

INDIVIDUAL AND COLLABORATIVE COMPUTERIZED CONCEPT
MAPPING AS A PRE-WRITING STRATEGY:
EFFECTS ON EFL STUDENTS' WRITING

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DECLARATION OF ORIGINALITY

I, Sena Sebit, certify that

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ABSTRACT

Individual and Collaborative Computerized Concept Mapping As a Pre-Writing Strategy: Effects on EFL Students' Writing

The purpose of this study was to examine the effects of computerized concept mapping on EFL students' opinion, compare and contrast and cause and effect essays in terms of content, organization, language use, vocabulary, and mechanics. The theoretical framework was based on writing-as-process approach in which the pre-writing stage as the focus of the study. Explanatory sequential mixed methods design was used to collect data. Quasi-experimental research data was collected from forty-five students who were assigned to two treatment groups as individual and collaborative computerized concept mapping and control group with no mapping. All participants completed a survey before and after the treatment. All groups were instructed to write an essay before the actual essays and thirty one essays were collected. The experimental groups were trained on how to use the computerized mapping tool. The essays were scored according to Jacobs et al.'s (1981) rubric by two raters and the inter-rater reliability was at least 88%. The quasi-experimental phase was pursued by semi-structured interviews. Twelve students from experimental groups participated in the interviews and these interviews aided to interpret quantitative results. The results suggested that the individual mapping group performed better than the control group in terms of content and organization in all essay tasks while the collaborative mappers outperformed control group only in the second task. The results of semi-structured interviews also revealed that learners had positive experiences using computerized concept mapping as a pre-writing activity in

EFL context and their attitudes towards writing were quite positive after computerized mapping.

ÖZET

Bireysel ve İşbirlikli Bilgisayarla İşlenmiş Kavram Haritalarının Yazım Öncesi Aşaması Stratejisi Olarak Yabancı Dil Olarak İngilizce Öğrencilerinin Yazısı Üzerindeki Etkileri

Bu çalışmanın amacı, bilgisayarlı kavram haritalama etkinliğinin İngilizce'yi yabancı dil olarak öğrenen üniversite hazırlık öğrencilerinin yazdıkları görüş, benzerlik ve farklılık ve sebep sonuç kompozisyonları üzerindeki etkilerini içerik, organizasyon, dil kullanımı, kelime bilgisi ve mekanik açılarından incelemektir. Çalışmanın teorik çerçevesi, yazım öncesi evrenin çalışmanın odak noktası olduğu süreç odaklı yazma yaklaşımına dayanmaktadır. Veri toplamak için açılımlayıcı sıralı karma desen yöntemi kullanılmıştır. Yarı deneysel araştırma verileri iki farklı deney ve bir kontrol grubuna atanmış toplam kırk beş öğrenciden toplanmıştır. Yazım öncesi evrede deney gruplarından birinde öğrenciler bireysel olarak diğerinde ise işbirlikli olarak bilgisayarla işlenmiş kavram haritaları hazırlarken, kontrol grubu haritasız sınıf etkinliklerine devam etmiştir. Tüm katılımcılar deneyden önce ve sonra bir anket doldürmüştür. Tüm katılımcılardan, asıl kompozisyonlarını yazmaya başlamadan önce bir kompozisyon yazmaları istenilmiştir ve bu süreçte deney grupları, bilgisayarlı haritalama aracının nasıl kullanılacağı konusunda eğitilmiştir. Çalışmada incelenen kompozisyonlar, Jacobs ve arkadaşlarının (1981) dereceli puanlama anahtarına göre iki değerlendirici tarafından puanlanmıştır ve değerlendiriciler arası güvenilirlik %88 olarak bulunmuştur. Yarı deneysel aşamayı yarı yapılandırılmış görüşmeler izlemiştir. Görüşmelere deney gruplarından on iki öğrenci katılmış ve bu

görüşmeler nicel sonuçları yorumlamaya yardımcı olmuştur. Sonuçlar, bireysel harita grubunun, tüm kompozisyonlarda içerik ve organizasyon bakımından kontrol grubundan daha iyi performans gösterdiğini, işbirlikli harita hazırlayan öğrencilerin ise sadece bir kompozisyonda kontrol grubunu geride bıraktığını göstermiştir. Yarı yapılandırılmış görüşmelerin sonuçları da yabancı dil olarak İngilizce bağlamında öğrencilerin yazım öncesi etkinliği olarak bilgisayarlı kavram haritası hazırlama konusunda olumlu deneyime sahip olduklarını ve yazmaya yönelik tutumlarının bilgisayarlı haritalama etkinliğinden sonra oldukça olumlu olduğunu ortaya koymaktadır.

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CHAPTER 1

INTRODUCTION

1.1 Rationale for the study

This study is based on writing-as-process approach and planning is considered to be an important part of the composing process due to its help to the writers in terms of setting goals, brainstorming, organizing ideas, and deciding text structure (Flower and Hayes, 1981). As a guide to research, writing models of Flower and Hayes (1981) and Bereiter and Scardamalia (1987) can also be put forward. According to Flower and Hayes (1981), a number of cognitive tasks might surpass the capacity of short term memory while writing and planning can reduce the cognitive burden of the writers by helping them to search for proper grammar and pragmatic structures (Schoonen, Snellings, Stevenson & van Gelderen, 2009). Concept maps, which are defined as graphics presenting meaningful relations among concepts (Nowak & Gowin, 1984), are resourceful tools for facilitating the organization, comprehension, and recalling recent knowledge by illustrating relationships visually. Therefore, this study employs computerized concept mapping during the pre-writing stage in an attempt to activate learners' background knowledge, generate and organize new ideas practically, reduce the cognitive loads and promote content-based feedback.

A large body of research has been carried out on the effects of planning on speaking and writing performances. While most of these studies revealed that planning before speaking has positive impacts on the produced language, especially for fluency and complexity; some of them had controversial results for accuracy (Crookes, 1989; Ellis, 1987; Mehnert, 1998; Ortega, 1999; Skehan & Foster, 1997).

Skehan and Foster's (1997) study found that learners divided their attentional resources among all the required processes and they illustrated a trade-off effect between complexity and accuracy: learners under planning condition manifested a more complex but a less accurate language. Skehan and Foster (1997) explained this phenomenon through limited attentional capacity model. The studies on planning before writing were considered to be limited compared to speaking and most studies in this area focused on manipulating both the timing and the planning conditions. Planning prior to writing has mixed results in contrast to the studies on planning before speaking and some explanations such as methodological differences, participants' proficiency level, genre knowledge and explicit instruction were provided for mixed results by scholars (Johnson et al., 2012; Johnson, 2014).

Concept maps are considered to be facilitating language learning by supporting vocabulary development and attainment of more permanent knowledge on a content subject (Carnine & Carnine, 2004; Tang, 1992), helping the comprehension in reading (Carrell, Pharis & Liberto, 1989; Liu, Chen & Chang, 2010; Tang, 1992), aiding learners in special education (Graham, Harris & MacArthur, 2006; Sturm & Rankin-Erickson, 2002) and easing the writing process (Abrams & Byrd, 2016; Al-Shaer, 2014; Lee, 2013; Ojima, 2006; Schultz, 1991; Shehadeh, 2011; Zhang, 2018). Studies on the implementation of concept mapping in reading contexts are also included in the literature review as skills of reading and writing share various common features. Many of the concept mapping studies pointed out a positive impact on reading comprehension (Carrell et al., 1989; Liu et al., 2010; Tang, 1992), increased learners' self-confidence and application of other reading strategies (Liu et al., 2010).

The implementation of pen-and-paper concept maps in writing appears to be giving similar findings with the area of pre-task planning in writing. Scholars such as Abrams and Byrd (2016), Al-Shaer (2014), Ojima (2006), Schultz (1991) and Zhang (2018) observed an improvement on the content and organization of the written outputs, but not on the grammatical forms as a result of using concept maps. Other researchers such as Graham, Harris and MacArthur (2006), Sturm and Rankin-Erickson (2002) benefited from concept mapping as a pre-writing activity for the students with learning disabilities. Many of them observed a positive attitude towards writing due to concept mapping (Schultz, 1991; Zhang, 2018) and this finding is parallel to the findings of studies in the reading context. Moreover, collaboratively constructed mind maps significantly improved content, organization, and vocabulary of written products compared to no planning condition (Lee, 2013). Nonetheless, Neumann and McDonough's (2015) study on the interactions of learners during planning put forward that L2 learners may regard planning activity just to joke around and ignore giving and receiving corrective feedback to one another. Some learners also found paper-based concept mapping as a time-consuming activity since choosing ideas and drawing and revising concept maps took a long time (Ojima, 2016; Zhang, 2018). Computer-aided concept maps have the potential to be more time efficient and foster more formative feedback.

Anderson-Inman and Zeitz (1993) appraised computerized concept mapping as an influential technological tool to enhance knowledge representation easily thanks to practical modification of the maps and the feedback opportunities; however, the studies with the implementation of computer-aided concept maps, specifically for second language learning, have been encountered only lately. Some scholars such as Chiou (2015), Liu (2011) and Sturm and Rankin-Erickson (2002) found significant

improvement on produced texts under computerized concept mapping compared to pen-and-paper concept mapping. It was also believed that the learners' positive perception towards computerized mapping decreased their cognitive burden as well as adding enjoyment (Sturm & Rankin-Erickson, 2002). On the other hand, Zaid's (2011) study manifested some inconsistent findings for the perceptions about the use of computerized concept maps as a pre-writing activity and associated computerized concept mapping tools with significantly greater anxiety due to their demanding, innovative and sophisticated nature. The present study also examines L2 writers' perceptions on using computer-based concept mapping as a pre-writing activity and attempts to explore the affective impacts of computerized mapping towards writing.

The present study attempts to bridge the gap in research on computerized concept mapping prior to writing in order to examine its potential for enhancing EFL learners' written output. With the foci on student surveys and semi-structured interviews, the present study also aims to explore learners' perceptions towards computerized concept mapping. The study aims to propose some pedagogical implications not only for teachers but also for learners.

1.2 Research questions

The present study intends to examine the effects of different types of computerized concept mapping as a pre-writing activity on learners' written outputs in three distinctive types of tasks. The quality of participants' written compositions is measured by a rubric adapted from Jacobs, Zinkgraf, Wormuth, Hartfiel, and Hughey's (1981) composition profile in terms of content, organization, vocabulary, language use, and mechanics (see Appendix A). The main research questions are divided into twofold. The first one is concerned with the quality of the written essays

among distinctive planning groups. The second one is concerned with more in-depth understanding of learners' experiences. The research questions of this study are as follows:

1. What are the impacts of different computerized concept mapping (no-mapping, individual-mapping, and collaborative mapping) on writing performance of intermediate level EFL learners in terms of:

- a) content
- b) organization
- c) vocabulary
- d) language use
- e) mechanics

2. What are the learners' perceptions towards computerized concept mapping as a pre-writing activity?

1.3 Significance of the study

This study contributes to L2 writing in theoretical and practical perspectives. Most studies favor the implementation of concept mapping in writing classes; however, a high number of the empirical studies are done in L1 context and in a limited scope (Cronin, Sinatra & Barkley, 1992; Kellogg, 1990; Reynolds & Hart, 1990).

Moreover, the computer-based concept mapping activities were acknowledged as effective technological tool for knowledge representation (Anderson-Inman & Zeitz, 1993), yet the studies on computerized concept mapping have been encountered only lately. As a result, there is a need for more studies that investigate concept mapping in second language writing in different contexts (i.e. ESL or EFL) and domains (i.e. pen-and-paper or internet). From a research perspective, this study can provide

information about the effectiveness of computerized concept mapping activities before writing essays in an EFL context. Furthermore, this study aims at extending the literature on collaborative concept mapping in online domain and adding knowledge for recent teaching approaches in line with the developments in the society, technology, and writing theory. The findings of this study might be significant for teaching writing by benefiting from computer programs as pre-writing tools individually and collaboratively.

From a pedagogical point of view, the burgeoning studies on EFL writing enrich theories and practices in second language writing and yield contemporary understanding for teaching and learning in EFL schools effectively as Lee (2016) expressed. In line with it, this study can aid schools, particularly writing teachers, comprehend the importance of writing processes, especially the pre-writing stage and improve the teaching of writing. It also informs the EFL learners about pre-writing mapping strategies that may lead to an improvement in their writing skills. As Liu et al. (2010) expressed, the computerized concept maps not only ease revising the concepts which might contain dense information but also help to provide the learners with quick feedback. The current study utilizes computerized concept maps and observes the relationship between writing and technology for further successful classroom activities.

1.4 Definition of terms

1. **Computerized Concept Mapping:** Using a specially designed computer program to create a map which visually represents learners' conceptualizations and

relationships among them (Anderson-Inman & Zeitz, 1993). It is also described as easy to modify and free of confusion.

2. Concept Maps: Graphics that are designated to illustrate meaningful relations between concepts in the form of propositions (Nowak & Gowin, 1984).
3. ESL: An abbreviation of English as a Second Language which refers to the English language in a country where it is dominantly spoken or where English is the official language.
4. EFL: An abbreviation of English as a Foreign Language which refers to the English language in a non-English-speaking country.
5. L1: An abbreviation for first language or native language.
6. L2: An abbreviation for second language which refers to the language that is not the native language of the learner.
7. Limited Attentional Capacity Model: Allocating the attentional resources to some parts of a task due to limited processing (Skehan & Foster, 1997).
8. Propositions: Two or more concept labels connected by words in a semantic unit. (Nowak & Gowin, 1984).
9. Scaffolding: A method of achieving ZPD by working with a teacher or an advanced peer (Wells, 1999).
10. Short term memory: The capacity to keep a small amount of information (i.e. from five or nine items) in mind actively for a limited period of time (i.e. from 15 to 30 seconds) (Atkinson-Shiffrin, 1971)
11. Writing-as-process approach: Theoretical and instructional approach that considers writing as a multiple recursive concept providing a meaningful interaction and purpose thanks to multiple drafting, feedback, audience, voice etc. (Grabe & Kaplan, 1996).

12. ZPD: An abbreviation of Zone of Proximal Development which is defined as the distance between a learner's actual development level on his or her own and learner's potential development with the help of a mature guide or a more skilled peer (Vygotsky, 1978).

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The first chapter introduced the summary of the literature, the research questions and significance of the study. This chapter presents previous research findings on planning in detail. It is divided into five sections. The first section begins with the theoretical framework that explains the skills and knowledge involved in writing and includes a discussion on writing-as-a-process approach, the role of planning in this process and the distinctions between L1 and L2 writing. In this section, two writing models are explained in detail: Flower and Hayes' (1981) writing process model and Bereiter and Scardamalia's (1987) knowledge-telling and knowledge-transforming writing models as they help to explain the stages during pre-writing cognitively. The second section is based on the research of pre-task planning both in spoken and written domains. Explanations for mixed results in the literature are also discussed in this section (Johnson et al., 2012; Johnson, 2014). The third section begins with the definition, purpose and application of concept mapping and moves to the concept mapping in reading context since reading and writing skills are intertwined. It is followed by the implementation of concept mapping in the writing context in which the outcomes of collaboration in writing studies are also explained. The fourth section is related to using technology in second language writing. The final section describes the advantages of computerized concept maps over pen-and-paper maps and explores the studies of computerized concept maps prior to writing activities.

2.2 Theoretical framework

2.2.1 Components of writing

Sokolik (2003) defines writing in three main contrasts. Firstly she states that writing is not only a physical but also a mental act. On the one hand, writing is basically a manual application of words to some platforms like papers or computers. On the other hand, it is the mental endeavor of finding ideas, thinking about the ways to introduce them and organizing them. Secondly, the purpose of writing is both expressing and impressing. According to Sokolik (2003), “writers typically serve two masters: themselves, and their own desires to express an idea or feeling, and readers, also called the audience, who need to have ideas expressed in certain way” (p.88).

Thus, writers are expected to choose the most appropriate form in line with their purposes. Finally, writing is considered as a process and product. The product is what the audience read ultimately whilst the process refers to cyclical steps the writers take such as thinking, organizing, drafting, editing, rereading. All these contrasts indeed illustrate different points of views on the teaching of writing.

Hyland (2003), on the other hand, argues that process and product should be regarded as complementary to one another rather than contrasting orientations and defines writing as “a socio-cognitive activity which involves skills in planning and drafting as well as knowledge of language, contexts, and audiences” (p. 23). An effective writing requires a meticulous combination of three important elements: process, purpose and context. In other words, teachers should make sure that “learners have an adequate understanding of the processes of text creation; the purposes of writing and how to express these in effective ways through formal and rhetorical text choices; and the contexts within which texts are composed and read and which give them meaning” (Hyland, 2003, p.24). Context is a broader term that

requires understanding of the discourse community. To illustrate, writers should not only know what and how to write but also what to include and exclude, how formal or informal they can be and when to use the appropriate genre (Hyland, 2003).

Raimes (1983) indicates that teaching writing in a second language not only helps students convey a message but also aids them learn the language as a skill through experimenting new grammatical structures or expressing creative ideas. Nunan (2015) also mentions similar purposes for writing such as recording some events, communicating with the people far away, entertaining others, reminding things and expressing complex arguments. These reasons can be divided into two in terms of their purposes: Writing for real-world purposes and writing for educational purposes; nevertheless, Nunan (2015) also expresses there can be a link between these two purposes. To illustrate, a student can write an invitation letter for a real audience while practicing the use of modal verbs as a grammar focus. To sum up, writing provides a communication between reader and writer and encourages the exploration of the language through practice.

To sum up, writing is not a practice of set of rules and teaching L2 writing is not simply providing opportunities to write and rewrite. Although it is not arguable whether writing should be taught, there are distinctive but complementary perspectives on how to teach writing. Hyland (2003) chronologically lists all these principle orientations each of which lead to different emphasis on language, goals and pedagogic techniques as “language structures, text functions, themes or topics, creative expression, composing processes, content, genre and contexts of writing” (p. 2). L2 writing classes are generally a combination of more than one approach and writing teachers usually combine these orientations in line with the process, purpose and context. Hyland (2003) also pinpoints five types of knowledge L2 writers bring

to compose effective texts: content knowledge (the ideas on the topic), system knowledge (the linguistic knowledge such as conventions), process knowledge (the steps of a writing task), genre knowledge (communicative aims and values of the specific genre) and context knowledge (cultural preferences or expectations). All in all, it is the teachers' duty to convey the importance of all these knowledge to students in addition to selecting proper approaches to teach L2 writing.

