflecting the underlying process, Tillema, van den Bergh, Rijlaarsdam, and Sanders's (2011) research reported that responses of learners' self-reported questionnaires showed a reasonably moderate correlation with their real-time writing behaviours. Regarding the cognitive processes in L2 writing, Ong (2014) adopted a retrospective questionnaire and investigated the influence of planning time and task condition

on the frequencies of L2 writers' metacognitive processes in terms of text interpretation, reflection and text production (Hayes, 1996).

The present study adopted questionnaires to analyse cognitive processes in writing. The retrospective questionnaire on metacognitive processes in writing included eight items that participants had to respond to an 8-point Likert scale immediately after completing each writing task. Of the eight items, five are adapted from Ong (2014), assessing the frequency of metacognitive processes in terms of idea generation, idea organization, idea elaboration, essay structure, and language aspects (see Table 6.3). Unlike Ong's (2014) design, our questionnaire aims to elicit the underlying processes L2 writers go through when performing a single writing task rather than dividing it into planning and writing phases. Besides, we are also concerned about the usefulness of content support. Given that the participants were assigned to two groups (provision vs. no provision of content support), two sets of questionnaires were designed. The question regarding *¨How useful were the ideas given to you in the task instruction?¨* was only available to the group provided with content support. Additionally, two items were developed by Huang (2011) concerning cognitive processing. These items investigated the effects of task complexity on learners' perception of mental effort and task difficulty when performing the writing task. We translated all the questionnaire items into Chinese and improved the Chinese wording with the help of a local teacher who was in charge of the language centre at our target school.

Table 6. 3 Items in Metacognitive Processes of L2 Writers Questionnaire

Variables of interest	Items	Source
Generation of new ideas	How frequently did you think of generating ideas for the essay? *Never 1 2 3 4 5 6 7 8 All the time*	
Elaboration of new ideas	How frequently did you make your ideas more complex and elaborated (e.g., giving examples and reasons)? *Never 1 2 3 4 5 6 7 8 All the time*	
Organization of new ideas	How frequently did you think of organizing your ideas? *Never 1 2 3 4 5 6 7 8 All the time*	Ong (2014)
Essay structure	How frequently did you think of the overall essay structure? *Never 1 2 3 4 5 6 7 8 All the time*	
Language aspects of the task	How frequently did you think of language aspects, e.g., word choice, sentence structure, grammar? *Never 1 2 3 4 5 6 7 8 All the time*	
Usefulness of the task instruction (only for writers given content support)	How useful were the ideas given to you in the task instruction? *Not at all useful 1 2 3 4 5 6 7 8 Very useful*	
Mental effort	How much mental effort did you invest in the essay? *Very low mental effort 1 2 3 4 5 6 7 8 Very high mental effort*	Huang (2011)
Task difficulty	How difficult is it for you to complete this essay? *Very easy 1 2 3 4 5 6 7 8 Very difficult*	

6.3.4 Semi-structured Interview

We conducted semi-structured interviews at the end of the writing sessions. Semi-structured interview is a means of qualitative research that has been widely used in social science and educational studies. It is considered to be effective for researchers who wish to interpret responses from interviewees (Cohen & Manion, 1994; Nunan, 1992). The purpose of the semi-structured interview was to elicit the thought processes that participants engaged in completing the tasks in order to shed light on whether the provision of content support would influence the

deployment of writing processes. In the semi-structured interview, we used participants' last two essays as the stimulus to help participants recall their writing experiences. We prepared an interview guide, starting from the guiding questions on participants' thoughts on the written tasks and their performance in general. We made an attempt to let the participants lead the conversation if they brought up a specific topic, such as the planning process, retrieving vocabulary, and structuring sentences. For example, if a participant commented that he had difficulty in finding an appropriate vocabulary, the follow-up questions would be: *When did he meet the problem (during planning or composing)? How did he keep the writing going?* Participants were also encouraged to identify the revision marks they made to the drafts (e.g., deletion or substitution). The author conducted 12 interviews with the sub-group of participants (N = 12) from both the CS group and the NCS group via a videoconferencing platform (with the participant's camera off). Each interview was carried out in Chinese and took place in a quiet room of the school.

6.4 Procedure

The overall data collection procedure is presented in Table 6.4. The study was conducted during the class time. It consisted of several stages: a pre-test, primary writing sessions (four writing tasks), and a post-test. Participants in this study had not taken any official language proficiency test prior to the start of the treatment sessions. They were informed that the language proficiency test and writing tasks over the next six weeks were a part of the writing practice, which would not constitute the course grades, and their written texts would be assessed for writing ability. Their writing performance would be delivered as an individual report at the end of the semester. The consent document in terms of the voluntary nature of their participation, their right to withdraw, the confidentiality of the data, and the benefits for participation were presented and signed by the participants at the beginning of week 3 (Appendix C).

Table 6. 4 Data collection procedure

Spring semester 2021	With content support (CS group) (n = 11)	Without content support (No CS group) (n = 13)
Pre-test		
Week 3	1. Oxford Placement Test; 2. Writing Strategies Questionnaire	
Writing sessions		
Week 4	Task 1 Argumentation Simple Version Writing processes questionnaire	Task 1 Argumentation Complex Version Writing processes questionnaire
Week 5	Task 2 Article Simple Version Writing processes questionnaire	Task 2 Article Complex Version Writing processes questionnaire
Week 6	Task 3 Argumentation Simple Version Writing processes questionnaire	Task 3 Argumentation Complex Version Writing processes questionnaire
Week 7	Task 4 Article Simple Version Writing processes questionnaire	Task 4 Article Complex Version Writing processes questionnaire
	Interview (N = 6)	Interview (N = 6)
Post-test		
Week 8	1. Writing Strategies Questionnaire	

In the pre-test, the Oxford Placement test was administered to measure participants' language proficiency. Participants had 10 minutes to complete the Listening Test of OPT and responded to the Writing Strategies Questionnaire in a computer lab at the school. The responses to the questionnaire would be used only as a reference for the subsequent analyses, given that three to five participants might not spend enough time reading through each item. The Grammar Test of OPT was administered in the second writing class of week 3, lasting 40-50 minutes. During the writing sessions, participants were assigned equally into two groups according to the results of the OPT: content support group (N = 11) and no content support group (N = 13). Over a four-week period, both groups of participants completed four writing tasks (two argumentative tasks and two article tasks) adapted from ISE II. Participants composed timed essays (with the time constraint of 40 minutes) without access to external resources or a dictionary under a traditional pen-and-paper condition. They were required to document the end time and the

amount of time spent on the essay, and care was taken by the writing teacher to ensure the accuracy of their time. Additionally, participants are required to complete the retrospective questionnaire on metacognitive processes in writing immediately after completing each writing task. For the participants who were absent from the writing sessions, the teacher delivered the writing task to them before the end of the week and ensured the whole writing session was conducted under the same rules and same conditions.

At the end of the writing session (week 7), semi-structured interviews tapping into the writing cognition were conducted with a sub-sample from both groups (N = 12) during the late self-study period. Out of 12 participants, there were nine attending the interview one day after the last writing session. Three participants were absent from the late self-study period due to personal reasons, and they were interviewed 3 days and 6 days after the last writing session, respectively. All the interviews were carried out online and video-recorded (with the participant's camera off). Finally, all the participants were asked to complete the post-test Writing Strategies Questionnaire under the pen-and-paper condition to ensure the responses' quality.

6.5 Data coding and data analysis procedures

6.5.1 Analysis of the interview data

The recording data of the interviews comprised 113 min and 9 s, with an average of 9 min and 26 s per participant of the sub-group (N=12). The analysis of the interview data involved six steps. First, participants' comments on their writing processes were transcribed on ATLAS.ti (Version 22). Second, following both coding schemes from Sasaki (2000) and Michel, Révész, Lu, Kourtali, Lee, and Borges (2020), we identified five general categories (planning, translation, retrieving, monitoring, evaluation) and several emergent micro-categories for classifying the participants' writing processes. Two additional categories were also added to elicit participants' affective responses and their sense of readers. Third, we coded all the comments related to participants' actual thoughts and actions during task completion. Care was

taken to the comments regarding participants' strategies in some hypothetical situations. For example, "*... if I continue to revise it, there will probably be more grammatical errors*"; such a comment would not be counted as the action of monitoring. Fourth, after we reviewed all the comments, the resulting categories were merged into more general categories (i.e., planning, translation, and monitoring), and some micro-categories were grouped into the meta-comment category, including noticing the gap, proficiency, positive and negative emotions, and audience (see Table 6.5).

Table 6. 5 Examples of student's retrospective accounts of their writing processes by coding category

Category	Definition	Example
Planning		
Organization	Planning of the structure or the paragraph	Before I started to write the whole article, on the page, I just wrote an outline or something roughly.
Thematic planning	Less detailed planning of the overall organization, mainly around the topic itself	I started by thinking about what is inside… what is related to the topic.
Content	Planning of ideas, incidents, evidence, or details	I presented a few arguments and then gave… and the arguments usually go with examples.
Translation		
Lexical retrieval	Getting from a concept to words and expressions	When I was writing, there's a word I didn't know how to express, so I spent a long time on it.
Syntactic encoding	Translating ideas into the syntactic structure	I had to think again that I couldn't express this idea in a simple sentence, so I had to find a way to form a complex sentence.
Other	Translating ideas in general	I was a bit slow in writing. There were some other ideas that just didn't come to my mind.
Monitoring		
Revision of the text	Editing ideas or the text	Basically, I wrote two or three sentences and then went back and read them, and I always felt that something was not quite right.
Meta-comment		
Noticing the gap	Noticing the gaps between one's own production and the target language	Because just in terms of some structures or the wording… maybe I think there was still a bit of problem. And there must be some grammatical errors in it.
Proficiency	Evaluating one's own L2 proficiency	I am bad at grammar all the time. Sometimes I might know which exact word I want to write, but whether it's going to be an adjective case, a noun, or a verb… just sometimes I can't make sure.
Overall positive emotions	Talking about enjoyment, confidence, interest, involvement	I think I was exposed to some different topics, and it became something very interesting.
Overall negative emotions	Talking about difficulty, boredom, and stress	I did get a bit annoyed and irritated while writing.
Audience	Arranging the text for readers	Although my grammar might be a bit of a mess, I still hope others are able to understand.

Next, in an attempt to understand the usefulness of content support, we identified three categories (generate content, rejection of content support, and others) for classifying participants' use of content support (see Table 6.6). Lastly, to form a frequency count and compare between groups, the comments falling into specific categories were added up.

Table 6. 6 Examples of participants' use of content support (exclusive for the content support group) by coding category.

Content support use	Example
Generate Content	At the time I wrote this essay, I didn't really have any ideas, so I read the example (content support), and then after reading the example, I could think of something to write.
Rejection of Content Support	I can use (my ideas) to avoid those ... in the content support, I saw some points were not good.
Other	The example (content support) there also taught me how to respond to the IELTS essay later.

6.5.2 Analysis of participants' written texts

A total of 96 essays were produced by the participants (see writing samples in Appendix D). The written compositions of the participants were transcribed in the TXT format. The average length of the essays was 190. 48 (SD = 7.14) words. The written texts of the participants were analyzed in terms of complexity (lexical, syntactic, propositional), accuracy, and writing fluency (CAF). CAF measures are assumed to describe the distinct levels of L2 writing performance comprehensively and objectively (Bulté & Housen, 2012; Lu & Ai, 2015; Wolfe-Quintero, Inagaki & Kim, 1998), and their working definitions are still employed as valid and global performance descriptors (Housen, Kuiken, & Vedder, 2012). Given that CAF measures are recognized as multifaceted, multidimensional and multilayered constructs and can be interrelated, L2 performance must be assessed from a multidimensional perspective, with a broad range of measures to capture different aspects of performance (Housen et al., 2012; Norris & Ortega, 2009). Therefore, in view of the comparability, reliability and validity of the measurements, several basic criteria for selecting CAF measures will be considered in this study.

To begin with, we took into account a series of CAF measures that have been employed in some of the key references in the current studies. The available CAF measures come in different forms. Specific metrics to assess writing performance have been employed in earlier SLA research (e.g., Crookes, 1989; Kormos, 2014; Stauble, 1978; Tonkyn, 2012). However, recent studies have favoured more general measures, which are assumed to allow more comprehensive descriptions of performance on CAF dimensions and be more sensitive in distinguishing between broad levels of proficiency or groups of learners in the experimental studies (Skehan, 2003). Therefore, this study mainly employed general measures. Second, while taking into account the measures that are distinct and complementary, we have to avoid the psychometric troubles associated with redundancy in the measurement (Norris & Ortega, 2009), which can lead to multicollinearity in the analysis (see Tabachnick & Fidell, 1996). Lastly, for this study, we employed the specific measure of propositional complexity to tap into the amount of information conveyed in the production (Vasylets, 2017; Vasylets, Gilabert & Manchón, 2017). The following sections will present the detailed definitions of CAF dimensions and measures selected for the current study.

6.5.2.1 Measuring linguistic complexity

Bulté and Housen (2012) distinguished lexical complexity and grammatical complexity that comprise separate and independent aspects of L2 performance and L2 proficiency, providing the operational, behavioural and theoretical-cognitive construct specification with the body of empirical studies. Many components and measures have been employed to assess both lexical and grammatical complexity in previous studies. However, given that Norris and Ortega (2009) argued for avoiding redundancy and multicollinearity, in this dissertation, we employed measures that are likely to gauge different subcomponents to account for the multifaced nature of complexity.

Measuring lexical complexity

Assessing lexical complexity can tap into three related but different aspects: lexical density (i.e., the amount of information in the text, measured by the number of content words to function words), lexical diversity (i.e., the variation in the use of word types), and lexical sophistication (i.e., the depth of lexis, mostly measured by the proportion of advanced words) (Michel, 2017; Read, 2000). However, under the simple view of linguistic complexity measures (Pallotti, 2014), we discarded measuring lexical density in this dissertation. To assess learners' lexical use, however, research on lexical measures suggested that the depth of vocabulary knowledge should be considered, in addition to calculating the frequencies of word forms (Chen, 2020). Thus, lexical richness (i.e., how well a learner knows the words) as a complementary measure has been used in recent L2 writing studies (see Sanchez, Manchón & Gilabert, 2020; Vasylets, Gilabert & Manchón, 2020). In general, in terms of the assessment of lexical complexity, we examined lexical diversity, lexical sophistication and lexical richness of the written texts, as suggested in Bulté and Housen (2014).

Lexical diversity

Although lexical diversity itself has been conceptualized as a multidimensional phenomenon that contains several properties (e.g., richness, disparity, and dispersion) that are believed to construct a full measure of diversity (Jarvis, 2013). To enhance our understanding of the interplay between the use of words, vocabulary knowledge and writing performance, we limited the measurement to the variety of active vocabulary deployed by the L2 learners. A type-token ratio (TTR) was commonly used to measure lexical diversity, which compares the number of word types to the number of words. However, since the index of TTR is determined by text length (Jarvis, 2013; Malvern & Richards, 2002), TTR is reported as a problematic measure. Accordingly, subsequent refinements were developed to overcome the text length. Malvern and Richards (2002) proposed index *D*, which is independent of sample size and allows valid comparisons between writers with a varying amount of output. The index *D* captures the degree of the word repetition, where the higher *D* value suggests the greater diversity of words used in

the text. We computed the index *D* by using the D_Tools programme developed by Meara &
Miralpeix (2006).

Lexical richness

The term lexical richness was treated as a superordinate term containing all lexical constructs
and the corresponding measures (Read, 2000) that assess the size and range of vocabulary
knowledge. Lexical richness, similar to lexical diversity, was commonly measured by the
traditional TTR or the index of Guiraud, which uses the square root for relating types and
tokens(Guiraud, 1959). On the other hand, Daller, van Hout and Treffers-Daller (2003) assessed
bilinguals' lexical knowledge with the notion of productivity in the lexicon and proposed
measures of lexical richness (advanced TTR and Guiraud Advanced) to trace the characteristics
of productive vocabularies. Although the traditional measures have apparent drawbacks, Bulté
and Housen (2014) argued that the index of Guiraud measures reflects more than diversity since
the mathematical transformation of the index of Guiraud "overcompensates for the decrease in
scores with increasing text length" (p. 49). In this case, texts can obtain higher scores for
Guiraud values with fewer word repetitions but also long texts (Bulté et al., 2008). Besides, the
index of Guiraud is also assumed to capture productivity, a crude indicator of lexical complexity
that complements the D-value. For this reason, we measured lexical richness by using the index
of Guiraud, which is the ratio of types over the square root of the tokens (Types / Tokens).

Lexical sophistication

Lexical sophistication often refers to the number of relatively unusual and low-frequency words
in a text (Read, 2000). Frequency has been examined in many studies and is believed to
represent one's lexical proficiency (Kyle & Crossley, 2015; Laufer & Nation, 1995). Given that
words with higher frequency are believed to be acquired earlier and used more often in natural
language, sophisticated words were often considered difficult (Bulté & Housen, 2012; Kyle &
Crossley, 2015). It has been shown that word frequency influences learners' decision-making
times (Kuperman, Stadthagen-Gonzale & Brysbaert, 2012). In other words, more common and

higher-frequency words require fewer processing efforts than low-frequency words. Thus, in the context of L2 writing, lexical sophistication is regarded as a strong predictor of writing proficiency, as more proficient writers are able to express ideas succinctly and clearly with greater vocabulary knowledge (Crossley & Kyle, 2018). However, previous studies presented varied findings on the relationship between lexical sophistication and language proficiency (Kyle & Crossley, 2015), as determined by how researchers defined 'advanced' words. Therefore, it is suggested that in addition to considering the frequency of words, the proficiency level of the learners should also be taken into account.

Lexical sophistication can be assessed by lexical frequency, which is obtained by comparing lexical items in one's production with their frequency in corpora (Kyle, 2019). Laufer and Nation (1995) proposed the lexical frequency profile (LFP) that measures the percentage of high-frequency words vs. low-frequency words in one's production through a written language corpora that divide all the words into different categories. However, the LFP approach segments the words in the reference corpus into different frequency bands and produces a series of resulting scores, thereby requiring the research to select a correct set of bands that could distinguish between levels of proficiency among a given sample (Laufer, 2005). Another method proposed by Daller, Van Hout, and Treffers-Daller (2003) is to adopt the Advanced Guiraud to measure lexical sophistication. Advanced Guiraud uses the Index of Guiraud formula (Guiraud, 1954) but includes the advanced/ sophisticated types in the numerator of the index, which is calculated by the ratio of advanced types over the square root of the tokens (Advanced Types / Tokens). For its calculation, all the words above the 2k frequency band are identified as advanced words (Daller, 2010). Previous studies have also considered words beyond the 1k frequency band to be advanced (Mollet et al., 2010; Vermeer, 2000), though these are the words that learners know anyway. According to the literature on vocabulary learning (e.g., Daller et al., 2003; Daller & Xue, 2007; Juffs, 2019), Advanced Guiraud has been regarded as a more effective measure of lexical sophistication over the traditional measures (TTR and Index of Guiraud) and provides more apparent results even with small samples. For this reason, we employed Advanced Guiraud to measure lexical sophistication in

this study. The advanced types of the written texts were computed using RANGE (Nation, 2006) and the values of Advanced Guiraud were obtained by dividing the number of types above the 2000 frequency band by the square root of the tokens (Kojima & Yamashita, 2014; Naismith, 2019).

Measuring syntactic complexity

Syntactic complexity has been regarded as a construct to capture L2 learners' linguistics development in writing and evaluate the writing quality in terms of the degree of variety and sophistication of the production units or grammatical structure (Lu, 2011; Ortega, 2003; Wolfe-Quintero et al., 1998). The underlying understanding is that the "more complex" syntactic structure can be the indicator of "more developed", "more advanced", and better writing skills (Bulté & Housen, 2014). Traditionally, syntactic complexity has been mainly related to the use of clausal embedding and subordination in production (see Diessel, 2004), and a large number of measures (particularly on clausal complexity) have been employed in previous studies. Biber and Gray (2010) have extended the discussion of syntactic complexity to the phrasal level, which is assumed to be prominent in academic writing. However, there lacks a consensus on the definition of *complexity*. Notably, Norris and Ortega (2009) conceptualized syntactic complexity as a multidimensional construct, which consists of several sub-constructs, including global or general complexity, complexity by coordination, complexity by subordination, and complexity via subclausal or phrasal elaboration. They also point out that coordination is expected to be first established at the early stages of L2 development, subordination would be more prominent at the intermediate stages, and subclausal complexification at the phrasal level would be achieved at a more advanced stage of development. Bulté and Housen (2014) also suggested at least two sets of measures: "one for measuring complexity in dynamic styles, typically at lower levels of proficiency, and one that captures complexity in synoptic styles, which are typically found in the writings of learners at the upper-intermediate and advanced levels of L2 proficiency" (p. 56). Therefore, all three levels (i.e., sentential, clausal and phrasal complexity) must be assessed to cover the full trajectory of L2 development (Bulté & Housen,

2014; Norris & Ortega, 2009). In this dissertation, we selected the measures carefully for assessing general complexity, subordination and coordination, nominal complexity and phrasal elaboration, and the details will be described below.

General complexity

The general complexity has been mostly operationalized as any length-based measures that involve a potentially multi-clausal production unit (Norris & Ortega, 2009). The length of T-unit (MLT) has often been employed to measure general complexity. A T-unit was originally characterized as one main clause attached to any other subordinate clause, though it does not differentiate between the dependent clauses (Hunt, 1965). T-units have often been chosen for the analysis of written production (cf. Foster et al., 2000). Previous studies have shown that MLT is a reliable predictor of writing quality and represents the differences in L2 writers' proficiency (Bulté & Housen, 2014; Ortega, 2003; Yang et al., 2015). In this dissertation, the mean length of T-unit was employed to provide a general measure of syntactic complexity, calculated by dividing the total number of words by the total number of T- units. This measure was still frequently used in recent studies concerning task-based L2 writing (Lee, 2020; Révész, Kourtali, et al., 2017; Sánchez et al., 2020).

Clausal subordination and coordination

The measures of syntactic subordination have been given greater weight in the measurement of syntactic complexity, as subordinate structures are assumed to be more cognitively difficult to process than other syntactic linking (Bulté & Housen, 2012). Norris and Ortega (2009) suggested subordination provides valuable insights when measuring the syntactic structures at intermediate and upper-intermediate levels, which corresponds to the current proficiency levels of most of our participants. The measures for subordination are often based on the average length of different linguistic units, such as sentence, clause, T-unit, or AS unit. However, there is a lack of agreement on the definition of a clause in terms of clause-level measures which may have led to mixed results in the previous research. In this study, we follow Lu's (2010)

definition that a clause contains "a subject and a finite verb (Hunt, 1965; Polio, 1997) and includes independent clauses, adjective clauses, adverbial clauses and nominal clauses" (p. 9). In addition, sentence fragments that contain no overt verb have been regarded as clauses, and a dependent clause refers to a finite adjective, adverbial, or nominal clause (Lu, 2010). Norris and Ortega (2009) pointed out that clauses (or subordinate or dependent clauses) in the numerator can be employed to measure subordinate complexity since these indices are all equivalent no matter which denominator is chosen. However, the values for subordination would increase when more subordinate clauses are produced. To the best of our knowledge, clauses can provide more detailed and appropriate analysis for the use subordination of intermediate learners, while T-unit is ideal for learners at a higher proficiency level (see the discussion in Biber, Gray, & Poonpon, 2011). For this reason, we adopted clause as the analysis unit for clausal complexity. In terms of subordination, we measured the number of dependent clauses per clause (DC/C), which is investigated in Lu (2011), Lu and Ai (2015), and Crossley and Verspoor (2021).

In this dissertation, we also measured the clausal complexity through the amount of coordination. According to Bardovi-Harlig (1992), the amount of coordination can serve as a more sensitive metric than subordination measures, especially to manifest the complexification at incipient levels of L2 development. Coordination structures can be measured at the phrase-, clause- and sentence-level. Previous studies on task-based writing also took into account the participants at low proficiency levels and employed coordination measures (Sánchez et al., 2020; Vasylets & Marín, 2021). Provided that a large proportion of our participants were at the elementary (N= 4 to A2) and the lower-intermediate level (N=14 to B1), coordination would be appropriate for measuring syntactic complexity at these levels of L2 development. To gauge coordination, we calculated the number of coordinate phrases per clause (CP/C), which was found to be positively related to the increase in proficiency levels (Lu, 2011; Mancilla, Polat & Akcay, 2017).

Nominal complexity and phrasal elaboration

While syntactic complexity has been widely operationalized through measures at the clausal or sentence level, Norris and Ortega (2009) argued that L2 researchers should measure the complexification at the subclausal or phrasal level, which is the most predictive at the advanced stage of L2 development. Norris and Ortega recommended using the mean number of words per clause (MLC) to measure phrasal complexity. It is hypothesized that the increased clause length will manifest the longer phrase length (through the pre- or post-modification of the head) as the number of phrases in a clause is limited (Bulté & Housen, 2012). However, adopting clause length as an indicator of phrasal complexity can be problematic. Biber et al. (2011) have questioned the use of clause-based indices and argued that academic writing features the use of complex noun phrases. The alternative is to measure the intra-phrasal complexity that takes into account the length of noun phrases and the number of modifiers (Kuiken & Vedder, 2019). For this reason, a few studies (Kormos, 2011; Mazgutova & Kormos, 2015; Sánchez et al., 2020; Vasylets et al., 2020) employed the noun phrase complexity as alternative indices that address various features determining phrasal complexity. In this dissertation, we adopted the mean length of clause (MLC) as the holistic measure of nominal complexity. In addition, we obtained the number of modifiers per noun phrase (Modifiers/NP), computed by Coh-Metrix 3.0 (McNamara, Graesser, McCarthy, & Cai, 2014), to tap into phrase elaboration of the learners' production.

6.5.2.2 Propositional complexity

Propositional complexity refers to the number of information or idea units a speaker or writer encodes to convey an intended message (Bulté & Housen, 2012). An idea unit acts as a segment of spoken and written discourse, carrying a meaningful and complete message. The boundaries of idea units can be difficult to identify by only relying on semantic criteria. As such, drawn from Chafe's (1982, 1985, 1994) work, Vasylets (2017) developed the guidelines and measures to assess propositional complexity, which includes the semantic criteria (the primary ones), intonational (in speech) and syntactic criteria (in both speech and writing). In order to capture

any developmental nuances or various degrees of propositional complexity, Vayslets (2017) distinguished between non-extended (i.e., simple) idea units and extended (i.e., informationally dense ideas) idea units. In this dissertation, we employed Vasylets's (2017) guideline to segment written discourse into idea units. We calculated (1) the number of idea units and (2) the mean length of idea units as the general measures of propositional complexity. In the following sub-section, we present the semantic, intonation and syntactic criteria for the segmentation of idea units.

Semantic criteria

An idea unit is primarily a semantic unit of discourse, which conveys a meaningful, semantically integral chunk of information (Chafe, 1985). As Vasylets (2017) put it, "meaningful" implies that the linguistic material cognitively makes sense to the writer who produces the message and to the reader who interprets the message; "meaningful" also suggests that idea units carry the piece of information about events, states, referents, or topics. In general, an event refers to something that happens, an action that someone does or a change of state; while a state refers to a situation that exists for a certain period without change. Referents are the participants involved in an event or state, typically the ideas of people, objects, or abstractions.

The semantic criteria in Vasylets's (2017) guidelines are established on what Chafe (1994) defined as substantive ideas. The *regulatory* ideas or *communicative signals* that regulate interaction or information flow (e.g., expressions "to my mind" and "I think") and *fragmentary* ideas (abandoned or unfinished intonation units) from Chafe's (1994) construct are not recognized as independent idea units. In other words, regulatory ideas or communicative signals and fragmentary ideas are subsumed by the meaningful idea units that express information about events, states, referents or locations in space or time. Additionally, their guidelines do not distinguish whether the idea units introduce new or old information (i.e., topic).

Intonation criteria

Chafe (1994) suggested that intonation units are identifiable based on various pauses, pitch changes or terminal contours. The intonation unit, which is not a sentence (but sometimes coincides with one), identified the consciousness focus of the speaker and listener. It also represents the amount of mental effort the speaker needs to access information. Vasylets (2017) argued that such criteria could be applied to writing and posited that writers use punctuation to denote prosody. Similar to pauses and pitch changes, punctuation marks (e.g., full stop, comma, semicolon) can be used to indicate the boundaries of idea units, representing the consciousness progression in the written production.

Syntactic criteria

Syntactic criteria are applied to identify the boundaries of idea units. According to Vasylets's (2017) guidelines, an idea unit can be syntactically smaller or bigger than a clause, which ranges from (1) a word, a phrase, or syntactic fragments of other kinds, (2) a clause, (3) a unit above clause. Also, an idea unit often contains a verb-complement structure (e.g., with noun phrases, adverbs, prepositional phrases, and so on). However, as introduced in the previous chapter, the connection between an idea unit and a clause is not fixed. Vasylets (2017) pointed out that an idea unit was always below or equal to (at maximum) an AS-unit, which consists of "an independent clause or sub-claused unit, together with any subordinate clauses(s) associated with either" (Foster, Tonkyn, & Wigglesworth, 2000, p. 365).

Discourse segments connected by a coordinate relationship are typically viewed as separate ideas. The boundary of an idea unit is marked by a double slash (//), as presented in Example 1.

Example 1

Many students won't spend their weekend or their leisure time to do sports, // and sometimes they will eat a lot of food. [2 idea units]

In the case of subordinate construction, Vasylets (2017) took into account different sub-classes of subordinate clauses as they might be planned differently and exhibit different degrees of semantic and syntactic integration. As discussed in Holmes (1988, 1995), combined clauses would involve non-restrictive relatives, independent clauses and adverbials, while embedded clauses would involve rather restrictive elements and complements. The former was found to be planned more independently than the latter. Similarly, Chafe (1980) considered restrictive relative and complement clauses to be part of an idea unit.

In Vasylets's (2017) guidelines, the main and subordinate clauses can be separated as independent ideas if there exists a weak conceptual dependency between them (Schilperoord & Verhagen, 1998). Examples of such cases would be (1) non-restrictive relative clauses, (2) *although, as for, since, while, because* clauses, or (3) adverbial clauses in the initial positions, as shown in Example 2, 3, 4.

Example 2

This means that their heart lack of executable to do the compulsory things // which will favour their bodies. [2 idea units]

Example 3

As a result, they will not take their homework or classes seriously, // because they have stress from too much work about study. [2 idea units]

Example 4

If students stay in the classrooms for a long time, // they will not get enough exercise to improve their health. [2 idea units]

If the subordinate clauses contain the information that forms an integral and indispensable part of the message conveyed by the larger construction, Vasylets (2017) viewed the main and subordinate component(s) as one single unit. Examples of such cases would be (1) restrictive

relative clauses, (2) clauses introduced by *that* or *to*, or (3) adverbial clauses in the final position, as shown in Example 5, 6.

Example 5

it is not fair for the student who are less talented in sport. [1 idea unit]

Example 6

The main reason is that sports always need teamwork. [1 idea unit]

6.5.2.3 Measuring accuracy

From the cognitive perspective, accuracy and complexity reflect the learner's ability to elaborate and reconstruct the L2 knowledge system and to analyze internalized linguistic information (Housen & Kuiken, 2009; Michel, 2017). Accuracy often refers to the error-free L2 language performance and the degree of deviation from the norm, which embodies the rule system of the target language (Housen et al., 2012; Pallotti, 2009). Yet, according to Housen and Kuiken (2009), it raised a controversial issue of how we define the criteria for evaluating the accuracy and identifying the deviation; problems also include whether the criteria should be tuned to standard forms or to non-standard and non-native usages fully acceptable in some contexts and communities. Under such considerations, Housen et al. (2012) suggested that the 'A' in CAF should take into account *appropriateness* and *acceptability.* As such, there has been a quest for an appropriate approach to measuring accuracy.

Previous studies in L2 writing have devised various measures with advantages and disadvantages. For example, the use of holistic or analytic scales (Knoch, 2009; Shaw & Weir, 2007)), the number of errors of total words or errors per T-unit (Kuiken & Vedder, 2008; Storch, 2009; Truscott & Hsu, 2008) the ratio of error-free units of language (e.g., sentence, the T-unit, or the clause) (Adams et al., 2014; Kormos, 2011; Ruiz-Funes, 2014), the weighted ratio of accuracy (Foster & Wigglesworth, 2016), and specific error categories, such as grammatical

errors or lexical errors (Kormos, 2014; Ruiz-Funes, 2014). However, the above-mentioned types of measures are not without challenges. First, the use of holistic and analytic scales is influenced by varying degrees of rater subjectivity. Since a great amount of ambiguity and disparity can lead to problems in validity and reliability, raters are compelled to interpret the criteria differently and introduce personal biases (Schenck & Daly, 2012). Similarly, in terms of error counting, previous studies employed varying levels and types of errors, which raises issues in defining errors and identifying error boundaries when multiple errors overlap and fail to measure linguistic accuracy comprehensively (Evans, Hartshorn, Cox & Martin de Jel, 2014). In addition, the ratio of error-free units can also be problematic. This measure does not consider the severity of the errors nor the number of errors within one language unit (Evans et al., 2014; Polio, 1997). Besides, since this measure is unit-based, there exists a disadvantage that the longer the unit, the greater the possibility that learners make errors, thereby disadvantaging more complex units (Foster & Wigglesworth, 2016).

Lastly, many approaches have attempted to justify the error severity (Kuiken & Vedder, 2008; Nas, 1975). For the weighted ratio of accuracy, a weight is given to each clause based on four error types on the guideline: the higher severity, the less weight (Foster & Wigglesworth, 2016). While detecting smaller accuracy contrasts, it can account for both the severity and frequency of errors. Evans et al. (2014) argued that although the weighted ratio of accuracy is suggested to be a valid linguistic accuracy measure when compared to the ratio of error-free clauses and the ratio of error-free T-units, it fails to differentiate different proficiency levels as thoroughly as the ratio of error-free clauses.

This dissertation assesses L2 learners' writing performance among four writing tasks in two types of tasks. Given that the tasks were not aimed at measuring the specific use of forms, the general measures would perform more sensitively to the differences in experimental conditions, thereby detecting the weaker effects on more variance (Foster & Skehan, 1996). Based on the above reasons, in this dissertation, accuracy was analysed by calculating the total number of errors per 100 words (all errors/ words) 100. This measure was used in recent studies

(Amelohina et al., 2020; Sánchez et al., 2020; Vasylets, 2017; Vasylets & Marín, 2021). As a global and objective measure that quantifies the overall accuracy, it allows us to compare accuracy with previous studies over different populations and tasks. However, counting the number of errors can be challenging since raters can have disagreements regarding error identification (Polio, 1997). In terms of classifying the type of error a learner makes, Polio (1997) presented a comprehensive description that helps use the accuracy measures, covering word order, word form, word choice, modals, tense/aspect, modifier, article, preposition, quantity words, punctuation, voice, ambiguous reference, sentence fragment, agreement and pragmatic errors. These guidelines have been further modified in a shorter version with examples provided by Polio and Shea (2014). Following Vasylets (2017), we counted all types of errors in this dissertation without distinguishing between different error types according to the modified error-coding guidelines (Polio & Shea, 2014); however, spelling and punctuation errors were not counted.

6.5.2.4 Measuring fluency

Fluency was first used to measure spoken language and, historically and informally, describe the characteristics of a generally proficient L2 user (Chambers, 1997). According to Wolfe-Quintero et al. (1998), fluency captures the real-time processing of language by learners, emphasizing the primacy of meaning; as such, it is associated with the production pressures placed on language users when communicating a message in either writing or speaking. In ISLA, four measures of speaking fluency proposed by Skehan (2003) were adopted regularly: (1) breakdown fluency or pausing, (2) repair fluency, (3) speech rate, and (4) length of bursts occurring between pauses. Derived from speaking fluency measures, writing fluency measures were often restricted to the product-based indicators in terms of rate (e.g., the number of words per minute of the final produced text) and length (e.g., number of words per production unit) (Lennon, 1990; Wolfe-Quintero et al., 1998). In Wolfe-Quintero et al.'s (1998) view, fluency measures the sheer number of words or structural units that learners are able to write in timed writing; in other words, learners with a higher proficiency tend to produce more words and

more structures regardless of their sophistication and accuracy. However, such fluency measurement of written production can be controversial, given that writers are allowed to spend more time on planning, monitoring and editing, which do not consider the real-time dimension (Latif, 2013; Michel, 2017). Accordingly, newer studies used process-based measures that draw on the online observation of composing processes (Révész et al., 2019; Révész, Kourtali, et al., 2017). Such measures allow for reviewing the pausing behaviours and underlying cognitive processes.

In our opinion, either of the above measures can adequately and satisfactorily represent writing fluency in a strict sense adequately and satisfactorily since fluency is viewed as a multifaceted construct with subcomponents (Skehan, 2003, 2009). In this dissertation, we intended to identify and describe the changes in writing fluency, and thus objective and product-based indicators are needed. Following the previous research on L2 task-based writing (Nitta & Baba, 2014; Ruiz-Funes, 2014; Vasylets et al., 2020), we calculated the speed fluency (the words per min) and the length-based fluency (the total number of words) to assess writing fluency.

6.5.2.5 Measuring overall text quality

The holistic measures of text quality have been suggested to be more predictive for L2 writing development over time (Bulté & Housen, 2014). While previous studies have mostly adopted quantitative CAF measures to assess for writing quality, others employed subjective ratings of overall text quality (Bulté & Housen, 2014; Crossley & McNamara, 2014; Vasylets & Marín, 2021), which often cover different analytical features including content, organisation, vocabulary and language use. Following Vasylets & Marín (2021), this dissertation adopted the Independent Writing Rubrics from TOEFL iBT as rating criteria. The overall text quality of writing considered topic development, organization, progression and coherence, syntactic variety, word choice and grammar errors. Thus, the overall text quality of participants' written texts was rated holistically by the author on a 5-point scale based on the selected criteria. The author was experienced in using TOEFL iBT writing rubrics and paid attention to whether the

written texts met the task requirement and demonstrated enough thinking about the topic. For the holistic quality rating, written samples were scored in the order of the tasks; the author read the writing prompt carefully and scored participants' written texts in random order. With the use of rating rubrics, the author checked each performance descriptor and assigned a corresponding holistic score to the participants' essays.

6.5.2.6 Intra-rater reliability

We assessed the intra-rater reliability of the judge's ratings several months after the initial data analysis. Recoding was conducted on 30% of the data for those measures that need manual calculations, including the number of idea units, errors, and overall quality. According to Howell (2002), we looked at the intraclass correlation and used Cronbach's alpha as the measurement of intra-rater reliability. The obtained Cronbach's alpha demonstrated good and even excellent reliability (range = .79-.99) (Table 6.7).

Table 6. 7 Cronbach's alpha intra-rater reliability for the ratings of idea units, errors and overall quality

Measures	n	Task 1	Task 2	Task 3	Task 4
Idea units	7	.991	.997	.903	.999
Errors	7	.994	.995	.956	.991
Overall text quality	7	.964	.873	.853	.788

6.5.2.7 Summary of the measures used in the study

Table 6.8 summarises the CAF measures we employed to measure writing performance. Following the suggestions to avoid redundancy and multicollinearity, we used measures that are likely to gauge different subcomponents. In terms of lexical complexity, we analyzed lexical variety, lexical richness and lexical sophistication using RANGE software (Nation, 2006).

Syntactic complexity was analyzed from general, clausal and phrasal perspectives. There are five measures employed: a general measure of complexity, two measures for subordination and coordination, a holistic measure of nominal complexity and a measure for phrasal elaboration. The first four variables were analyzed utilizing the Web-based L2 Syntactical Complexity Analyzer (Ai & Lu, 2013; Lu, 2010, 2011; Lu & Ai, 2015). Phrasal elaboration was analyzed using Coh-Metrix 3.0 (McNamara et al., 2014). Additionally, we measured propositional complexity in terms of the total number of idea units and the mean length of idea units. For accuracy, we calculated the total errors per 100 words. Writing fluency was operationalized in terms of speed fluency and length-based fluency. In this dissertation, we employed general and objective measures that enable writing performance to be quantified and compared with previous studies. At the same time, we assessed the overall text quality to tap into participants' writing development over time. In what follows, we will present the details of the statistical analyses.

Table 6. 8 Summary of measures used in the study

Lexical complexity	Lexical diversity	D- value
	Lexical sophistication	Advanced Guiraud
	Lexical richness	Index of Guiraud
Syntactic complexity	General complexity	Mean length of T-unit
	Subordination	Dependent clauses / total number of clauses
	Coordination	Coordinate phrases/total number of clauses
	Nominal complexity	Mean length of clauses
	Phrasal elaboration	Modifiers/noun phrase
Propositional complexity		Total number of idea units
		Mean length of idea units
Accuracy		Errors/ 100 words
Fluency		Words/min
		Number of words
Overall text quality		Holistic ratings (0-5)

6.6 Statistical analyses

This dissertation adopted both between-learners designs (i.e., provision vs. no provision of content support) and repeated measures (four writing tasks with two task types) to examine the effects of content support in L2 writing. In response to the first research question, we compared the differences between the two groups on all the measures for complexity, accuracy, fluency, and overall text quality and explored the changes in learners' performance over time. In the first stage, data screening and the test of normality were performed in SPSS (Version 27). Since our research contained a small sample size (i.e., under 50), a Shapiro-Wilk test (p> .05) from the normality results was used to assess the normality distribution among all data (Larson-Hall, 2015). The results of the Shapiro-Wilk test, combined with Z-scores of skewness and kurtosis (in the span of -1.96 and +1.96) (Cramer & Howitt, 2004), showed that 8 out of 14 measures (lexical complexity, coordination, nominal complexity, number of idea units, number of words, and holistic ratings) were not normally distributed.

Therefore, we compared the means of the two groups by using Mann-Whitney U Test which might be more power to investigate the effects of content support on the different performance areas (see Larson-Hall, 2015). Additionally, we detected the developmental changes within groups by using both the paired-sample t-test, and Wilcoxon Signed Rank tests, depending on the normality of the distribution, following the statistical analysis in Révész (2011). The alpha level for all the tests was at .05 due to the relatively small sample size. Cohen's d was calculated for the t-test in order to measure the effect sizes, classified as .02 = small, .05 = medium and .80 = large, and r was calculated for Mann-Whitney and Wilcoxon tests, classified as .01 = small, .30 = medium, .50 = large, according to Cohen's (1992) guidelines.

To address the second research question, we calculated the descriptive statistics (means and standard deviations) for the retrospective questionnaire on metacognitive processes in writing. We intended to examine how the provision or absence of content support can influence L2 writers' deployment of writing processes. To detect whether writers deployed the cognitive writing processes differently, we calculated the mean frequencies of the metacognitive

processes and conducted Independent-Samples t-Test to detect the differences between two groups. Next, a series of Paired-Sample t-Test were performed to detect the changes in L2 writers' frequencies of engaging in the metacognitive processes from Task 1 to Task 4.

6.7 Chapter summary

In this chapter, we have offered a detailed account of the methodology of our current study, which guided us to address the research questions. First, we presented the learning context and proficiency level of the L2 learners involved in this study. We then introduced the design of content support, writing tasks, retrospective questionnaires, and semi-structure interviews, and emphasised the rationale for using these instruments in this study. This was followed by the data analysis of the interview recordings and written texts. We described the coding scheme and categories for interview data in relation to the cognitive writing processes. Also, we explained the rationale and methods of the analysis of written texts, which is followed by the detailed definitions of the measures of lexical, syntactic, and propositional complexity, accuracy, fluency and overall text quality. In line with Vasylets et al. (2017), we introduced the guidelines for the segmentation of discourse into idea units and gave examples according to several criteria. Lastly, we presented the statistical tests used in our study. In the following chapter, we will introduce the results related to the participants' written products and the deployment of writing processes.

CHAPTER 7 RESULTS

In this chapter, we present the results for the effects of task complexity, which was operationalised by +/- content support, on L2 writing performance and processes, answering each research question formulated in Chapter 5 separately. First, it presents the results of the effects of content support on L2 writing performance in terms of linguistic complexity, propositional complexity, accuracy, fluency and overall text quality. The results were obtained for the comparison of the writing performance of the content support group and the no content support group, as well as the within-group changes in writing performance from Task 1 and Task 4. Second, we present the results of writers' responses on the task perceptions and metacognitive processes from the retrospective questionnaires, as well as the comments of the sub-group of the participants (N = 12) on writing processes (i.e., planning, translation, monitoring) from the semi-structured interviews. In the last section, we provide a summary of all the findings.

7.1 Research Question 1

Our first research question asked how content support would affect the L2 written production in terms of lexical, syntactic and propositional complexity, accuracy, fluency (text length and writing speed), and overall text quality (rating by 5-point scales). To answer this research question, we explored whether there were (1) any differences of writing performance between the two task conditions (provision vs. no provision of content support) and (2) any developmental changes within the groups. We predicted higher lexical complexity, higher syntactic complexity, higher accuracy and higher overall text quality under the condition of providing content support. We proposed a non-directional hypothesis for propositional complexity and a null hypothesis for fluency. Regarding the within-group changes over four weeks, a non-directional hypothesis was advanced. Table 7.1 provides the means and standard deviations (SD) of CAF measures among four tasks.

Table 7. 1 Descriptive statistics for the L2 writing performance of the NCS group and the CS group from Task 1 to Task 4

	Measure		NCS (n = 13)				CS (n = 11)			
			Task 1	Task 2	Task 3	Task 4	Task 1	Task 2	Task 3	Task 4
Lexical complexity	D value	M	69.26	67.03	57.05	69.21	77.46	82.89	71.15	58.55
		SD	10.04	16.43	11.33	20.54	22.37	11.77	21.47	5.84
	Index of Guiraud	M	7.21	7.45	6.82	7.30	6.86	7.81	7.04	7.23
		SD	0.66	0.89	0.74	0.71	0.98	0.57	0.83	0.44
	Advanced Guiraud	M	0.59	0.83	0.77	0.83	0.76	0.90	0.86	0.80
		SD	0.29	0.42	0.44	0.53	0.33	0.38	0.40	0.32
Structural complexity	Mean length of T-unit	M	13.25	11.58	12.47	13.39	12.96	11.08	12.25	12.77
		SD	1.86	1.86	1.56	2.16	2.22	1.73	2.04	2.47
	Dependent clauses/Total N of clauses	M	0.32	0.34	0.32	0.37	0.29	0.29	0.29	0.30
		SD	0.10	0.09	0.10	0.09	0.11	0.10	0.08	0.12
	Coordinate phrases/Total N of clauses	M	0.18	0.17	0.15	0.24	0.17	0.24	0.24	0.20
		SD	0.10	0.13	0.07	0.18	0.13	0.09	0.15	0.05
	Modifiers/Noun phrase	M	0.75	0.69	0.72	0.72	0.79	0.67	0.63	0.65
		SD	0.17	0.16	0.15	0.13	0.21	0.13	0.12	0.12
	Mean length of clauses	M	9.33	7.88	8.34	8.65	9.10	7.66	8.59	8.62
		SD	1.66	1.09	1.24	1.29	1.74	0.96	1.29	0.60
Propositional complexity	Total N of IU	M	21.69	25.15	22.77	22.69	19.18	22.91	21.00	24.27
		SD	4.71	6.36	3.56	5.34	6.40	5.41	4.92	5.95
	Mean length of IU	M	9.27	8.33	8.45	8.44	9.51	7.90	8.60	8.18
		SD	0.66	1.02	0.89	0.74	1.33	1.02	0.61	1.14
Accuracy	N of errors/100 words	M	9.49	11.45	11.68	8.96	9.83	12.36	10.31	10.32
		SD	3.74	4.09	3.81	2.77	3.37	2.30	4.22	3.42
Fluency	N of words	M	199.54	205.15	192.15	190.62	177.36	177.64	181.64	194.73
		SD	36.89	38.42	35.08	44.29	51.98	36.84	45.49	39.31
	Words/ min	M	6.64	6.06	6.59	7.11	6.16	5.23	6.13	6.84
		SD	1.90	1.55	1.71	2.69	1.88	1.26	1.80	2.23
Holistic Rating		M	3.23	3.08	3	2.62	2.27	2.64	3.09	3.09
		SD	0.83	1.04	1.00	1.04	1.01	1.03	1.14	0.70

Note. NCS = no content support group; CS = content support group.

From the descriptive statistics of writing performance, we found several differences in lexical diversity, lexical richness, coordination, total number of words, and holistic scores of text quality between the two groups among four tasks. We then compared the writing performance between the two groups in order to examine whether there were any significant differences between the provision of content support and the absence of content support. To this end, we conducted the Mann-Whitney U tests which might be more power to investigate the effects of content support on the different performance areas (i.e., complexity, accuracy and fluency) (see Table 7.2) when 8 out of 14 measures were not normally distributed (see Larson-Hall, 2015).

Table 7. 2 The Mann-Whitney U tests results for the between-group differences from Task 1 to Task 4

Measure		Task 1			Task 2			Task 3			Task 4		
		z	*p*	*r*	*z*	*p*	*r*	*z*	*p*	*r*	*z*	*p*	*r*
Lexical complexity	D value	-1.21	0.226	-0.25	-2.64	0.008**	-0.54	-1.88	0.06	-0.38	-1.48	0.14	-0.30
	Index of Guiraud	-1.13	0.259	-0.23	-1.19	0.235	-0.24	-0.38	0.706	-0.08	-0.32	0.75	-0.07
	Advanced Guiraud	-1.65	0.099	-0.34	-0.72	0.469	-0.15	-0.84	0.401	-0.17	-0.15	0.885	-0.03
Structural complexity	Mean length of T-unit	-0.84	0.401	-0.17	-0.15	0.885	-0.03	-0.49	0.622	-0.10	-0.78	0.434	-0.16
	Dependent clauses/Total N of clauses	-0.58	0.562	-0.12	-0.90	0.369	-0.19	-0.78	0.433	-0.16	-1.33	0.182	-0.27
	Coordinate phrases/Total N of clauses	-0.17	0.862	-0.04	-1.68	0.093	-0.34	-1.80	0.072	-0.37	-0.41	0.685	-0.08
	Modifiers/Noun phrase	-0.15	0.885	-0.03	-0.23	0.817	-0.048	-1.54	0.125	-0.31	-1.07	0.284	-0.22
	Mean length of clauses	-0.38	0.706	-0.08	-0.52	0.602	-0.11	-0.55	0.582	-0.11	-0.49	0.622	-0.10
Propositional complexity	Total N of IU	-0.73	0.467	-0.15	-0.73	0.468	-0.15	-0.99	0.32	-0.20	-0.73	0.467	-0.15
	Mean length of IU	-0.23	0.817	-0.05	-1.07	0.284	-0.21	-1.07	0.284	-0.22	-0.61	0.543	-0.12
Accuracy	N of errors/100 words	-0.49	0.622	-0.1	-0.20	0.839	-0.04	-1.01	0.311	-0.20	-0.78	0.434	-0.16
Fluency	N of words	-0.78	0.434	-0.16	-1.83	0.068	-0.37	-0.03	0.977	-0.01	-0.26	0.794	-0.05
	Words/ min	-0.35	0.728	-0.07	-1.30	0.192	-0.27	-0.28	0.782	-0.06	-0.49	0.622	-0.10
Text quality	Holistic ratings	-2.29	0.022*	-0.47	-0.95	0.341	-0.19	-0.33	0.74	-0.07	-1.16	0.245	-0.24

Note.$p < .05$, **$p < .01$.

The first research question also concerned whether the provision of content can drive changes in writing performance over time. We compared the within-group variations of CAF measures and holistic scores from Task 1 to Task 4. Again, given that not all the variables are normally distributed, following Révész's (2011) statistics analysis, we employed both the Paired-Sample t-Test and Wilcoxon Signed Rank tests to detect the within-group changes in writing performance. The pairwise results revealed significant changes in lexical diversity, phrasal elaboration, propositional complexity, fluency, and overall text quality from Task 1 to Task 4 (see Table 7.3 and Table 7.4).