2.2.2 History of writing

Research on L2 writing started in the late 1960s in the USA and the UK with an increase in the number of international students in academic institutions as well as unsuccessful L2 learners in the public education systems. Writing at first was very controlled and included practices of sentence-level grammar exercises. In 1966, Kaplan introduced contrastive rhetoric studies by examining international students' writing in English and deduced that "each language and each culture has a paragraph order unique to itself, and that part of the learning of a particular language is the mastery of its logical system" (p.14). This led to an increase in discourse-level analysis of texts produced by second language users. There was an emphasis on personal reflection, which was not suitable for all academic settings. Despite its huge influence on L2 writing research, writing-as-product approach focused on merely the product, not only ignoring the context of the produced text but also the processes of the writers during composition.

At the beginning of the 1980s, the writing-as-process approach was acknowledged in order to answer some questions related to writing, which substantially influenced L2 writing research in theoretical and practical domains. It freed the instruction from conventional one-draft writing tasks, stimulated multiple

drafting with planning and revision, inspired learners on voice and audience, pointed out the recursive nature of writing, supported peer, small group or teacher feedback rather than working alone; and as a result, boosted feedback practices including content-based formative evaluations (Grabe & Kaplan, 1996; Ferris & Hedgcock, 1998). Writing-as-process approach became so influential that it was considered to bring about a paradigm shift in writing theory and education (Hairston, 1982).

2.2.3 Writing-as-process approach

Process approach not only emphasizes writers as independent producers of compositions but also addresses what teachers ought to do to help the learners. These are; focusing on the improvement of students' planning abilities, defining a rhetorical problem and evaluating solutions (Hyland, 2003). There are two important cognitive models of the writing process as a guide for further research: Flower and Hayes' (1981) writing process model and Bereiter and Scardamalia's (1987) knowledge-telling and knowledge-transforming models, which will be explained in detail.

Kroll (2001) clearly distinguishes process approach as a “cyclical approach rather than through a single-shot approach” (p. 220). Sokolik (2003) indicates that writing is more than the composition of the final output, writing is “the learning of a series of skills leading to that product” (p.96) and she explains them as brainstorming, mapping, drafting, giving feedback, revising, proofreading, editing activities. A writing teacher can aid students comprehend the process of writing through the process of invention, drafting, revision, and evaluation. In order to do this, the instructor is expected to carry out these four important principles: conveying the goal of the writing to the students via learner-centered curriculum, providing opportunities for writing with a variety of genres, giving meaningful and

helpful feedback and opportunities of peer checks, illustrating a clearly-defined rubric for the evaluation of the texts (Nunan, 2015; Sokolik, 2003). Raimes (1992) also puts forward that teachers ought to guide writers in the writing process through providing pre-writing activities on content and structure, emphasizing brainstorming and outlining, checking multiple drafts, giving extensive feedback, and facilitating peer responses.

Writing-as-process approach prioritizes the development of learners' metacognitive awareness of the process like providing strategy training for L2 writing (Hyland, 2003). Writing-as-process approach focuses on responses to writing as well as the use of metacognitive strategies. Response is important "assisting learners to move through the stages of the writing process and various means of providing feedback are used, including teacher-student conferences, peer response, audiotaped feedback, and reformulation" (Hyland, 2003, p.12). An effective implementation of writing-as-process model requires a careful consideration all these abovementioned points.

2.2.3.1 Flower and Hayes' writing process model

Flower and Hayes' (1981) cognitive model of writing is composed of three major elements: task environment, writer's long-term memory, and the writing process (see Figure 1). The task environment means everything that contributes to shaping the writing process outside of the writer. It starts from scratch, the rhetorical problem and evolves into the text with a gradual growth. Secondly, the long-term memory stands for all of the writer's knowledge so far. This includes topic knowledge, audience knowledge and knowledge of writing plans. Finally, the writing process includes planning (the internal representations of the knowledge), translating (the

visible language) and reviewing; all of which are under constant inspection of the monitor. It is important to note that the overall process might be recursive in the sense that the writer can go back and forth while composing a text rather than writing in a linear order.

The initial salient feature of planning stage in Flower and Hayes' (1981) writing process model is generating ideas that represent extracting proper information from long-term memory. Sometimes it could be a whole sentence; sometimes it might be in fragments, like a bunch of relevant (or even irrelevant) words. Organization takes the active role when the ideas in the long-term memory have not satisfactorily met the requirements of the rhetorical task and when it is high time for creativity and discovery. The organization process allows the writers to categorize the text in subordinate ideas (to develop a current topic) and superordinate ideas (to include the current topic). In this regard, the organization process also helps the writers to decide on the arrangement and order of the text (i.e. defining the first and the last topics, crucial ideas and the way they are exhibited). Finally, the purpose of reaching the audience affects all the organization process, which is led by a major but little-studied notion of the planning: goal-setting. The goals written by learners could be procedural (exemplified by Flower & Hayes, 1981; p. 372: "Now let's see, I want to start out with energy") and substantive, or both at the same time. One of the most important aspects of goal-setting is that goals are defined by the writers for the most of the time and as goals guide the writers to the new ideas, new ideas direct the writers to the new goals. It might also be stated that goal setting is not limited to planning stage, it could be observed in each step of the composing.

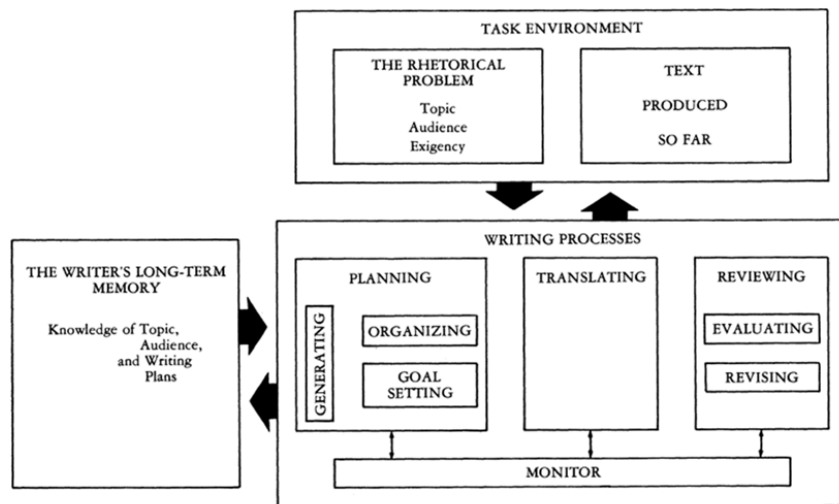


Figure 1. Structure of writing process model
 Source: [Flower & Hayes, 1981]

2.2.3.2 Bereiter and Scardamalia’s knowledge-telling and knowledge-transforming writing models

Knowledge-telling and knowledge-transforming writing models are based on the distinctive abilities of the cognitive psychology that are labeled as natural and problematic. The essential difference between psychology of the natural and psychology of the problematic is that the first refers to acquisition with mind’s natural capabilities and explains knowledge-telling model whereas the latter requires a particular effort to exceed natural limitations (what is involved beyond those natural capabilities) and justifies knowledge transforming (Bereiter and Scardamalia 1987, p.4). In light of these definitions, Bereiter and Scardamalia (1987) put forward an explicit model of composing that links the literature of writing in educational psychology with cognitive psychology. In contrast to Flower and Hayes’ (1981) writing process that considers all the writers in the same continuum (with common features), Bereiter and Scardamalia (1987) make a distinction between skilled and

less skilled writers and stress on why and how they compose distinctively. They pinpoint that the writing process of a knowledge teller, in other words, and less-skilled, immature, inexperienced writer and a knowledge transformer, namely a skilled, mature, experienced writer differ.

Knowledge telling, the model that can be explained within the boundaries of psychology of the natural, is considered to be employed by less-skilled writers who try to put the oral language into written form appropriately by using fewer strategies as illustrated in Figure 2. Knowledge tellers simply utilize from topic identifiers to automatically retrieve the related information and look for genre identifier cues related to discourse type to decide the appropriate structure of the composition. After the content is retrieved from memory, these writers run a test of appropriateness. To provide a clear picture, one may look at the following example provided by Bereiter and Scardamalia (1987):

[T]he task might, for instance, be to write an essay on whether boys and girls should play on the same sports. Depending on the sophistication of the writer, the topic identifiers extracted from this assignment might be *boys*, *girls* and *sports* or *amateur sports* and *sexual equality*. According to the model, these topic identifiers serve as cues that automatically prime associated concepts through a process spreading activation (Anderson, 1983). (pp. 7)

The knowledge-tellers automatically retrieve the related information from memory, without monitoring or planning for coherence. It is more likely that, in this example, they would choose to write an argumentative or opinion essay on whether girls and boys should play same sports since the genre cues lead the writer to this type of composition. It is, once again, up to the knowledge and sophistication of the writer to compose a simple statement of belief and a reasoning paragraph or a more complex essay with multiple reasons and counterarguments (Bereiter & Scardamalia, 1987).

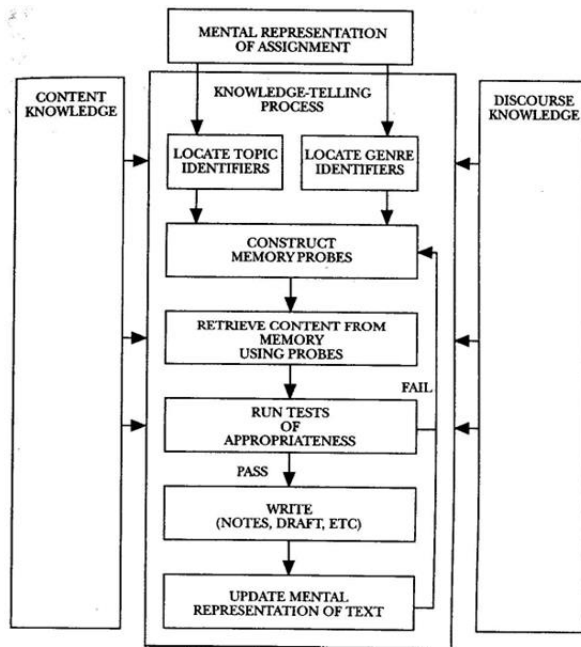


Figure 2. Structure of knowledge-telling process
 Source: [Bereiter & Scardamalia, 1987]

To summarize, knowledge telling model gives less-skilled writers a natural solution thanks to the activation of available information and existing discourse-production skills. Thus, knowledge tellers tend to compose as they think, without much planning or goal setting, particularly on the topics including personal experiences or feelings, journals, diaries, and while telling stories. Thereby, this model is considered as a writer-based approach (Flower, 1979).

However, when it comes to more complex processing that requires going beyond the natural capacities, knowledge-transforming model calls into play. This type of composing is usually regarded for academic purposes. The writers are expected to be more mature and skilled who “actively rework their thoughts” (Bereiter & Scardamalia; 1987, p. 11). Hence, this model of writing is regarded as the reader-based approach. In this larger model, the writing task directly leads the writers to problem analysis and goal setting. The knowledge-telling model is only

one part of the knowledge-transforming model along with two other spaces: content problem space and rhetorical problem space. After determining the goals and anticipated problems, skilled writers try to resolve content problems which are associated with belief and knowledge as well as rhetorical problems which are related to the completion of the composition goals. As could be understood from Figure 3, the solution to one problem in one domain (e.g. content problem space) might create another problem in another domain (e.g. rhetorical problem space). This interaction between domains is best explained by Bereiter and Scardamalia (1987):

[A] writer might be working in the rhetorical space on a problem of clarity and might arrive at the decision that she needs to define the concept of *responsibility* as she is building her argument around. This is a content problem, however, and so one might imagine a message going from the rhetorical problem space to the content problem space, saying “What do I really mean by *responsibility*?” Work on this problem within the content space might lead to determining that responsibility is not really the central issue after all but that the issue is, let us say, *competence to judge*. This decision, transcribed to the rhetorical space, might initiate work on problems of modifying the text already written so as to accommodate the change in central issue. This work might give rise to further content problems, which might lead to further changes in the writer’s beliefs, and so on until a text is finally created that successfully embodies the writer’s latest thinking on the subject. (pp. 11)

As could be understood from the instance, the solution of the content problem leads to revision of the organization for the composition and this new organization might call for new terms or additional information. This “two-way interaction between continuously developing knowledge and continuously developing text” (Bereiter & Scardamalia, 1987, p. 12) goes on until there are no problems waiting to be resolved.

The key difference between knowledge-telling and knowledge-transforming lies beneath the way writers compose. While knowledge-tellers construct an adequate on-topic product without much cognitive complexity; knowledge transformers start

with constructing problems and try to solve these complexities throughout the process. In this sense, some writers may never be knowledge-transformers. However, that does not indicate a poor completion of the task. Grabe and Kaplan (1996) suggest that: “A good writer, in many cases, may depend solely on a knowledge-telling process because the information has been through a knowledge-transforming process from an earlier similar writing task, or because the writer can satisfy the task requirements from a sophisticated use of the knowledge-telling process.” (p.124). Thus, one may infer that irrespective of the genre, it is possible to compose efficiently merely by relying on the knowledge-telling model. In fact, it is possible to compose efficiently or poorly on both models.

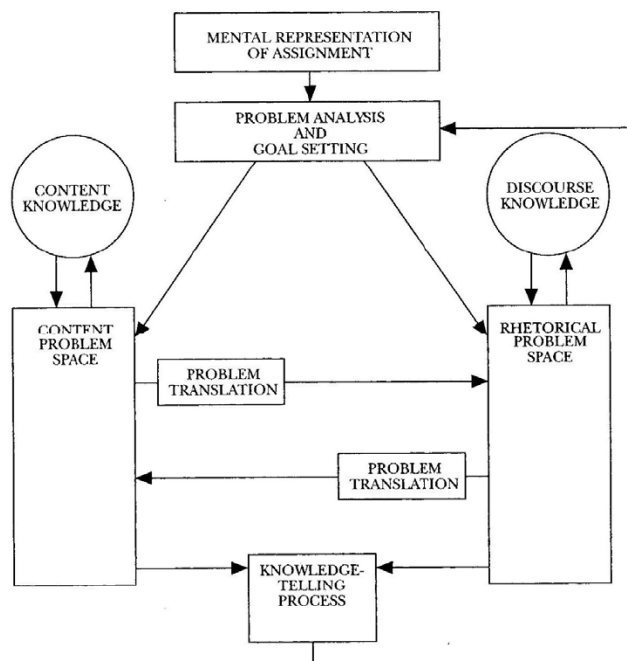


Figure 3. Structure of the knowledge-transforming process
Source: [Bereiter & Scardamalia, 1987]

As expressed before, writers produce in two different paths in line with their skills in writing as Bereiter & Scardamalia (1987) represented. Grabe and Kaplan (1996) remark some benefits of knowledge-telling and knowledge-transforming models.

First of all, rather than defining the writing process as one dimensional, these models represent the skilled and unskilled writers as having separate composition paths. In this way, they also illustrate a satisfactory explanation for the differences in the writing processes by regarding the level of learners' writing skills. In addition, the knowledge transforming model "accounts for the heuristic nature of writing, the content, rhetoric, and the discourse" (p. 58). Despite manifold advantages, scholars also found some limitations of the model. Firstly, this cognitivist model ignores the context effect while composing, yet different contexts might influence the produced text during the organization of content knowledge or rhetorical knowledge. The most important of all, Bereiter and Scardamalia could not explain how and when the writer makes the cognitive transition between the two models. All in all, knowledge-telling and knowledge-transforming models are still regarded as worthwhile to try to explain the progress of distinctive skilled writers in decent way.

2.2.4 The role of planning in process-oriented approach

Planning is simply defined as "internal representations of the knowledge that will be used in writing" (Flower & Hayes, 1981). According to Flower and Hayes (1981), planning not only constitutes words but also images, symbols, or anything that triggers the writer. Planning contains sub-processes such as generating ideas, organizing and goal setting, which are under the control of monitor (See Figure 1). In order to fully comprehend the key aspects of planning from process-oriented perspective, in the following paragraphs, the sub-processes are explained as well as the importance and further categorization of planning, its relation to the limited attentional resources, and the overall positive effects of pre-writing.

After conducting thinking-aloud protocol analysis of novice and expert L1 writers, Flower and Hayes (1980) claimed that defining the rhetorical problem and setting goals in line with the creativity generate the major difference between good and poor writers. The very first phenomenon, rhetorical problem in fact reveals the topic, the audience and the role of the students. Students try to write something in order to solve this rhetorical problem. Defining the problem is “a major, immutable part of the writing process” that every writer engages in (Flower & Hayes, 1981; p.369). Nevertheless, the way the writers define this problem might alter from person to person based on their creativity. Similarly, Schoonen et al. (2009) indicated that "writers differ in terms of the (metacognitive) knowledge they have about writing and also in terms of which knowledge they can put into use" (p. 79). Thereby, it is vital to study how the process works and how it has an effect on the writers' performances.

Flower and Hayes (1981) depict the significance of planning in relation to limited attentional resources that are on display during translation. They consider that the demands of the translation stage could be so high that this extra burden on children and inexperienced writers might exceed the capacity of short term memory. To illustrate, if writers focus more on language problems (spelling, grammar etc.), they might strive for what they want to say, in other words they might produce poor planning; however, if they focus on planning and ignore language, then they may have many linguistic errors. In both cases, it is expected to result in some kind of frustration from the writer's perspective and planning, either pre-task or within task, could help to reduce the cognitive burden of the writer and reduce the writer's frustration.

As Hayes and Nash (1996) stated, the quality of the planning process is thought to enhance the quality of the written product. As a result, it is crucial to spare the appropriate time and attentional resources into this process (Bereiter & Scardamalia, 1987; Kellogg, 1987; Manchón & Roca de Larios, 2007). Schoonen et al. (2009) advocated that: “a writer needs to have a large repertoire of words, collocations, sentence frames and morphological options to get the intended messages across. Preferably, this repertoire should be easily accessible.” (p.80). In this case, the pre-writing stage can aid the writers to look for grammatically and pragmatically appropriate structures and reduce the cognitive load of the writing process. Hayes and Nash (1996) also supported that the advantage for both before task and within-task planning is that they ease the representation of the task and its completion with cognitively less demanding terms.