Table 7. 3 Wilcoxon Signed Rank tests results for the measures that are not normally distributed

Measures		NCS (n = 13)			CS (n = 11)		
		z	p	r	z	p	r
Lexical diversity	D value	-0.45	.650	0.09	-2.19	.028*	0.49
	Index of Guiraud	-0.31	.753	0.06	-1.33	.182	0.28
	Advanced Guiraud	-1.85	.064	0.36	-0.71	.477	0.15
Syntactic complexity	Coordinate phrases/Total N of clauses	-0.80	.422	0.16	-0.98	.328	0.21
	Mean length of clauses	-1.71	.087	0.34	-0.62	.534	0.13
Propositional complexity	N of IU	-0.18	.86	0.04	-2.67	.01*	0.57
Fluency	N of words	-0.75	.46	0.15	-1.96	.05*	0.42
Overall text quality	Holistic rating	-1.84	.066	0.36	-2.71	.007**	0.58

*Note. *p < .05, **p < .01. NCS = no content support group; CS = content support group.*

Table 7. 4 Paired-sample t-test results for the measures that are normally distributed

Measures		NCS (n = 13)				CS (n = 11)			
		t	*p*	*CI.95*	*d*	*t*	*p*	*CI.95*	*d*
Syntactic complexity	Mean length of T-unit	-0.22	.827	[-1.54, 1.26]	0.06	0.43	.677	[-0.80, 1.18]	0.13
	Dependent clauses/ Total N of clauses	-1.26	.231	[-0.14, 0.04]	0.35	-0.25	.811	[-0.11, 0.09]	0.07
	Modifiers/ noun phrase	0.84	.419	[-0.06, 0.14]	0.23	2.50	.031*	[0.02, 0.27]	0.75
Propositional complexity	Mean length of IU	2.35	.037*	[0.06, 1.60]	0.65	5.71	0***	[0.81, 1.85]	1.72
Accuracy	Errors/ 100 words	0.66	.522	[-1.21, 2.26]	0.18	-0.45	.665	[-2.95, 1.96]	0.14
Fluency	Words./min	-0.60	.56	[-2.21, 1.26]	0.17	-1.86	.09	[-1.50, 0.14]	0.56

*Note. *p < .05, **p < .01, ***p < .001. NCS = no content support group; CS = content support group.*

7.1.1 Effects on lexical complexity

First examined are the effects of content support on lexical complexity. The results for lexical diversity, lexical richness and lexical sophistication are illustrated in Figure 7.1, 7.2, and 7.3. The CS group obtained greater lexical diversity in terms of the D value among Task 1, 2 and 3, compared to the NCS group (see Figure 7.1). In particular, only the means of D value in Task 2 turned out to be significantly different between the two groups ($z = -2.64$, $p < .01$) with a large effect size ($r=.54$). Learners also produced more lexically diverse language with content support than those without content support in Task 3. However, the difference was not statistically significant ($z = -1.88$, $p = .06$, $r = .38$).

Figure 7. 1 Results for lexical diversity between two groups
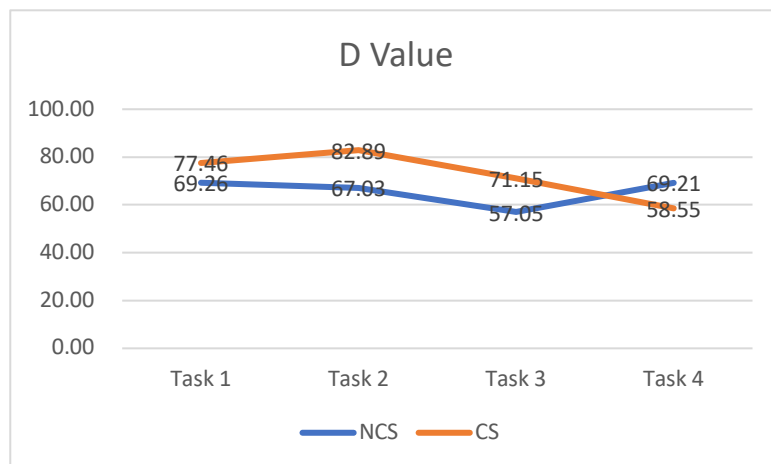
We found the CS group produced higher lexical richness in terms of the index of Guiraud in Task 2 and Task 3 (Figure 7.2). Yet, there were no statistically significant differences found between the two groups.

Figure 7. 2 Results for lexical richness between two groups
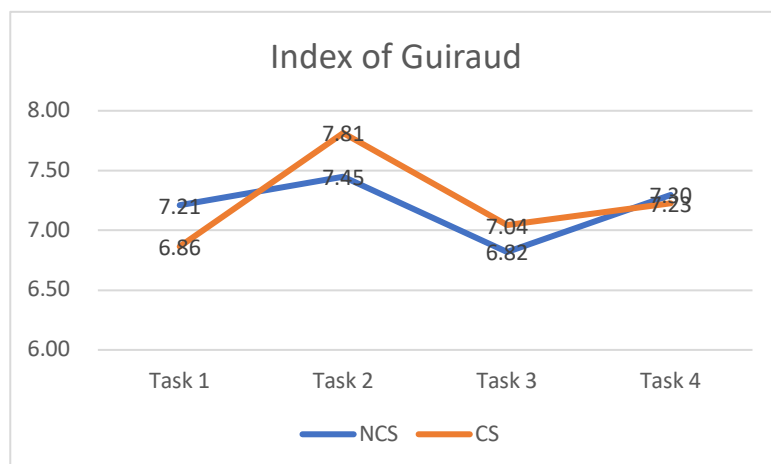
Lastly, regarding lexical sophistication, although the CS group produced slightly higher values of Advanced Guiraud from Task 1 to Task 3, the findings showed no marked differences between the two groups (Figure 7.3).

Figure 7. 3 Results for lexical sophistication between two groups
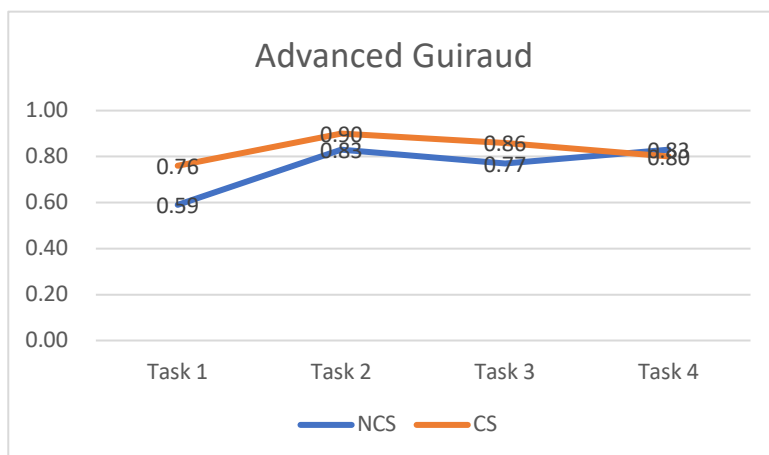
With regards to the effects of content support on lexical indices over time, we found content support resulted in a significant decrease in lexical diversity ($z = -2.19$, $p < .05$) with a nearly large effect size ($r = .49$). On the other hand, the absence of content support showed stability between Task 1 and Task 4. Regarding lexical richness, the performance of the two groups demonstrated a similar but fluctuating trend during this period. A close look at the graphs shows that both the NCS and the CS groups produced higher values in Task 2 and Task 4 (i.e., the article writing tasks). However, there were no significant differences found in lexical richness of the two groups from Task 1 to Task 4. Lastly, in terms of lexical sophistication, while the CS group demonstrated stable results of Advance Guiraud, the NCS group showed a slightly upward trend over time. However, no significant differences were detected in the changes regarding lexical sophistication.

7.1.2 Effects on syntactic complexity

As for coordination (measured by coordinate phrases to the total number of clauses), the CS group showed a tendency toward higher values in Task 2 ($z = -1.68$, $p = .093$, $r = 0.34$) and Task 3 ($z = -1.80$, $p = .072$, $r = .37$) than the NCS group (Figure 7.4). However, these differences did not reach a significant level.

Figure 7. 4 Results for coordination between two groups

Coordinate phrases/Total N of clauses
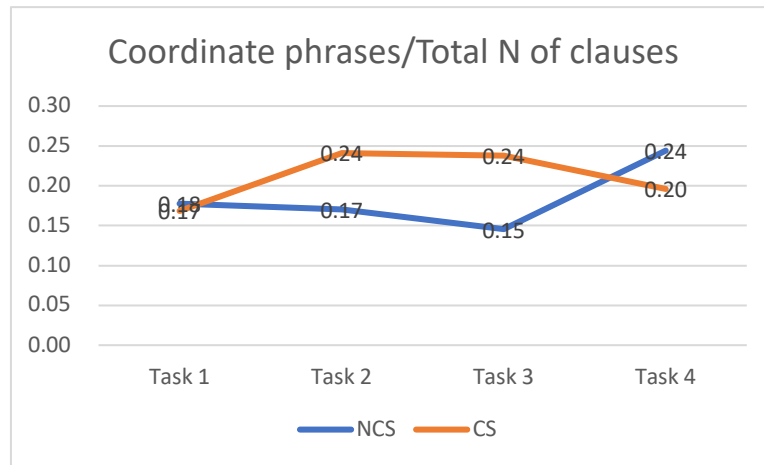
In terms of subordination, the NCS group produced slightly greater dependent clauses to the total number of clauses than the CS group (Figure 7.5).

Figure 7. 5 Results for subordination between two groups

Dependent clauses/Total N of clauses
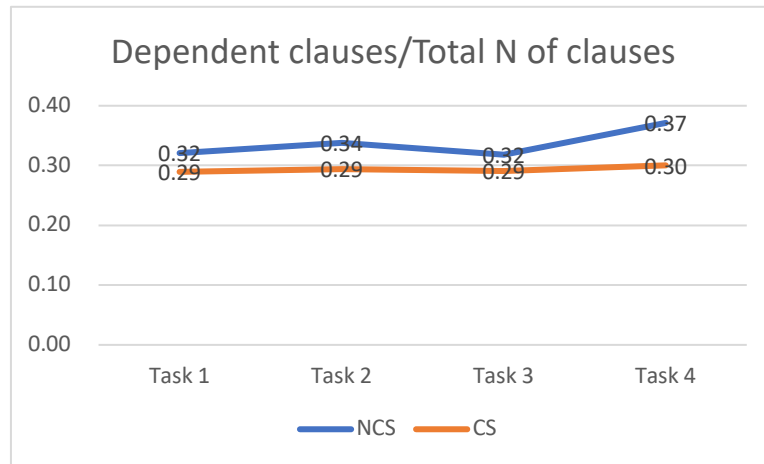
Besides, we can observe that the NCS group and the CS group showed similar performance where general complexity, phrasal elaboration, and nominal complexity were concerned (see Figure 7.6, 7.7, and 7.8).

Figure 7. 6 Results for general complexity between two groups

Mean length of T-unit
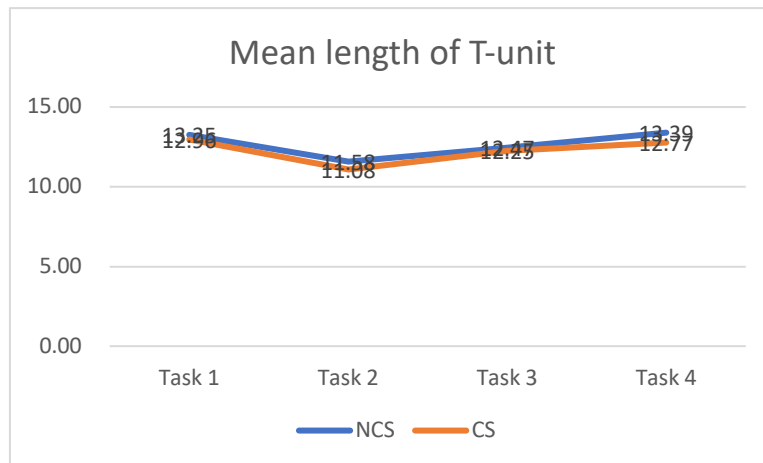
Figure 7. 7 Results for phrasal elaboration between two groups

Modifiers/Noun phrase
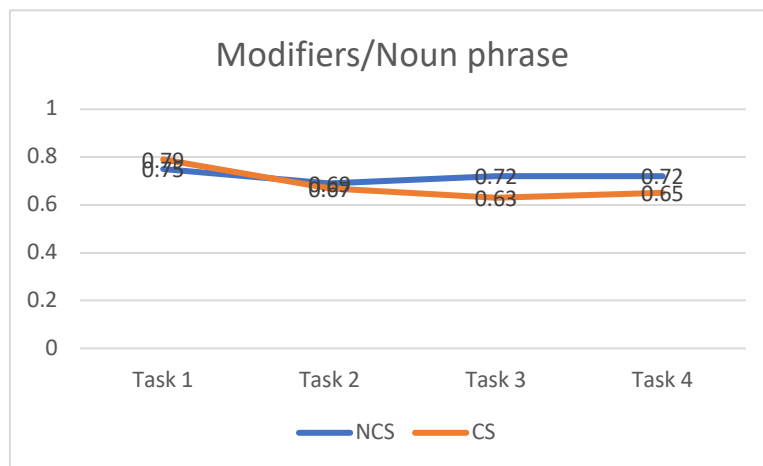
Figure 7. 8 Results for nominal complexity between two groups


Mean length of clauses
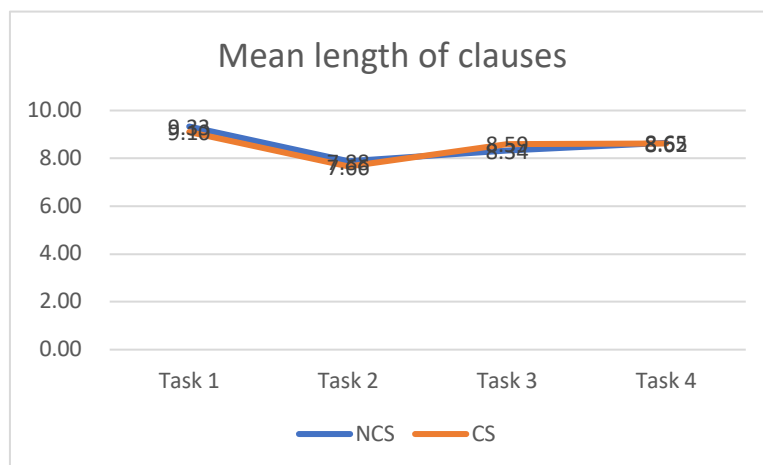
Regarding the within-group changes in syntactic complexity, both groups demonstrated stagnant patterns in the syntactic measures (except for phrasal elaboration, measured by Modifiers/ Noun phrase). The results suggest that the syntactic system of learners was stabilised over the four tasks. On the other hand, phrasal elaboration illustrated a significant decrease over four weeks in the CS group (t (10) = 2.50, $p < .05$, $d = 0.75$), while the NCS group presented a stagnant development over this period.

7.1.3 Effects on propositional complexity

Turning to propositional complexity, Figure 7.9 and 7.10 present the performance of the number of idea units and mean length of idea units. We found that the total number of idea units and the mean length of idea units were comparable between two groups among four tasks. However, our longitudinal observation reveals that the number of idea units exhibited a significant increase under the condition of providing content support ($z = -2.67$, $p = .01$) with a large effect size ($r = .57$). At the same time, there was stability from Task 1 to Task 4 when content support was absent.

Figure 7. 9 Results for propositional complexity (N of idea units) between two groups
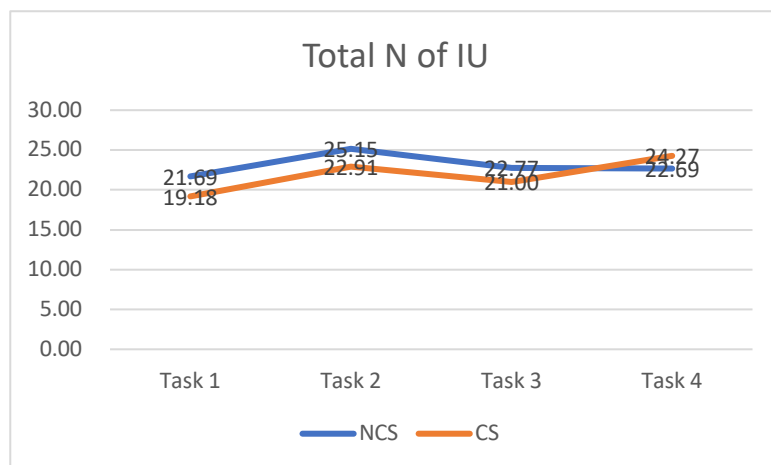
As for the mean length of idea units, both groups present a significant decrease over time (NCS group: t (12) = 2.35, $p < .05$, $d = 0.65$; CS group: t (10) = 5.71, $p < .001$, $d = 1.72$).

Figure 7. 10 Results for propositional complexity (Mean length of idea units) between two
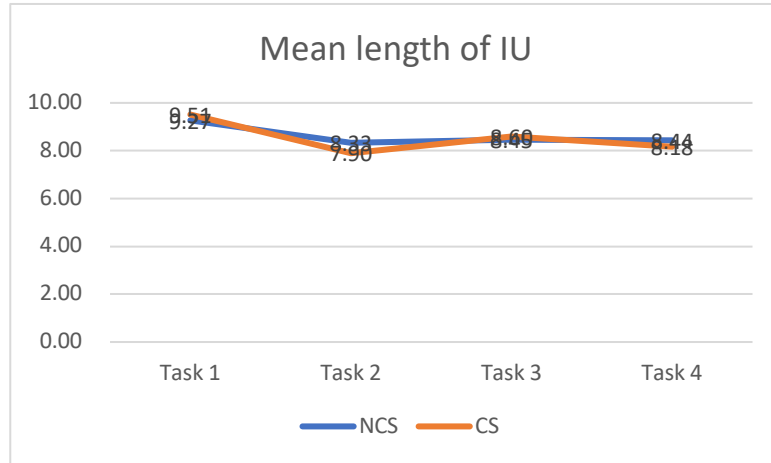
groups

7.1.4 Effects on accuracy

In terms of accuracy, no significant differences were detected in the number of errors per 100 words between the NCS group and the CS group (Figure 7.11). Regarding the effect of content support on accuracy over time, the performance of the two groups demonstrated fluctuating trends, while they did not exhibit significant changes from Task 1 to Task 4.

Figure 7. 11 Results for accuracy between two groups
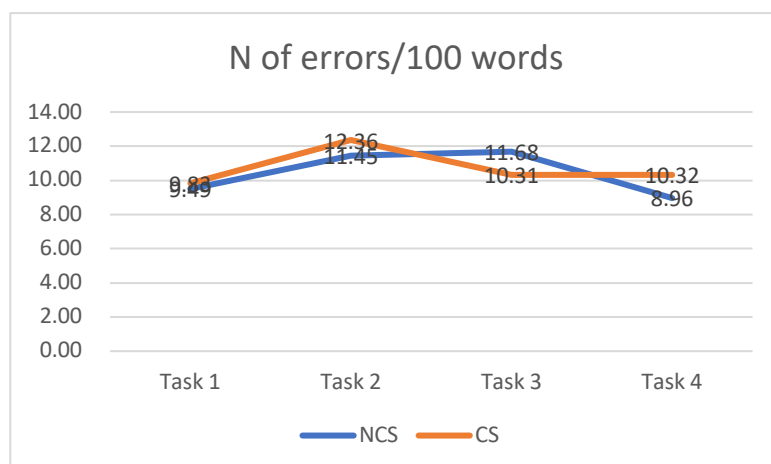
7.1.5 Effects on fluency

Regarding fluency, the results for text length and writing speed are illustrated in Figure 7.12 and 7.13. We notice that the NCS group generated more words than the CS group from Task 1 to Task 3. With the longest texts (M = 205.15, SD = 38.42) in Task 2, the difference between the two groups approached a significant level (z = -1.83, p = .068, r = .37). However, the CS group overtook the NCS group in Task 4 with the longest texts (M= 194.73, SD = 39.31). With regards to the effect of content support on fluency over time, the number of words exhibited a significant increase from Task 2 to Task 4 under the condition when content support was provided (z = -1.96, p = .05, r = .42), while there were no significant changes over when content support was absent. As for the writing speed, the two groups demonstrated similar and stable patterns during this period.

Figure 7. 12 Results for fluency (text length) between two groups
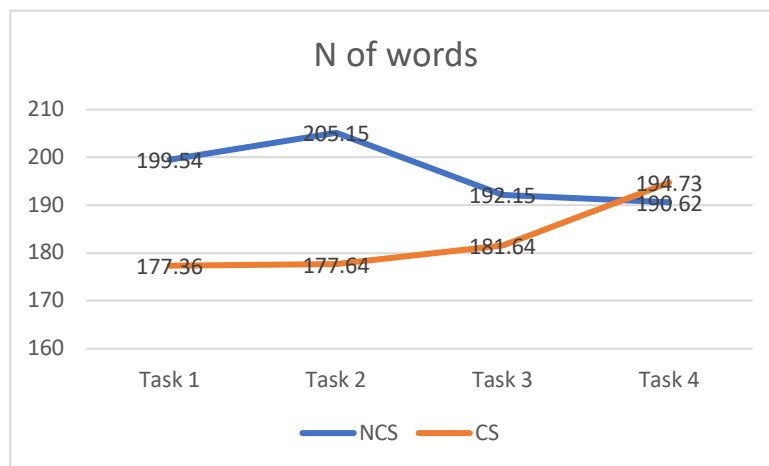
Figure 7. 13 Results for fluency (writing speed) between two groups
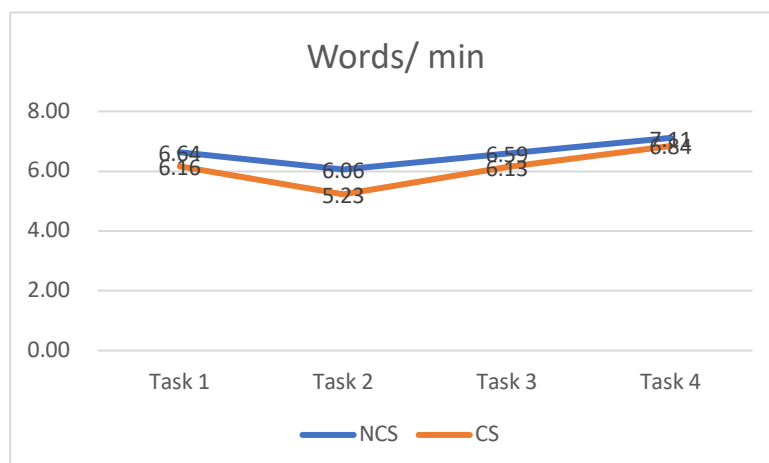
7.1.6 Effects on overall text quality

Last examined is the effect of content support on the overall text quality (Figure 7.14). We find that the NCS group obtained greater holistic ratings in Task 1 and Task 2 than the CS group. In particular, the NCS group scored significantly higher ($z = -2.29$, $p < .05$, $r = .47$) in Task 2. However, the CS group outperformed the NCS group in Task 4, but the difference was not statistically significant. Our longitudinal observations revealed that the overall text quality significantly increased over time when content support was provided ($z = -2.71$, $p < .01$, $r = .58$). On the other hand, the absence of content support showed a downward pattern in the overall text quality from Task 1 to Task 4.

Figure 7. 14 Results for overall text quality between two groups
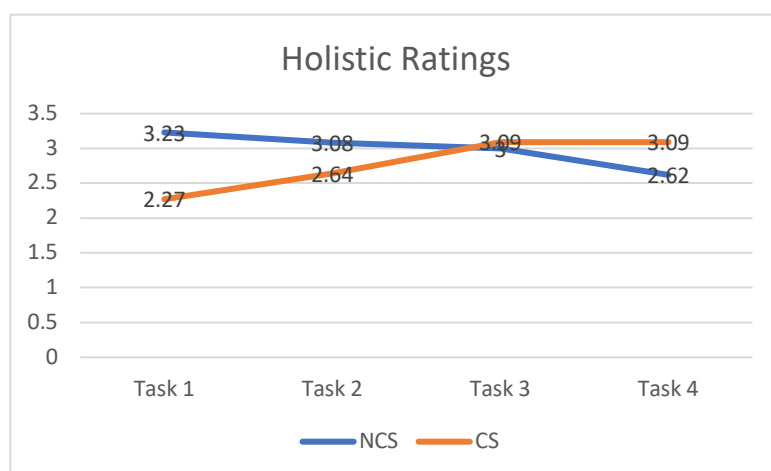
7.2 Research Question 2

Our second research question aims to explore how content support would affect the nature and deployment of L2 writing processes. To answer this question, we employed retrospective questionnaires immediately after each writing task and semi-structural interviews with a sub-sample (N = 12) from both groups at the end of the writing session to tap into L2 writing cognition. We aimed to explore whether there were (1) any differences in mean frequencies of the metacognitive processes between the NCS group and the CS group, (2) any changes in the L2 writers' deployment of metacognitive processes over time when content support was provided or absent, and (3) any differences in the distribution of writers' comments on writing

processes between the two groups. Given the lack of empirical evidence on content support and writing processes, we proposed a non-directional hypothesis for L2 writers' deployment of writing processes. Table 7.5 presents the descriptive statistics of frequencies of five metacognitive processes and task perceptions of L2 writers in the conditions with and without content support.