All in all, the benefit of considering planning within the process approach is that one might observe the ways writers compose a text (i. e. by using thinking aloud protocols) and it leads to a detailed examination of writing (Flower & Hayes, 1981; Hayes & Nash, 1996; Manchón & Roca de Larios, 2007). One thing to note is that the planning can be a recurring process that is not limited to before the task, it could also occur within the task (Flower & Hayes, 1981; Ellis & Yuan, 2004). Be it a pretask or within task, planning helps writers for developing an effective outline (i.e. the “representation of the task”) in addition to a successful process towards the output (Hayes & Nash, 1996). Planning helps writers in terms of generating and organizing ideas besides goal setting (Flower & Hayes, 1981). While learners try to handle multiple constraints (e.g. spelling, grammar, structure of the essay and cohesion), planning activities could help to reduce the burden of cognitive resources and lead to better products.

2.2.5 L1 and L2 writing

In a broad sense, it is possible to state L1 and L2 writing are very similar (e.g. both apply a writing process including planning, writing and revision) and therefore, the adoption of L1 writing trainings used to be supported in the language classes.

However, writing problems and the needs of L2 learners in the USA showed that L2 learners could not be evaluated in accordance with the guidelines of L1 writing instruction (Grabe & Kaplan, 1996). As Silva (1993) expressed, “L2 writing is strategically, rhetorically and linguistically different in important ways from L1 writing” (p.669). In line with this statement, Hyland (2003) lists noticeable distinctions between L1 and L2 writing and learning:

- Different linguistic proficiencies and intuitions about language
- Different learning experiences and classroom expectations
- Different sense of audience and writer
- Different preferences for ways of organizing texts
- Different writing processes
- Different understandings of text uses and the social value of different text types (pp. 31).

In spite of these differences, the theoretical frameworks of L1 writing studies can be adapted to L2 writing studies. Another important issue to consider is the context for English writing instruction: the learners in ESL classes, who have exposure to the English language outside the classroom, might have different writing needs and writing instruction from EFL students who do not have English as the community language. While the students in the ESL context aim at developing academic texts, EFL students can focus on writing skills such as basic paragraphs, essays or articles depending on their level of education, departments and the institutional requirements (Grabe & Kaplan, 1996). These distinctive groups of learners and different writing needs turn second language writing theories and

practice into an intricate one. Students' educational history such as first language experience, reading and writing motivations, perception towards English and its literacy also enhance the complexity of the second language writing.

2.3 Pre-task planning

2.3.1 The effects of planning in L2 speaking context

This section aims to review the effects of planning on speaking skill before discussing studies on planning in writing. As Chafe (1986) declared, one way to perceive the nature of writing is to look from the perspective of speaking because both skills share many similar aspects. Furthermore, L2 learners might benefit from the strategies of oral language in writing tasks (Schleppegrell, 1996; Schleppegrell & Colombi, 1997).

Many of the L2 studies that take account of planning before oral performance look into these three aspects: fluency, complexity, and accuracy. It has usually been noted that planning before speaking had a positive influence on language production, particularly on its fluency and complexity; yet the literature has shown controversial results for accuracy (Ellis, 1987; Crookes, 1989; Skehan & Foster, 1997; Mehnert, 1998; Ortega, 1999).

Ellis (1987) probed planning variability in narration, in other words, he checked for accuracy variation in L2 oral performance (and in a written performance) under different planning conditions with 17 participants from an EFL classroom context with different L1 backgrounds. Altering planning time for the use of regular past, irregular past and copula past tense, this study was important in terms of observing style shifting in a single discourse: narration. The first task was to write

a story based on some determined series of pictures in an hour. The second task was to tell the story orally based on the same series of pictures and to write a composition; furthermore, the participants were allowed to record their stories twice. The third task was to tell another story with a new set of pictures only by looking at them after two minutes. This time, students recorded their voice only once and without any planning. The study showed positive correlation between planning time and accuracy. The learners in the first task with a long period of planning time had the most accurate use of past tense whereas the third task with no preparation demonstrated the least accurate degree of past tense usages.

Crookes (1989) also investigated the difference between planned and unplanned oral performance of ESL learners in terms of complexity and accuracy. Data were collected from 40 participants with Japanese L1 through two equivalent language production tasks that call for monologue: a description task and an explanation task. The participants were either given ten minutes of planning time ($n = 20$) or no planning time ($n = 20$). The results indicated that the learners constructed a more complex interlanguage regarding words per utterance, number of subordinate clauses per utterance and sentence nodes per utterance in ten minutes' planning compared to no planning condition. On the other hand, no significant difference between planned and unplanned condition was observed in terms of general measures of accuracy (i.e. number of error-free T-units or length of error free T-units). As for specific measures of accuracy, the plural marker -s did not create any difference for planned or unplanned oral performance. Only the definite article the improved when learners had the time to plan their speech, which could be due to the fact that planning may partially increase the chance to use forms that are in higher developmental stages (p. 378). It was concluded that with the planning condition, the

interlanguage of L2 learners seemed more complex for the short term, yet the measure for general accuracy did not demonstrate any significant difference. One might deduce from this study that planning could help L2 learners to generate a better developed narration in the short run.

One prominent empirical research on planning in speaking context was done by Skehan and Foster (1997). Different from Ellis's study (1987), there were three distinctive tasks completed in pairs: A personal information exchange, a narrative, and decision-making. Skehan and Foster (1997) aimed at studying the effects of pre-task planning (and also post-task conditions) on fluency, accuracy, and complexity of oral performance. The personal task was defined as the least cognitively demanding one as it was related to the participants' personal lives. The narration was expected to be a more cognitively challenging one than the personal information exchange. The last task was to make a decision in pairs for unfamiliar problems, which was expected to be the most cognitively taxing one. There were 40 pre-intermediate level participants from an EFL college with different L1 backgrounds. As in Crookes' (1989) study, the participants were presented either with 10 minutes of planning time or no planning time. Fluency was determined with the number of pauses less than one second. Complexity was the division of the total number of clauses to the total number of c-units. Finally, accuracy was analyzed as the percentage of error-free clauses in terms of syntax, morphology and word order. The study revealed an apparent positive effect of planning on fluency; however, its effect on the accuracy and complexity was unclear. Skehan and Foster (1997) indicated that the participants without planning had many breaks and this led to a less fluent speech; whereas, participants with planning condition had the chance to think what they were going to say and it diminished the pauses. There was a trend towards greater accuracy in

planned condition for all tasks except for decision-making task in which there was no statistically significant gain. However, planning increased the complexity of the language; especially the most significant gain was in the decision-making task. This result was conceived as a clear illustration of the trade-off effect between complexity and accuracy. In other words, thanks to the planning prior to the oral performance, the participants manifested a more complex yet less accurate language in cognitively demanding tasks such as narration and decision-making. In a nutshell, task characteristics and pre-task planning had an impact on accuracy and complexity divergently due to limited attentional resources. Planning had a facilitative role on fluency and complexity of the oral performance, but not on accuracy owing to the fact that attentional resources were shared between accuracy and complexity.

Ellis (1987), Crookes (1989), Skehan and Foster (1997) analyzed some aspects of language production after a being given a chance to plan for the related tasks; in other words, they focused on the planned output without giving much attention to planning process. Ortega (1999), on the other hand, considered planning which he defined as “the actual use of planning time by learners when they are instructed to prepare for the experimental tasks” as a task condition with an extensive role (p.120). Thereby, other than examining the syntactic complexity, lexical range, accuracy, and fluency of planned output, he tried to find out what the participants, in fact, did while they were planning (i.e. where they used their limited attentional sources, whether there was an advantage to utilize from a focus on form). There were 64 participants who had English as the native language and advanced Spanish as L2. The participants had two storytelling assignments either with 10 minutes of planning or without planning time. In order to dodge the individual differences for storytelling, they were permitted to listen to the story in their L1 and look at the

picture strips. Keeping every other variable constant, Ortega (1999) wanted the planning group to take some notes with full sentences (they could not use their notes while telling the story) and the group without planning to start telling the stories without any preparation. After that, the researcher had retrospective interviews with the participants on what they did in the process of planning with the goal of observing their attentional focus.

Ortega (1999) examined the planned output in terms of syntactic complexity, lexical range, accuracy, and fluency. For complexity, words per utterance were calculated. For the lexical range, the type-token ratio (number of different words divided by the total number of words) was analyzed. As for language accuracy, noun-modifier agreement and article system of the target language were analyzed. For fluency, he measured pruned speech rate. Looking at the type-token ratio, Ortega concluded that there was no statistically significant difference between planning and no planning condition regarding lexical performance. Planning appeared to have a positive impact on syntactic complexity and fluency in the participants' speaking, which shows a similar outcome with the previous studies. Nonetheless, accuracy had a mixed result with an improvement for the usage of noun modifiers but not with the use of articles in the target language. In a nutshell, L2 Spanish participants could perform more fluent and complex language under the planning condition, yet there were no impacts on the lexical range and there were unsettled results for accuracy. When it comes to the usage of limited attentional resources, Ortega (1999) analyzed semi-structured retrospective interviews and found that in general, the participants benefited from planning in problem-solving, rehearsal and memory-related strategies. In addition, many of the participants in the planning condition had some self-reliance and insight of self-improvement, which relieved communicative stress

and perceived difficulty. Nevertheless, some participants found planning unnecessary (because the task was simple), restricting (not using the written notes during storytelling), and anxiety yielding.

2.3.2 Summary of the effects of planning in L2 speaking context

Since all of these studies appeared to be consulting on different tasks with different cognitive demands, diverse variables to measure the oral performance; it is challenging to compare the results across studies and give an accurate conclusion on the effects of planning on L2 learners' speaking performance. However, one general finding could be that planned oral performance had more fluency compared to no planning condition (Crookes, 1989; Mehnert, 1998; Ortega, 1999; Skehan & Foster, 1997). Another impact of the planning on the L2 oral performance was that planning increased the complexity of the language especially for more cognitively demanding tasks. That was explained with the allocation of complexity as opposed to accuracy for more difficult tasks within more planning time (Crookes, 1989; Mehnert, 1998; Ortega, 1999; Skehan & Foster, 1997). As a result, planned output seemed to be more complex than the unplanned one. The participants were not consulted how their experience was with and without planning. The literature is still in need of further studies which take into consideration of the perceptions and performance of the learners during pre-task planning.

The relationship between accuracy and planning in oral performance was found to be inconsistent and inconclusive. Crookes (1989) found no significant difference between planned and unplanned condition regarding the language accuracy except for the use of the definite article *the*. Skehan and Foster (1997) illustrated a trade-off effect between complexity and accuracy as explained before.

That is, for cognitively demanding tasks; the more complex the language was, the less accurate the oral production was. Ortega (1999) found mixed results for pre-task planning on accuracy; there was a significant increase in the usage of noun modifiers but not for the use of articles. Taking all of these into consideration, in order to resolve conflicts between accuracy and planning, the literature needs more research with a broader scope that includes some variables such as individual differences, task complexity, and learner proficiency. Defining and measuring accuracy are also troublesome but essential requirements for further studies to obtain consistency.

2.3.3 The effects of planning in L2 writing context

There are numerous studies investigating planning on oral performance in EFL or ESL contexts, yet there are less studies focusing on the impacts of planning on written texts within the second language (Ellis & Yuan, 2004; Johnson, 2014; Shi, 1998). Different from oral performance studies, the scholars altered not only the timing for the planning before the tasks but also the conditions of the pre-writing: one study looked for the effects of different interaction types upon learner essays in terms of Hamp-Lyons 9-point band scale (1991) including a general score in addition to communicative quality, organization, argumentation, linguistic accuracy, and appropriateness (Shi, 1998), another examined on-line planning (the planning that takes place during the composition) as opposed to pre-task planning and no planning (Ellis & Yuan, 2004). Some of the research done on pre-task writing used the same methods encountered in studies on planning in L2 speaking contexts such as complexity, accuracy and fluency (Ellis & Yuan, 2004; Johnson, Mercado & Acevedo, 2012). While some put forward quite similar results (Ellis & Yuan, 2004), other studies illustrated no impact (Johnson et al., 2012; Johnson, 2014). As a result,

an explanation for mixed findings was required for planning prior to writing (Johnson et al., 2012; Johnson, 2014).

Ellis' (1987) abovementioned study could also be regarded as a study that demonstrates an example of planning in written contexts because he analyzed one written text and two oral performances in terms of accuracy. 17 participants with different L1 backgrounds initially wrote a story without a time limit, then told the same story twice with planning and finally told another story after two minutes without planning. Ellis and Yuan (2004) regarded the first phase, the written narrative, as an illustration of on-line planning as there was no time pressure for writers to complete the story. Ellis (1987) checked the accuracy of regular, irregular and copula past tenses and he observed that overall accuracy was higher in the written narration compared to planned or unplanned oral narrations. The most important of all, merely the use of regular past tense indicated a statistically significant difference, which implies that on-line planning helped the writers for the accuracy only for a simple, portable rule; the use of simple past tense.

Shi (1998) examined how the different types of interaction (i.e. teacher-student, student-student) prior to writing affect the written output with 47 adult intermediate level participants from an ESL context under three different planning conditions: peer discussion, teacher-led discussion, and no discussion. She observed in the pilot study that there was no significant difference among essay topics, and therefore it did not create a methodological risk to counter-balance the three different tasks for three different groups, each class was exposed to all three types of interaction (no discussion, teacher-led, peer speech) in different weeks. The timing was arranged as 20 minutes preparation and 40 minutes writing for discussion groups while 60 minutes for no discussion condition. The discussions were audiotaped. Two

raters evaluated the three opinion essay tasks by using Hamp-Lyons 9-point band scale (1991). The scale had two sections: One was the global scale with general scores and another was profile scale communicative quality, organization, argumentation, linguistic accuracy, and appropriateness. The results indicated no significant difference in overall points on the written essays among different interaction types. The students from pre-writing discussions, particularly the teacher-led discussion produced their texts in a more summary format. Meanwhile, students with peer discussion used more verbs that showed mental process. Nonetheless, students without discussions were inclined to write more detailed and longer essays with more verbs of status and possession. As a result, even though the different interaction types could not enhance the quality of the essays, it led to some important distinctions in terms of the length of the essays and vocabulary preferences. It ought to be noted that no discussion group spent 60 minutes for composing while the other two groups had 40 minutes to do so, which could equate the extra 20 minutes with the length of the essays. As for vocabulary, teacher-led group had the chance to get help from the instructor in terms of organizing the ideas, which presumably brought about essays with fewer words and a summary style. On the other hand, students who shared ideas with their peers before writing might have had the opportunity to investigate their ideas by using many mental process words. In short, the type of interaction revealed itself in the essays regarding vocabulary choices.

One of the most influential studies on the effects of planning on written text was done by Ellis and Yuan (2004). They examined the impacts of pre-task planning ($n = 14$), on-line planning ($n = 14$) and no planning ($n = 14$) on a narrative writing task. Considering Kellogg's (1996) remark on the similarities between oral and written production processes, they examined the accuracy, fluency, and complexity

of the written narrations as in L2 oral performance studies. Participants were 42 undergraduate Chinese participants from an EFL context. They had a pretest before starting to write and there was no significant difference among groups in terms of the English levels. The task was to write a story based on the series of pictures Ellis used in 1987. After the task, they were asked to express their experiences for the activity through an open-ended questionnaire. For the analysis, they adopted the accuracy, complexity and fluency measures that were used in oral production studies (Foster & Skehan, 1996; Mehnert, 1998) by adjusting some expressions applicable for oral performance (i.e. the length of pauses) into written performance (i.e. syllabus per minute). The most important differences were found in the planning conditions. In no planning, participants were asked to complete the task within a time limitation, 17 minutes, with at least 200 words. The reason for the limitations was to eliminate the possibility of on-line planning. In the pre-task planning, the participants were given 10 minutes to plan and 17 minutes to write their stories with at least 200 words. The reason for allocating 10 minutes planning time was supported in L2 oral performance studies (Crookes, 1989; Foster & Skehan, 1996; Mehnert, 1998). There were no instructions, yet the participants were requested to plan considering language, organization, and content similar to the studies of Crookes (1989), Foster and Skehan (1996). The participants were encouraged to take some notes, but those notes were taken away before they started writing the essay. As for on-line planning condition, participants were asked to write down the story without any limitation for the words and the length of the time. The purpose of this freedom was to let them use as much time as they needed for on-line planning within the task and remove the chance of pre-task planning. A difference was expected between the pre-task planning (outside the task) and on-line planning (within the task) since there was no pressure for the

number of words and the length of time in on-line planning condition. The results showed that on-line planners used 21 minutes on average, significantly more time was spent on task compared to no planners ($M = 17.00$ min.) and pre-task planners ($M = 17.00$ min.) This study revealed that different planning styles had an impact on different components: pre-task planning had an influence on the written texts as greater quantity, fluency, and complexity; while on-line planners had some benefits such as reduced number of dysfluencies (the number of words a participant reformulates divided by the total number of words) and greater accuracy thanks to the opportunity to monitor the language meanwhile composing. Pre-task planning significantly helps fluency in two general routes, firstly by facilitating the process for content and organization and secondly by boosting confidence for the writing ability that were expressed in the questionnaires. It might also be inferred that utilizing both planning conditions would enable better quality narrations. Participants without planning had lower accuracy, fluency and complexity measures for their products when compared to pre-task planning and on-line task planning participants. The results are similar to the studies of earlier oral performance ones that point to limited attentional resources as an explanation (Foster & Skehan, 1997; Mehnert, 1998). Ellis and Yuan (2004) indicated the need to replicate this experiment by centering on what the students, in fact, do while planning and if possible, by giving the same amount of time.