Table 7. 5 Descriptive statistics of the mean frequencies of five metacognitive processes and task perceptions of the NCS group and the CS group

Variables	Task 1		Task 2		Task 3		Task 4	
	NCS	CS	NCS	CS	NCS	CS	NCS	CS
	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)	M(SD)
Ideas generation	5.85	5.36	5.92	5	6.08	4.64	6	5.09
	(1.82)	(1.86)	(2.33)	(1.16)	(1.71)	(1.50)	(2.04)	(1.30)
Ideas elaboration	5.77	5.91	5.77	5.09	6	5	5.69	5
	(2.17)	(1.14)	(2.13)	(1.58)	(1.78)	(1.27)	(1.84)	(1.34)
Ideas organisation	4.85	4.45	5.62	4.64	5.62	4.55	4.85	4.91
	(2.12)	(1.44)	(2.29)	(1.36)	(1.61)	(1.37)	(2.23)	(1.04)
Essay structure	4.69	4.55	5.54	4.7	5.69	4.82	5.31	5
	(2.06)	(2.25)	(2.30)	(1.70)	(1.84)	(1.33)	(2.10)	(1.41)
Language aspects of the task	5.23	5.73	6.31	5.36	6.46	4.73	6	4.73
	(2.35)	(1.42)	(1.84)	(1.69)	(1.45)	(1.27)	(2.12)	(1.56)
Mental effort	5.69	5.64	5.85	5	5.31	5.36	5.31	5
	(2.53)	(2.06)	(2.34)	(2.34)	(2.43)	(1.50)	(2.72)	(1.18)
Difficulty	4.15	4.09	4.69	5.45	4.92	4.45	5	5.64
	(1.95)	(1.30)	(1.80)	(1.37)	(2.18)	(1.21)	(2.55)	(1.21)
Usefulness of content support		6.64		5.36		5.55		5.09
		(1.43)		(1.91)		(1.81)		(1.38)

Note. NCS = no content support group; CS = content support group.

Also, we calculated the mean frequencies of the metacognitive processes deployed by writers. To determine the impact of content support on L2 writing processes, we conducted the Independent-Samples t-Test to detect the differences in the mean frequencies of metacognitive processes and ratings on task perceptions between the two groups; however, no significant differences were detected. Table 7.6 presents the mean frequencies of the metacognitive

processes, ratings on task perceptions, and the Independent-Samples t-Test results between the two groups. As for the changes in L2 writers' deployment of writing processes over time, we conducted a series of Paired-Sample t-Tests to detect the within-group differences from Task 1 to Task 4. Results will be presented below in separate sections.

Table 7. 6 The mean frequencies and Independent-Samples t-Test results for the five metacognitive processes and ratings on task perceptions between the two groups

Variables	NCS (n = 13) M(SD)	CS (n = 13) M(SD)	Comparison (t-test)		
			t	p	*d*
Ideas generation	5.96 (1.67)	5.02 (1.30)	1.51	.144	0.62
Ideas elaboration	5.81 (1.72)	5.25 (1.02)	0.94	.357	0.39
Ideas organisation	5.23 (1.60)	4.64 (1.01)	1.07	.298	0.44
Essay structure	5.31(1.57)	4.80 (1.30)	0.83	.416	0.35
Language aspects of the task	6 (1.48)	5.14 (1.25)	1.52	.142	0.62
Mental effort	5.54 (2.36)	5.25 (1.50)	0.35	.730	0.14
Difficulty	4.69 (1.81)	4.91(1.06)	-0.35	.730	-0.14
Usefulness of content support		5.66 (1.34)			

Note. NCS = no content support group; CS = content support group.

7.2.1 Effects of the manipulation of content support on task perceptions

The mean ratings on task perceptions in terms of mental effort, task difficulty, and the usefulness of content support and the Paired-Samples t-Test results of participants' responses were presented in Table 7.7 and Figure 7.15. Our assumption was that writing tasks provided with content support would require less mental effort from L2 writers and reduce task difficulty. The results of the self-reported ratings over four weeks revealed that the CS group reported less mental effort (M = 5.25, SD = 1.50) in the writing practices compared to the NCS group (M = 5.54, SD = 2.36). Surprisingly, the CS group perceived the tasks to be more difficult (M = 4.91, SD = 1.06) than the NCS group (M = 4.69, SD = 1.81). However, the Independent-Samples t-Tests confirmed that the above differences between the two groups did not reach statistical

significance. In addition, the provision of content support in writing tasks was perceived to be fairly useful (M = 5.66, SD = 1.34).

Table 7. 7 The Paired-Samples t-Tests result in participants' responses to the task perceptions

| Variables | Task 1- Task 4 | | | | | |
| | NCS (n = 13) | | | CS (n = 11) | | |
	t	p	d	t	p	d
Mental effort	-0.75	.468	0.21	-1.40	.190	-0.42
Difficulty	1.72	.111	0.48	7.46	<.001***	2.25
Usefulness of content support				-3.14	.011*	-0.95

*Note. *p < .05, **p < .01, ***p < .001. NCS = no content support group; CS = content support group.*

Figure 7. 15 Results for the mean frequency of task perceptions
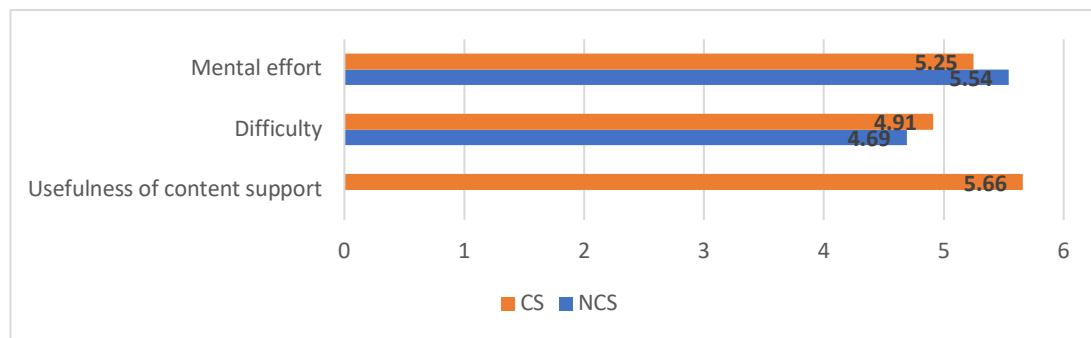
We observe that the manipulation of content support led to significant changes in participants' perceptions of task difficulty and the usefulness of content support. The Paired-Samples t-Tests indicated that after four writing tasks, the CS group reported significantly higher task difficulty with the provision of content support (t (10) = 7.46, p < .001, d = 2.25). In addition, content support was perceived to be significantly less helpful over this period (t (10) = -3.14, p = .011, d = 0.95). The changes in usefulness and task difficulty indicated large effect sizes. Lastly, both groups reported an overall downward trend in the mental effort required for task completion, but changes in the two groups did not reach statistical significance.

7.2.2 Effects of the manipulation of content support on the frequencies of the metacognitive processes

Table 7.8 and Figure 7.16 present the mean frequencies and the Paired-Samples t-Tests result of frequencies of five metacognitive processes of L2 writers in the conditions with and without content support. We hypothesized that the lack of content support in writing tasks would lead to higher conceptual demands on L2 writers in the planning process, which might engage them more frequently in the metacognitive processes.

Table 7. 8 The mean frequency and the Paired-Samples t-Tests result in participants' responses to the metacognitive processes

Variables	Task 1- Task 4					
	NCS (n = 13)			CS (n = 11)		
	t	p	d	t	p	d
Ideas generation	0.28	.781	0.08	-0.52	.614	-0.16
Ideas elaboration	-0.16	.877	0.04	-2.47	.033*	-0.75
Ideas organisation	.000	1.000	0.00	1.46	.176	0.44
Essay structure	0.80	.436	0.22	0.59	.567	0.18
Language aspects of the task	0.94	.365	0.26	-2.24	.049*	-0.67

*Note. *p < .05. NCS = no content support group; CS = content support group.*

Figure 7. 16 Results for the mean frequency of metacognitive processes
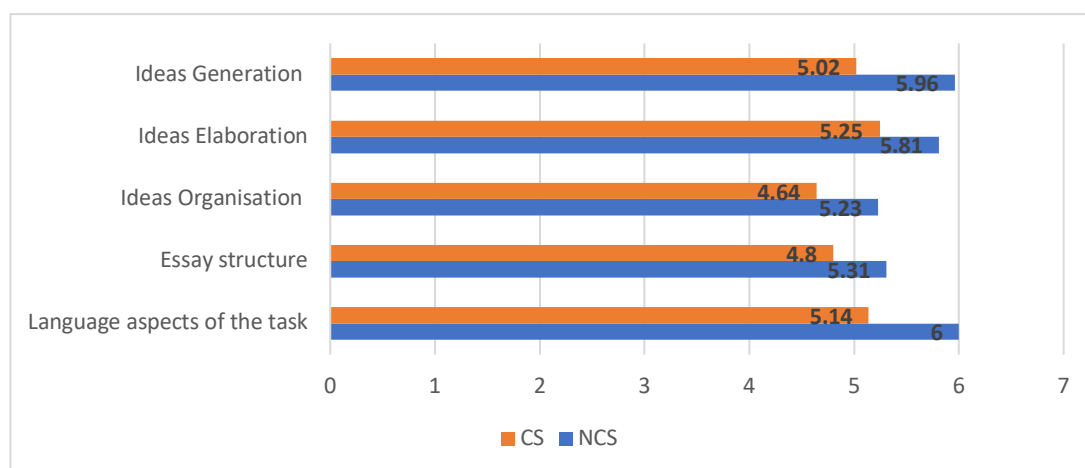
First, regarding the mean frequencies of idea generation, elaboration, and organisation, the means of participants' ratings indicated that the NCS group reported higher frequencies in these aspects than the CS group. In particular, the highest mean frequency reported by the NCS group was on idea generation (M = 5.96, SD = 1.67), followed by idea elaboration (M = 5.81, SD = 1.72). In contrast, the lowest mean frequency reported was on idea organisation (M = 5.23, SD = 1.60). On the other hand, under the condition of content support, participants reported the highest mean frequency was on idea elaboration (M = 5.25, SD = 1.02), but the lowest mean frequency was on idea organisation (M = 4.65, SD = 1.01).

With regard to the frequency of thinking about the essay structure, the means of the four responses revealed that the NCS group (M = 5.31, SD = 1.57) engaged in this aspect more frequently than the CS group (M = 4.80, SD = 1.30). As for the frequency of thinking about the language aspects of the task, compared to the condition when content support was available (M = 5.14, SD = 1.25), the lack of content support led to a higher mean frequency (M = 6, SD = 1.48), which was also the highest mean reported across the five metacognitive processes.

In the meantime, the manipulation of content support was found to lead to significant changes in L2 writers' deployment of cognitive processes. The Paired Samples t-Tests revealed that after four writing tasks, the CS group reported thinking about idea elaboration less frequently (t (10) = -2.47, $p < 0.05$, $d = 0.75$) with the abrupt decline from Task 2. They also reported engaging less in thinking about the language aspects of the task (t (10) = -2.24, $p < 0.05$, $d = 0.67$). The effect size for these two aspects was moderate. On the other hand, the absence of content support led to the relatively stable mean frequencies in thinking about structure and language over time.

7.2.3 Effects of the manipulation of content support on participants' comments on writing processes

Table 7.9 provides the comments on the writing process from the sub-sample (N = 12) of both groups. It should be noted that these comments were obtained through the semi-structured interviews, where participants drew on guiding questions and their essays from the last two tasks for reflecting on their writing experience. Participants' comments were categorised into four groups—planning, translations, monitoring, and meta-comments—together with their subcategories. Regardless of the task complexity, the comparison of the number of comments between the two groups showed that the distribution of comments associated with planning, translation and monitoring is similar. To be specific, nearly 2/5 of the comments were associated with meta-comments, 1/3 of the comments referred to the planning process, and 1/5 described the translation operations, with the fewest comments concerning monitoring.

Under the condition of content support, the sub-sample of the CS group described the planning process in 35.38% of the comments, with 22.31% of the planning comments related to the content planning process and 10 % referring to planning organisation. This is followed by 17.69% of the comments describing the translation process, of which more comments focused on syntactic encoding (8.46%) than lexical retrieval (6.15%). On the other hand, when content support was absent, participants referred to the planning process (30.30%) less than those provided with content support. There were 13.64% of the planning comments focusing on planning content, while 12% of the comments were associated with planning organisation. The frequencies of these two subprocesses were similar. The lack of content support also produced more comments concerning the translation processes (20.45%) compared to the condition with content support. Of these translation comments, the most mentioned subprocess was lexical retrieval (9.85%), followed by syntactic encoding (8.33%).

Table 7. 9 Distribution of the subgroups' comments related to the writing processes

Category	CS Group (n = 6)		NCS Group (n = 6)	
	N	%	N	%
Planning				
Organisation	16	10.00%	13	12.12%
Thematic planning	6	3.08%	4	4.55%
Content	18	22.31%	29	13.64%
	40	*35.38%*	*46*	*30.30%*
Translation				
Lexical retrieval	13	6.15%	8	9.85%
Syntactic encoding	11	8.46%	11	8.33%
Other	3	3.08%	4	2.27%
	27	*17.69%*	*23*	*20.45%*
Monitoring				
Revision of the text	*10*	*5.38%*	*7*	*7.58%*
Meta-comment				
Noticing the gap	26	13.08%	17	19.70%
Proficiency	11	8.46%	11	8.33%
Overall positive emotions	3	4.62%	6	2.27%
Overall negative emotions	13	11.54%	15	9.85%
Audience	2	3.85%	5	1.52%
	55	*41.54%*	*54*	*41.67%*
Total	*132*	*100.00%*	*130*	*100.00%*

Note. NCS = no content support group; CS = content support group.

In terms of the meta-comments, the largest percentage of the comments under the condition with content support referred to noticing the gap (13.08%), followed by 11.54% of comments describing negative emotions in the writing and 8.46% of comments concerning the language proficiency. The complex condition, when content support was absent, generated more comments related to noticing the gap (19.70%) than the simple condition, followed by the reference to negative emotions (9.85%) and language proficiency (8.33%).

Furthermore, we extracted comments from the sub-sample of the CS group mentioning the use of content support from the interview data (Table 7.10). We found that content support was

primarily used for content generation (i.e., participants generated ideas through the supporting content) (N = 10). Interestingly, participants might not fully agree or accept the given content or ideas, thus avoiding rejecting the adoption of content support (N = 4). Besides, positive perceptions and evaluations of content support were mentioned (N = 6).

Table 7. 10 Examples of L2 writers' use of content support by coding category.

Content support use	Example	N
Generate Content	At the time I wrote this essay, I didn't really have any ideas, so I read the example (content support), and then after reading the example, I could think of something to write.	10
Rejection of Content Support	I can use (my ideas) to avoid those ... in the content support, I saw some points were not good.	4
Other	The example (content support) there also taught me how I should respond to the IELTS essay later on.	6

7.3 Summary of results

This dissertation aimed to explore whether and how task complexity, operationalised as provision vs. no provision of content, may influence L2 writing performance in terms of linguistic complexity, propositional complexity, accuracy, fluency and overall text quality, as well as L2 writers' deployment of writing processes. Our results on L2 written production showed that (1) content support led to significantly higher lexical diversity and a tendency toward higher coordination compared to the condition without content support; (2) the absence of content support showed a tendency toward longer texts than the provision of content support; (3) content support led to significant increases in the total number of words, the number of idea units and overall text quality over the four weeks, yet accompanied by decreasing lexical diversity, phrasal elaboration, and mean length of idea units; (4) the lack of content support demonstrated stability in the writing performance over the period. In terms of the results on writing processes, the main findings were that L2 writers who wrote without content support tended to report higher mental effort invested in the task and higher frequencies of the five metacognitive processes. On the other hand, the provision of content support reduced the cognitive processing load on the L2 writers and significantly lowered the pressure posed by

idea elaboration and language aspects over time. Finally, content support was reported to direct writers' attentional resources primarily to content planning rather than translation operations.

A discussion of these results will be provided in the next chapter.

CHAPTER 8 DISCUSSION

8.1 Aims of the chapter

In the previous chapter, we presented our results from L2 writers' written texts and the responses from self-report ratings and interviews separately. The current chapter seeks to provide interpretations of our results following the research questions and hypotheses that guided the study. The aims of our research were to explore whether and how task complexity, operationalized as presence vs. absence of content support, might affect L2 writing performance and the deployment of writing processes. To answer these questions, we employ Robinson's(2001b, 2011a) Cognition Hypothesis, Skehan's (1998) Limited Attentional Capacity Model, and models of speech production (Kormos, 2006; Levelt, 1989, 1993) to interpret our findings regarding the effects of content support on learners' attention allocation, which is reflected in complexity, accuracy, fluency and overall text quality of the L2 written production. Also, we explain the effect of the cognitive demands imposed by content support on the writing process in our study with Kellogg's (1996) model of writing and results from previous studies. Finally, we discuss the way content support may contribute to learning writing in the L2 and, in general, to overall language learning.

8.2 Research question 1: Effects of content support on L2 writing performance

The first research question to be addressed was concerned with the effects of task complexity, operationalised as the provision or absence of content support, on the L2 writing performance of learners. Learners' written texts were analysed for lexical, syntactic and propositional complexity, accuracy, fluency (production speed and length), and overall text quality (using 5-point holistic ratings). This dissertation defined *cognitive task complexity* as the inherent cognitive demands of a task that interact with learner characteristics, which has the same meaning as the term *cognitive load*—the amount of cognitive processing required for a task—in Sweller's (1988) Cognitive Load Theory. One of the assumptions of this theory is that

human's capacity for processing information is limited, and too much complexity would reduce working memory and affect the learning outcomes. In this dissertation, the provision of content support is expected to reduce the conceptual demands in writing. We regard content support as the resource-dispersing feature of task complexity since it provides the background knowledge of the topic (+/- prior knowledge). We hypothesized that there would be a higher conceptualization effort when content support is not provided. However, previous studies (Ong & Zhang, 2010; Révész, Kourtali, et al., 2017; Yoon, 2021) have not offered clear evidence of content support effects on L2 written production. In order to shed light on the on the effects of content support in writing tasks and fill in the gap in task complexity studies, we posed the following research question:

Research Question 1: What are the effects of the presence or absence of content support on L2 writing production, operationalised as complexity, accuracy and fluency?

A number of hypotheses were advanced for this research question based on the task-based models(Robinson, 2001b, 2011a; Skehan, 1998)), the writing model (Kellogg, 1996) and available empirical studies. Although the mixed findings were obtained by the existing studies, we hypothesized that the content support would increase lexical and syntactic complexity. Given the lack of available studies on task complexity and propositional complexity, a non-directional hypothesis was advanced. Given that Kellogg's (1996) model only allowed for predicting the effect of content support on revision behaviours, we followed Johnson's (2017) summary of the effects of resource-dispersing features of task complexity on accuracy and predicted content support would produce higher accuracy in the written production. Informed by the findings from previous studies that content support did not have significant effects on writing fluency (Ong & Zhang, 2010 & Révész et al., 2017; Jung, 2020), we proposed a null hypothesis for this research question. Lastly, based on the theoretical models of writing and empirical evidence on idea generation, text quality and writing (Crossley et al., 2016; Ong & Zhang, 2013), we predicted content support would increase overall text quality. In response to the call for longitudinal investigations of task complexity (see Johnson, 2021), we observed the written production of L2 writers over four weeks. Due the lack of empirical studies, we

proposed a non-directional hypothesis for the within-group changes in the performance measures. We hypothesized that the provision or absence of content support would produce different effects in writing performance over the four weeks.

The analysis of the written production of L2 writers did not fully support our hypothesis, and overall findings were as follows:

(1) Lexical complexity: we found that content support produced greater lexical diversity. However, no statistically significant differences were found between groups in terms of lexical sophistication and lexical richness. However, regarding the within-group changes over four weeks, there was a significant decrease in lexical diversity with the provision of content support. On the other hand, there were no significant changes found in the lexical measures under the condition without content support over the period.

(2) Syntactic complexity: there were no significant differences between groups in terms of syntactic complexity. However, we found L2 writers provided with content support outperformed their counterparts in terms of coordination. Content support was found to decrease phrasal complexity significantly over time, while the lack of content support resulted in stable patterns in the syntactic measures.

(3) Propositional complexity: there were no significant differences between groups. We found content support led to a significant increase in idea units over time. However, both task conditions were found to significantly decrease the mean length of idea units over four writing tasks.

(4) Accuracy: there were no significant differences between groups and there were no changes in the levels of accuracy over time in both groups.

(5) Fluency: there were no significant differences between groups in terms of text length

and production rate. However, we found the absence of content support led to more words from Task 1 to Task 3 and slightly higher speed fluency than the condition with content support. Regarding the within-group changes over time, content support significantly increased the text length. On the other hand, the lack of content support led to a stable pattern in speed fluency but a downward trend in text length.

(6) Overall text quality: in Task 1, the absence of content support produced significantly higher overall text quality, assessed on a 5-point scale. However, we found content support significantly increased the overall text quality over time, while the absence of content support produced a downward trend.

In the following sections, we discuss our findings separately for each writing performance area.

8.2.1 Linguistic complexity

In the current research, we distinguished between lexical and structural complexity and employed multidimensional and multifaceted measures to assess linguistic complexity of L2 writing performance. Guided by the predictions of the Cognition Hypothesis and by previous empirical findings, we formulated a directional and general hypothesis for this dimension of performance—content support would yield higher lexical complexity and syntactic complexity of the L2 written production. Our findings showed that content support exerted its main effect on lexical diversity and showed a tendency toward higher coordination; on the other hand, the absence of content support was likely to produce longer texts.

8.2.1.1 Lexical complexity

To assess lexical complexity, we utilised three metrics that address related but distinct aspects: lexical diversity (i.e., variations in word types), lexical richness (i.e., size of vocabulary knowledge), and lexical sophistication (i.e., depth of lexis). Our results revealed that providing

content support resulted in higher lexical diversity (measured by D value), whereas there were no significant differences found between the two groups for lexical richness and lexical sophistication.

- Greater lexical diversity with the provision of content support

We found higher lexical diversity of L2 written production when content support was available, which supports the findings of Ong and Zhang (2010). This finding runs counter to the results in Révész et al.'s (2017) and Jung's (2017, 2020) who found that content support did not yield significant effects on lexical diversity of the written production by advanced L2 writers. Although we provided content support following Révész et al.'s (2017) design, there was a design difference in that we provided keywords and phrases as supporting ideas rather than complete sentences. There are two plausible explanations for the positive effect of content support on lexical diversity. First, the availability of content could reduce the cognitive load imposed on the writer to complete the writing task. In fact, lexical retrieval in L1 writing demands a certain degree of attentional resources (Kellogg, 1994). In the case of L2 writing, the processes of planning and formulating would be much more complex. Based on Robinson's (2001, 2003, 2011a) Cognition Hypothesis, the attentional and working memory resources of L2 learners would be diverted away from focusing on the linguistic aspects when increasing task complexity along the resource-dispersing dimension. Therefore, when content support was not provided, L2 writers would be more likely to draw on familiar or simple words to convey information, which led to less varied vocabulary utilised in the written production compared to those provided with content support. On the other hand, the provision of content support may have facilitated the activation and retrieval of learners' prior knowledge to a certain extent, which could reduce the processing load on the central executive in working memory. This might allow more attention to be allocated to lexical retrieval and produce higher lexical diversity in the production. Also, the availability of time and the visibility of written output (Manchón, 2014; Vasylets, Gilabert & Manchón, 2019) could enable L2 writers to perform lexical selection and retrieval by activating concepts and considering. When the relevant linguistic knowledge was provided in L2 writing tasks, writers were likely to deploy their attention more effectively to

select and use complex lexical forms.

Another possible explanation is that the additional supporting ideas inherently offered a more diverse vocabulary, which supports Frear and Bitchener's (2015) argument. They argued the finding that the addition of extra requirements/information to written tasks led to greater lexical diversity may not necessarily be orientated by cognitive demands. Instead, it could result from learners being exposed to a broader range of vocabulary under the condition of content support, thus contributing to more diverse vocabulary in writing. Besides, Gebril and Plakans (2016) also identified that source information provided in written tasks can be borrowed into the production of L2 writers and then potentially improve lexical diversity.

- No effects on lexical richness and lexical sophistication

Our results revealed that the provision of content support did not yield significant effects on lexical richness (measured by the index of Guiraud) and lexical sophistication (measured by Advanced Guiraud), following Bulté and Housen's (2014) constructs of lexical measures. In terms of comparison with previous research, few studies have examined the task complexity effects on lexical richness. According to Daller et al. (2003), the measure of lexical richness is assumed to assess the learners' vocabulary knowledge and capture its productivity. In our study, the provision of content support did not benefit L2 learners' vocabulary size and range in their L2 written production. A possible account for our finding is that lexical richness would be influenced by many other factors, such as topic, writing ability, and purpose of communication (Laufer & Nation, 1995). As such, we argue that the influence of content support on the lexical performance of L2 writers needs to be gauged by a variety of lexical measures.

With regards to lexical sophistication, our findings run counter to those of Révész et al. (2017), Jung (2017, 2020) and Kormos (2011) that the content support was found to produce significantly higher lexical sophistication. It is noteworthy that few writing studies have explored the metrics for lexical sophistication (see Johnson, 2017). Given that these studies adopted different measures compared to ours, we should be cautious when interpreting the

effect of content support on lexical sophistication. In Révész et al.'s (2017) and Jung's (2017, 2020) studies, the proportion of K1 and K2 words were used to assess lexical sophistication of the written production. They found that under the condition when content support was available, the proportion of K1 words was significantly smaller but the proportion of K2 words was larger. It is assumed that the lack of content support imposed higher cognitive demands on L2 writers during the planning process imposed, and thus, L2 writers could only rely more on frequent words (K1 words) but struggle to retrieve less frequent words (K2 words) in the translation process.

However, our results indicated that both task conditions (the provision of content support vs. the lack of content support) produced a similar level of lexical sophistication. This inconsistency in results may be attributed to methodological differences between the previous studies and our own, especially the proficiency level of the participants. Crossley and Kyle (2018) posited that more skilled writers would be able to express ideas with greater vocabulary knowledge in a concise and clear manner. However, as our participants were at the lower-intermediate level, their limited lexical knowledge seemed to hinder their access to more advanced vocabulary during the writing process. Also, content support in our study did not include complete sentences but rather keywords. In the case of high school learners who lacked L2 writing experience, we speculate that more cognitive resources need to be allocated to the planning process for both task conditions, which may inhibit their attention to the linguistic encoding. In this case, writers are more likely to select basic vocabulary as more basic and high-frequency words require less linguistic processing than low-frequency ones. Our findings seem to support Verspoor, Schmid, and Xu's (2012) and Yoon and Polio's (2017) supposition that there is a trade-off between lexical diversity and lexical sophistication. In future research, we need to explore further the lexical complexity of low- and intermediate-level writers' production.