On the contrary to abovementioned findings, Johnson, Mercado, and Acevedo (2012) and Johnson (2014) suggested learner and instructional variables were potential determiners of the quality of an L2 composition rather than planning. In terms of the impact of planning on L1 studies, Johnson (2014) expressed that Kellogg's (1990, 1996) studies were found to be leaning on the organization of the

pre-task planning, leaving idea generation and goal setting aside. As a result, less was known about the idea generation and goal setting as an isolated research area. Johnson et al. (2012) also drew attention on the nature of the research by stating that Kellogg did not directly investigate the effect of outlining on specific linguistic forms, he had rather deduced an indirect impact of the organization on the grammatical forms. In terms of L2 studies, the field that also encompasses the linguistic dimension, the results of written production seemed to illustrate mixed results (Johnson et al., 2012; Johnson, 2014). Many of the studies such as Ellis and Yuan (2004) proceeded using Kellogg's (1996) working memory model as an explanation, yet there were also other studies that contradicted it. In a large-scale study consisting of 914 EFL learners of Spanish speakers, Johnson et al. (2012) examined the effect of pre-task planning sub-processes. There were five conditions such as control (i.e. vocabulary matching activity prior to essays), idea generation (i.e. brainstorming), organization (i.e. completing an outlining worksheet), goal-setting (i.e. indicating purposes of writing and the audience) and goal setting with organization (i.e. completing outlining and goal setting worksheets). Participants were given ten minutes for preparation and thirty minutes for composing their essays. Mean differences of students, written products in terms of fluency as well as lexical and grammatical complexity were compared. Since the data were not normally distributed, a Kruskal-Wallis test was conducted to analyze the results which suggested no significant difference in any measurements of grammatical or lexical complexity. Mann-Whitney U test found a significant difference between control and organization conditions in terms of sentence length, yet the effect size was too small to argue that organization decreased the length of the sentences and had an impact on writing fluency in the texts. This large-scale study of Johnson et al. (2012) was in

contradiction with the studies that found a positive effect on writing fluency and grammatical complexity (Ellis & Yuan, 2004). There were four probable explanations to illustrate the differences of such results (Johnson et al., 2012; Johnson, 2014). Firstly, writing studies may not be explained by using the models and/or hypothesis of speaking studies since they are fundamentally distinctive from one another. On-line planning and monitoring, which are salient features of writing tasks, might impede the impact (Johnson et al., 2012). Secondly, the differences in the threshold proficiency level of the participants across studies might have caused different results. This could explain the reason for observed fluency in L1 studies and mixed results in L2 studies. However, the effect of pre-task planning was more likely to be mediated by learners' genre knowledge and explicit instruction (Johnson, 2014). Thirdly, genre knowledge and educational experience are suggested to have an impact on the mixed results across writing studies. While familiar genres such as narration (Ellis & Yuan, 2004) lead to fewer demands on working memory, argumentative tasks might be a burden for it. It could be observed from the study of Johnson et al. (2012): many participants who had been expected to write an argumentative composition, which was an unfamiliar genre, used a compare and contrast organization, which was a previously-learned genre. Finally, when the findings of the L1 studies were compared to L2 studies, it can be deduced that positive findings of the L1 studies are likely to be due to explicit instruction, not the impact of pre-task planning. The instructional interventions should be replicated for L2 studies to observe such effects. To sum up, Johnson et al. (2012) suggested:

[A]n approach to writing instruction which combines explicit instruction in the use of pre-task planning with explicit instruction in the features of the target genre, features of common writing prompts associated with the target genre, scaffolded instruction in the use of pre-task and on-line planning, and reflection on each student's individual writing process. (pp. 273)

2.3.4 Summary of the effects of planning in L2 writing context

In summary, pre-writing planning studies suggested mixed results. Some studies noted increased accuracy for on-line planning (Ellis, 1987; Ellis & Yuan, 2004) and increased fluency and complexity for pre-task planning (Ellis & Yuan, 2004), yet some others could not observe any significant difference among different planning conditions (Shi, 1998; Johnson et al., 2012; Johnson, 2014). Ellis and Yuan (2004) revealed that pre-task planning assisted learners in the organization of the tasks while on-line planning led to opportunities for monitoring the texts. Pre-task planners had better results in terms of quantity, fluency, and complexity whereas on-line planners had more accurate language in their works as in the study of Ellis (1987). The no-planning condition, on the other hand, ended up having lower accuracy, fluency and complexity results compared to both planning conditions. With this conclusion, Ellis and Yuan (2004) established a connection with the earlier studies of limited attentional resources (Skehan & Foster, 1997; Mehnert, 1998). Shi (1998) looked for the impacts of different interaction types (peer discussion, teacher-led discussion, and no discussion) on the written texts and found out that different styles of planning displayed different lengths and diverse vocabulary in the essays of learners. For instance, the teacher-led group produced more summative texts; the peer-talk group wrote more words that illustrate mental process and no discussion group kept their essays longer and used more status and possession words. Different from other written performance studies, she used a well-known rubric of Hamp-Lyons (1991) with the help of two instructor-rates.

Pre-task planning before writing has a lot in common with the studies of planning before speaking; however, written and oral performances have manifold differences that cannot compensate for each other, which may lead to methodological

discrepancies. One of the weaknesses was analyzing L2 compositions with the measures that are employed in the speaking studies (Ellis, 1987; Ellis & Yuan, 2004) because speaking and writing are essentially different (Johnson et al., 2012; Johnson, 2014) and the written data are in need of a broader analysis which requires an examination of text components rather than using a discourse level analysis like accuracy, complexity, and fluency.

2.4 Concept mapping

The idea of concept mapping is based on Ausubel's Assimilation theory (1963) that explained learning as an association of new concepts with already known concepts and propositions (Novak, 1998). First concept maps were developed in 1972 for Novak's research program with the purpose of following and conveying children's science knowledge (Novak & Musonda, 1991). Concept maps can simply be defined as graphical devices for organizing and drawing connections between concepts symbolized by a connecting line (Novak & Cañas, 2008). On top of that, those concepts are arranged in a hierarchical method where the general concepts are at the top of the specific information. Similarly, Anderson-Inman and Zeitz (1993) recognized concept mapping as a process that illustrates learners' understanding of particular knowledge in the graphics style. Moreover, that illustration is "bound to change over time, as knowledge increases and understanding is refined" (Anderson-Inman & Zeitz, 1993, p.6). Concept mapping has many other names in the literature such as semantic units (Novak & Cañas, 2008), semantic mapping (Cronin et al., 1992; Heimlich & Pittelman, 1986; Lipson, 1995; Schultz, 1991), cognitive mapping (Boyle, 1996; Peresich, Meadows & Sinatra, 1990; Reynolds & Hart, 1990), webbing (Norton, 1993), clustering (Brown & Salisch, 1996) graphic organizers

(Cronin et al., 1992) and mind mapping (Abrams & Byrd, 2016; Zhang, 2018) and they are observed to be used interchangeably in both L1 and L2 studies.

Grabe and Kaplan (1996) mentioned manifold graphic organizers such as “flow charts, hierarchical tree structures, classification arrays, charts, tables, figures, histograms, diagrams, matrices, maps, or outlines” (p.312). The application of these information organizers is varied as well. They can be constructed by the instructor or the learners, they can guide the learners for reading, they could be semi-completed in which learners try to fill the blanks or they can be empty frames for the learners to develop ideas in them. All of these forms can be completed individually or collaboratively, in pairs or in groups. Liu (2011) also mentioned other different kinds of concept maps in line with the purposes and producers of these maps such as individually-constructed concept maps, cooperatively-constructed concept maps, filling in concept maps, and expert-constructed concept maps. All these organizers could be used before or after writing. The ideal implementation promotes learners as independent users to find theoretical relationships among ideas and organize them (Grabe & Kaplan, 1996). Based on Ausubel’s idea that meaningful unit has to begin with what is known and then continue with construction of more ideas, Novak and Cañas (2006) expressed two different but legitimate ways to formulate concept maps. One is that the learners create the concept maps on their own for a question in any subject by specifically indicating the opportunity of improvement on the topic. This way makes it possible to observe what is known and leads to the construction of the instruction. Another way is to support the learners with expert skeleton concept maps which reckon what is known and direct the learners for progressing to a greater ZPD.

The present study provides the learners of the two experimental groups with various kinds of expert skeleton concept maps designed by the researcher/instructor

in line with the purpose of the essays and enables the opportunity for the collaboration for one of the experimental group (i.e. by allowing concept mapping in pairs).

2.4.1 Purpose and applications of concept mapping

Grabe and Kaplan (1996) introduced concept mapping as a preparation step to writing papers. They suggested that concept mapping is a strategy for formulating information, finding relationships between them, looking for the organization of the information, and using all these information for better compositions. In this way, concept mapping was regarded as a useful technique to enhance both language and content acquisition.

As Novak (1984) stated, the aim of concept maps is to "represent meaningful relationship between concepts in the form of propositions" (p. 15). Propositions consist of two or more labels connected by semantic units. To illustrate, "sky is blue" is a representation of a simple concept map which creates an acceptable proposition about the concepts of sky and blue. Concept mapping not only allows the meaningful usage of the knowledge in new contexts but also increases the retention of knowledge for longer time (Novak, 1990; Novak & Cañas, 2007). The idea of concept mapping entails brainstorming that helps to stimulate prior knowledge and relate it with the new information under the guidance of the instructor who assists the organization and categorization (Carrell, Pharis & Liberto, 1989).

Novak (1998) defined the good teacher as aiding "to move the learner beyond rote learning by negotiating meanings with the learner" and considered concept maps useful for instructors and students. The participants of Novak's study who had been getting more and more skilled on concept mapping indicated that they were learning

how to learn, improving meaningful learning and avoiding rote learning. Novak (1998) also described the concept mapping experience of the instructors who indicated an increased competence since concept mapping was helpful for planning more meaningful teaching and arranging a platform with the students to construct a meaningful interaction.

Concept mapping is used for a variety of educational practices. Novak and Gowin (1984) for instance, drew attention to the use of concept mapping to investigate learners' prior knowledge, setting future learning goals, extracting meaning from reading passages, reporting laboratories and/or field trips, reviewing articles in newspapers, magazines and journals and planning a composition. The literature has been witnessing many studies involving concept mapping as a helpful strategy for vocabulary development, comprehension of subject knowledge (Carnine & Carnine, 2004; Tang, 1992), reading texts (Carrell et al., 1989; Tang, 1992; Liu, Chen & Chang, 2010), learners in special education (Graham, Harris & MacArthur, 2006; Sturm & Rankin-Erickson, 2002).

Most studies also favor the implementation of concept mapping in writing classes; the majority of the empirical studies are observed in L1 context (Cronin et al., 1992; Kellogg, 1990; Reynolds & Hart, 1990). As a result of the need for more studies investigating concept mapping in second language writing in different contexts (i.e. ESL or EFL) and domains (i.e. pen-and-paper or internet), there has been an increase in the number of the studies (Abrams & Byrd, 2016; Al-Shaer, 2014; Lee, 2013; Ojima, 2006; Schultz, 1991; Shehadeh, 2011; Zhang, 2018).

2.4.2 The use of concept mapping in reading context

There are many definitions of reading, yet Grabe's (1991) definition with a focus on fluency is one of the most prominent ones: "A description of reading has to account for the notions that fluent reading is rapid, purposeful, interactive, comprehending, flexible, and gradually developing" (p. 378). Reading and writing are two skills that are connected to each other, and in fact, Hedgcock and Ferris (2009) claim "few would argue against the view that reading and writing are inextricably connected" (p.188).

This section discusses the application of concept mapping in reading contexts due to the strong interaction between reading and writing. Brodney, Reeves, and Kazelskis (1999) pointed out to the interplays between reading and writing in classroom education. First of all, both of them are active and meaningful processes. While reading is the reception for gathering ideas from texts, writing is the production phase of the ideas through texts. Secondly, both of them benefit from similar thinking processes. Additionally, learners who are skilled in reading and writing use the same cognitive strategies like establishing goals, stimulating prior knowledge, applying metacognitive processes to create meaning and monitoring the development, which could be observed in the studies below (Schultz, 1991). Thirdly, both of them are linguistically associated processes. In other words, "[a]n understanding of sentence construction facilitates reading comprehension, and well-constructed sentences characterize effective writing" (p. 6). Finally, the implementation of reading and writing skills into a classroom course highlights the writer and reader relationship. In fact, most of the writing classes also utilize a lot of reading texts and this increases writers' awareness of the readers since writers

compose for the sake of being read. Consequently, all these similarities lead to this section of concept mapping in reading contexts.

Liu, Chen and Chang (2010) indicated that most EFL teachers focus on revising grammar mistakes or extending vocabulary in reading classes. However, students are rarely guided on how to use reading strategies efficiently in order to enhance their reading comprehension; and as a result, continue to have difficulties with this skill (Chi, 1997; Tsao, 2004; Liu et al., 2010; Carnine & Carnine, 2004). In order to overcome this problem, scholars apply some reading strategies and investigate the efficiency of them and one of the featured reading strategies is concept mapping. The positive improvements on reading comprehension via concept mapping lay the foundation for the prominence of teaching concept maps as a reading strategy (Carrell, Pharis & Liberto, 1989; Tang, 1992; Liu et al., 2010).

Grasping the content is one of the main difficulties experienced in reading. In their article, Carnine and Carnine (2004) illustrated how to improve middle school science learning as well as reading skills of the secondary level struggling students. Struggling readers, as the name suggests, are those who have multiple difficulties in decoding and those who can read but have problem in understanding the reading passages of science and social studies (Carnine & Carnine, 2004). Carnine and Carnine (2004) wrote an article to enhance the students' success in the content areas in the middle schools and offered various strategies to overcome reading difficulties such as focusing on certain parts of reading texts prior to reading the whole content to improve fluency, instruction of important words and teaching affixes for vocabulary development. Applying these strategies lays the foundation for writing activities such as summarizing and concept mapping. They regarded those reading

strategies as a path to satisfactory concept mapping and leading eventually to well-written compositions.

Tang (1992) conducted a study on comprehension of content knowledge in English with 45 seventh grade students with different L1 backgrounds and low level of English. This study focused on the effectiveness of using graphics in instruction on the understanding of content-area texts in English by the L2 learner. The experimental group ($n = 22$) received instruction on how to read and practice tree graphs while the control group ($n = 23$) worked on the texts without graphics. This study consisted of pretest, post-tests, and interviews in semi-structured design. Both groups had a pretest including pre-reading, reading and writing activities. With the aim of familiarization with the graphics, the experimental group was exposed to graphics about the presentation of information as well as classification. For the initial step, the instructor drew the tree graphic onto the board and then requested the students to complete a partial graphic onto the handouts individually. The instruction for the control group, on the other hand, did not include the use of graphics; the participants in it were exposed to the text orally and observed some keywords from the board. After the experiment, participants were asked some question similar to the questions in pretests and completed an interview to shed a light into their perceptions on the use of graphics. The post-tests showed that graphic representation could ease the understanding of content-area reading passages. There was also a salient development on recalling the related information for the experimental group. The interviews supported the positive findings: the participants of the graphics group stated some positive impacts of the technique in most of the aspects like easily recalling and efficiently summarizing the knowledge. Some of them also expressed that graphics did not help in every field, for instance using graphics did not aid in

spelling the words correctly during the test. All in all, Tang (1992) presented a positive report on graphic representation as a strategy to increase the comprehension of content-area texts.

The study of Carrell, Pharis and Liberto (1989) can be seen as an example of the metacognitive strategy training through concept mapping and experience-text-relationship method in ESL reading context. . The aims of this study were to examine whether different reading strategies improved L2 reading and to investigate the impacts of these different strategies on the duration of learning to read. There were 26 participants in an ESL context with different L1 backgrounds. The control group only took pre and post-tests; they did not have any training at all. Participants of semantic mapping ($n = 9$) completed an initial brainstorming about the fundamental concepts before reading with the aims of learning the key vocabulary items and activating background knowledge, later discussed the passage and drew a class concept map onto the board and/or finally completed individual mapping after reading the passages. ETR ($n = 9$), which is the abbreviation of experience-text-relationship, consisted of discussing the experiences prior to the passage, reading the text and answering some content questions after each section, and finally drawing relationships between the text and the previous knowledge thanks to the guidance of the instructor. All the groups had the same questions in the pretest and post-tests in order to ensure comparison on the subjects of America, Cholesterol, and Malnutrition. The tests included multiple-choice questions, open-ended questions, partial semantic mapping, and an open-ended semantic mapping to be completed by the individuals. There were two raters that evaluated the mapping in line with Carrell's (1989) rubric of open-ended questions and semantic mappings. The results indicated that metacognitive training in mapping and ETR method seemed to

improve L2 reading significantly; while the control group did not have any gains at all. It also demonstrated that both strategy training methods had a similar positive result on open-ended questions, but there were some differences on other measures: ETR significantly improved partial semantic mapping while the trained mapping group had significant gains on open-ended semantic mapping part.

Liu, Chen and Chang (2010) preferred the application of computer-aided concept mapping arguing that “computer-assisted concept maps help learners organize concepts effectively and achieve meaningful learning” (p. 437) and observed the impacts of computer-aided concept mapping strategy on EFL university students’ reading comprehension. 192 university students were asked to read an upper-intermediate English magazine which included nine reading articles. Participants completed a reading task, followed by a reading test and a reading strategy questionnaire so that their levels and perspectives could be determined prior to the study. After evaluating the reading test scores, participants were categorized as skilled or less-skilled readers. The experimental group ($n = 94$) completed some practices on computerized concept mapping as a reading strategy while the control group ($n = 98$) only composed reviews for the same reading passages. Then they had three tests assessing their understanding of the articles. Finally, once again, they completed the reading questionnaire which covered their usage of some strategies such as listing, inferring, elaborating, summarizing, evaluating, and reviewing. The results were twofold. To begin with, a significant improvement was observed in the reading skill of the computerized concept mapping group. Not only concept mapping helped to monitor but also it increased the self-confidence of the users. The test scores before and after the treatment revealed that computerized concept mapping particularly increased the reading ability of less-skilled readers; thus, it diminished

the gap between skilled and less-skilled readers. Secondly, the results of the reading strategy questionnaire showed that many participants stated some gains from listing, enforcing and reviewing strategies after their training on computerized concept mapping. Overall, Liu et al. (2010) suggested that computerized concept mapping could be noted as useful both for the comprehension of the reading texts and for the effective use of numerous reading strategies.