8.2.1.2 Syntactic complexity

For the assessment of syntactic complexity, we adopted the multidimensional constructs of syntactic complexity proposed by Norris and Ortega (2009), who pointed out that coordination would be established at the early stage of L2 development, subordination would be more prominent at the intermediate stages, and subclausal complexification at the phrasal level would be achieved at a more advanced stage. Accordingly, we assessed (1) general complexity, (2) subordination and coordination, and (3) nominal complexity and phrasal elaboration of L2 learners' written production. Our results showed no significant differences in general complexity, complexity via subordination, nominal complexity, and phrasal elaboration between the two groups. On the other hand, we found a tendency toward higher coordination in the group provided with content support. The studies most relevant to the current research (i.e., Révész et al., 2017; Jung, 2017, 2020; Yoon, 2021) have also employed multidimensional structural measures, while their results revealed that content support had positive effects on different aspects of syntactic complexity. To be specific, Révész et al. (2017) and Jung (2017) found that content support produced a higher general syntactic complexity of written production. Jung (2017, 2020) demonstrated the benefits of content support in phrasal complexity. In Yoon's (2021) study, content support led to higher subordination. However, in Kormos's (2011) study, where content support was manipulated along the resource-directing dimension, there were no significant effects found on syntactic complexity. Our results are rather in line with Kormos (2011). Our interpretation is that proficiency level may influence the effects from task complexity. As for the tendency toward higher coordination produced by the content support group, it should be taken into account that lower-intermediate L2 writers first dominate coordination. In the following sections, we will discuss our findings for syntactic complexity in detail.

- No effects on syntactic complexity, but a tendency toward higher coordination with content support

In contrast to our hypothesis, content support exerted no significant effects on syntactic complexity. We can also observe that lexical and syntactic complexity did not increase in

parallel, which seems consistent with Kormos's (2011) finding. Kormos (2011) provided a possible account of their finding that both task conditions, narrating a story with coherent pictures vs. unrelated pictures, posed different processing demands on the learners in different ways. On the other hand, the lack of difference in syntactic complexity between groups may be attributed to the idea that both task conditions offered writers similar opportunities to demonstrate their L2 language skills in writing.

In our study, we assume that L2 writers were exposed to high pressure during the writing process, regardless of whether content support was available. Under the complex condition when content support was absent, L2 writers need to draw on their current L2 knowledge to plan what to write, which may distract their attention from the linguistic aspects (Gilabert, 2007). Accordingly, there was less varied syntax employed by the writers who wrote without content support. On the other hand, the availability of content support in written tasks would help free up the working memory resources to be used for processing linguistic structures. However, content support may guide L2 writers to encode support ideas, which seems to impose pressure on their cognition, as they might not be able to avoid certain linguistic structures targeted by the writing task (see Kormos, 2011). Judging from our results, the supporting ideas provided in L2 written tasks did not result in the effective use of attentional resources for linguistic encoding by lower-intermediate L2 writers. One possible explanation is that the limitation of learners' proficiency may influence the effects from task complexity. The increased coordination may suggest that learners are trying to move from simple coordination to more complex subordination, though their current stage of acquisition may not allow for achieving this.

Our study revealed different findings from Révész et al. (2017) and Jung (2017, 2020), who found that content support resulted in longer T-unit and more syntactically complex written production in general. At the same time, the increased number of modifiers per noun phrase suggested that providing content support allowed advanced L2 writers to produce longer and more complex noun phrases in the written production. These studies concluded that the increase in syntactic complexity might result from the extra time and attentional resources available for

syntactic encoding under the condition providing content support. However, in our study, content support did not have significant effects on syntactic complexity. Differences in the research outcome may be attributed to the different amount of information provided between these studies and our own. In Révész et al.'s (2017) and Jung's (2017) studies, content support contained additional linguistic resources (i.e., provision of subtopics and complete sentences) as examples of arguments, which would benefit the translating processes. We argue that relevant syntactic resources could be activated more easily when content support contained more complete information, and thus writers would be allowed to produce longer linguistic units and more complex phrases. However, in the present study, providing supporting content in the form of pre-task questions and keywords may require writers to prioritize the planning process constantly, as they have to link the supporting ideas to the content generated by themselves. Accordingly, syntactic encoding becomes more difficult when no complete sentences can be used as a reference.

Our results revealed that subordination structure, nominal complexity, and phrase-level complexity exhibited very similar levels in both task conditions; however, we can observe that content support was more likely to yield higher coordination. This seems to suggest that the syntactic complexity in the L2 written production is associated learners' proficiency level. In the early L2 development, the amount of coordination would be a more sensitive indicator than subordination for syntactic complexity (Bardovi-Harlig, 1992). On the other hand, subordination is regarded as a useful and powerful complexity indicator at intermediate proficiency, while phrase-level complexity is regarded as an index of advanced development of L2 learners (Bulté & Housen, 2014; Housen, De Clercq, Kuiken & Vedder, 2019), which is more complex than subordinate structures (Halliday & Matthiessen, 1999). In Yoon's (2021) study, content support was found to produce higher clausal subordination, measured by clauses per T-unit, in the written production of high-intermediate L2 learners. Unlike Yoon's (2021) study, most of our participants were at the lower-intermediate levels, and with the aid of content support, our participants tended to use more coordinated phrases in their writing. Based on these findings, one may speculate that the higher coordination may be an indirect sign that learners are trying to bring ideas together; however, their limited proficiency may not enable combining

those ideas via subordination. That is, our participants had yet fully acquired subordinate structures and nominalisation, so they failed to utilize more syntactically complex structures. This seems to support Yoon's (2021) perspective that supporting content had a limited effect on L2 learners' language use.

8.2.1.3 Summary of the findings for linguistic complexity

In general, providing content support had limited effects on linguistic complexity. Lexical diversity and coordination showed a difference when content support was available, which would suggest that attention was distributed between the two dimensions. We found content support allowed L2 learners, to some extent, to select and use varied lexical units, which resulted in greater lexical diversity in the written production. Yet, similar levels of lexical sophistication and lexical richness were found in both groups. On the other hand, content support did not show benefits on syntactic complexity, although there was a tendency toward higher coordination when content support was provided. Our findings suggested that proficiency level may mediate the impact of content support on syntactic complexity. L2 writers at lower-intermediate levels have not acquired the complex syntax to produce different syntactic structures between the two conditions, which may explain why changes were only detected in coordination.

8.2.2 Similar propositional complexity in both task conditions

Few task complexity studies have analysed propositional complexity in the past, except for Choong (2011), Vasylets (2017) and Vasylets et al. (2019). Propositional complexity measures the amount of information or idea units encoded in a text for communicative purposes (Bulté & Housen, 2012). Based on this, higher propositional complexity can be represented as more ideas and longer idea units. In this study, we manipulated content support in the writing task, which was expected to affect the conceptualisation phase of language production. According to Ellis and Barkhuizen (2005), writers' conceptualisation process for task completion can be

understood by analysing the generation of idea units. For the current research, we adopted Vasylets' (2017) guidelines for segmenting written discourse into idea units and measured (1) the number of idea units and (2) the average length of idea units. Due to the lack of empirical evidence, we proposed a non-directional hypothesis regarding task complexity effects on propositional complexity. Our results showed that, in general, content support had no significant effect on propositional complexity. We discuss the results in detail below.

As the written output is less time-constrained, writers can organise ideas into more complete and complex language (Chafe, 1985). Vasylets et al. (2017) identified that writers were able to accumulate information to produce more information-dense ideas, thereby increasing the proportion of extended idea units. Although Robison's (2001b, 2011b) Cognition Hypothesis did not predict the effect of cognitive demands on content complexity, several studies have provided empirical evidence in this regard. Choong (2011) manipulated different task variables along the resource-directing dimension and found that increasing the reasoning demand in the writing task produced higher content complexity, assessed by the number of idea units. Vasylets (2017) hypothesized that when task complexity increased, it would entail using more ideas in general to convey more complex concepts. In contrast to previous findings, we found that content support yielded no significant effect on the number of idea units. This seems to indicate that L2 writers generated similar amounts of information or similar units of ideas during the writing process, with or without supporting content. One possible explanation is that the presence or absence of content support might impose different cognitive demands on writers. When content support was available, L2 writers could search for linguistic knowledge in L2 and activate past experiences through the given ideas to generate linguistic materials needed for task completion. However, due to the characteristics of written production (Manchón, 2014c), we argue that writing may inherently carry the low resource-dispersing condition (i.e., planning). Thus, the lack of content support may have provided the condition for L2 writers to produce idea units in a more self-determined way. In other words, L2 writers who did not receive content support have the freedom to generate their own content. Therefore, based on the language production model (Levelt, 1989), we assume that this variable (+/- content support) might have influenced the conceptualisation phase of writing but had no substantial effects on

the number of idea units generated for task completion. Besides, Vasylets et al. (2017) took into the conceptual connections between ideas and conceptual dependency within clauses and differentiated between non-extended (i.e., simple) idea units and extended idea units (i.e., informationally dense ideas). They found that L2 writers were inclined toward elaborating extended idea units rather than non-extended idea units as task complexity was increased. In this regard, we need to investigate further the impact of content support on extended idea units, which possibly can explain the developmental pattern of propositional complexity.

Furthermore, our study revealed that both task conditions produced similar length of idea units. This aligns with Vasylets's (2017) finding that the metric of length of idea units may not be sensitive to the manipulation of task complexity. According to Chafe and Danielewisz (1987), the writer's intention or the topic of the task may be factors influencing the language form. As such, we argue that our participants performed the writing task for the same communicative purpose, and this did affect the way in which language was produced. In general, our findings contributed to the empirical evidence of the task complexity effects on propositional complexity. Due to the lack of empirical evidence, future investigation is also needed to explore the task complexity effect on the length of idea units across different task types.

8.2.3 Similar accuracy in both task conditions

To assess accuracy, we adopted a general measure (the number of errors/100 words), which is thought to be more sensitive to differences under experimental conditions. Polio and Shea's (2014) guidelines were employed to consider all error types. According to Housen and Kuiken (2009), accuracy assesses the knowledge systems of L2 learners and their ability to produce target-like language forms. Our results demonstrated that providing content support in writing had no significant effect on accuracy, which is not consistent with our hypothesis. Previous studies provided little empirical evidence on the effect of content support on accuracy. In order to interpret our results, we draw on theories related to L2 writing and existing empirical studies. As mentioned earlier in our literature review, the self-pacing nature of writing and the visibility

of output allow L2 writers to plan, formulate and monitor the writing products. Based on Robinson's (2001b, 2011a) Cognition Hypothesis, increasing task complexity along the resource-directing dimension would benefit the accuracy of the production due to learners' increased attention to form, especially in the monitoring session. In his view, the increased conceptual demands of the task may direct learners' attention to the way in which the L2 is grammaticalized in the conceptual domain, thereby increasing the accuracy of the linguistic encoding. Vasylets (2017) assumed that the increased effort in the conceptualisation and formulation from greater reasoning demands in the writing task would be transferred to the monitoring stage; in the longer term, a decrease in errors in production can be expected.

However, previous task complexity studies that manipulated cognitive demands or requirements utilising visual cues have shown mixed results. Choong (2014) and Shajeri and Izadpanah (2016) found that increased task complexity regarding the video/picture sequence produced lower accuracy. Kormos (2011) found that picture sequence had no effect on accuracy. At the same time, these studies found that increased reasoning demands led to higher linguistic complexity. The results of Choong (2014) and Shajeri and Izadpanah (2016) indicated that the increased reasoning demands induced learners to allocate more attentional resources to the formulation stage, which may sacrifice the monitoring process and result in more errors. Kormos (2011) argued that regardless of whether L2 writers need to plan the content or not, they were given the opportunity to draw on their linguistic resources and not avoid using complex syntactic structures that were not fully acquired. Even though the provision of storyline was regarded as a form of content support, we must be cautious when comparing our findings to the results of the above-mentioned studies. We believe that providing coherent pictures differs from providing extra linguistic resources, as this would require different linguistic forms. In the complex condition, L2 writers would have to plan content based on images or films and direct their attention to the linguistic aspects (i.e., searching for existing linguistic resources to encode the content), which is probably beyond their capacity. However, in our study, the +/- content support factor was manipulated along the resource-dispersing dimension. When some textual information was given as content support in the written task, L2 writers could access these resources at any time, which may reduce the cognitive efforts needed

in the conceptualisation phase and allow extra attention to be allocated to the linguistic aspects. On the other hand, a lack of content support would deviate writers' attention from the linguistic form (Gilabert, 2007). We argue that both task conditions allowed L2 writers to devote similar cognitive effort to monitoring accuracy. This did not show a direct trade-off effect between linguistic complexity and accuracy.

L2 proficiency level can be drawn on to explain the similar accuracy of the two conditions. As Vasylets (2017) suggested, errors can be produced due to a lack of automaticity in the writer's language system and the weakness of L2 representations. Given the failure to automatize language production, errors would be produced when L2 writers access forms that have not been fully acquired. Also, due to the limitations in the level of L2 proficiency, the participants of our study might have experienced an important gap between their L2 linguistic resources and the linguistic demands of the task. The gap in linguistic knowledge implies that the produced errors could not be corrected for not being detected. Although content support allowed more attention to be devoted to linguistic aspects, it may not guarantee closer attention to form during task performance as the resource-dispersing condition (e.g., the provision of extra planning time, prior knowledge and task structure) does not direct attention towards form in any particular ways. Content support may not help writers monitor their written production at low levels of proficiency.

8.2.4 Similar speed fluency but a tendency toward more words without content support

Writing fluency is seen as a multifaceted construct (Skehan, 2003, 2009). In order to assess writing fluency, we employed several objective and product-based metrics to capture changes in writing fluency. Following previous studies on task complexity, we calculated speed fluency (measured by words per minute) and length-based fluency (measured by total number of words). Our results demonstrated that content support did not yield significant differences in writing fluency, which confirmed our prediction.

In task-based approaches, the meaning-focused and outcome-assessed attributes of the task lead language learners (and native speakers) to prioritise meaning rather than the form of the language used (Skehan, 1996a). Skehan and Foster (2001) suggested that when a task has high cognitive demands, learners will focus less on language production in order to decide on the prioritisation of meaning over form. The increased fluency could result in greater complexity or higher accuracy, while the actual performance might be affected by task features and conditions. Robinson's (2001b, 2011b) Cognition Hypothesis distinguished between two directions of increasing cognitive demands of the task. It predicted that fluency would be reduced when cognitively demanding tasks direct learners' attention to specific linguistic forms. However, increasing cognitive complexity along the resource-dispersing dimension (e.g., the absence of prior knowledge) would reduce attentional and memory resources for language production. Despite this, this kind of task would enable learners to access and use the language faster and more automatically. However, we found no significant effect of content support on the production speed, which was consistent with previous studies (Ong & Zhang, 2010; Jung, 2017; Révész et al., 2017). A possible account for this finding is that the manipulation of resource-dispersing task complexity exerted little impact on writing speed. As explained by De Jong, Steinel Florijn, Schoonen & Hulstijn (2013), speech fluency is strongly correlated with linguistic knowledge and skills in L2 oral performance. We hypothesize that the same might apply to L2 writing. Kim, Tian and Crossley (2021) point out that a higher level of L2 knowledge and common knowledge seemed to free up L2 writers from the constraints imposed on different writing processes. L2 writers with higher language proficiency are expected to produce longer, higher-quality text. For our participants who might not be able to automatically access their language knowledge or juggle linguistic forms, we assume the provision of content support would not have a significant effect on their writing speed.

In addition, we can observe that the absence of content support showed a tendency toward longer texts. Based on Kellogg's (1996) model, we expected that the absence of content support would increase the processing load on planning, with fewer attentional resources to be allocated to translation. As discussed earlier, both conditions of providing and not providing content support may have led writers to focus more on content planning. Since planning and idea

elaboration were viewed as higher-level writing procedures, writers prioritised expressing the meaning and completing the written tasks in L2. This finding can be explained by the different cognitive demands involved in the two task conditions. When content support was not given, writers might be less restricted in the planning stage, making it easier for them to generate content to fulfil the communicative requirement of the task. However, in the simple condition, writers had to use the supporting ideas as outlines for content planning, which may require extra cognitive effort to encode the predetermined content.

8.2.5 No significant differences between the two groups in overall text quality

According to Bulté and Housen (2014), the overall text quality is considered predictive of L2 writing development. In previous studies, the overall text quality could be assessed by the holistic ratings besides the quantitative measures (e.g., CAF) (Vasylets & Marín, 2021) which often cover different analytical features including content, organisation, vocabulary and language use. We adopted the Independent Writing Rubrics from TOEFL iBT as rating criteria of overall text quality, examining topic development, organisation, progression, coherence, syntactic diversity, word choice and grammatical errors. Our results identified no significant effect of content support on overall text quality. However, we can observe a pattern from the results that the lack of content support led to higher holistic ratings in Task 1 and Task 2, while the simple condition when content support was given outperformed the complex condition in the subsequent written tasks.

Given that previous research has provided little empirical evidence on the task complexity effects on the overall text quality, we interpret our results relying on the existing studies investigating the effect of task design features on writing quality. In the case of L1 writing, Kellogg (1990) manipulated planning and different task conditions (i.e., provision of topic, idea and organisation) in written tasks and found that the provision of topic rather combined provision of topic and ideas led to much higher text quality. The study by Ong & Zhang (2013) with Chinese EFL writers found different results—the condition when content and organisation

were given produced higher text quality. They assumed that providing content support or content and organisation support allowed writers to engage less in the subprocesses of planning, so they were able to focus on the writing strategies. These strategies were thought to enable writers to organise and elaborate the content more effectively, thereby improving the overall quality of the essay. In Ong and Zhang's (2013) study, the provision of content and organisation support showed a positive influence on Chinese EFL learners. However, in our study, there was no significant difference found in the overall text quality between two groups.

Our study showed that the absence of content support favoured the overall text quality in the first two writing tasks. We assume that fewer constraints were imposed on writers when content support was not available, thereby allowing them to use the planning strategies formulated in the previous writing practices in order to complete the writing tasks better. On the other hand, the provision of content support seems to guide writers to employ more effective writing strategies, though it might take time and practice. In this case, L2 writers might not be able to plan what to write effectively when they were exposed to content support at the very beginning. They might also fail to focus on other aspects of writing, such as topic development and organisation. Given that content support might have provided workable schemata, writers have to generate the corresponding ideas and sentences to complete the writing, which can be overwhelming for writers. After two writing tasks, it would be feasible to suggest that writers may have adopted the strategies for conceptualisation by following the given ideas, and they would be able to free up working memory resources to focus on strategic aspects of writing, thereby meeting the task requirements. Such a speculation is consistent with Ong and Zhang's (2013) discussion on text quality. In addition, Crossley et al. (2016) noted that the quality of ideas can be predicted by the number of ideas and elaboration of ideas. We suggest that content support facilitated the generation of more flexible (i.e., how different the ideas are from others) and well-designed ideas, which may account for the increased text quality of the written production. If our tentative explanation is valid, we would observe a short-term increase in overall quality over time in the content support group. We will continue to discuss the within-group changes in the next section. All in all, a longer-term study is needed to validate the effect of task complexity on text quality.

8.2.6 Short-term changes in L2 writing performance

Unlike previous research on task complexity that was predominantly short-term, this dissertation responds to the call for longitudinal investigations of within-group changes in the writing performance under the condition with or without content support. In order to examine the effects of content support at the individual level, we compared their writing performance between the first and the last writing tasks. From the results, two intriguing patterns can be observed. When content support was available, there was a significant increase in text length, the number of idea units, and the overall text quality of L2 written production over time. In other words, content support benefited the production of longer and higher-quality essays with more meaningful chunks of information over time. However, content support led to a significant decrease in lexical diversity, phrasal elaboration and the mean length of idea units of the written production over time. This may indicate that writers devoted less effort to processing lexis and noun phrase modifiers. On the other hand, the absence of content support also produced a significant decrease in the mean length of idea units over time. For other performance measures, L2 writers without content support had relatively stable performance over the period. The findings of short-term changes suggest that content support may cause learners to sacrifice lexical and syntactic complexity for the sake of idea generation. Below, we will discuss the changes in more detail.

8.2.6.1 Increases in text length, number of idea units, overall text quality with content support

Our results suggest that the provision of content support may have provided favourable opportunities for idea generation and language production in the short-term writing sessions. We assume that the supporting content largely predetermined the number of concepts to be delivered in the writing so that more linguistic units were produced in the simple condition when content support was given. This may also be attributed to the fact that task-based approaches allow learners to prioritise the need for content rather than the form (Skehan, 1996a).

To start with, the increased text length suggested that content support pushed writers to deliver

longer written output and convey greater amount of information in their essays. It should be noted that the writers in our study were not used to writing with content support in their regular practices. The supporting content seemed to enable writers to access and use the L2 knowledge in a faster and more automatic way over time. Since content support was provided in the form of pre-task questions and keywords, we found that writers were inclined to focus on lexical diversity at the beginning of the writing sessions (Task 1 and Task 2), followed by fewer words and lower text quality in the written production compared to the condition without content support. One possible explanation to this result is that when the content support condition contained more information, there might be a high processing demand for information in the written task. It is likely that some cognitive effort was devoted to processing content words so that writers might prioritise their attention on vocabulary use. However, starting from the Task 3, writers produced longer essays with the help of supporting content. According to the production stages identified in Levelt (1989), we assume that writers became more familiar with processing content-related information in the writing task and passed the conceptualization stage easily. This would help them free up the capacity to deal with language more easily. In light of the Output Hypothesis (Swain, 2005), it could be argued that the writing output in the condition with content support may activate the noticing function of output, prompting them to use new linguistic forms or consolidate their current knowledge (see Swain & Lapkin, 1995). Another possible reading of this result is the skill acquisition through practice and automatization (DeKeyser, 1998, 2001, 2015) that learners may have automatized (or at least proceduralized) the process of accessing. As such, writers given content support are able to produce more words in the later writing tasks.

On the other hand, the absence of content support exhibited a tendency toward decreased text length over time, though there was no significant difference found over the period. In the previous section, we found that the no content support group tended to produce more words in their essays compared to their counterparts. We attribute such results to fewer constraints imposed on the writers at the planning stage when they could create their own content. However, from the longitudinal results, our interpretation is that the absence of content support might not favour the language production in the longer term, as writers could be less motivated to generate

content relying on their own language resources and the prompt for the task.

The provision of content support was found to increase the number of idea units over time. This finding can be explained by the characteristics of written production and task repetition (see Bygate, 2001). Vasylets et al. (2019) pointed out that written tasks allow writers to produce complex, informationally dense discourse, as compared to the counterpart oral task production. Due to the visibility of the written text, L2 writers were not required to pack the information in working memory initially and were able to elaborate ideas to a greater extent. One may interpret that content support can facilitate the process of idea retrieval and elaboration, allowing for easier idea generation. Besides, the growth in the number of idea units under the condition with content support can be attributed to task repetition. Nitta & Baba (2014) investigated how timed writing task repetition influenced the L2 English writing over one semester. They found that the repetitive writing tasks, which involved different topics, showed qualitative changes in L2 written production over time in terms of syntactic complexity and lexical use. Their longitudinal results revealed that task repetition might have cumulative effects that encourage writers to focus on lexical and syntactic aspects. Following Nitta and Baba's (2014) argument, we can assume that the benefits of content support in idea generation could be cumulative when writers were exposed to the writing tasks with content support repeatedly over the period. In other words, when content support was available, task repetition might push L2 writers to focus on content generation in the writing output and employ the same content planning strategy in the next writing practices. It is argued here that the repeated provision of content support can offer favourable opportunities for writers to generate idea spontaneously over time.

On the other hand, the lack of content support showed stability in the number of idea units in the written production over time. As Nitta & Baba (2014) noted, simple repetition of writing tasks might not have an impact on language processing. This might explain why the absence of content support did not lead to the burst in the quantity of ideas units over time, since writers' attention might not be directed to idea generation specifically. However, our results are not sufficient to conclude the long-term effects of content support on idea generation. Longer writing sessions are required in order to observe the changes in the number of idea units when

content support is provided.

Lastly, we can observe that content support led to an increase in overall text quality over time. In line with Ong and Zhang's (2013) findings that the provision of content and organisation led to higher writing quality in Chinese EFL learners' written production, our results suggest that such an impact is more likely to be found in the individual-level changes over time. To be specific, we observed a steady upward trend in the overall text quality. This finding can be explained by the possible shift in writers' attention focus from linguistic aspects to task requirements over the four writing tasks. As what we discussed above in section 8.2.5, although content support was expected to reduce the cognitive load in the planning process, writers might not be able to formulate effective planning strategies in the first two writing tasks as they had to focus on processing the supporting content. Therefore, we can observe that content support group only produced higher lexical diversity instead of obtaining higher scores in the overall text quality in the beginning of the writing sessions. When similar tasks with content support are repeated, L2 writers might take advantage of the conceptual structure or the linguistic form encoded from prior information. Thus, there would be more attentional resources available for the other aspects of the task (e.g., content, organization and communicative requirements), which contributed to the overall text quality. Once the content planning and translation procedures became more fluent with the help of content support, L2 writers who were at the lower-intermediate level might focus on meeting the communicative requirements of the task. After all, their goal was to fulfil the task requirement and obtain higher scores of the overall quality.

On the other hand, writers without content support were more likely to deviate from the task requirement. For example, when the task required the introduction of a public figure, some writers who wrote without content support went on to describe friends, teachers, and family members in their texts. In this case, writers' creativity may have run counter to the overall text quality. Under this condition without content support, the repetition of the task failed to help writers focus on the communicative requirement of the task as they might juggle content planning with linguistic encoding, resulting in a decreasing trend in their text quality.

8.2.6.2 Decreases in lexical diversity, phrasal elaboration with content support, and decrease in the length of ideas in both task conditions

Our longitudinal inspection revealed that content support produced significantly decreased lexical diversity, phrasal elaboration and the mean length of idea units over the period. On the other hand, there was a significant decrease only in the mean length of idea units under the condition when content support was absent. Traditionally, L2 writing literature has regarded complexity as an indicator of linguistic progress and development (Bulté & Housen, 2014). To be specific, language proficiency is viewed to be advanced when more diverse, complex lexical units and syntactic structures are used. However, from the perspective of writing development, Polio (2017) argued that:

> "Development may not always coincide with improved quality or movement toward a target norm... Over time, learners' language might become more complex, but at some point, learners must vary their sentence structure, and too many long and complex sentences can cause essays to be judged as lower in quality." (p. 261)

In line with the above discussion, we argue that when content support was provided, L2 writers seemed to prioritise production fluency and content at the expense of control over linguistic complexity. However, we must highlight that our study focused on the short-term changes in L2 writers' writing performance, and patterns and trends that we can observe were not sufficient to conclude the effect of content support on overall long-term L2 writing development. Below, we will discuss the decreases in lexical diversity, phrasal elaboration and length of ideas in more detail.

At the beginning of the writing sessions (Task 1 and Task 2), we could observe an upward trend in lexical diversity of the L2 writing performance, which was then followed by a significant decline. We found that the decrease in lexical diversity was not consistent with the increase in overall text quality. Our findings align with Bulté and Housen (2014) that examined the

correlation between complexity measures and subjective ratings. They found that lexical diversity (i.e., varied words used) and lexical sophistication (i.e., less frequent words) showed little or no significant correlation with the overall writing quality rated by expert judges. Their findings also suggested that the increased perceived writing quality over time was not consistent with the results of lexical measures. Therefore, our findings can be attributed to the fact that the lexical complexity measures and holistic ratings can yield different results, as the lexical indices may not tap into other aspects of vocabulary that were considered by the subjective ratings. Besides, we take into account the dynamic process of L2 development (Verspoor, Lowie, & Van Dijk, 2008; Verspoor, Schmid, & Xu, 2012) and argue that lexical complexity and overall writing quality did not necessarily coincide at some point of L2 learner development.

One may interpret that the supporting content inherently provided writers with a more diverse vocabulary, which activated and retrieved learners' prior knowledge to some extent and allowed for more cognitive effort to be allocated to lexical use. Therefore, writers may have relied more on the lexical variety to solve the writing task. As for the subsequent decline, one possible explanation is that when L2 writers were more familiar with processing the supporting ideas, the benefits on lexical complexity appeared to be neutralised over time. Instead, writers were more likely to produce more meaningful chunk of information and longer written texts. In our study, the short-term effects of content support in terms of meaningful output and higher text quality were confirmed by our longitudinal results. For lower-intermediate L2 writers, it would be easier to deliver meaningful content rather than diverse lexical features, and the focus on meaning was found to meet the communicative requirement of the task, which was reflected in the increase in overall text quality over four weeks.

On the other hand, the absence of content support resulted in the relatively stable performance of lexical and syntactic complexity over time, which suggested that L2 writers had to constantly devote their attentional resources to the linguistic aspects. We assume that creating the content on their own would require higher cognitive demands in both planning and translation processes, and thus writers could not prioritize any aspects of the performance.

Our results also reveal that content support led to a significant decline in the complexity of noun phrases. As we discussed above, this finding can be attributed to the fact that writers in our study had not yet fully acquired the nominalisation structure and were not able to use complex devices at a higher level due to their limited L2 knowledge. However, the study by Mazgutova and Kormos (2015) on a one-month EAP programme found that L2 learners at the low proficiency level demonstrated development in the use of noun phrases and the use of genre-specific syntactic structures in argumentative writing over time. They argued that learners were more aware of various lexical choices and the use of vocabulary when they were incidentally exposed to new words in academic programmes. In contrast, our study revealed that writers provided with content support might not continuously devote their attention to lexical forms. On the other hand, the lack of content support showed the stability in phrasal elaboration. One possible explanation is that nominalisation and complex noun-phrase structures had not been covered in the writing instruction to our target L2 writers. The once-a-week provision of content support might not be effective in triggering learners' attention to the complexification of noun phrases. Also, the decline in phrasal elaboration in the written production could be a result of tiredness arising from task repetition, which might limit the use of complex noun-phrase structures. Nevertheless, longer writing sessions are needed to observe the development of noun-phrase structures when writers perform tasks with or without content support.

Lastly, we found that both task conditions led to a decline in the length of ideas over the four weeks. The finding seems to imply that, regardless of whether content support was provided or not, L2 writers were not encouraged to produce longer idea units over the period. In particular, writers in our study tended to express their ideas and opinions in a conceptually simpler way with the aim to fulfil the task requirements. When content support was available, the change in the writer's purpose (from complex lexical structure to meaningful output) may be responsible for the form that ideas are produced (Chafe & Danielewicz, 1987). However, further empirical research is needed to explore the effect of task complexity on propositional complexity.

8.2.7 Summary of the effects of content support on L2 writing performance

The first purpose of this study was to explore the impact of resource-dispersing task complexity, manipulated with +/- content support, on lexical complexity, syntactic complexity, propositional complexity, accuracy, fluency, and overall text quality of L2 written production. Our study revealed that content support elicited its limited effect on lexical diversity and a tendency of higher coordination in the written production. On the other hand, we found the absence of content support was more likely to produce longer texts and obtain higher overall text quality in the first two tasks. Nevertheless, both groups show similar syntactic complexity, propositional complexity, accuracy and speed fluency.

To begin with, the content support group produced a higher lexical diversity, which may be attributed to writers' allocating more attentional resources to the lexical aspects. The availability of ideas and vocabulary items in the content support was expected to facilitate the retrieval of linguistic knowledge and the activation of prior knowledge by L2 writers, thus contributing to more diverse vocabulary used in the written production. Our results for lexical complexity seemed to suggest a trade-off between lexical diversity and lexical sophistication (Verspoor et al., 2012; Yoon & Polio, 2017). For the lower-intermediate L2 writers, their limits in vocabulary knowledge seemed to prevent them from accessing more advanced words in the writing process. Besides, as the basic and high-frequency words require less processing effort than low-frequency ones, we hypothesize that writers under both task conditions were more likely to select basic words. This might be the reason why we found no significant effect of content support on lexical sophistication as in the prior research. However, content support did not yield significant effects on syntactic complexity, although higher coordination was found when content support was available. This suggested that the syntactic complexity in the L2 written production is related to learners' proficiency level. Since writers in our study have not acquired the complex syntax to produce different syntactic structures, we can only observe a difference in the use of coordination between two groups.

On the other hand, when writers had to create their own content, they seemed to have fewer

constraints in the planning process since no predetermined content was to be processed. In this case, they might adopt the planning strategies used in their previous writing practices and produce more content easily for the task completion, which is reflected in the longer texts and higher overall text quality in Task 1 and Task 2. Yet, there were no significant differences found in other aspects of performance between the two groups. We argue that the two task conditions (the provision vs. absence of content support) might have provided L2 writers with opportunities to demonstrate their linguistic competence in writing in a different way.

The second aim of this study was to explore whether and how content support affects the written production of L2 writers over time. Our longitudinal results showed that under conditions of content support, there were significant gains in text length, number of idea units, and overall text quality of the written production. However, the content support was found to significantly decrease lexical diversity, noun-phrase complexity, and the length of idea units over the four weeks. From the results, there was discrepancy between lexical indices and holistic ratings of the text quality. We attributed the inconsistency to the fact that quantitative lexical complexity did not necessarily correlate with the overall text quality (Bulté & Housen, 2014). Besides, we also consider dynamic process of L2 development (Verspoor, Lowie, & Van Dijk, 2008; Verspoor, Schmid, & Xu, 2012) and argued that lexical complexity and subjective ratings of writing quality may not coincide at some point during the language development.

This study added empirical evidence to the effects of content support on L2 writing performance over time. The growth in text length, the number of idea units and overall text quality resonated with the claims in the Limited Attention Capacity Hypothesis posited by Skehan (2014). That is, due to the limited capacity for processing information, L2 learners must allocate their attention to the aspects that facilitate the task completion. Although we did not find benefits from providing content support at the beginning of the writing sessions, after a certain amount of time and practice, L2 writers were able to focus more on the communicative requirement of the task gradually. As a result, writers were able to produce longer and higher-quality texts with more meaningful chunks of information in L2. Moreover, we consider that the increase in fluency and the number of idea units may reflect the development of automaticity

of processing. In other words, the provision of content support facilitated the access to and consolidation of the current L2 knowledge of writers faster, which allowed writers to generate texts successfully. However, we assume that the priority given to meaning resulted in less control over form, which is also reflected in the decreased lexical diversity and phrasal elaboration. It seems that the benefits of content support for activating and retrieval lexical knowledge were transferred to task completion (i.e., the meaningful output) over time. Our findings lend support to Pallotti's (Forthcoming) claim that in order to facilitate efficient and effective message formation, L2 learners need to appropriately adjust the linguistic complexity and focus on the communicative purpose. In our study, L2 writers at the lower-intermediate level might find it easier to express meaningful content, which would better fulfil the communicative requirement and contribute to higher text quality.

In contrast, under the condition when content support was absent, L2 writers had to create their own content, which might require higher cognitive demands in both content and language on L2 writers. Our longitudinal inspection revealed that the lack of content support led to stable performance of linguistic complexity but a tendency toward the decreased length-based fluency and overall writing quality over the period. We argue that under such a condition, L2 writers might be pushed to maintain their focus on the linguistic issues. However, L2 writers might not be able to focus on generating ideas and meeting the task requirement over time when they had to rely on their own language resources in the writing process, thereby resulting the decline in text length and overall text quality.

Judging from the results, it is argued here that both task conditions (provision vs. no provision of content support) were not neutral but work differently in L2 written production:

- For intermediate-level L2 learners, the provision of content support was of benefit to using more diverse vocabulary and coordinated phrases compared to the condition without content support.

- From a longitudinal perspective, content support was found to offer favourable opportunities to fulfil the task completion and communicative requirements rather

than creating complex discourse in L2 writing.

- The writing practice that provides content support could be used as a tool to develop the fluency and text quality of L2 writing.

- On the other hand, the absence of content support provided L2 writers with the freedom to generate content relying on their own resources and creativity and contributed to the production of longer essay.

- Over the four weeks, we found that writing tasks without content support had the potential to maintain L2 writers' attentional focus on lexical and syntactic constructions.

Our findings contribute to the further explanation of the effect of resource-dispersing task complexity on L2 writing development. Nevertheless, longer writing sessions are needed to explore the task complexity effects on the development of linguistic complexity and propositional complexity in future research.

8.3 Research question 2: Effects of content support on the nature and deployment of L2 writing processes

The second research question was concerned with the influence of the provision of content support on L2 writing processes. The investigation of content support as the task design factor allowed us to test the predictions of cognitive models of writing that attribute a key role to the planning process. Previous studies suggested that content support would lower the cognitive demands on the planning process (Révész et al., 2017; Ong & Zhang, 2013), leading to more attentional resources available to the translation operations. However, little is known about the nature and deployment of the L2 writing processes when content support was available or absent, especially which processes they prioritised and to which ones they allocated fewer cognitive resources. In order to add to empirical work about the task complexity effects on L2 writing processes, we formulated the following research question:

Research Question 2: What are the effects of content support on the nature and deployment of L2 writing processes?

Given that existing studies on content support and writing processes are limited and have produced mixed results, we formulated a non-directional hypothesis for this research question. We hypothesized that the provision of content support would affect L2 writers' deployment of writing processes.

In our study, L2 writers reported their frequencies of attending to the metacognitive processes in terms of thinking about ideas generation, ideas elaboration and ideas organization, easy structure, and language aspects. Besides, semi-structured interviews with the sub-group of the participants were elicited to describe their thoughts during the writing processes (i.e., planning, translation, and revision) and other meta-comments. The overall findings from questionnaires and interviews were as follows:

(1) In line with our prediction, we found that when content support was absent, L2 writers reported higher mental efforts invested in the writing tasks compared to their counterparts. They also reported higher mean frequencies of engaging in the metacognitive activities in the writing tasks. Over the four weeks, their ratings on the frequencies of the five metacognitive processes remained stable.

(2) On the other hand, the content support group reported lower mental efforts devoted to the writing tasks. Yet, the tasks provided with content support were regarded as more difficult. L2 writers reported lower mean frequencies of attending to the metacognitive processes in the writing tasks. Over the four tasks, we found that content support significantly reduced the processing demand posed by idea elaboration and language aspects but increased the writers' perceptions of task difficulty. In addition, the usefulness of content support declined significantly over the period.

(3) Regardless of whether content support was provided or not, we found similar

distribution of cognitive writing processes regarding planning, translation and revision between the two groups. The interviews revealed that L2 writers were more aware of the planning-related processes and then translation operations. The availability of content support led to more comments on planning (especially content planning), while writers without content support recalled more thoughts concerning translation (especially lexical retrieval).

In what follows, we discuss our findings for the cognitive processes of L2 writing in more detail.

8.3.1 Perceptions of mental effort and task difficulty and cognitive demands placed on L2 writers

In this study, content support was considered as a task feature of task complexity manipulated along the resource-dispersing dimension, given that Robinson's (2001b, 2005, 2007) Componential Framework categorised the +/- prior knowledge factor under this dimension. It was hypothesized that the provision of content support would reduce the cognitive demands placed on the planning process, thereby allowing for more attentional resources available towards the translation process. We found that content support seemed to influence the complexity (i.e., mental efforts invested to the task) perceived by L2 writers. To be specific, the lack of content support was more likely to entail greater mental effort, which was further demonstrated by the higher mean frequencies of writers' engagement in the five metacognitive processes regarding thinking about ideas generation, ideas elaboration and ideas organisation, easy structure, and language aspects. On the other hand, writers provided with content support was found to devote less mental effort to the writing task and engage in the metacognitive processes less frequently.

Our findings are in line with the predictions that writing tasks provided with content support would be perceived as less complex than tasks without content support (see Ong & Zhang, 2010). Nevertheless, the availability of content support did not make the writing task more

manageable. We found that L2 writers provided with content support tended to report higher task difficulty, which differed from the results of Révész et al. (2017) and Jung (2017). Moreover, their perceptions of task difficulty were found to increase significantly over time, which did not correspond with increased text quality. On the other hand, the no content support group perceived the writing tasks as less difficult compared to their counterparts.

From the interview data, we found that both sub-groups of the L2 writers mentioned negative emotions during writing in their comments, and the proportions of these comments were similar between the two groups. The majority of comments produced under the content support condition addressed the task difficulty. For example, *"It was hard to express myself completely" and "I didn't feel confident".* This provided additional information about the increased task difficulty perceived by the writers. On the other hand, when content support was absent, writers reported *"not easy to write"*, *"hard to come up with the content"*, in addition to *"very poor writing"*. Given that our participants were lower-intermediate L2 learners, the interpretation of task difficulty and cognitive load under both task conditions needs more caution. Building on these findings, we provide a further discussion on the writing processes in the following sections, with the aim of exploring how the manipulation of content support affects the L2 writers' deployment of planning, translation, and monitoring processes.

8.3.2 Content support and L2 writing processes

8.3.2.1 Effects of content support on planning processes

The results of writers' comments on the planning processes ran counter to our predictions. From the interview data, we found that both subgroups of the participants were more likely to recall their thoughts during the planning process, regardless of whether content support was provided. However, when content support was available, L2 writers produced more planning-related comments compared to their counterparts. The distribution of comments related to the sub-processes of planning in the two groups showed different patterns. L2 writers provided with content support were found to give more attention to the content planning process, which

accounted for a large proportion of the planning-related comments. However, when content support was absent, L2 writers were aware of content planning and organisation planning, which made up similar proportion of the planning-related comments.

Our findings run counter to the results from Révész et al. (2017) and Michel et al. (2020), who identified an increase in the effort required in planning only when content support was absent. The inconsistency in the results may be attributed to the fact that different methods were employed to tap into the L2 writing cognition. Our study employed guiding questions and writing samples that allowed writers to recall their writing experience over four weeks, which is different from the stimulated recall used in the previous studies, where writers make comments while watching the recording of their writing behaviours. Notwithstanding, a possible explanation is that what the participants mentioned in the semi-structured interviews were the operations they considered important and to which they paid attention during writing. Therefore, as the majority of comments referred to planning in our study, one interpretation is that planning is a high-level cognitive activity, which also contains strategic procedures and practical goals (Alamargot & Chanquoy, 2001). For lower-intermediate L2 learners, we could suggest that the most pressing tasks for them are to generate ideas and complete the writing task. As such, both writing groups would prioritise the planning process. To clarify the effect of content support on the planning process, we draw on the results of the frequencies of metacognitive processes and comments about writing processes to identify L2 writers' focus of attention during the planning process in both task conditions.

Planning content

Our findings suggest that L2 writers provided with content support were more likely to devote their attentional resources on content generation in the planning process. A possible explanation for this is that content support may help to activate and retrieve the writers' prior knowledge, thus enabling them to automatically generate more ideas and complete the tasks better. Drawing from the results of writers' engagement in the metacognitive processes, we considered that planning content with the help of content support might not be too costly or cognitive

demanding. When content support was available, writers reported lower engagement in idea generation and idea elaboration compared to their counterparts. In addition, over the four weeks, content support was found to significantly reduce writers' engagement in idea elaboration.

Below, we extracted the subgroups' comments referring to content planning:

> *I read through the prompt (content support) and the topic and then selected what I thought was a better part to write about in my own thoughts and within the given content.*
> *Then, I might insert examples and my own ideas into the given content. (Student M, CS group, 23:23 & 23:34)*

Although idea elaboration requires high-level processing (Fayol, 1991) and greater cognitive effort on the writers (Robinson, 2007; Robinson & Gilabert, 2007), we found content support may potentially help learners elaborate ideas by extracting knowledge and previous experience in long-term memory. This finding is in line with Torrance, Thomas & Robinson's (1999) claim that the automaticity of knowledge retrieval may be more robust when the written tasks are common and familiar to writers. Accordingly, writers are likely to prioritise generating ideas as it is more economical. On the other hand, since content support contained more information, writers may need to select what to write in addition retrieving prior knowledge. According to van Dijk and Kintsch's (1983) account of the content generation process, content support may enable writers to retrieve knowledge with different goals and guide the subsequent drafting of text structures. However, as content generation is regarded as strategic and controlled, writers might perceive it as difficult and be more aware of the process of content planning.

When content support was absent, writers were less aware of planning content compared to those given content support, although the comments of content made up the largest proportion of the planning-related comments. From the results of writers' engagement in the metacognitive processes, we found that idea generation and idea elaboration seemed to require more processing demands when writers had to create their own content. We assume that writers who wrote without content support had to rely on the topic and their language resources to develop

their writing plans. The processing pressure would be likely to require constant effort to generate, elaborate and organise ideas for the task completion. This pattern is consistent with the findings from Ong (2014) and Jung (2017, 2020), who suggested that a lack of content support facilitated more intensive online planning, pushing L2 writers to generate and insert ideas during writing.

Drawing on their comments, we found that writers who wrote without content support were more likely to describe a more general process of content planning. For example:

> *I just had to think about what points were worth ... that I could write about, but I ended up coming up with only two points. (Student H, NCS group, 18:12 – 18:14)*

Compared to the simple condition when content support was given, the lack of content support may not offer favourable conditions for L2 writers to select the ideas to be written. Under this condition, L2 writers must generate content relying on their own linguistic resources and also show creativity in their essays, which may be challenging for inexperienced writers. They may need to come up with some content to fulfil the task goal and meet their teachers' expectations and it may have to be something they can express in writing with their own resources. This may lead to a situation of working memory and processing capacity overload.

Planning organisation

The findings from interviews revealed that writers might not prioritise organization in the planning process, regardless of whether content support was provided. It is consistent with the frequencies of metacognitive processes where L2 writers reported the lowest engagement in idea organisation and thinking about essay structure out of the five metacognitive processes. We speculate that organising the ideas that appeared in the text and essay structure was less cognitively demanding for the writers in both task conditions. However, it differs from Ong's (2014) finding that organising the essay structure during planning and organising essay structure during writing required more cognitive effort when content support was absent. In our study, the writing task may have placed high cognitive demands on the textual content or on

language encoding (see Kormos, 2011), which would require L2 writers to prioritise the content planning and language aspects. Therefore, as McCutchen (1996) suggested, the subprocess of planning organisation may not receive enough attention from the L2 writers. For lower-intermediate L2 writers, their priority may be to write down something and then survive the tasks without paying much attention to organisation.

Furthermore, the manipulation of content support might lead to different strategies of planning organisation deployed by L2 writers. We found the content support group tended to refer to using the introduction paragraph as a writing plan in their comments. They considered the introduction paragraph was crucial to idea generation and idea organisation, and such a strategy helped them activate their prior knowledge. For example,

> *In the beginning, I didn't know how to introduce the topic or write more coherently. If I manage to write the opening (sentences), what I write later goes more smoothly. (Student A, CS group, 20:3)*

On the other hand, when content support was absent, writers tended to use the essay structure as a plan for content generation, with filling and expanding each paragraph as a goal for the task completion. This may explain why the no content support group produced similar proportions of comments on planning content and planning organisation. Below is an excerpt from their comments on planning organisation.

> *I usually write three paragraphs, but sometimes, maybe I write two paragraphs, and the last paragraph, I'm not sure how to work out last paragraph. (Student L, NCS group, 17:22)*

Overall, we consider that the lower engagement in planning organisation under both task conditions may be attributed to L2 writers' limited language resources and writing skills. Following Bereiter and Scardamalia's (1987) model of Knowledge Transforming, organising operations are often regarded as the problem-solving operations and require a high degree of control and cognitive resources. Thus, planning organisation may be more related to advance levels or more skilled writers, while novice writers may struggle to manage the organising

activities. For the lower-intermediate L2 writers in this study, our understanding is that they have not yet automated the organising operations. Accordingly, L2 writers were inclined to prioritise their attention on content generation and development in order to complete the writing task.

8.3.2.2 Effects of content support on translation processes

Our results from the interviews revealed that the availability of content support did not lead writers to allocate more attentional resources to the translation process, which is opposite to our hypothesis. Instead, writers were more aware of the planning process during writing and made fewer comments on the translation operations compared to those without content support. It is consistent with the frequencies of metacognitive processes where the content support group reported relatively lower mean frequency of reflecting language-related issues than thinking of idea elaboration. Over the four weeks, content support was found to significantly reduce the L2 writers' engagement in thinking about the language aspects. We could suggest that language resources provided by the content support would release the processing load of encoding, thus allowing writers to retain their focus on content generation. This pattern is consistent with Ong's (2014) findings that when pre-task planning was given, L2 writers did not shift their attention from planning to translation but rather limit themselves to language planning.

On the other hand, writers who lacked content support tended to engage more in thinking about the linguistics aspects, which accounted for the largest proportion of the five metacognitive processes. It can be suggested that when content support was absent, the translation process would require a great deal of cognitive effort, which is very similar to the processing demand for idea generation. This finding is consistent with Révész et al.'s (2017) hypothesis that the absence of content support is more likely to impose pressure on the planning process and extra pressure on the translation process. In general, our findings showed a different pattern for the deployment of the translation process compared to those of previous studies when content support was provided. Considering the language proficiency of our participants, caution is

needed when interpreting the results. In what follows, we will address comments from the sub-groups and discuss whether and how content support affected sub-processes of translation and how L2 writers allocate their attentional resources.

Firstly, content support did not yield significant effects on the distribution of comments regarding translation operations (i.e., lexical retrieval and syntactic encoding). When content support was given, writers mentioned relatively fewer translation-related comments, which is inconsistent with the findings of Révész et al. (2017). In particular, the content support group was less likely to describe the process of lexical retrieval, while proportion of their syntactic-related comments were similar to those of their counterparts. We assume that L2 writers would maintain a certain degree of control over their linguistic resources so that their working memory would not be overloaded by the translation operations. Below are excerpts of the comments from the content support group.

> *I asked myself what my ambition was, read over the writing prompt and then wrote down the words that could replace those in the topic.* （*Student J, CS group, 16:23*）
>
> *I could write the introduction only after paraphrasing the writing prompt. (Student J, CS group, 16:24*）

According to Hayes and Flower (1980), the translation process involves not only the syntactic formulation but also the retrieval and interpretation of knowledge units. Our take here is that the supporting content might have offered L2 writers the linguistic knowledge and semantic constructs that they need to process in the translation process. In this case, L2 writers at the lower proficiency level tended to rely on given words or activated words to express information by means of synonymous substitutions. As a result, they were able to allocate available attentional resources to content generation, which in turn operates the translation process through limited recursive cycles. Our findings in the deployment of the translation process are also reflected in writers' comments on noticing the gap. In particular, when content support was available, writers made fewer comments reflecting on their limited linguistic resources and writing performance but primarily referred to their vocabulary knowledge and syntactic

construction. These comments may explain why the provision of content support significantly reduced the cognitive demands that language issues placed on L2 writers in the successive writing practices. Our understanding is that content support may have fostered the translation process. In addition, we could infer that the provision of content support allowed L2 writers to consider the workload of information processing, so they were able to devote available attentional resources to the operations that are more beneficial to task completion. This assumption is consistent with the short-term changes in writing performance; that is, the content support group significantly produced longer and higher-quality texts with more idea units.

On the other hand, when content support was absent, L2 writers produced more comments describing the translation process compared to those given content support. In particular, the proportions of lexical-related comments and syntactic-related comments were similar. As Roca de Larios, Marin and Murphy (2001) concluded in their study on formulation, we found the translation operations performed by the lower-intermediate L2 writers were more oriented toward searching for lexical structures. It is reflected in the finding of L2 writers' engagement in metacognitive processes that the no content support group reported the highest mean frequency of thinking about the language aspects. To further clarity this finding, we must draw on writers' comments on lexical retrieval under the condition without content support.