2.4.3 Summary of the use of concept mapping in reading context

Most of the studies suggested that concept mapping brought about a positive impact on reading comprehension (Carrell et al., 1989; Liu et al., 2010; Tang, 1992). More specifically, Carrell et al. (1989) illustrated how different reading strategies resulted in different improvements in reading skills. Tang (1992) presented that concept mapping was significantly beneficial for the reading comprehension and instant recall of low-level learners. Different from other studies, the study of Liu et al. (2010) suggested that computerized concept mapping had positive impacts on the reading skills especially for lower proficiency students and diminished the gap between low and high levels. . The study also demonstrated an improvement in learners' self-confidence and evidence of application of reading strategies like enforcing, listing, and reviewing. To sum up, it could be stated that concept mapping enhanced reading comprehension particularly for the low-level learners.

2.4.4 The use of concept mapping in writing context

Grabe and Kaplan (1996) simply stated: "When children and less-experienced writers begin to compose texts, they need to keep the task relatively uncomplicated if they are to be successful" (p.119). Thereby, there comes a need to convert the oral

language experience (i.e. dialogue with a partner) into the written form, namely, monologue that will be used for composition, without worrying about all the parts causing perplexity. The primary goal for these writers is to tell what they have simply retrieved. For this reason, they basically utilize from some strategies by considering topic and genre as well as monitoring what they have written and constructing extra related information.

Concept mapping can be seen as one of the effective pre-writing strategies by facilitating conceptual and linguistic progress. Recent studies investigated the use of concept mapping as a pre-writing activity, in particular for improving content-based issues in L2 writing (Abrams & Byrd, 2016; Al-Shaer, 2014; Lee, 2013; Ojima, 2006; Schultz, 1991; Sturm & Rankin-Erickson, 2002; Zhang, 2018).

Kellogg's (1990) research investigated the overload and interaction and hypotheses in terms of outlining and clustering strategies for L1 writing. The informative essays written by 207 native speaker college students under three groups, no pre-writing, outlining (i.e. hierarchical outline planning) and clustering (i.e. visual representation of ideas and relations) were examined. Those groups were also divided into three as topic only (TO), topic and ideas (TI) and topic, ideas and organization (TIO) task demands. TO group was asked to generate and organize their own ideas without any support. TI group was only given suggested ideas and TIO group was provided ideas and a possible organization chart, yet it was not mandatory for participants to use them. Two raters scored the essays by using a 7-point scale from poor to excellent in terms of content (the idea development and representation) and styles (word choice, sentence structure, spelling and grammar). The fluency and the quantity of the essays were also calculated. Firstly, the results supported the overload hypothesis in favor of the outlining group. Planning a written outline prior

to writing increased the quality of the essays both in terms of style and content for topic only condition, followed by TI condition. When participants were given topic, possible ideas, and some suggested organization, the value of outlining diminished since “these lesser task demands actually hindered rather than helped writers who used the effective prewriting strategy of outlining”(Kellogg, 1990, p.336). The fluency criterion was also best met by the outlining group for number of minutes per writing time. Secondly, although the clustering group came up with the greatest number of ideas, the quality of these ideas were not significantly different from the quality of ideas produced by outlining. As a result, it was recommended that learners should prepare their own outlines by generating ideas and organizing them (i.e. the ideas and organization should be demanded rather than provided) especially for information writing tasks. Kellogg’s study is commonly cited for explaining overload hypothesis for the writing field.

Another one of the early studies on semantic mapping was conducted by Schultz (1991). In order to compose better argumentative essays in French classes, she looked for the ways to apply activities which supported higher-level thinking, affected composing positively and increased the communicative purposes of language education; consequently, she decided to use semantic mapping activities that included all. The process started with classroom discussion, which was followed by theme selection, idea construction, establishing connections between those ideas, excluding irrelevant ideas and finally extracting the main point that would be the basis of the thesis statement. Schultz (1991) implemented this mapping process in the third week of the first semester for sophomores to teach French effectively in California and observed that despite some defects in argumentation part, learners who struggled beginning to compose benefited the most from semantic mapping. She

also noticed an improvement in learners' oral skills on account of class discussions at the beginning. This study only contained qualitative measurements, other scholars within the study and the learners also commented on improvements in the acquired language. The mapping implementation was regarded as both promoting language learning and helping the mental progress of the students. Albeit its methodological limitations, Schultz (1991) early work is crucial in terms of expressing positive views of students and teachers on semantic mapping as a pre-writing activity.

Ojima (2006) examined the impacts of pre-writing on the writing performance of three participants, who wrote two pre-planned and two unplanned essays. Only the first drafts of their compositions were evaluated. Those three students also wrote their experiences in their L1 after the introduction of concept mapping as well as answering semi-structured interview questions. For the analysis of the written data, Ojima utilized the rubrics of Hamp-Lyons (1991) and Polio (1997). The results revealed that the written essays were better after concept mapping in terms of complexity and fluency, but not for accuracy. Interview responses and observation of concept maps shed light to issues that were not clear before. To illustrate, although all three participants defined concept mapping with similar words, their usage of mapping differed from one another. Chie considered mapping as a holistic brainstorming game, preferred jotting down a lot of words one by one and only used some of them while Miho opted for a careful organization and benefited from all the mapping as a draft for the essays. Yuri did a listing, not specifically a concept mapping activity and did not consult to these ideas during essay writing. The implementation of different concept mappings also manifested itself in the composition process. They benefited from concept maps differently, for instance, Chie used it for the activities that required creativity and Miho used it for organizing

the paragraphs. While Chie and Miho had used concept mapping before, it was the first time for Yuri. As a result, Ojima (2006) argued that the familiarization and practice with concept mapping can positively affect the writing process.

Al-Shaer's (2014) study could be noted as another proof for the concept mapping as a resourceful tool for the pre-writing stage. Participants were 38 Palestinian EFL students who were taking Writing II from the researcher/instructor ($n = 19$ for the experimental group, $n = 19$ for the control group). The evaluation criteria concerning the point of view, coherence and unity, development, organization, and thinking were constructed by the researcher. The control group and experimental group went through the same process except for the tutorial and application of concept mapping strategy prior to composing essays. The L2 learners produced argumentative essays based on the course book. A training of Harris and Graham's (1996) self-regulated strategy development was given to the experimental group; next, the students in the experimental group were asked to determine how they desired to create their maps, either with computer-based concept mapping or handwritten concept mapping. Most of the participants preferred to compose with handwritten concept mapping before the actual essays; as a result, handwritten concept mapping was selected as the model of concept mapping. The participants of the experimental group composed seven types of essays using pen-and-paper concept mapping at the pre-writing stage while the learners of the control group produced their outputs without any mapping. The results indicated that the experimental group had an overall significant improvement in written outputs compared to the control group. Al-Shaer (2014) expressed a significant gain with "stronger claims, more unified and coherent paragraphs, more developed supporting details, more organized essays, and richer ideas and thinking" (p.18). By writing the main idea as a basis and

adding more supporting ideas, participants were able to recognize the irrelevant ideas and remove them, which improved the unity and coherence of the argumentative essays. Consequently, thanks to mapping, learners could observe the main ideas in addition to the flow of these ideas. He also found the strategy training beneficial for organization because not only did they help the participants to present the information systematically but also they aided the memory by easing the cognitive burden experienced during the composition process.

Abrams and Byrd (2016) examined the effect of pre-writing planning activities like mind mapping and chronologically listing on written summaries in task-based language teaching. 26 university participants who wanted to learn German in the U.S. completed three summary writing tasks. Initially, they wrote their summaries without preparation, then one group used mind mapping as a pre-writing activity while the other completed a chronological sequence activity prior to writing and finally, the groups switched their strategies and composed each summary in twenty minutes. Following the advice of Norris and Ortega (2009), Abrams and Byrd (2016) evaluated multiple measurements that included seven traits such as syntactic complexity, linguistic accuracy, fluency, propositional content, lexical richness, accuracy, and choice. While there seemed to be a boost on the written summaries in terms of content-based skills such as compositional fluency, propositional content and lexical richness, the results did not show any significant improvement on syntactic complexity, linguistic accuracy or lexical accuracy. Abrams and Byrd also (2016) inferred that the pre-task planning resulted in more enriched summaries with more words and ideas, but not more accurate grammar. No mapping condition yielded the most accurate scores for language use, lexical accuracy and lexical choice and the most complex structures; which might be considered as an indicator that the

more complex the task is, the more accurate the written text is. In other words, without pre-writing, participants appeared to be having better results considering lexical accuracy and choices as well as syntactic complexity. As for pre-task planning “the higher level of cognitive information available to the learners (i.e., having pre-tasks for generating ideas) helped improve their performance in terms of content, focusing on meaning, but at the expense of accuracy” (p.8). Both of these results appeared to support Limited Attentional Capacity of Skehan and Foster (2001) in this way.

Another study that focused on the relationship between the use of mind maps as a pre-writing activity and the writing skills of EFL learners was done by Zhang (2018). Data was collected from 39 EFL university students. In addition to pre and post-tests, a semi-structured interview was carried out with five students from the experimental group. Both writing tasks were argumentative essays that were alike in terms of task difficulty. All participants had 40 minutes to finish their texts. Mind mapping group were instructed on how to apply concept maps before producing their essays while control group followed the conventional route in which learners were taught writing skills in every unit, then they were expected to write a draft and finally, were evaluated by the instructor. All the written works were evaluated by two skilled raters considering the rubric of Jacobs et al. (1981) in terms of content, organization, and use of language. After writing their essays, five participants were interviewed in their native language. The results demonstrated that mind mapping resulted in a significant improvement, particularly on content and organization grades. Zhang (2018) explained it by diminished cognitive load thanks to “getting access to opportunities of activating their prior knowledge and experiences, establishing connections between different ideas, and organizing information in a

coherent whole” (p.98). One thing to note was that this study did not state any significant improvement on language use for mind mapping group, which indicated that mapping was beneficial for focusing on meaning, not for grammatical accuracy. The interview also supported that learners regarded mind mapping helpful in organization and idea construction skills. They also indicated a boost on their self-confidence stemming from the completion of the mind maps before the actual writing. Some participants, however, regarded mind mapping as time-consuming because it took a lot of time to draw and complete the mind maps, which had seldom led to incomplete writing tasks. To summarize, the study supported the implementation of mind mapping as a pre-writing task especially for enhancing meaning-focused skills such as organization, finding ideas and for improving self-confidence and self-regulation.

2.4.5 Summary of the use of concept mapping in writing context

In many studies, concept mapping aided to enhance the content and organization of written outputs; it did not improve the grammatical accuracy (Abrams & Byrd, 2016; Al-Shaer, 2014; Ojima, 2006; Zhang, 2018). Abrams and Byrd’s (2016) study not only observed an improvement on content-based skills with concept mapping strategy but also concluded the most accurate and complex language under no planning condition, which is in line with Skehan and Foster’s (1997) limited attentional resources model. The results also revealed some variables that had an influence on the quality of produced texts under concept mapping condition stemming from the diverse application of concept mapping. Ojima (2006) listed some of these factors as “familiarity with the strategy, the nature of writing tasks

(e.g., length, complexity, discourse types) and situational restrictions (e.g., time limits)” (p. 581).

Many of the comments done by mind mappers showed a positive attitude towards concept mapping before the actual writing activity, followed by a boost of self-confidence (Schultz, 1991; Zhang, 2018). However, some learners also indicated mind mapping activity as time-consuming on account of the fact that the learners might not have been skilled enough, they may have been limited by their proficiency levels and cognitive abilities or there could have been different variables such as the nature of the writing tasks (Ojima, 2006; Manchón & Roca de Larios, 2007; Zhang, 2018). Learners also might have spent a lot of time in drawing the concept maps and selecting ideas from them as Ojima (2006) expressed. This negative point, in fact, leads us to the following chapter: computerized concept mapping prior to compositions at which learners can have many opportunities that they might not have had with pen and paper.

2.4.6 The collaboration in writing

Before moving onto the impact of technology on concept mapping and teaching writing, this section discusses collaborative writing activities. Although collaborative language learning has been promoted, the studies for the effects of collaborative planning on second language writing are scarce (Lee, 2013). Before mentioning some of the important studies on collaborative concept mapping and its impact on writing, one thing to note is that this part includes the papers only with the exclusive focus of collaboration notion that would require further explanations in spite of the fact that there are other reviewed studies that compare collaborative, individual and no concept maps. The coinciding studies are explained in the following parts that are

believed to be more appropriate. Some studies demonstrated that written outputs constructed through collaborative planning have better results compared to individual planning (Shehadeh, 2011) whereas others could not discover any significant gains between individual and collaborative planning on compositions (Lee, 2013). Researchers also indicated that learners could not thoroughly benefit collaborative activities and collaboration could be promoted to the learners more efficiently (Lee, 2013; Neumann & McDonough, 2015).

Shehadeh's (2011) study used quantitative (i.e. writing performance) and qualitative methods (i.e. the perceptions of learners). The junior female participants (n = 38) were from an EFL context, a public university in the United Arab Emirates with a low-intermediate level of English, (n = 20 for control group, n = 18 for experimental group), and Shehadeh's (2011) aim was to examine the efficiency of collaborative composition for the learners who were not used to it. Except for composing the assignments individually (control group) and collaboratively (experimental group), all variables were under control. Shehadeh (2011) distributed a survey after the completion of the essays. Hedgcock and Lefkowitz's (1992) writing rubric adapted from Jacobs et al. (1981) was used and the compositions were rated by two trainers other than the researcher. The pre-test suggested that the composition skills of the participants were "rather basic" (Shehadeh, 2011, p. 293). There were no significant difference between the scores of control group and experimental group. Then individual writers had 30 minutes for composing whereas collaborative groups used 40 minutes since pair works can be more time-consuming. In addition, pair groups had the opportunity to change partners in every two or three weeks. After the completion of all compositions, the collaborative group filled out a survey regarding their opinions on the experience. As for the results, collaborative

group appeared to have a significant gain concerning the quality of their compositions, yet this improvement was found only in content, organization and vocabulary; not for mechanics and grammar. However, an improvement was expected in the collaborative group in line with the social constructivist approach. Shehadeh (2011) put forward an explanation for lack of significance in mechanics by stating that “the mechanics of writing . . . are more straightforward because they represent a relatively limited range of rules and conventions which can be more easily dealt with and mastered by all students in both conditions” (p. 295). Shehadeh (2011) related lack of significance in grammar to the participants’ level which might have been too low to aid each other accurately in the linguistic area. The survey supported these findings, as well. All in all, low-level participants of the collaborative group had significant improvements regarding content, organization, and vocabulary. The survey responses also supported the quantitative data. It was found that pairs had some reservations at first and they became more supportive in time. In addition to that, most respondents indicated collaborative writing activity “enabled them to generate ideas, pool ideas together, discuss and plan, generate their text collaboratively, provide each other with immediate feedback, and put their text in a better shape” (p.296). They also expressed positive comments on changing partners after some time. Lastly, when they were asked whether they wanted to do collaborative tasks in the future, only two participants opted against that. As positive comments illustrated, the participants felt engaged with the language during composition; hence, collaboration could be a preferable way for L2 learning and writing.

Lee’s (2013) study examined the effect of collaboratively constructed concept mapping on the writing performance of Korean language learners. There were 132

participants, who studied the Korean language in a U.S. college, with three different levels: beginners, intermediates and advances. Control and experimental groups had writing pre-tests. The experimental group ($n = 63$) held the first writing session with individual concept maps and after that, they constructed collaborative concept maps for very similar topics. The control group ($n = 60$), on the contrary, did not use concept maps at all during the two writing sessions. The essays were evaluated by considering Jacobs et al. (1981) composition profile that included content, organization, vocabulary, language use and mechanics. The results indicated a positive impact of planning on written texts under the concept mapping conditions. Lee (2013) also expressed that concept mapping strategy helped to reduce the cognitive load for the writing process (Kellogg, 1990). While there were significant differences between the experimental and control group in terms of content, organization and vocabulary, the experimental group had slightly higher scores than the control group in language use and mechanics. Lee (2013) denoted that concept mapping had a positive influence on generating ideas and a potential to improve linguistic aspects. As for the comparison between collaborative and individual planning activities, there seemed to be no significant difference between two conditions; yet the language use and mechanics results of the collaborative group were significantly higher than the individual group. When the levels of the students were considered, it came out that beginners in the collaborative mapping group benefited the most from the mapping compared to the beginners in individual group whereas collaboration had no positive impact on the compositions of the upper level students. Lee (2013) explained this by stating that collaborative mapping group could not have had enough time to share responsibility and complete the task. In order to overcome this time limitation, concept mapping activities could be implemented

differently; for example, learners might complete an individual map before the completion of a collaborative one (Lee, 2013; Novak, 1998). Due to the lack of significant effect of collaborative concept mapping on the composition, it was suggested that the interactions among learners as well as the influencing factors should be investigated in detail for further studies.

Neumann and McDonough (2015) conducted a study to observe the influence of collaborative oral interaction on the writing process. They probed into the question of what students deliberate collaboratively prior to the composition in addition to how much of their discussion could be reflected in their writing. For the initial study, the participants were 19 EAP students from different fields of Concordia University. The participants were video and audio recorded for 13 weeks and merely the relevant data that had given consents were transcribed. The data were analyzed according to the content and the organization of participants oral planning. The interactions were classified either as reflective, meaning “involving explicit evaluation, consideration of alternatives, or justification” or non-reflective, in other words, “having none of the features of reflective episodes” (p. 88), which led to four different language-related episodes: reflective content, non-reflective content, reflective organization, and non-reflective organization. All the outputs were graded by using an analytic rubric. The outcome suggested that content episodes were preeminent, organization episodes were not observed at all. Furthermore, non-reflective content episodes which are natural ways to speak to the people were more common than reflective content. After adapting the conditions, Neumann and McDonough’s (2015) replicated the study for 23 participants from the same university, this time to investigate the oral planning in the written outputs. Two different raters graded the compositions in terms of content, organization, grammar and vocabulary, organization and form. They identified

contributive and not contributive groups, which were later divided as high and low reflectors. Considering the excerpts of oral planning and composed texts, Neumann and McDonough (2015) affirmed that even though some groups created reflective content episodes, they could not comprehend the feedback they had gotten during oral communication. For the final part, the participants expressed their perceptions to three open-ended questions in which they generally conveyed a positive attitude towards oral discussions particularly for brainstorming whereas only a few indicated organization as helpful. 16 of 22 participants wished to work with classmates while 6 opted for individual planning due to greater focus and less time pressure. Neumann and McDonough's (2015) stressed the nature of task as socially and cognitively burdening because of the difficulty in criticizing other people in addition to the pressure of listening and answering them at the same time. These could explain the use of non-reflective episodes in greater amount compared to reflective episodes. It was also put forward that some participants viewed these oral discussions as a chance to make fun with others rather than dealing with the task. They did not prefer giving corrective feedback to one another, which was explained by the excessive challenging notion of providing an appropriate response. That was seen as an opportunity loss for more qualified papers. Moreover, more reflected episodes did not certainly mean better compositions. It could be due to not benefiting the discussions during the composition of the texts and not using the peer feedbacks that they had perceived as unqualified. To sum up, feedback appeared to be a troublesome issue not only in terms of giving but also conveying during the oral planning stage and even if it was given and understood correctly, learners might perceive their peers as incompetent and prefer not to use their comments during

writing their compositions. This study carried importance regarding the explicit search of planning in the text.

2.4.7 Summary of the collaboration studies in writing context

The abovementioned studies indicate some results that have different interpretations. Shehadeh's (2011) study revealed a positive influence on the collaboratively written works for meaning-based areas like content, organization and vocabulary, yet collaboration did not result in a significant improvement in grammar and mechanics. Lee's (2013) results were also consistent with Shehadeh's (2011) to some extent. Comparing experimental and control groups, Lee (2013) found out significant improvements in content, organization and vocabulary and not significant but slightly high results for language use and mechanics. On the other hand, Lee (2013) concluded those slightly positive consequences on language use and mechanics could be the indications of the potential to improve linguistic aspects.

Shehadeh (2011) also noted the favorable perceptions of the students on collaborative writing. He found out that even though participants had some doubts at the beginning because they were not accustomed to writing an essay with a pair, they enjoyed composing towards the end when they realized they could learn a lot from others, receive feedback and other people could make mistakes just like them. Although Shehadeh's (2011) participants made favorable comments, other studies found contrasting results. Investigating the interactions among learners who did oral planning to compose essays, Neumann and McDonough (2015) found out that learners considered prewriting activities to "joke around" with others rather than completing the task (p.99). They also observed that these learners not only disregarded giving constructive feedback to one another but also did not consider the

feedbacks given to them. They did not prefer to comment within the group as it might have been burdensome to give appropriate reply in seconds. Even if they had given a reply, it seemed that they did not opt for using it during the composition just because learners did not consider other peers competent and qualified enough.

2.5 Technology and writing

The educational system for foreign language context has been turning into a technology-driven one, and teaching and learning of EFL writing through technology has become a popular research field (Lee, 2016). While the conventional classroom writing is described as mostly individual, text-focused and written for the teacher; technology-aided writing supports collaboration, interaction, multimodality and wider audience (Godwin-Jones, 2015; Kurek & Hauck, 2014; Zheng & Warschauer, 2017).

Zheng and Warschauer (2017) pointed out that in this digital age learners are active participants of various technology-aided literacy experiences out of the school like text-messages, e-mails, games, chatting through social media, yet these learners may not be aware of the link between inside and outside the class practices. As a result, there comes a huge responsibility for the instructors to reconsider what and how to teach students as well as the ways to link the outside activities into the classroom practices (Zheng & Warschauer, 2017).

Godwin-Jones (2015) argued that one of the obstacles is the proper curriculum integration of the learners' online activities that are done out of the classroom into classroom practices. Since the instructor cannot observe the use of the second language outside the class, it is difficult to adjust the learning to pre-

determined grammar, vocabulary and so on. For this reason, the outside classroom activities should be regarded as complements of in-class instruction rather than presenting new knowledge. Enhancing fluency or expanding cultural knowledge can be seen as some exemplary activities for out of class time. Thanks to building a link between inside and outside the class, learners can benefit from active participation in searching and figuring out their interests for the learning area. The present study guides the L2 learners of a school of foreign languages to utilize from computerized concept mapping for the pre-writing stage in an attempt to build a link inside and outside the classroom.

2.6 Computer-based concept mapping

Most of the studies investigating the handwritten concept mapping prior to the actual writing show a gain particularly in content-based skills. The interviews and surveys backed up those positive perceptions towards concept mapping (Zhang; 2018) as well as illustrating some ideas that had not been revealed before. For instance, some learners found concept mapping time-consuming (Ojima, 2006; Zhang, 2018). The computers, in this case, were presented as a solution to ease the concept mapping process. Novak and Cañas (2006) summarized the history of the transformation from hand-written mapping to the computerized concept mapping and the reason for this alteration (p.179):

For many years, concept maps were drawn by hand. Iterating through revisions of a concept map was cumbersome and time consuming. Group concept mapping sessions could be handled by using post-it notes. The introduction of personal computers enabled the development of software programs that facilitated the construction of concept maps. Initial versions of concept mapping programs, however, did not enhance the power of the tool - they were limited to displaying a concept map on the screen. Programs like Inspiration popularized the use of concept mapping in elementary school

education by allowing children to easily add pictures and clipart to concepts. Other software programs like Knowledge Manager and Smart Ideas have also taken advantage of technology to facilitate the construction of concept maps. However, it was the marriage of the concept map and the Internet that launched a completely new world of applications and uses for concept mapping.

As stated above, there are many affordances of computerized concept maps such as enabling an easy construction and adjustment of the concepts and links. In other words, the computerized mapping contributes to the process of writing concepts and supporting details as well as allowing to form links in line with the relationship among concepts. Furthermore, it supports revisions such as adding and removing concepts easily and rapidly (Anderson-Inman & Zeitz, 1993). Some software programs such as Inspiration are recommended for students since they are exclusively designed for mapping purposes. Mindomo, an online mind mapping tool, is one of the web-based concept mapping devices used during this study. Mindomo has its own affordances besides the abovementioned points. It allows students to use pre-designed mind maps individually or collaboratively, to add images from the web directly to the map, to record video or audio, and to chat online for better communication.

The happy marriage between the concept map and the Internet also led to the improvement of the framework for collaboration and learning by enabling thousands of users from different ages and disciplines to share concept maps with each other and to cooperate synchronously and/or asynchronously. This development within the online concept mapping brought about a new model for education (Cañas, et al., 2004; Novak & Cañas, 2006). This model is based on Vygotsky's (1978) idea of the zone of proximal development, which represented the gain in the level of understanding in any topic through the guidance or collaboration among peers. Only if the meaningful learning that enables the learners actively engaged during concept

mapping is provided, can teachers accomplish scaffolding the learning in the related subject domain. Moreover, it is practical to follow the contributions of the individuals in computerized concept maps. In Mindomo, the instructor can observe all the changes executed to the concept maps such as attachments of new topics, connections, photos or videos by following each student's record. Even removed information can be tracked easily thanks to this record of changes. The affordance of keeping track is particularly helpful for instructors to observe the individual contributions displayed in the collaborative concept maps, which is not possible to pursue in pen-and-paper model.

2.6.1 Advantages of computer-based concept mapping

Anderson-Inman and Zeitz (1993) explained the most difficult problem for implementing concept mapping in the classroom and that was the mapping itself. According to them, students consider constructing and revising pen-and-paper concept maps "extremely difficult" (p.6). Although students in the Allen's (1989) study regarded concept mapping as a precious tool to see the connections between ideas, they did not request to construct it for other classes as it was like a burden. The computers, in this case, may be a solution to ease the concept mapping process.

Differentiating skilled and less-skilled writers in line with the Bereiter and Scardamalia's (1987) writing model, Kozma (1991) recorded that less-skilled writers might benefit from computerized tools to compensate for loads of short-term memory and they could become more successful in composing. On top of that, with the adequate help and revision to the students, computerized concept maps could lead to a more practical remake of nodes and links, thus a better organization and structure of the knowledge (Reader & Hammond, 1994; Liu, 2011). Liu et al. (2010)

also defined two more advantages of computerized concept maps over pen-and-paper maps. Initially, concept maps with various concepts can be more suitable for computerized platform due to its user-friendly notion, or it might be a bit more difficult to deal with abundant concepts in the pen and paper style. Anderson-Inman and Zeitz (1993) supported this by saying “Using a computer to create concept maps enables learners to move and modify concepts and links at will, thereby removing the drudgery and mess of revising their maps on paper.” (p.7). Secondly, instant feedback is possible in computerized concept maps while immediate feedback could take a while in the pen and paper model. As a result, it is easier to draw and revise the concepts in computerized concept mapping.

2.6.2 The use of computer-based concept mapping in writing context

The introduction of computerized concept mapping to promote knowledge illustration and production has been regarded as an impressive technological advancement since the 1990s (Anderson-Inman & Zeitz, 1993), yet the implementation of computer-aided concept maps particularly for L2 studies has seemed to be acknowledged recently. Some studies denoted a significant improvement for computerized concept mapping group when compared to pen-and-paper concept mapping (Chiou, 2015; Sturm & Rankin-Erickson, 2002). However, while some scholars such as Chiou (2015) and Sturm and Rankin-Erickson (2002) witnessed a positive attitude towards writing; others observed a boost in the level of learners’ writing anxiety (Zaid, 2011). Moreover, considering other variables such as the level of the learners and the quality of computerized maps can shed a light into this area (Liu, 2011).

Chiou's (2015) study as to the efficiency of computer-aided and pen-and-paper concept mapping on learners' motivation and academic performance was one of a kind in the literature that compared different strategies of concept mapping. Another thing to note is that the focus of the study was to observe the impact of different strategies on a content-based course in terms of academic success and level of motivation, not foreign language skills. There were 151 participants who were taking the Advanced Accounting course from Accounting Information Department at a private university in Taiwan. Considering the studies that prioritized computer-based mapping over pen-and-paper ones (Liu et al., 2010; Liu, 2011), Chiou (2015) aimed at implementing different strategies to assess the motivational levels and academic accomplishment. For this reason, students were assigned into four different groups: semi-completed expert concept maps named as construct-on-scaffold, individually completed concept maps called as construct-by-self, pen-and-paper concept mapping and no concept mapping group in which learners only practiced textbook exercises. Participants were asked to fill out academic and motivational tests before and after the treatment. Except for the traditional group, all experimental groups received training on mapping strategies. The two computerized groups were also instructed on how to use Inspiration software. The traditional group completed the exercises on the book only. The results indicated a significant increase in motivation and academic performance for all experimental groups compared to the traditional textbook group. Particularly the computerized groups were significantly better than pen-and-paper group although no explanation was provided for the reason behind it. There was no significant difference between semi-completed concept maps and individually completed concept maps. The results supported the implementation

of concept maps, particularly computerized concept maps for better motivation and academic success.

Another empirical study that examined no mapping, hand mapping and computerized concept mapping for middle-level students with learning disabilities is that by Sturm and Rankin-Erickson (2002). 12 participants from EFL context firstly wrote two essays prior to any instruction. For the following weeks, Graham and Harris' (1996) strategy instruction to use concept mapping as a tool during the composing process was taught first for hand mapping and later for computer mapping to all participants. After that, the participants started producing two essays for each condition in rotation: no-map support, hand-map support, and computer-map support. Their essays were measured in terms of the number of words (for fluency), the number of T units (for language quantity), syntactic maturity (for linguistic length and complexity of written utterances), and holistic writing scores (for overall quality). They benefited from Inspiration software, particularly diagramming for concept mapping in the computer. A writing attitude scale test with 18 items was collected four times, after writing the baseline essays in addition to those with computer mapping, those with hand mapping and the completion of all conditions. One thing to note was that participants were permitted to use as much time as they needed in order to plan and write each essay. As for the results, participants overall composed more (i.e., a higher number of T-units) and better in quality (i.e., higher holistic scores) under both mapping conditions; thus it could be stated that mapping supported the writing process in terms of content and organization. On the other hand, there were no syntactic maturity differences among the three conditions, which signified that mapping did not have an impact on the compositions regarding syntactic complexity. While it is documented that both hand

mapping and computerized concept mapping led to some gains on the essays, Sturm and Rankin-Erickson (2002) addressed that demonstrating the mapping strategy as the single reason for the essay improvement would not be proper because participants proceeded development in quality without mapping as well. This alteration in the length and quality of the essays could be due to the increased knowledge on writing processes and conventions that was embedded in the writing instruction. In addition, the strategy instruction and the extra exercises in writing might be the incentives of better and lengthier essays regardless of the conditions. When it comes to the results of writing attitudes test, it was observed that participants had a significantly more positive attitude for computer-mapping strategy compared to no mapping and hand mapping strategy. Sturm and Rankin-Erickson (2002) interpreted that the use of technology could help not only to decrease the cognitive load but also to promote fun during activity. The students even requested another prompt to construct a different composition while using computerized concept maps, which could confirm their positive feelings towards writing.

Liu's (2011) study investigated the distinctive computerized concept mapping strategies on the written documents of participants with different proficiency levels in an EFL context. There were 94 participants from first year students in Taiwan and they were divided as low, middle and high achievers in line with their grades for their initial writing task. As a result, there were 30 low-level, 34 middle-level and again 30 high-level participants. All the participants respectively experienced all three conditions that were no mapping, individual computer-aided concept mapping and collaborative computer-aided concept mapping. Firstly, they got instructions on the structure of writing and conventions, and then participants composed their first task about the topic of My Ambitions on fifth week. Later they got education on how

to use the computer software to compose their plans. After that, they produced their plans individually and wrote their second assignments about Character Sketch on eighth week. Finally, they composed a collaborative mapping in heterogeneous groups and completed the third writing task about On Love on ninth week. These topics were considered as appropriate for the participants not only to help conveying daily experiences but also to explore themselves. They all spent two hours class time on the topics after mapping them out. Hamp-Lyons and Henning's (1991) rubric was used and scored by an outsider instructor. The statistics revealed that computerized concept mapping developed the written output for all levels of learners. The individual or collaborative concept mapping had similar positive impacts on low and middle-levels' composition performances, yet the individual concept mapping appeared to result in more favorable performance than collaborative mapping for high-level learners. Concerning the writing levels, low-level learners benefited from both computerized mapping conditions. However, the results were different for middle and high achievers. While middle-level learners had better results in collaborative concept mapping, high achievers obtained better scores after individual concept mapping. By examining the quality of concept maps, Liu (2011) stated that collaboratively constructed concept maps were more qualified than individually constructed ones. The relationship between the maps and written outputs also revealed that the better the maps scores were, the better the writing marks the learners got. Considering the level as an independent variable, he suggested that there was a strong positive correlation between the maps and writing scores for all levels of learners in the individual mapping condition, yet the power of the correlation diminished to moderate levels for high and middle-level learners. There was a low correlation for low achievers. In other words, when individuals completed

their own mapping thoroughly, they got prolific scores for their written outputs. However, that was not the case for the heterogeneous collaborative groups in which there had been different understandings from different levels of learners; as a result, it was more problematic for collaborative mapping group members to express their unique ideas among other people's theories.

Zaid's (2011) quasi-experimental research revealed another ideal combination of extended class time with digital-based pre-writing activities. The participants were 108 male undergraduates from an EFL context of King Khalid University. The first experimental group ($n = 36$) was exposed to multimedia-based concept mapping strategy; the second experimental group ($n = 36$) was presented with online reading prior to composing and the control group ($n = 36$) was provided with conventional, instructor-led writing instruction. The research concentrated on the influences of online pre-writing activities, in particular, multimedia-based concept mapping and online reading before writing with the aim of examining the writing quality and the writing apprehension. To begin with, all the participants had Daly and Miller's (1975) Writing Apprehension test both before and after the treatment. In addition to the test, the participants were requested to write an opinion essay before and after the treatment for the same topic and they were evaluated with a holistic TOEFL writing test scoring which contained ideas, organization, style, vocabulary and sentence structure as criteria. As for the results, the pretest yielded no statistically significant difference among all the groups concerning writing quality and writing anxiety, which is a sign of balance among groups. After the experiment, the mean scores of the three groups were compared and a statistically significant difference was observed among all the groups. To begin with, the experimental groups appeared to be more efficient than conventional teacher-led writing instruction in terms of

enhancing the writing quality of the students. When the experimental groups were compared, multimedia-based concept mapping group seemed to be more effective in terms of the quality of written essays than online reading before composition group. Zaid (2011) did not provide any explanation for the cause of this valuable gain. On the other hand, as for the writing anxiety test, the outcomes of posttest were in a disagreement with most of the studies. Zaid (2011) found out that the writing anxiety of the students appeared greater with the experimental group than the control group. The groups that illustrated an increase considering composing apprehension were respectively digital-based concept mapping, online reading prior to composing and conventional classroom. Consequently, for more qualified essays, web-based pre-writing activities used out of the class time were suggested.

2.6.3 Summary of the use of computer-based concept mapping in writing context

Liu's (2011) study of different implementations of concept mapping on participants with different levels revealed that all computerized mapping is beneficial for participants, but while middle-levels are better at collaborative concept mapping, high-levels got better results when they were planning alone. Although it is based on a skill achievement, Chiou's (2015) study approved an important gain considering motivation and performance for all concept mapping groups, rather than conventional textbooks. Furthermore, the computerized groups had better results than pen-and-paper groups (Chiou, 2015; Sturm & Rankin-Erickson, 2002). The positive perception of computerized mapping enabled the learners to diminish cognitive burden as well as providing fun to the tasks (Sturm & Rankin-Erickson, 2002). However, Zaid's (2011) writing apprehension test indicated the opposite: learners of the experimental group, especially computer-aided mapping, denoted greater anxiety

than control group. Zaid explained this bizarre result by indicating a pressure resulting from the use of a “special software that was highly demanding and sophisticated” (p.82). That is, participants’ anxiety might be due to the novelty and intricacy of the digital pre-writing activities.