> *At first, I didn't even know what "ambition" meant… not the exact meaning, but probably a general idea. (Student L, NCS group, 17:25)*

> *But when writing, there were words that I wanted to write, but I didn't know how to express them in English. (Student H, NCS group, 18:8)*

The no content support group seemed to be constrained by their vocabulary knowledge in the translation process, with the majority of comments related to the lexical form (e.g., spelling, part of speech, and sophistication). As for the comments on syntactic encoding, they further described their operations of translating ideas into language and thinking about the syntactic structures. This aligns with the results of Roca de Larios et al.'s (1999) study on vocabulary retrieval with Spanish beginner and intermediate ESL learners. They found that learners need

to address two major issues when retrieving the lexical items in the writing process: (1) retrieving the linguistic forms to express their thoughts and (2) searching for corresponding words in L2 by using the ideas encoded in L1. We argue that generating texts in L2 is complex and requires greater cognitive effort when the relevant linguistic resources are absent. This is further reflected in the writers' comments on noticing the gap when content support was not provided. In particular, L2 writers made more reference to grammatical errors, deficiencies in the word form and sentence structures, as well as difficulties in expressing ideas during writing. For example, *"I don't know how to express them (words) in English".* We could suggest that writers were aware of the linguistic problems when they could only rely on their own linguistic resources for translation. Under the condition without content support, the intensive problem-solving operations regarding planning and translation performed by L2 writers would overload their working memory capacity. We argue that cognitive overload would have a potentially negative effect on writing performance. Using the Cognition Hypothesis to interpret our findings, we can suggest that the absence of content support might lead to disperse attentional and memory resources to different aspects of the task. In line with Ong (2014) and Ong & Zhang(2013), we found that lack of content support resulted in the decreased text quality and text length over time.

8.3.2.3 Effects of content support on revision

We found that the manipulation of content support did not yield significant effects on the proportions of writers' comments on the monitoring process, which is in line with Michel et al.'s (2020) findings. Regardless of whether content support was available, the participants made relatively fewer comments about revision in their interviews. According to Hayes and Flower (1980), the subprocesses of revision (i.e., evaluation and revision) are triggered only when a mismatch is detected between the writing plan and the changing text. When content support was available, we found L2 writers were less concerned with revision compared to their counterparts. In particular L2 writers followed the task requirement and established a writing plan based on the supporting ideas. During the revision process, they might evaluate whether

the written texts fulfilled the writing plan and make corresponding ideas or textual revisions. Following Jung (2017), we argue that L2 writers were provided with clear outlines in the planning process and thus devoted less attention to organising and revising ideas in the later stage of writing.

In contrast, when content support was absent, L2 writers did not refer to *"outlining"* or *"writing plan"*, but rather described the behaviours of *"changing ideas", "changing expression",* and *"reading and revising"*. This could suggest that they might rely more on online planning, which pushed them to engage in reviewing and monitoring. In other words, L2 writers might be less confident about what they are expected to write without content support, and revision may be the consequence of online planning. It should be noted that formulation, execution and monitoring of the writing process are regarded as simultaneous and recursive until the resulting text can fulfil the writing plan and task requirements. We would speculate that the lack of conceptual support could induce writers to address the processes of planning, translating, and revising simultaneously to a greater extent. This interpretation is also supported by writers' higher engagement in the five metacognitive processes regarding thinking about ideas generation, ideas elaboration and ideas organisation, easy structure, and language aspects when content support was absent. Moreover, we argue the revising behaviours in both conditions might be limited by the novice writers' revising strategies, writing experience and language proficiency. That being said, further research employing keystroke logging would be needed to explain the location and behaviour of the revision.

8.3.3 L2 writers' perception of the usefulness of content support

Although content support was found to reduce the cognitive load on L2 writers in the planning process and allowed for more attention devoted to content planning, the usefulness of content support had decreased over time, with a downward trend from Task 2. Our interpretation here is that content support was found to be useful in the beginning of the writing session, while the perception of usefulness decreased as writers might get used to it in subsequent tasks. In an

effort to provide additional information about the usefulness of content support, we investigated the comments referred to writers' use of content support in the interviews.

We found that the majority of comments referred to the use of content support to generate content. In particular, writers tended to focus more on content planning, mentioning *"thinking of details"*, *"elaborate the ideas"* and *"generating new ideas"* in their comments. This is not consistent with Michel et al.'s (2020) findings that L2 writers provided with the source text and/ or lecture spent less time in the planning process. The inconsistency in results can be attributed to different cognitive demands imposed on writers by the provision of content support. For the lower-intermediate L2 writers, the supporting content may impose greater processing pressure on them. This is because writers had to constantly develop the ideas and focus on their persuasiveness (see Robinson & Gilabert, 2007). As a result, writers might perceive content support as less useful over time.

In addition, our findings revealed that content support seemed to push writers to compare and evaluate the given ideas with their own thoughts, leading to acceptance or rejection of the content support:

>   *It's nice to have the concept with you. (But)I didn't exactly include the prompts in the essay.*
>   *(Student Y, CS group, 24:23)*

A possible explanation for the rejection is that even though content support may provide a favourable condition for activating L2 writers' long-term memory, its further support might not be inspiring. That is, the difficulties in retrieving relevant idea units from their long-term memory can lead to the rejection of content support, which is in line with Ong's (2013) hypothesis.

We could suggest that although the availability of content support encouraged L2 writers to devote higher attention to idea generation and idea elaboration in the planning process, it did not make the process of content generation more manageable. In particular, writers would

consider the usefulness and quality of the ideas being generated and approach the topic from a more familiar perspective. However, content support may gradually fail to meet writers' goals of delivering texts when they set higher standards for the text quality. As a result, writers might perceive content support to be less and less useful. This assumption is supported by the changes in the writing performance that L2 writers produced significantly higher text quality and more ideas units over time under the condition of content support. Another possible reason is that the repetitive provision of content support might inevitably produce restriction given that writing is associated with creativity. The fact that some writers did not adopt the supporting content in their essays seems to demonstrate that L2 writers need freedom of creativity to some extent.

8.3.4 Summary and evaluation of the effects of content support on L2 writing processes

In the current study, we manipulated task complexity by the +/- content support factor and hypothesized that providing content support would reduce the cognitive load on the L2 writers in the planning process, which allowed for attentional resources devoted to the translation process. As evidenced by the results, both task conditions (i.e., provision vs. no provision of content support) can play different roles in guiding writers' deployment of the writing process. We found that the lack of content support tended to require more mental effort and higher cognitive demands on L2 writers, which was reflected in their constantly higher engagement in the metacognitive processes (i.e., thinking about the idea-related issues, essay structure and language aspects). On the other hand, the provision of content support allowed L2 writers to devote less attentional resources to the metacognitive processes. Given that the supporting content could facilitate the activation and retrieval of writers' prior knowledge, they also reported the decreasing engagement in thinking about idea elaboration and language aspects over the four weeks. As for their deployment of writing processes, overall, we argue that the most pressing task for lower-intermediate L2 writers under both task conditions were to plan and generate enough content for the task completion, and thus writers were more aware of the planning process. Given that L2 writing inherently place higher cognitive demands of language encoding on writers, we could suggest that the manipulation of content support may direct L2

writers' attention to different writing processes.

We argue that the supporting content in the written task may help L2 writers to retrieve idea units from long-term memory and previous experiences, thereby allowing them to be more aware of the content planning procedures. It did not imply that planning would require fewer attentional resources in the simple condition when content support was available. Instead, L2 writers might need to take the advantage of the available language resources, elaborate the supporting content with more details and examples, and take into account the usefulness and quality of the ideas generated, as these would facilitate task completion. Besides, the provision of content support might release the processing load in the translation process, as it might have offered L2 writers the linguistic knowledge and semantic constructs to be processed. This may have helped writers to focus on the translation process more clearly. As a result, L2 writers could rely on the given linguistic resources to express their thoughts, which enables the translation operations to be conducted recursively. Lastly, content support might fail to push L2 writers to make greater use of the revising procedures, although they became more aware of assessing whether the written texts and generated ideas would fulfil the writing plan. We believe that content support may impose higher communicative requirements on writers, requiring them to deliver texts with higher quality and better ideas. For this reason, L2 writers would perceive the task as more difficult when content support was provided.

On the other hand, the lack of content support led L2 writers to engage more in metacognitive processes. Without supporting content, they need to develop the content relying on their own linguistic resources, and such cognitive demands may push them to think about the planning and translation process at the same time. Although the cognitive processing capacity of L2 writers may be overloaded, we argue that the lack of content support may not necessarily be detrimental to the writing process. When content support was absent, writers were more aware of the lexical retrieval and syntactic encoding in the writing process and more likely to notice the gap between their own linguistic knowledge and the target language. We would have likely obtained different results regarding L2 writers' coordination of the cognitive processes in the current study if there had been a more extended writing session. Still, further research is needed

to confirm our hypothesis above.

8.4 Discussion of the potential role of content support in L2 writing and language learning

The current research seeks to deepen our understanding of the multifaceted nature of learning to write in an L2 and to explore the relations between tasks, products, and processes. Given that content support was found to reduce cognitive load during the writing process, we would like to discuss the potential role of content support in the development of writing competence and language learning in light of our findings on writing performance and cognitive processes of L2 writers.

Regarding writing performance, although the two types of cognitive demands (i.e., planning with content support vs. planning relying on their own language sources) elicited different patterns in their writing production, they offered similar opportunities for L2 writers to demonstrate their language competence in different aspects. The content support inherently provided writers with additional ideational and linguistic resources, which would facilitate the activation and retrieval of learners' prior knowledge to some extent and lead to higher lexical diversity in the written production. Considering the traditional concepts and conventions in the writing instruction that led to the increased focus on the complexity and grammatical accuracy of written texts (see Hyland, 2011), we had speculated that content support would push L2 writers (especially Chinese EFL learners) to prioritise lexical complexity at the expense of other areas of language. However, writers might have sufficient awareness of the communicative requirements in the writing task over the period and appropriately adjust the linguistic complexity for different purposes. Accordingly, content support allowed writers to prioritise meaning rather than creating complex discourse, which is reflected in the short-term growth in their text length, number of ideas units and overall text quality. We could suggest that the provision of content support facilitate the automatic access to and consolidation of the writers' L2 knowledge over the period and give them some level of attentional control. As content support reduces the need for planning, writers are able to gear their resources to translation

processes to a greater extent. In addition, the supporting content can guide writers to focus on the communicative purposes and message to be conveyed in their writing, thereby supporting them to control the language and content intentionally. This explanation aligns with Hirvela et al.'s (2016) comment in relation to *learning to write* that written texts are viewed as discourse—the way we use language to achieve purposes in a specific situation.

On the other hand, we argue that the absence of content support could also benefit the L2 writing performance. When writers had to plan the content, different cognitive demands were placed on the planning and translation processes. Under this condition, it is assumed that writers were less constrained in the planning stage and thus more likely to generate content to meet the task requirements, as reflected in the tendency toward longer texts compared to their counterparts. However, the lack of supporting content did not lead to writers' avoidance of using the complex linguistic constructions. We found they were able to maintain their focus on linguistic forms in the translation process and had relative stable performance in linguistic complexity over time when content support was not available.

As for L2 writers' cognition, we attempt to understand the complex cognitive processes involved in learning to write by manipulating the content support in the task. We could suggest that L2 writers were more aware of the planning processes in both task conditions, as the most pressing task for them was to generate enough content to complete the task. For the lower-intermediate L2 writers in our study, we could observe two distinct modes of thinking under the two task conditions. On the one hand, the provision of content support was found to reduce the cognitive demands in the writing process. Since content support provided a writing plan and additional linguistic resources, L2 writers' attention were guided to planning content and develop effective strategies that contribute to the task completion. Having the supporting content did not imply restricting writers to the *right* ideas. Instead, it could encourage writers to retrieve knowledge with different goals, compare and reflect on the usefulness and quality of ideas generated to complete the writing task. As evidenced by the results of the writing performance, such content-focused strategies showed positive effects on text length, number of idea units and overall text quality in the short term. However, as content generation was

considered strategic and controllable, L2 writers at the lower proficiency level might find it difficult and less manageable and devote more attention to this subprocess. On the other hand, we found the lack of content would allow L2 writers to be aware of the different aspects of the writing task. When L2 writers had to draw on their own language resources and the task topic to generate the content, they were under constant pressure and cognitive overload in terms of idea generation, text production and language. In other words, writers had to handle the processing demands from both content planning and linguistic encoding at the same. It should be noted that L2 writers who did not receive content support were more aware of the lexical retrieval and syntactic encoding compared to their counterparts, although they might not be able to focus on translation clearly. This aligns with the finding that writers' control over the linguistic aspects remained stable over the period. In general, the two task conditions resulted in different focus of attention during the writing process and benefited the writing cognition in different ways.

Lastly, we would like to discuss the potential for language learning in the writing tasks provided with content support. Our findings suggest that content support elicited higher lexical diversity to a certain extent. The use of diverse lexical units has been widely considered as an important indicator of language proficiency and task performance, especially when learners have not fully developed from a predominantly semantic mode (i.e., to convey message) to a syntactic mode (i.e., to convey their message with complex and appropriate language) (Robinson, 1995). As we summarised above, the additional content and linguistic resources provided by content support enabled L2 writers to deploy complex lexical items and expand their vocabulary knowledge with different purposes of lexical searches. However, content support was not found to benefit the lexical complexity over time; instead, it elicited more meaningful and higher-quality output. The discrepancy between lexical diversity and overall text quality may suggest that the development of language is dynamic, and lexical development and perceived writing quality may not necessarily coincide at some point of L2 development. According to Bialystok (1994), increasing task complexity along the resource-dispersing dimension ultimately will lead to learners' better control as well as faster, more automatic access and use of their L2 knowledge rather than new L2 form-concept mappings. On the other hand, the availability of content

support may have fostered translation over time, as reflected in the higher-quality output. We consider these findings provide evidence for the language learning potential in writing with content support.

More importantly, we argue that the potential of language learning is also presented in the L2 writers' cognition. According to Galbraith and Al-Saadi's (2020) remark on L2 writing research and language development, writers' beliefs about writing processes or the metacognitive definitions of the process have a strong impact on how they write and think. In particular, if writers define writing as a process of translating ideas into words, the potential of language learning may be limited to the text revision. If writers aim to demonstrate their understanding of the topic in the writing task, they will further develop their understanding of the topic and may formulate more varied and precise expressions. Similarly, content support can be seen as the means of orchestrating different cognitive processes during writing production. We found that content support might not only encourage writers to utilize the available linguistic resources to activate L2 knowledge but also formulate strategies for prioritising content during writing. Language learning will be promoted when writers push themselves to express intended meaning accurately (Ortega, 2009). Such cognitive processes demonstrate the pushed output proposed by Swain (2005). Our findings suggest that content support provided writers with favourable conditions to control cognitive processes and language for communicative purposes. This may also account for the mixed performance of L2 writers in terms of linguistic complexity. Still, further research is needed to observe the effects of content support on language development.

CHAPTER 9 CONCLUSIONS

In this concluding chapter, we first summarise the main findings of the empirical study. We discuss the theoretical and pedagogical implications for task complexity studies and L2 writing instruction. This chapter ends with the acknowledgement of the limitations of the study and suggestions for future research.

9.1 Summary of the study and its major findings

The dissertation investigated the effects of cognitive task complexity (operationalised as the provision vs. no provision of content support) on L2 writing performance and the writing process. The first aim of the study was to investigate whether and how content support may influence L2 writing performance of the lower-intermediate EFL learners and add empirical evidence to the task complexity studies that manipulated content support in the writing task. Our findings revealed that both task conditions provided different opportunities for writers to demonstrate their language skills. We found that the provision of content support exerted its impact mainly on lexical diversity and coordination, while the absence of content support was more likely to produce longer texts with higher overall text quality in the first two tasks. From a longitudinal perspective, content support was found to benefit the text length, the number of idea units and the overall quality of the writing, accompanied by a decrease in lexical diversity, phrasal elaboration, and mean length of idea units over time. On the other hand, the lack of content support led to stable performance of linguistic complexity but a tendency toward decreased length-based fluency and overall writing quality. It can be argued here that content support offers favourable opportunities for L2 writers to fulfil the task completion and communicative requirements, thereby promoting longer and higher-quality written outputs over time. Our results may coincide with Robinson's (2001b, 2005) predictions on CAF (+complexity, +accuracy, -fluency) as long as the task complexity is kept low along the resource-dispersing dimension—learners' cognitive resources can be allocated to different dimensions of task performance. We could also suggest that proficiency level of writers may

have influenced the effects of content support on L2 writing performance.

The second aim of this study was to explore and account for the effects of content support on the writing processes of lower-intermediate level EFL learners. We hypothesized that content support would reduce the pressure in planning, allowing more cognitive resources to be devoted to translation operations. However, regardless of whether content support was available, L2 writers were found to prioritise the planning process, followed by the translation process. As opposed to our predictions, the findings suggest that writers provided with content support geared their attentional resources to content planning rather than the lexico-grammatical concerns. We can attribute writers' focus on planning content to the limits of their proficiency and writing skills, and providing content support at a more advanced level may impact the writing process differently. Besides, our findings offer empirical evidence that content support can activate writers' evaluation and selection of available linguistic resources over time, which facilitates the production of new knowledge in L2 writing. On the other hand, the absence of content support required L2 writers to engage more in metacognitive processes. When content support was absent, L2 writers need to overcome the difficulties in allocating attentional resources and juggling the cognitive demands of the planning and translation processes.

9.2 Implications

The findings of this study are of theoretical and pedagogical significance to the TBLT-oriented research. The first theoretical implication is related to the understanding of how cognitive complexity manipulations work in L2 writing performance and writing cognition. Given that writing is a strenuous activity, L2 writers have to address not only the cognitive demands imposed by the writing task but also the complexity inherent in written production. We examined the impact of content support along the resource-dispersing dimension, where the provision and absence of content support can impose different cognitive demands during different stages of the writing process on L2 writers. Through this study, the account of the task complexity effects on L2 writing performance and writing cognition can be expanded to the lower-intermediate groups of language learners. This study has also answered the call for

longitudinal task-based research on how task complexity can affect L2 written production and the writing process (Byrnes & Manchón, 2014a; Johnson, 2021; Manchón, 2020). We found that with content support, L2 writers' focus of attention was gradually diverted to meaning and overall text quality rather than the complex discourse over the four weeks. On the other hand, the lack of content support imposed higher cognitive demands, requiring L2 writers to strive to maintain stable writing performance. Theoretically, it is possible to improve L2 learners' writing performance by manipulating content support to reduce cognitive load and help them cope with the limits of their attentional capacity.

Secondly, this dissertation links Kellogg's (1996) writing model to the cognitive-interactionist models of TBLT to investigate the complex nature of L2 writing process, and our findings contribute to the explanation for L2 writers' allocation of attention during the planning, translation and monitoring process. On the methodological level, our study revealed that the combination of retrospective questionnaires and interviews had the capacity to capture writers' focus of attention during the writing process and provide detailed explanations for the subprocesses of the planning and translation operations. Turning to writing cognition, we can suggest that proficiency level and writing experience largely determine the deployment of writing processes. Lower-intermediate L2 writers in our study were more aware of the planning process, as the most pressing task at their current level was to plan and generate enough content for the task completion. However, it is argued that the balanced combination of all processes is associated with more advanced writing skills. An implication of this dissertation is that, for writers at the lower level, providing ideational and textual information as supporting content would favour the effective deployment of their cognitive resources, which may benefit content planning and foster translation.

Pedagogically, our findings have implications for language learning potential in writing and L2 writing instruction. Firstly, people designing and/or teaching writing tasks should be aware of the tension between complexity and fluency in L2 written production and adjust the amount of content support to favour a balanced writing development in complexity, accuracy, fluency and text quality (Robinson, 2010). Following Abram's (2019) suggestion, we argue that content

support provides novel linguistic content that has the potential to expand the vocabulary knowledge of L2 learners. Although the provision of content support can compromise authenticity, our findings imply that content support can help L2 writers formulate effective writing strategies and place increased attention on the approach of generating content and planning. Besides, L2 writing teachers should communicate the planning strategies clearly with learners, guiding them to focus on content generation, the organisation of the text and the elaboration of ideas. Lastly, content support can be developed as an effective pre-planning tool to direct writers' attention to the quality of content and ideas during the planning process as well as the communicative demands of the writing task.

Another pedagogical implication of this dissertation is that writing teachers must take into account various aspects associated with the writing process and writing product when designing and implementing writing lessons. We raised similar concerns from Ong and Zhang (2013) that providing content support may not be a sustainable instructional approach. There is a possibility that content support may cause lower-intermediate EFL learners to overly focus on content while neglecting language development over time, although further empirical evidence is needed in this regard. Our findings of the condition without content support may suggest the importance of using regular, free writing practices in the writing lesson. Admittedly, writing tasks that require writers to generate the content independently are commonly used in the L2 writing assessment and pedagogy (Kormos, 2011), especially for upper-intermediate and advanced L2 writers. Allowing learners to create their own content and organisational schemes will encourage them to address the issues of planning and translation and be aware of the linguistic aspects in the writing process. That said, further research is still needed into how and when to introduce and remove content support in the L2 writing classroom.

9.3 Limitations and future directions

Despite the potential contributions of this dissertation to task-based writing research and L2 writing pedagogy, we must acknowledge several limitations in the empirical study. Firstly, we recruited a relatively small number of participants who studied at an international high school

in southern China. Affected by the teaching arrangements after the Pandemic of COVID-19, we managed to include the learners from only one of the writing groups in the target school, with a total N = 24, which poses a limitation for conducting inferential statistical analyses. In addition, the fact that all the participants were Chinese EFL learners would restrict the generalisation of our findings to other ESL or EFL learning contexts. In future studies, we need to take into account lower-level learners from different language learning settings and increase the sample size, thereby expanding the generalisability of findings on L2 writing performance and deployment of the writing process. It is worth investigating further the potential impact of additional individual differences in learners (e.g., working memory capacity, creativity, etc.) on L2 written production.

The second limitation concerns the use of semi-structured interviews (with the last writing samples as the stimuli) and retrospective questionnaires to tap into L2 writing cognition. In contrast to Révész et al. (2017) and Jung (2017), we were not able to arrange computer-based writing sessions and utilise the keystroke logging software due to the equipment limits in the computer lab of the target school. The inherent limitation of using semi-structured interviews is that learners can only report a subset of conscious operations in the writing process. In addition, interviews were carried out during the last writing session, and thus, the lapse of time and memory decay may have inhibited writers from accurately and completely self-reporting their conscious activities during the writing process (Révész et al., 2019). On the other hand, using retrospective questionnaires that allow writers to provide information on the metacognitive processes may only provide a broad presentation of their focus of attention during the writing process, even though Tillema et al. (2011) reported a moderate correlation between questionnaire responses and real-time writing behaviours. This problem can be mitigated in future studies by the triangulation of eye-movement data, keystroke logging, and stimulated recall. As writing is a dynamic and recursive process, using direct and indirect observational techniques will enable researchers to capture a broader range of writing behaviours and gain a comprehensive understanding of the allocation of attention in text production.

Another limitation is that our study employed only a single manipulation of task complexity, i.e., providing pre-task questions and ideas to assist L2 writers in content planning. Although we selected two common task types (argumentative writing and article writing), the number of supporting ideas included in the same task type was consistent and the ideas were refined by experienced EFL teachers to meet the needs of the writers. In future research, we need to explore the role of supporting ideas in mitigating the limited working memory capacity and the pressure on planning content in writing. In line with Yoon's (2021) suggestion, we could examine the impact of the number of ideas provided and the different degrees of content support on L2 writing performance and the writing process, which will contribute to the implementation of content support in the L2 writing instruction. Besides, our study did not assess topic familiarity and genre knowledge of the L2 writers. Given that the subjects were novice writers, the next step in this research is to analyse the effects of content support on L2 written production across the two task types. Based on the logic of our findings, it is recommended that teachers introduce learners to the communicative requirements of different genres and the linguistic expressions needed to fulfil the objectives in the L2 writing classroom.

Lastly, given that this was a classroom-based study, we did not have a control group, which would allow us to discover whether changes in L2 writing performance over time were related to task repetition. Due to the intensive teaching schedule in the target school, we could not obtain the pre-test writing scores of our subjects or arrange a delayed post-test, which could have been used to reveal whether content support has a long-term effect on L2 writing performance and writing cognition. As we concluded in the previous chapter, content support may influence the development of lexical sophistication, complex noun-phrase structures and propositional complexity over time. In future research, there will be a need to conduct longer writing sessions to account for the effect of content support on the development of linguistic complexity.

Taken together, our findings suggest that the inherent complexity of the writing task might place independent cognitive demands on different stages in the writing process and the effects of task complexity can also be moderated by the proficiency level. In light of the current findings,

future research should delve into these issues:

(1) whether the task complexity features employed in the writing task are indeed complex, and how different levels of task complexity (e.g., the amount of supporting content) would affect L2 written production;

(2) how working memory capacity might influence the writing processes and the completion of complex tasks;

(3) whether it is the provision of content support or the repeated practice itself that brings about benefits for learning;

(4) following on from the third issue, how L2 writing development, general L2 proficiency, and genre knowledge interact.

In a nutshell, future TBLT-informed L2 writing research needs to expand the manipulation of task complexity, move from a laboratory setting to an authentic language classroom and adopt longitudinal investigation to capture learning and development through writing.

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Writing Task 3 Argumentation

Complex condition:

You should spend no more than 40 minutes on this task.
Write an essay (150–180 words) for your teacher on whether or not smoking should be banned in public places. Give your opinion with reasons and arguments.

You may plan your essay before you start to write. Think about what you are going to write and make some notes.

Simple condition:

You should spend no more than 40 minutes on this task.
Write an essay (150–180 words) for your teacher on whether or not smoking should be banned in public places. Give your opinion with reasons and arguments.

Audience/ Reader: Your Teacher
You should think about all the options below before you write.
In your essay, you can use one or two ideas below in the bullet points and expand on them.

If you agree with the statement,	OR	If you disagree with the statement,
What are the <u>benefits</u> of banning smoking in public places? For example,		What are the <u>drawbacks</u> of banning smoking in public places? For example,

- *health problems and risks*
- *environment and air quality*
- *influence on teenagers*
- *helping smokers to quit*

- *difficult to carry out*
- *freedom of smokers*
- *shops, bars and restaurants out of business*
- *taxes on cigarette sales*

Writing Task 4 Article

Complex condition:

You should spend no more than 40 minutes on this task.
Write an article (150-180 words) for your college magazine with the title: 'My ambition'. Think of something you would like to do in the future and write about how you believe you can achieve your goal.

You may plan your article before you start to write. Think about what you are going to write and make some notes.

Simple condition:

You should spend no more than 40 minutes on this task.
Write an article (150-180 words) for your college magazine with the title: 'My ambition'. Think of something you would like to do in the future and write about how you believe you can achieve your goal.

Audience/ Reader: Your Fellow Students
You should think about all the questions below before you write.
In your article, you can use one or two ideas below in the bullet points and expand on them.

What attracts you to achieve your goal?

How did you first get interested in this goal?

What did you do to prepared yourself for it? For example,

- talked to someone experienced in the field

- read books about what it is like

- tried out a workshop or classes

How do you plan to achieve your ambition in the future? For example,

- a major, classes or activities that you'll pursue

- summer job, internship

- practice and field research

APPENDIX B Descriptive and inferential statistics for the participants' use of writing strategies

Items	NCS group (n = 13)			CS group (n = 11)			Comparison (t-test)		
	Mean	SD	CI 95%	Mean	SD	CI 95%	t	p	d
I thought about how well I understood the task requirements.	4.85	0.99	[4.25,5.44]	4.82	1.40	[3.88,5.76]	0.06	0.955	0.02
I thought about what I knew about the topic.	4.85	0.99	[4.25,5.44]	4.73	0.79	[4.20,5.26]	0.32	0.751	0.13
I thought about what I knew about the genre.	4.23	1.30	[3.44,5.02]	4.73	1.10	[3.99,5.47]	-1	0.29	0.41
I thought about the purpose of the task.	4.23	1.42	[3.37,5.09]	4.27	1.42	[3.32,5.23]	-0.07	0.943	0.03
I thought about the intended reader of my essay and their expectations.	4.08	1.44	[3.21,4.95]	4.00	1.34	[3.10,4.90]	0.13	0.894	0.06
I thought about the goal I wanted to achieve in my writing (e.g., to use new words or sentence structure, to get high score, etc.)	4.54	1.33	[3.73,5.34]	4.09	1.30	[3.22,4.96]	0.83	0.416	0.34
I thought about how much time I should spend on each part of the essay.	3.69	1.18	[2.98,4.41]	3.73	1.35	[2.82,4.63]	-0.07	0.947	0.03
Conceptualization	4.35	1.00	[3.75,4.96]	4.34	0.85	[3.76,4.91]	0.04	0.971	0.02
I thought about or wrote down ideas which are relevant to the task/topic.	4.23	1.36	[3.41,5.05]	4.64	0.67	[4.18,5.09]	-0.9	0.380	0.37
I put these ideas in order based on the task requirements.	4.15	1.21	[3.42,4.89]	4.27	1.27	[3.42,5.13]	-0.23	0.817	0.10
I linked these ideas to what I know already about the topic from memory.	4.85	1.21	[4.11,5.58]	4.73	1.01	[4.05,5.41]	0.26	0.799	0.11
I worked out how these ideas relate to each other, e.g. main ideas or examples.	5.08	1.17	[4.34,5.82]	4.82	0.98	[4.16,5.48]	0.59	0.563	0.25
I thought about the structure of my essay.	4.42	1.17	[3.68,5.16]	3.91	1.14	[3.15,4.67]	1.06	0.303	0.44
I reordered some of the ideas to fit the structure of my essay.	4.77	1.24	[4.02,5,52]	4.09	1.38	[3.17,5.01]	1.27	0.216	0.52
I removed some of the ideas to fit the structure of my essay.	3.92	1.26	[3.16,4.68]	4.09	1.38	[3.17,5.01]	-0.31	0.758	0.13
I re-read the task instructions.	4.69	1.38	[3.86,5.52]	4.82	1.25	[3.98,5.66]	-0.23	0.818	0.10
Planning	4.51	0.97	[3.93,5.09]	4.42	0.86	[3.85,5.00]	0.24	0.82	0.10
I thought about the appropriate words to express my ideas.	5.15	0.80	[4.67,5.64]	4.73	0.79	[4.20,5.26]	1.31	0.203	0.54
I thought about the correct grammar to express my ideas.	4.77	0.93	[4.21,5.33]	4.55	1.13	[3.79,5.30]	0.53	0.599	0.22
I thought about how to connect my ideas smoothly in the whole essay	4.69	1.11	[4.02,5.36]	4.82	0.75	[4.31,5.32]	-0.32	0.753	0.13
I thought about how to make my ideas persuasive to the reader.	4.77	0.93	[4.21,5.33]	4.73	0.79	[4.20,5.26]	0.12	0.907	0.05

I organised my sentences and paragraphs in a logical order.	4.54	1.13	[3.86,5.22]	4.27	0.91	[3.67,4.88]	0.63	0.536	0.26
I developed new ideas or a better understanding of the topic.	4.62	0.96	[4.03,5.20]	4.55	1.04	[3.85,5.24]	0.17	0.865	0.07
I changed my writing plan (e.g. structure and content).	3.33	1.44	[2.42,4.25]	4.00	1.34	[3.10,4.90]	-1.15	0.264	0.48
I focused my attention on the current writing task to avoid being distracted.	4.69	1.25	[3.94,5.45]	5.00	1.18	[4.21,5.79]	-0.62	0.545	0.25
I focused on how much time left and adjusted my time arrangements to ensure completion of the writing task.	4.62	1.50	[3.71,5.52]	4.82	0.98	[4.16,5.48]	-0.38	0.705	0.16
Drafting	4.59	0.69	[4.17,5.00]	4.61	0.61	[4.20,5.02]	-0.08	0.940	0.03
I checked that the content was relevant and revised accordingly.	4.15	1.41	[3.30,5.00]	4.00	1.27	[3.15,4.85]	0.28	0.782	0.12
I checked that my essay was well-organised and revised accordingly.	4.08	1.44	[3.21,4.95]	3.91	1.22	[3.09,4.73]	0.3	0.764	0.13
I checked the accuracy and range of the sentence structures and revised accordingly.	3.92	1.44	[3.05,4.79]	4.00	1.10	[3.26,4.74]	-0.15	0.886	0.06
I checked the possible effect of my essay on the intended reader and revised accordingly.	3.31	1.44	[2.44,4.18]	3.50	1.27	[2.59,4.41]	-0.33	0.741	0.14
I checked the grammar (e.g. part of speech and tenses) and revised accordingly	4.15	1.28	[3.38,4.93]	4.00	1.34	[3.10,4.90]	0.29	0.777	0.12
I checked the appropriateness and range of vocabulary and revised accordingly.	4.15	1.46	[3.27,5.04]	4.27	1.10	[3.53,5.01]	-0.22	0.827	0.09
I thought about what I might do to improve my English writing next time.	4.92	1.19	[4.21,5.64]	4.36	1.21	[3.55,5.17]	1.14	0.267	0.47
Revision	4.10	1.15	[3.40,4.80]	4.02	1.02	[3.33,4.70]	0.19	0.854	0.08

APPENDIX C. Participant formation sheet and informed consent

写作水平测试知情同意书

亲爱的同学：

　　为了更好地帮助你准备下一阶段雅思、托福的语言考试，我们将组织一个完整的、有权威性的写作水平测试。通过这个测试，你可以得到一份个性化的写作水平报告，它将会详细地报告你目前的写作水平、写作习惯、优势和劣势。

　　通过这次写作水平分析，你可以做出更理性的判断来更好、更快地提高你的英语写作水平。当然，这个写作水平测试仅仅是个开始，希望你利用好自己的水平分析报告，为英语学习设定目标并为之努力！

写作水平分析包括哪些内容？

1. 你将会完成一次牛津大学分级测试，以此知道自己现阶段对应的雅思/托福成绩。

2. 你将会完成关于写作习惯和参与度的问卷，帮助你自己和你的任课老师了解你的写作方法和优势。

3. 你将会完成 4 次课堂写作练习。

完成这次写作水平分析测试，你将会得到：

1. 现阶段预估的雅思/托福成绩。

2. 一份个性化的写作水平分析报告。

* 特别说明：

1. 这次写作水平分析不是考试，不会计入你的平时成绩、期中成绩和期末成绩。请放轻松并且努力完成问卷和课堂写作练习。

2. 我们会认真批改和分析你的 4 篇作文，以此帮助任课老师更好地了解你目前遇到的问题，给你一些写作建议和方法。

3. 这是一个可靠的、有权威性的写作水平分析，我们将邀请巴塞罗那大学的写作专家帮助任课老师批改和分析你的作文，以此更加贴近国际性英语水平测试的标准，也能帮助你更好地提高写作水平。

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✓　我愿意并且尽最大的努力完成课堂写作练习和问卷！

学生姓名(Name)：　　　　　　　　日期(Date)：

APPENDIX D. Writing samples of the NCS group and the CS group

Writing sample from the NCS group:

From my point of view, sports should be a compulsory school subject. Sports can ~~bring~~ ~~students~~ be ~~benefic~~ benefic to students

First, playing sports can reduce students' pressure. ~~Students~~ if students. study all the time in the school, they will feel bored and stressful. As a result, they will not take their homework ~~or~~ or classes. seriously, because they have stress from too much work about study. Doing sports can help students pay attention to other things in order to make them feel relaxed.

Second, doing sports is also good for students' heath. If students ~~stand~~ stay in the classrooms ~~for a~~ ~~whole day~~ long time, they will not get. enough exercise to improve their health. ~~Student~~ → They may be easy to sick beacause the lack of exercising. Therefore, it is necessary to do sports in students' daily life instead of ~~or~~ sitting in the chairs all the time.

Last but not least. Sports can make students close together. The main reason is that sports always need team work. For example, playing a volleyball need at least 6 people. Student cannot study and do their homework by ~~themsel~~ themselves. anymore, they must work for a team. During their coorportation, they will help each other and ~~communi~~ conmmunicate with each other. ~~As a res~~ They ∗ may make friends ∗ with others.

All in all, sports should be a compulsory school ~~jeet~~ subject.

Writing sample from the CS group:

Sports is strongly associated with our dialy life, and some experts suggest that sport should become a compulsory subject at school. I disagree with this statement.

First and foremost, do not have compulsory sport project will give students more disposable time to do the things they want, for example, if they do not have that project to occupy their freetime, they can spend their freetime on learning, reading, playing and so on.

Secondly, to consider about students's physical ability view, it is unappropriate to carry out compulsory sport subject because of the difference of capability of students' physical body. For instance, some obses student cannot adapt the sports which are use up plenty of calories, as the result, it might hurt their body. In addition, this subject will also hurt their mantalety because it is not only a kind of abuse of their body but also a kind of torment of their mind and hearts.

In summary, having compulsory sport subject at school will occupy the disposable time of students and donot fit all students because of their different physical ability, so, I disagree with this statement.

APPENDIX E Sample interview transcripts of the NCS group and the CS group

Transcripts are originally in Chinese and translated into English.

Student H, NCS group

T: 你觉得这些写作练习下来会很难吗？

T: Do you think these writing practices were difficult for your, after four tasks?

H：还好，这就是经常会，就是，因为我本就不是很擅长写作。

H: It's okay, it's just often … it's …, because I'm not very good at writing in the first place.

T: 意思是有一些地方你不擅长写的？

T: You mean there are some parts in writing that you're not good at?

H: 对。

H: Yes.

T: 哪些地方呢，还有印象吗？

T: Do you still remember what they are?

H: 就是有一个题目，就是写一个 someone you admire，我觉得那个就挺难写的。

H: There was a topic about someone you admire, and I found it quite difficult to write.

T: 你觉得难的地方在哪里呀？

T: And what do you think is so difficult to write about?

H:就是去，额，描述一件事情，还有就是额，就是去通过一件事情然后呢，得到一个结论那样子。

H: It's about describing a thing, and it's … writing about one past event, and then getting a conclusion.

T：你觉得它写起来跟以前写的练习有很不一样吗？

T: Did you find it different from your previous writing practices?

H: 有些不一样。

H: A bit different.

T: 那写之前你会做什么样的准备吗？

H: What kind of preparation did you do before writing?

H：我写之前就是花了挺长时间就去想，到底要怎么写的，然后就是想的时候还是不太想的到。然后呢就直接去写，然后呢就写着写着，有一个单词不知道要怎么去写，然后就会花很长时间在上面。

H: I spent a long time thinking about how to write about it before I wrote down something. And then when I thought about it, I just couldn't come up with something. And then I'd just start writing. But when writing, there were words that I wanted to write, but I didn't know how to express them in English. And I'd spend a lot of time on it.

T: 那要是那个单词，你找来找去都不知道是什么，那你会怎么办？

T: What would you do if there was a word that you couldn't find out what it was?

H: 我会把它替换成一个短语，或者是用用一些稍微简单的词去替换掉，可能。

H: I'd replace it with a phrase, or with replace it with some slightly simpler word, maybe.

T: 反正就是我把这个内容写长了就对了。写多。

T: So you think "I just need to write as longer as possible"? To write more?

H: 也算是吧。

H: Sort of.

T: 那么你前面说道，比方说接触一个比较陌生的话题，someone I admire，这种情况。当这个话题很陌生的时候，你会很紧张吗？ 脑袋一片空白。

T: As you said earlier, let's say, when you have a relatively unfamiliar topic, someone I admire. In this case, when

the topic is unfamiliar to you, will you get nervous? Will you mind go blank?

H: 会，就是想不到应该写什么。

H: Yes, I just can't think of what to write.

T: 会再看一遍题目吗?

T: Will you read the topic again?

H: 会，会看题目，但还是不知道要怎么写。

H: Yes, I read the writing prompt, but I still don't know what to write

T: 换句话说，你是不知道怎么去组织这些内容？还是没有内容可以写？

T: To put it another way, so you have no idea how to organize this content? Or there is no content to write?

H: 有内容。但是不知道该怎么把他们串在一起。

H: There is some content. But I don't know how to link them together.

T: 那么像你在写的时候，就是我真的不知道怎么写，但是我写下来了，后面会修改吗？

T: Like when you're writing it, it's like "I didn't really know how to write about it, but I wrote something down". And did you revise later?

H: 感觉如果后面再修改，就已经没有什么时间了，如果再继续修改的话，可能还会有更多的语法错误。所以一般写完之后就会再怎么动它了。因为写的时候就是会留意一些语法这样子。

H: Well, I think if I revise it later, there's not much time left. If I continue to revise, there might be more grammatical errors. So I usually don't revise that much after I've done. It's because when I'm writing, I pay attention to the grammar.

T: H，根据你刚刚说的，你很注重自己的词汇表达对吗？

T: H, based on what you said, you pay attention to how you express the vocabulary, right?

H: 对。

H: Yes.

T: 那你怎么能确保你用得足够准确呢，这些词汇？

T: And how can you make sure that you use them accurately enough, those words?

H: 就是有去背单词，但是写作的时候还是会，就是有一些很想写的单词，但是不知道怎么用英文表达。

H: I try to memorize words. But when writing, there were words that I wanted to write, but I didn't know how to express them in English.

T: 我们现在来看一下你昨天写的作文。

T: Let's take a look at the essay you wrote yesterday.

T: 你觉得这篇作文难写吗？

T: Do you think it's difficult to write about?

H: 我觉得是挺难写的。因为本来就不是很擅长写作文。

H: I think it was quite difficult. I'm not very good at writing essays.

T: 你觉得哪个地方卡住？

T: Which part did you get stuck?

H：主要是突然会想不到要写什么。然后还有就是，这个题目就是不会有太多观点之类的那种。

H: Basically, all of a sudden, I couldn't think of anything to write about. Then there was … the fact that some topics don't allow for a lot of points of view or anything like that.

T: 拿到题目了之后，你是怎么确定你这里要写几段还是几个观点，你是怎么计划的呢？

T: After you got the topic, how did you decide you would write a few paragraphs here or a few points of view? How did you plan?

H: 就是有去想，有哪些点值得我，就是我可以去写的，然后但是还是，最后还是只想到了两个观点。

H: I just had to think about what points were worth ... that I could write about, but in the end … I ended up coming

up with only two points.

T: 想到观点之后，会想怎么去多写一点？ 去延伸呢?

T: After you think of the ideas, how did you write a bit more? To expand it?

H: 就是会想，为了达到一个怎样的目的，然后会去做的事情。

H: I would think about, what kind of purpose to achieve, and things that I would do.

T：比方说，什么样的目的。

T: Let's say, what kind of purpose?

H：就比如说，就是为了 achieve my target，然后我去做了这些事情。然后呢，写到为了 achieve my target in the future，然后去背更多的单词，然后有更多……学习。还有就是，多做一些就是和我未来想做的事情一致的一些，提前做准备。

H: For example, "to achieve my target", and then I did those things. And then I wrote about … in order to achieve my target in the future, and I memorize more words, and then more ...... learning. And then to do something more that is in line with what I want to do in the future. And I prepare in advance.

T: 换句话说，你会去尽量想一些例子，一些具体的事情去延长。

T: In other words, you would try to think of some examples, some specific things to elaborate.

H: 对。 但是每次感觉句子只能写一两句，再往下延伸就想不到要怎么写了。

H: Right. But I find that I can only write one or two sentences at a time, and then I can't think of anything further to write about.

T: 谢谢你 H。

T: Thank you, H.,

Student J, CS group

T: 在这次写作练习完成之后，一个月下来，你觉得这次写作练习难吗？

T: After the whole one-month writing practices was completed, did you find it difficult?

J: 还好吧就是中等难度。然后它那边给的例子帮助比较大，然后大概就这么多。 如果让我想自己的新观点的话，可能想不出来。

J: It's okay, it's just a medium level of difficulty. The examples there help me a lot, and that's it. I probably wouldn't have been able to come up with new ideas by myself.

T: 就是看了这些给的观点，你反而想不出来本来自己想说的内容对吗？

T: You couldn't come up with what you wanted to say after reading those given ideas, right?

J：并不是。就是我觉得那个观点啊帮助我很多，但是就算抛开那些观点，我也能想得出来。

J: Not really. I think those ideas help me a lot, but even if I don't have those ideas, I can still come up with some.

T: 那么你觉得哪些方面比较难去继续写下去或者是说拓展，哪些部分比较难呢？

T: So which parts do you find more difficult to expand on, or which parts are more difficult?

J: 怎么说呢，我一般就是开头占的时间是比较多的，因为我也想办法搞一个学术性的开头，因为当时我在初中我学语文，写的都是议论文，所以前面会很芜杂。但是我发现那些芜杂的句子放到英语写作里面是写不出来的，因为我还没有那么高的词汇量。这就导致我必须得想个办法去搞另外一种风格的开头。

J: How can I put it… I usually spend more time on the opening. I tried to make an academic introduction paragraph, because at that time I was in junior high school, I wrote argumentative essays in the Chinese classes. And the introduction (in Chinese essays) could be very messy. I found that I couldn't write those convoluted sentences in English writing because I don't have rich vocabulary yet. This made me find a way to get another style of the opening paragraph.

T: 所以你能说一下你现在在使用的是什么风格的开头？

T: So can you tell us what kind of opening styles you're using now?

J: 就是我现在就是喜欢开头就是会说个，反映社会现实我就会说 in the …,改写一遍这个标题，因为我听我的一个同学说 in the …等同于 nowadays，这是我基本的常规开头。 如果是其他作文的话，那就会，还是一样改写几波题目吧，题目里面的东西同义替换一下。来敷衍开头。

J: I like to start my essays by saying… reflecting social realities by using "in the …" and I would rewrite the prompt. Because I heard one of my classmates say that in the ... is the same as nowadays, and that's my basic way of opening. For any other essays, it would be… I would still rewrite the title in the same way, paraphrasing the words in the writing prompt. I've found that the only way to start is by writing a few words about the topic. I would write a perfunctory the opening paragraph.

T: 其实我发现了，只有你一个写了"现在"只有的单词。那么你在写的时候，发现有哪些东西是跟你之前练习不太一样的呢？

T: Actually, I found that you were the only one who started the essay with the word "nowadays". When you were writing, what did you find different from the practices you had before?

J: 和练习不太一样？

J: Different from the practices?

T：跟你之前的写作这个练习有什么不太一样的地方。

T: I mean how it is different from your previous writing practices.

J: 首先，先说他们的共同点吧，那些练习很多都是有反应社会现实的，或者是对社会的一些事情进行立判。至于不同点的话就在于，它会给你一个例子，而且这个练习里面的题目呢，学术性会更强一些吧。

J: First, let's talk about what they have in common. Those exercises mainly reflect the reality of society, or judge

what happened in society. The difference is that they (writing tasks) give you examples, and the topics in those tasks are more academic.

T: 怎么认为学术性更强呢?

T: Why do you think it's more academic?

J: 就比如说，它这个有的时候会提到什么环保，譬如说会提到关于，叫什么来着，有点忘了，反正就是跟你未来和未来的一些东西有关。但是课堂上的写作练习，有的时候离我们生活比较远。比如说它会给一些关于电影院的东西，但是电影院这种休闲娱乐的活动我觉得，学术性还是有点缺乏的。

J: Well, for example, it sometimes mentioned environment protection. And for example, it mentioned something about… what is it called? I kind of forget. Anyway, it's something to do with your future and something related to the future. But the writing practices in the classroom … sometimes (the topics) are quite distant from our lives. For example, it will tell us something about cinema, but cinema is a kind of leisure and entertainment activity, I think. It is not that academic.

T: 也就是说这四次的练习，话题跟你比较接近对吗?

T: In other words, the topics of these four tasks are closer to you, right?

J: 我觉得会有，就备考下来感觉是用处比较大。

J: I think there will be, I think it's more useful for the exam preparation.

T: 那么 J 我们来看一下你最近一次写的练习。my ambition

T: So J, let's take a look at your latest essay. My ambition.

J: 我写得没啥信心，所以我写得比较奇怪。

J: I don't have a lot of confidence, so I write in a weird way.

T: 不会啊，为什么这样想，我感觉你每次写得内容都好多。

T: No, why do you think that? I find that you wrote a lot in every essay.

T: 你看一下这个 my ambition, 可以告诉我，你觉得这篇文章哪里做得比较好?

T: Please take a look at My Ambition. Can you tell me what you think you did better in this essay?

J: 我觉得唯一做得好的地方就是把开头写好了，但是我，不知道为什么那段时间有点困，所以我中间部分我个人是不是很满意的。

J: I think the only thing I did well was to write a good opening paragraph. But I don't know why I was a bit sleepy at that time, so personally I am not happy with the middle part of my essay.

T: 哪里不满意呢?

T: Which parts were you not happy with?

J: 比如说比尔盖茨我不知道怎么拼，还有就是额，怎么说呢，就是当时写的比较快，字写得比较潦草。而且我觉得这篇作文里面的例子对我的帮助比较大，就我自己的心意写得就比较少一些，这是我自己当时不满意的地方。 至于比较满意的地方就是写好了开头。

J: For example, I didn't know how to spell Bill Gates, and I, how can I put it, I was writing quite fast. I was scribbling a lot. And I think the examples in this essay helped me more. I wrote less about my own ideas, which was something I wasn't happy with at the time. What I was more satisfied with was having a good introduction paragraph.

T: 那么你在写一篇文章的时候开始会做什么准备,再下笔呢?

T: So what do you do when you start writing an essay, before you actually write down something?

J: 额，我会在脑海里面列个提纲，比如说就拿这篇作文来说吧就是，我的雄心。先问我自己我的雄心到底是什么，看一遍那个文章的题目，然后再把文章题目的可以换的同义替换给写出来。改写完题目之后就可以写开头。然后中间段的话，其实老实说，当时写这篇作文的时候，我并没有啥思路，所以我看了下example，然后看了example之后我就可以想法设法地去扯一些东西。再来就是为了凑字数，我会使用举例子这样的手法，就比如说，比尔盖茨对微软这个就是我会用这种方法去凑字数，并提高我的分数。 这也是我在语文作文的时候常用的一些做法。

J: Well, I'll make an outline in my head, for example. For example, this essay, "My Ambition". I asked myself what my ambition is, read over the writing prompt and then write down the words that can replace those in the topic. I could write the introduction only after I paraphrased the writing prompt. And then in the middle part, to be honest, when I was writing the essay, I didn't really have any ideas. So I read the examples, and then after I read at the examples, I was able to make something up. And then to write more words, I would use the technique of giving examples, like, Bill Gates and Microsoft are something that I would write to have more words written and it improved my score. These are also the techniques when I wrote an essay in Chinese.

T: 所以你觉得搬到英语里面还是比较好用的这个方法？

T: So you think this technique still works well when you write in English?

J: 对，比较好用。

J: Yes, it works quite well.

T: 我看你写的好长，写了两页。

T: I see you wrote a long essay. It's two pages long.

J: 还好。

J: It's okay (not a lot of words).

T: 字迹其实很清晰了，没有很潦草，我都能看得很清楚你在写什么。

T: The handwriting is actually quite clear. It's not scribbled, and I can read what you wrote.

J: 歪歪扭扭的，我个人不是很满意。

J: It's messy, I'm not really happy with it personally.

T: 那么除了对这篇文章还有一些遗憾的地方，你觉得你整个，一个月练习下来之后，对写作更好把握了吗？

T: So, apart from some minor disappointments with this essay, do you think you've managed writing better after the one-month practices?

J: 先不能说有没有把握，就是肯定熟练度是提高了嘛。我觉得我现在在改写开头的能力跟刚开始学雅思的时候，改写能力要强很多。然后说，还有一些奇怪的话题，my ambition，里面的 example 也是告诉了我，后面的雅思作文我应该怎么去应对。

J: I can't say I've managed writing better, but I'm definitely more proficient. I think my skill to paraphrase the writing prompt as the introduction is much better now than when I started to prepare IELTS. There are also some strange topics, My Ambition, in which the examples are also telling me how I should deal with the IELTS essays later.

T: 还有吗？

T: Anything else?

J: 让我看到了雅思作文可能会考些什么。我之前一直以为就是让我们立判，大作文就让我们判断，现在发现有的时候还让我们自己描述，可能就比较多元化。然后就能…准备。

J: I've learnt what topics that IELTS writing can cover. I used to think it only wanted us to make an argument. And the Task 2 required us to decide … But now I find that I will need to describe something, so maybe they (the topics) are a bit more diverse. And then … I can prepare for them.