2.7 Summary of all concept mapping studies

As can be seen in table 1, many studies showed that concept mapping aided to enhance the content and organization of written outputs, yet it did not improve the grammatical accuracy (Abrams & Byrd, 2016; Al-Shaer, 2014; Ojima, 2006; Zhang, 2018).

Table 1. Summary of Studies on Concept Mapping in Writing

	L2	N	Participant	Proficiency	Tasks	Rubric	Results	Perceptions
Schultz (1991)	French	Not reported	Sophomore students	Intermediate	Argumentative essays	Not used	Better compositions	Positive views (both teachers and students)
Ojima (2006)	English	3	University students (Elective)	Intermediate + (TOEIC=500 +)	4 exposition tasks (2 = no pre-task, 2 = pre-task)	Hamp-Lyons (1991) & Polio (1997)	+ complexity & fluency N: accuracy	positive - : time consuming to draw
Al-Shaer (2014)	English	38 (19 = cont, 19 = exp.)	University Students	Not reported	8 argumentative essays (1 = pretest, 7 = posttest)	Constructed by the researcher	+ all measures (point of view, coherence and unity, development, organization, thinking) pretask = + fluency, propositional content, lexical richness	
Abrams and Byrd (2016)	German	26	Freshman Students	Intermediate	3 summary tasks (1= no planning, 2= pre-task planning i.e. chron. sequence & concept map)	Norris and Ortega (2009) multiple measurements	no planning = + syntactic complexity, linguistic accuracy, lexical accuracy, and choice	
Zhang (2018)	English	39 (cont. & exp.)	Freshman Students	Not reported	2 argumentative essays (1 = pretest, 1 = posttest)	Jacobs et al. (1981): content, organization, use of language	+ content, organization N: language use	+: self-confidence - : time consuming to draw

Note: L2 = second language; N = number of participants; + = illustrates a positive impact; - = illustrates a negative impact N: illustrates a neutral impact

Table 2 summarizes the studies on collaboration in writing and many scholars found a positive effect on the compositions of collaborative planners in terms of content, organization and vocabulary (Lee, 2013; Shehadeh, 2011). Lee (2013) also indicated slightly higher results for language use and mechanics. Neumann and McDonough (2015) examined the prewriting discussions and their impact on writing stage. While they expressed an improvement for generating ideas, the collaborative planners tended to disregard giving and evaluating constructive feedback to one another. That is, they considered prewriting discussions to joke with one another rather than seizing the opportunity of feedback.

Table 2. Summary of Studies on Collaboration in Writing

	L2	N	Participant	Proficiency	Tasks	Rubric	Results	Perceptions
Shehadeh (2011)	English	38 (n = 20 ind. plan., n = 18 col. plan.)	University Students	Low-intermediate	2 description paragraph (1 = pretest, 1=posttest)	Hedgcock & Lefkowitz's (1992) adapted from Jacobs et al. (1981)	+ content, organization, vocabulary N: language use, mechanics	+: self-confidence (in writing and speaking)
Lee (2013)	English	132 (n = 60 cont., n = 60, exp.)	Senior Students	Beginner, intermediate, advanced	3 narrative essays (1 = pretest, 1= ind. 1 = col. map)	Jacobs et al. (1981)	+ content, organization, vocabulary slightly high: language use, mechanics	
Neumann and McDonough (2015)	English	23	University students	TOEFL iBT: 75-89	6 exposition paragraph (audio recording of pre-writing discussions)	Constructed by the researcher	Non-reflective content episodes > reflective content episodes + generating ideas N: evaluating & organizing ideas	+: brainstorming - : cognitively demanding task -: giving and receiving peer feedback

Note: L2 = second language; N = number of participants; + = illustrates a positive impact; - = illustrates a negative impact N: illustrates a neutral impact

As can be observed from table 3, computerized concept mapping studies illustrated a positive impact on the writing quality of the tasks (Sturm & Rankin-Erickson, 2002; Zaid, 2011). Different from other scholars, Liu (2011) found an improvement in all measures including language use and mechanics by using Hamp-Lyons and

Henning's (1991) rubric. Although Sturm and Rankin-Erickson (2002) found computer mappers had positive attitudes towards writing after computerized concept mapping, Zaid (2011) indicated an increase in computer mappers' anxiety level due to the novelty and intricacy of the digital pre-writing activities.

Table 3. Summary of Studies on Computer-based Concept Mapping in Writing

	L2	N	Participant	Proficiency	Tasks	Rubric	Results	Perceptions
Chiou (2015)		151 (cont., pen-paper, construct-on-scaffold, construct-by-self)	University Students	Not reported	2 achievement and motivation tests	Motivated Strategies for Learning Questionnaire, Accounting Achievement	Computer assisted > pen-paper > control in achievement and motivation tests	
Sturm and Rankin-Erickson (2002)	English	20	8th grade students with learning disabilities	Middle level	8 descriptive essays (2 pretest, 2 = no map, 2 = hand map, 2 = comp. map)	nb of words, syntactic maturity, nb of T-units, holistic writing scores	+ quantity, quality (content, organization) N: syntactic complexity (information on writing processes and conventions embedded in the writing instruction) + all measures (incl. grammar and mechanics)	Positive attitudes, +: fun
Liu (2011)	English	94 (n = 30 low, n = 34 middle, n = 30 high)	University Students	Low level, middle level, high level	3 exposition tasks (1 = no mapping, 1 = ind. comp. map, 1 = col. comp. map)	Hamp-Lyons and Henning's (1991)	N: language use low: both maps middle: col map high: ind map writing quality: comp. map > online reading > cont.	
Zaid (2011)	English	108 (n = 36 cont. n = 36 comp. map, n = 36 online reading)	Freshman Students	Not reported	2 opinion essays (1 = pretest, 1 = posttest)	Holistic TOEFL writing scoring, Daly and Miller's (1975) Writing Apprehension	online reading > cont. writing anxiety: comp. map > online reading > cont.	- : too demanding to use the tool

Note: L2 = second language; N = number of participants; + = illustrates a positive impact; - = illustrates a negative impact N: illustrates a neutral impact

CHAPTER 3

METHODOLOGY

3.1 Introduction

The chapter is organized into six sections. Firstly, the design of the study is presented. Then the setting, participants, instruments are illustrated. Instruments are classified as surveys, writing tasks, scoring rubric and procedure, and semi-structured retrospective interviews. Finally data collection and data analysis are discussed.

The present study aims to investigate the effects of collaborative and individual computerized concept mapping as a pre-writing activity on writing output produced by EFL students enrolled in intermediate reading and writing classes in the preparatory school of a state university in Istanbul. This research seeks the answer to the following questions:

1. What are the impacts of different computerized concept mapping (no-mapping, individual-mapping, and collaborative mapping) on writing performance of intermediate level EFL learners in terms of:

- a) content
- b) organization
- c) vocabulary
- d) language use
- e) mechanics

2. What are the students' perceptions towards computerized concept mapping as a pre-writing activity?

3.2 Research design

The present study used explanatory sequential mixed methods design in which a quantitative phase was followed by a qualitative one. The purpose of utilizing qualitative data (in this study, semi-structured interviews) was to gain further insight about the quantitative results (Creswell, Plano Clark, Gutmann, Hanson; 2003). As the first phase, nonequivalent control group pretest-posttest design, one form of quasi-experimental research design, was employed. Three classes consisting of the participants assigned by school administration were selected as control and two treatment groups. Both the nonequivalent control group and the two treatment groups were asked to complete a survey and produce essays before and after the treatment. As the second phase, a follow-up qualitative study consisting of semi-structured student interviews was administered. The qualitative data was built on the quantitative data. The rationale for this approach is twofold. The quantitative phase and its analysis promote a general understanding of the research problem. The qualitative data and their analysis help the explanation of those statistical results by probing participants' views in depth (Creswell et al., 2003; Tashakkori & Teddlie, 1998).

The study utilized a convenience sample of EFL students in the school of foreign languages of a state university in Istanbul. There were two main reasons for choosing this educational setting. Firstly, the researcher was also an instructor in that institution; as a result, there was satisfactory knowledge of the mission, goals, administration, curriculum, and students of the school. Moreover, the close interaction between the instructor and the university administration enabled the approval of data collection and the implementation of the experiment easily.

Secondly, the school of foreign languages had a well-defined curriculum and action plan in which all the instructors had to follow weekly. Using the same materials in all classes, comparing participants of the same level and similar ages helped control extraneous variables to a great extent even though the students had been in different classes in previous periods.

The researcher/instructor was the responsible teacher for Reading and Writing lessons of two experimental groups, which were assigned to collaborative concept mapping and individual concept mapping groups. Another instructor, who had an experience of ten years of teaching, was the Reading and Writing teacher of the control group. All three groups received the same training and used the same textbooks except that the experimental groups additionally were trained on how to use concept maps in a computer laboratory and produced concept maps. The data collection lasted for eight weeks, which was the duration of the last period at the university. The independent variable was the computerized concept mapping while the dependent variable was writing performance of the participants.

3.3 Setting

The school of foreign languages offers Main Course and Reading & Writing classes to university students mainly for those who are admitted to departments with English-medium instruction, yet are unable to pass the proficiency exam upon entrance. In addition to that, some students who enroll in Turkish medium instruction departments can attend the school of foreign languages upon their preference. The school offers classes in four periods. The first and third periods consist of seven weeks whilst the second and fourth periods last eight weeks. The classes consist of 25 students at most. At the end of the fourth period, all students are expected to reach

B2 level of English language learners and pass institution-based English proficiency exam. The minimum point accepted by the institution is equivalent to 78 in TOEFL IBT, 67 in PTE (Pearson Test of English), C in CPE (Cambridge English Proficiency) and CAE (Cambridge English Advanced). Three instructors are responsible for one class, which alter in each period as well. Two of the instructors teach Main Course lessons in collaboration while only one instructor delivers Reading & Writing lessons. All the instructors attend a monthly meeting in which lesson plans, expected learning outcomes and learning progress are discussed. The Material Office prepares all the materials and collaborates with the Testing Office. The instructors are requested to share their ideas and materials with Testing Office before implementing their materials in their classes. If the materials are appropriate, the instructors are allowed to use them in their classes.

The institution assigned the students according to the results of their English placement test administered at the beginning of the first term. Those who got more than 70 points were administered to B groups, which had 20 hours of lectures per week while those who were under were classified into A groups with 24 hours of lectures. Those who were in A classes were classified as A1 level English language users while B groups were considered with A2 level according to Common European Framework of Reference. In line with this initial classification, all the students were assigned to different classes in each period after the midterms. They all had two distinct lessons as Main Course and Reading & Writing. The instructors used *Oxford's English File* books starting from elementary to upper intermediate for Main Course lessons. As for Reading & Writing lesson, all the instructors used a variety of sources, which had been determined by the Material Office of the university, such as

an introductory writing pack, the books of *Q Skills for Success Reading Writing 1* and 2, and finally an academic essay pack.

All levels had 8 hours of Reading and Writing lessons and in the fourth period, they all utilized the academic essay pack which consisted of reading passages, example essays, and grammatical exercises. Students were first asked to complete the reading assignments, and grammatical exercises related to the specific essay type in the pack, then they were requested to write this type of essay in multiple drafts as a portfolio project. The Material Office was responsible for announcing the essay topics on the appropriate week and students were required to write their first draft in the class during 60 minutes under the supervision of their Reading and Writing instructor. The process approach to writing (Flower and Hayes, 1981) was employed by most of the writing instructors; yet the planning stage was not fully implemented in the classroom. Students were instructed to write three different types of essays which were opinion, compare and contrast, cause and effect and for each essay type they were able to choose between two topics announced by the Materials Office (see Appendix B).

The experimental and control groups were selected from B2 levels English language learners, who had limited writing experience in the English language, and thus they were considered as novice writers. Two of the groups were assigned to experimental groups named as collaborative concept mapping (A1) and individual concept mapping (A2) by the instructor/researcher. Another instructor, who had a B.A. degree in teaching English as a foreign language and ten years of experience in EFL context, taught the control group (A3). All the classes were equipped with white-boards, speakers and projectors. At the beginning of the period, the number of students was equally distributed to A1 ($n = 22$), A2 ($n = 23$), and A3 ($n = 23$).

However, through the end of the period, there was a loss of participants due to lack of attendance requirements. Three students in A1, two students in A2 and two students in A3 classes could not be part of the study because of lack of attendance. The number of students that did not complete all three essay tasks was one for each class. A small amount of students did not agree to participate in the study at the beginning A1 ($n = 1$), A2 ($n = 3$), and A3 ($n = 5$). Two participants in each experimental group agreed, but did not complete all three of the computerized concept mapping activities. At the end of the period, a total of 15 students in each classroom completed writing all three types of essays and approved their participation in the study.

3.4 Participants

3.4.1 Participants of quantitative stage

Participants in this study were 45 intermediate-level EFL students from three intact classrooms of Reading and Writing lectures in a Turkish state university. The students were assigned by the school administration to different classes according to their levels. They had learned different styles of paragraph writing in the third period and they were expected to learn and compose three types of essays which were defined as opinion, compare and contrast, cause and effect in the fourth period which is when the data collection took place. The students were informed at the first week about the study and they were asked to fill in the inventory of English language learning (see Appendix C) in order to document their language background. Appendix D summarizes the participants' English language learning experience according to the inventory.

A1 class, the collaborative experimental group included the responses of 15 students ($n = 9$ female, $n = 6$ male). The native language of all participants in this group was Turkish. They were from different departments ($n = 6$ History, $n = 4$ Molecular Biology and Genetics, $n = 2$ Political Science and Public Administration, $n = 1$ Philosophy, $n = 1$ Sociology, $n = 1$ Health Management). All participants started learning English in the fourth grade of primary school and they continued learning English until university. 14 of them were experiencing their first year at a university; whereas one student had a previous university experience that only included a language preparation school education.

A2 class, which is the individual experimental group, also had 15 participants ($n = 7$ female, $n = 8$ male). 14 of them learned Turkish as the native language while one of them was Arabic and Turkish bilingual. Their departments were also diverse ($n = 3$ History, $n = 5$ Molecular Biology and Genetics, $n = 2$ Political Science and Public Administration, $n = 1$ Psychological Counseling, $n = 1$ Turkish Language, $n = 1$ Electrical and Electronic Engineering, $n = 1$ Physics Engineering, $n = 1$ Health Management). In this group, as well, all participants started learning English in primary school. 14 of them were studying in their first year; only one student had a previous university experience of full four years.

A3 class, the control group consisted of 15 students ($n = 9$ female, $n = 6$ male). 14 of them learned Turkish as the native language, while only 1 had Kurdish as the mother language besides Turkish. They studied in different departments ($n = 4$ Political Science and Public Administration, $n = 4$ History, $n = 2$ Molecular Biology and Genetics, $n = 1$ Health Management, $n = 1$ Gastronomy, $n = 1$ Information and Document Analysis, $n = 1$ Electrical and Electronics Engineering, $n = 1$ Business Administration). All students started learning English at primary school, and it was

their first year in the university. In addition to English, they studied some other languages ($n = 4$ German, $n = 4$ Arabic, $n = 1$ Spanish, $n = 1$ Bulgarian) at some part of their lives. None of the participants traveled or lived in an English-speaking country before.

3.4.2 Participants of qualitative stage

Participants from both collaborative concept mapping group ($n = 7$) and individual concept mapping group ($n = 5$) participated in the semi-structured interviews (see Appendix E and F) at the end of the period. Since it was the end of the fourth period, the number of students coming to school decreased to a great extent. 12 participants were selected through convenience sampling. The experimental group students who were available in the school were individually asked whether they could spare some of their time for the interview. The instructor/researcher explained that their participation in the interview was voluntary, they could withdraw at any time they requested and their names would be altered with pseudo names. There were one female and four males in the individual concept mapping group whose pseudo names are Ayşen, Adil, Celal, Asım and İrfan. They all had Turkish as the native language and started learning English at the primary level. Except for İrfan, all the participants just started university education. İrfan was 34 years-old male with a high motivation to learn English not for his department but for developing his interactions in the business world. His job provided opportunities to speak in English, yet he had limited experience in writing. In collaborative concept mapping group, there were five females (Hale, Zuhale, Esra, Rabia, Selin) and two males (Kadir and Erdinç). They also started learning English at primary school and it was their first year in a university except for Erdinç. Erdinç studied at a university for one year and then quit

it. None of them had any work experience except for Erdinç who worked as a tennis coach for a while. All of the interviewees completed the concept maps and their essay tasks except for Zuhale. She created only one concept map and therefore; she was included in the qualitative data collection so that the researcher could get insight regarding why she did not want to contribute in the collaborative concept mapping. Table 4 summarizes the background information of the interview participants.

Table 4. The Demographics of Semi-structured Interviewees

	Participants											
	individual concept mapping						collaborative concept mapping					
	group						group					
Pseudonym	Ayşen	Adil	Asım	Celal	İrfan	Hale	Zuhale	Esra	Rabia	Selin	Kadir	Erdinç
Gender	F	M	M	M	M	F	F	F	F	F	M	M
Age	18	18	19	18	34	18	20	19	20	20	20	21
Years of Eng	10	10	10	10	14	10	10	10	10	10	10	10
Work Ex	N	N	N	N	Y	N	N	N	N	N	N	Y

Tr: Turkish
 Years of Eng: Years of English Studied
 Work Ex: Work Experience
 Y/N: Yes or No

3.5 Instruments

This section illustrates a detailed description of the instruments, which are surveys, writing tasks, scoring rubric and procedure, and semi-structured interviews.

3.5.1 Writing tasks

This study utilized two exposition tasks (cause and effect, compare and contrast) and one argument task (opinion) which included counter argument and refutation parts.

These tasks were determined by the Materials Office of the university where four

instructors with at least ten years of experience in the field worked. Hale, Taylor, Bridgeman, Carson, Kroll and Kantor (1996) claimed that exposition and argument are the most frequently asked rhetorical tasks at university levels. Exposition task is regarded as a discourse type that describes or clarifies a subject. Among all the patterns; cause and effect, problem solution, classification, compare and contrast, and analysis are the most encountered exposition tasks in the academic field (Hale et al., 1996). Argument is different from exposition task in that it includes persuasion (Hale et al., 1996). Argumentative tasks hold a huge potential of promoting writers in engaging with problem solving and, thereby, in planning (Manchón & Roca de Larios, 2007).

There were two different writing topics for each task selected by the Materials Office and all the students were asked to write one opinion, one compare and contrast, one cause and effect essays by considering the explicit structure the institution demanded. Since the essay topics had been selected before, the instructor/researcher did not have any authority to alter them. In order to familiarize participants to write an essay, the instructors of all three groups asked their students to write an opinion essay before the actual assignments. This can be considered as task 0 that enables us to observe participants' initial writing skills as well as decreasing the novelty that the new portfolio assignments bring about. The purpose of task 0 was simply to make participants write an essay without any pre-writing activity in one hour. The following three assignments were written after the completion of computerized concept mapping training for experiment groups. The students were expected to compose the first drafts during 60 minutes under the supervision of the instructors and they were allowed to consult at dictionary. All writing tasks can be seen in Appendix B.

Grabe and Kaplan (1996) define the first step of an idealized writing course as “content-driven” with multiple topics and writing tasks (p. 262). The writing tasks should not only motivate the students to write but also challenge and supply opportunities to learn and this can be possible by providing new writing tasks. With this aim, this study provided opportunities to compose distinctive rhetorical tasks which would be helpful in the academic setting.

3.5.2 Scoring rubric

As Weigle (2002) stated a score does not only represent the test and subjects, there are other elements in which two of them are fundamental: selection of rating scale and making sure of its proper use by raters. There are different types of rating scales named as primary trait, holistic and analytic. Analytic scales allow separate evaluation of different components and considered to be resourceful to show the strengths and weaknesses of the written output (Brookhart, 1999).

Analytic scales provide useful diagnostic information on learners’ writing skills, allow raters to distinguish among various aspects of writing like fluent expression or knowledge of the topic, support reliability and rater training (Weigle, 2002). This study employed the analytic scoring of Jacobs et al. (1981), which is acknowledged as one of the best and most extensively used scale in ESL studies (Weigle, 2002). Another reason behind the adoption of Jacobs et al. (1981) analytic scale for the present study is that there appears to be a one-to-one correspondence between the rubric of Jacobs et al. (1981) (see Appendix A) and the institutions’ analytic rubric (see Appendix G).

The analytic scoring of Jacobs et al. (1981), also known as ESL Composition Profile, consisted of five subdivisions: Content, organization, vocabulary, language use, and mechanics each of which was distinctively weighted (see Appendix A). The content stresses the knowledge of the subject, appropriate ideas with well-explained supporting details. The organization criterion refers to the logical sequencing of ideas as well as the relevant use of cohesive devices. The vocabulary criterion encompasses wide ranges and appropriate choices of lexical items. The language in use specifies the correct grammatical constructions. The mechanics criterion focuses on conventions including spelling, punctuation, capitalization, paragraphing.

3.5.3 Scoring procedure

The 166 handwritten essays were typed into a Word document by preserving all spelling errors and the original format of the essays. The names of the students were altered with pseudo names not only for securing the confidentiality of the participants but also for eradicating the possibility of writer identification. All the essays were checked on edubirdie, a website for plagiarism checker, for plagiarism and no essays were detected for copying from another source.

The researcher/instructor graded all 166 essays and another instructor, who had been working in the field for four years, rated 50% of the written essays that were randomly selected from each group in order to establish inter-rater reliability. Before the grading, a rater training was held in three sessions. In the first session, the raters were introduced the scoring rubric of Jacobs et al. (1981) and some essays that were not included in the present study. In the second session, the raters evaluated the chosen essays and scored them independently. In the final session, they shared their scores with each other and discussed their grades in line with the rubric to maximize

their agreement in scoring. After the training, they scored 50% of the essays which were included in the study in separate settings. They were asked to write down their scores in an excel file considering the scoring rubric. After checking the reliability (see Appendix H for reliability scores), the researcher/instructor graded the other 50% and entered data to SPSS (See Appendix I for scoring of an example essay).

3.5.4 Surveys

All participants were requested to complete a survey at the beginning and at the end. Appendix J illustrates the pre-survey question while Appendix K and L are for post-surveys. There were extra questions added to illustrate the experiences of experimental groups (See Appendix L). The pre-survey question was aimed to collect information about: (1) how much time participants spent during pre-writing stage on previous writing assignments. The post-survey questions were intended collect information about: (1) how much time participants spent during pre-writing stage, (2) how important they considered pre-writing activities, (3) to what extent they were satisfied for the allocated planning time, (4) how they completed their concept maps and if they were given a chance, how they would complete on-line planning activities. The pre-survey question were responded by 34 participants of control group ($n = 9$), individual mapping ($n = 11$), and collaborative mapping group ($n = 14$). They post-survey questions were responded by all participants ($n = 45$) and the results are reported with the descriptive statistics.

3.5.5 Semi-structured retrospective interviews

Two interview guides were used during the semi-structured interviews at the end of the period. They included the same questions with a little alteration in the wording

for collaborative and individual groups. Appendix E illustrates the questions for individual concept mapping group while Appendix F is for collaborative group. They consisted of nine questions. The main questions of the interviews concerned: (1) participants' perceptions of pre-writing activities before and after the experiment, (2) whether they used their concept maps, and if they did, to what extent, (3) the most interesting and difficult parts they found of the concept mapping, (4) whether they would have preferred to work alone or with partners and (5) whether the activity had an impact on their confidence in writing or on other language skills. Some of the questions were adapted from Shehadeh's (2011) study in line with the purpose and all questions were checked by another instructor who had ten years of English language teaching experience. The interviews were administered in participants' first language, Turkish. Since they would be able to give more detailed responses in their L1, it was more appropriately serving the purpose of this study (Shehadeh, 2011). Each interview took place in researchers' private office and lasted for approximately six minutes. Throughout the interviews, the researcher asked the questions in order and provided clarification if the questions were not understood. The researcher audiotaped each interview and transcribed them for later analysis.

3.6 Data collection procedures

Before collecting data, experimental group participants were informed on researcher's purpose of the study and the intended result of the process. All participants were guaranteed that their names would be anonymous and confidential. They were also provided the assurance that they could remove themselves from the research at any time they requested. The experimental groups were expected to complete computerized concept maps prior to the writing tasks and to review the

feedbacks received. Different from experimental groups, the control group did not have the opportunity of systematic concept mapping and teacher feedback before writing their essays; they were only expected to share their first drafts which would be written in one hour under the inspection of their instructor. The participants who accepted to take part in the study signed the consent form. Then each participant filled out a form to provide background information about their experience with English language (see Appendix C) and a survey to illustrate their perceptions of pre-writing stage (see Appendix J).

Data for the quantitative phase were collected through survey questionnaires, and written essays. The qualitative part was collected from semi-structured retrospective interviews. The data collection procedures are explained as follows:

At the beginning of the period, all participants were informed on the syllabus that four weeks were going to be allocated to writing an opinion essay, two weeks to writing compare and contrast essay, and last two weeks were going to be allocated to writing cause and effect essay. The first three weeks also covered an introduction to essay writing as well as tutorials for using computerized concept mapping as a pre-writing activity for those who were in the experimental group. Having introduced the format of the opinion essay, the researcher/instructor asked all participants to write an opinion essay prior to the actual task in an attempt to identify their writing skills in the second week.

In the third week, the topics of the opinion essays were announced via *Edmodo*, a learning platform that the institution utilized. The control group were informed that they could spend as much time as they needed to think about the writing topic at home and bring a dictionary for writing stage. After that, students

followed the curriculum and completed the exercises on academic essay pack. The instructor allocated one and a half hours' planning time for the control group, and followed traditional prewriting activities in the classroom. The activities included brainstorming or outlining for the essay topic that they would begin writing. The activities of the students were not checked or evaluated. In other words, the participants were given time to work on their topic, yet they were not supported.

The experimental groups were also informed on the topics at the same week. They were additionally trained on how to use the computerized concept mapping tool in the computer laboratory of the institution, which included 50 computers with portable headphones. They were provided with expert skeleton maps (See Appendix M and N) and guided on how to register and edit the expert skeleton concept maps, how to insert topic and relationships, how to add icons or images. Each participant was provided with an explanation on the benefits of completing a computerized concept map, that is, planning the organization and the content of knowledge easily, searching for more information on related topic, and utilizing teacher feedback before starting the essays. Different from individual mappers, the collaborative concept mapping group was also informed that both group members could have access to the map at the same time and give feedback to one another. These mappers were allowed to choose their pairs. They were supported to write down their own ideas and give feedback to each other without hesitation and the history of changes on the tool allowed the instructor to keep track of the individual contributions on a single map. The collaborative mappers produced their concept maps in pairs, yet they were asked to write their essays individually. In the light of above-mentioned instructions, the experimental groups started constructing computerized concept maps for their first task in the computer laboratories and asked for clarification when

they needed. They were asked to continue and complete their maps at home after one and a half hour of instruction. They were announced the due hour of the mapping was Saturday midnight for the instructor/researcher to examine all the maps created. The following day, the instructor/researcher reviewed the maps, gave content-based feedback in terms of the quality of the ideas, and saved them into a pdf file for printing and delivering them at school.

In the fourth week, all the participants were asked to write opinion essays under the inspections of their instructors. While the experimental groups completed computerized concept maps as the pre-writing activity and received feedbacks, the control group did not have this opportunity. The process of essay writing lasted for 60 minutes for all groups. The essays were collected for error correction and then they were given back for the second drafts, which were composed out of classroom without any time limitation. All participants revised their essays by considering the indicated errors and handed them in the next lesson. The process of essay writing followed these phases and was repeated for other two tasks. The second drafts of the study were not included in the present study since they were not under the inspection of any instructors.

The same processes were followed for the other two tasks. All participants were instructed on the structure of compare and contrast essays in the fifth week. They were also informed about the topics they could work on. The experimental groups completed their computerized concept maps outside the classroom. In the sixth week, they began writing their essay. The cause and effect essay structure, some model essays and the essay topics were illustrated on the seventh week. The experimental groups were again requested to construct concept maps on computers. All participants composed cause and effect essays on the eighth week. All

participants were asked to complete post-survey. The instructor/researcher finally conducted a semi-structured interview with those who were available at the end of the last lesson. The summary of data collection is presented in Table 5.

Table 5. Summary of Data Collection

	The Experimental Groups	The Control Group
1 st Week (2-6 April)	Completion of consent form, the inventory of English language learning and pre-survey Introduction to Essays (From Paragraph to Essay Writing)	Completion of consent form, the inventory of English language learning, and pre-survey Introduction to Essays (From Paragraph to Essay Writing)
2 nd Week (9-13 April)	Instruction on opinion essay Task 0: Writing an opinion essay	Instruction on opinion essay Task 0: Writing an opinion essay
3 rd Week (16-20 April)	Instruction on opinion essay cont. + Computerized concept mapping in computer labs (cont. at home)	Instruction on opinion essay cont.
4 th Week (23-27 April)	1 st task: Writing an opinion essay	1 st task: Writing an opinion essay
5 th Week (30 April – 4 May)	Instruction on compare and/or contrast essay + Computerized concept mapping (at home)	Instruction on compare and/or contrast essay
6 th Week (7-11 May)	2 nd task: Writing a compare and/or contrast essay	2 nd task: Writing a compare and/or contrast essay
7 th Week (14-18 May)	Instruction on cause and effect essay + Computerized Concept Mapping (at home)	Instruction on cause and effect essay
8 th Week (21 – 25 May)	3 rd task: Writing a cause and effect essay Completion of post-survey and semi-structured interviews	3 rd task: Writing a cause and effect essay Completion of post-survey

3.7 Data analysis

Four sources of data consisting of written essays, surveys and semi-structured interviews were analyzed to answer the two research questions. Data from the English inventory and surveys were analyzed by using descriptive statistics.

Research question 1

What are the impacts of different computerized concept mapping (no-mapping, individual-mapping, and collaborative mapping) on writing performances of intermediate level EFL learners?

The essays were graded in line with the scoring rubric of Jacobs et al. (1981) and the data were saved into an excel file divided by the tasks (task 0, first task, second task and third task). An inter-rater reliability check was held for the 50% of the data. To measure rating consistency between the raters, Pearson Correlation Coefficient was computed on the five subdivisions of the ESL Scoring. All measures indicated more than 88% reliability (see Appendix H). Only the scores of the first rater were accounted for further statistics on IBM SPSS 21.0 (The Statistical Package for Social Sciences).

When the normality assumptions are not met, non-parametric tests are supported to be used (Field, 2009). Although non-parametric tests are thought to be less powerful compared to parametric tests (Fraenkel, Wallen & Hyun, 2012; Pallant, 2016), Field (2009) supports this is only correct when the assumptions of parametric tests are satisfied. If the assumptions of parametric tests are not met, non-parametric tests do not necessarily lead to higher chance of making Type II error. Hill and Lewicki (2006) recommend nonparametric methods for small sample sizes (p. 479). When the data is large (i.e. $n > 100$), it is more plausible to use parametric statistics (Hill & Lewicki, 2006). The present study consisted of 45 intermediate-level EFL students from three intact classrooms. Because the sample size was small ($n = 15$ for each group), the present study utilized non-parametric tests, namely, the Kruskal-Wallis test and the Mann-Whitney Test, which are based on ranked data.

Descriptive statistics including means, standard deviations, medians, minimum and maximum grades were analyzed for three groups distinctively. The Kruskal-Wallis test was conducted to find out whether there was a significant difference among three groups. Significance for this test was determined by Monte Carlo p value and if there is a significant difference (i.e. $p < .05$), the Mann-Whitney Test

was conducted to identify where the difference lies. Monte Carlo method was preferred in the present study since the sample was not small enough to calculate exact test. This method illustrates an unbiased estimate of the exact p value with repeated sampling method (Mehta & Patel, 2012). The Monte Carlo method was based on 10000 repeated samples, random starting seed and 99% confidence interval (CI). In order to control for Type I errors, a Bonferroni correction was applied. It was attained through the p value divided by number of tests, which would lead to the new critical level of significance as $.05/3 = .0167$. Result from each Mann-Whitney test were reported using median, test statistic (U), the corresponding z , the significance value, effect size and 99% confidence interval.

The significance value represents results either as significant or not significant, yet the calculation of effect size shows “an estimate of the extent to which two variables are actually related” (Plonsky & Oswald, 2014, p. 3). Since it was more meaningful to calculate the effect sizes of the focused comparison (i.e. two groups) rather than yielding the general effect of all groups, Mann-Whitney tests were considered for the present study (Field, 2009). Pearson’s r was calculated by following formula: z scores of each comparison were divided by the total number of observations (in the present study, two groups of 15 make 30 observations). Plonsky and Oswald (2014) also attributed new benchmarks for the interpretation of effect sizes since they were found to be more appropriate for L2 research. The new effect sizes were interpreted by following r sizes: .25 as small, .40 as medium and .60 as large.

Monte Carlo method also illustrates a confidence interval for significance, which can confirm the range of exact p value with 99% confidence (Field, 2009). If the boundary of the confidence interval for significance does not exceed the

significance value, it indicates 99% confidence that the significant effect is real. On the other hand, if the significance value falls within the boundary of this interval, it can be interpreted that the effect cannot genuinely tell the difference. As a result, the present study not only indicated the Monte Carlo p value, but also illustrated the magnitude of the effect size with new benchmarks (Plonsky & Oswald, 2014) and 99% confidence interval for significance of 10000 Monte Carlo samples in order to attain more meaningful interpretation of the results.

Research question 2

What are the students' perceptions towards computerized concept mapping as a pre-writing activity?

In order to better understand the importance of prewriting, the results of the survey based on the perceptions and experience of the writing activities were analyzed. All the participants responded these perception questionnaires before and after the experiments. In order to analyze Likert-scale questions, descriptive statistics were applied. On top of that, a semi-structured retrospective interview was held with 12 participants. The themes that emerged in the interviews were grouped and explained with verbatim excerpts. The qualitative data was built on the quantitative data to enrich the quantitative results and provide a deeper understanding on the use of computerized concept maps as a pre-writing activity.

3.8 Summary

This chapter represented the research questions and discussed mixed methods sequential explanatory design, which was used to examine the effects of computerized concept mapping on EFL students' writing performance on three

different tasks. In the first phase, nonequivalent control group pretest-posttest design was used. Three classes consisting of the participants assigned by school administration were selected and asked to write an essay without any pre-writing techniques. Then two of the classes (the treatment groups) held training on computerized concept-mapping while the nonequivalent control group did not. All of them produced three different essays. In the second phase, a qualitative study including 12 semi-structured interviews was administered. The qualitative study provided a deeper understanding for the quantitative data. The setting, the textbooks and the purposes of the lectures, the participants of quantitative and qualitative studies, and the instruments (i.e. surveys, writing tasks, scoring rubric and procedure, and semi-structured interviews) were presented in detail for the sake of transparency. Finally, data collection procedure and the methods of data analysis for each research question were explained. Results of the data analysis for two research questions are reported in the next chapter.

CHAPTER 4

RESULTS

4.1 Introduction

This study intended to examine the effects of individual and collaborative computerized concept mapping on three different writing tasks for intermediate level EFL learners in terms of content, organization, vocabulary, language use and mechanics and it intended to examine the views of those learners towards computerized concept mapping as a pre-writing activity.

Firstly, the data were divided with split file and descriptive statistics, effect sizes and confidence intervals for significance were reported. Since the sample were too small to run parametric tests, non-parametric methods such as the Kruskal-Wallis test and the Mann-Whitney test were applied on IBM SPSS 21.0. The quantitative data were followed by the results of semi-structured interview and survey questions to help the explanation of the statistical results.

This chapter presents the results of the data analysis for two research questions. Firstly, the quantitative data are explained for each tasks: task 0, task 1, task 2 and task 3 and the results are summarized in the end. Secondly, the results of the survey are illustrated along with the mean scores, number of respondents and percentages. Finally, the results of semi-structured interviews are presented. Semi-structured interviews are divided by subheadings which explain themes and some excerpts.

4.2 The results of ESL composition profile

4.2.1 Task 0

The present study investigated the scores of three groups (i.e. no-mapping, individual mapping and collaborative mapping) considering the ESL Composition Profile of Jacobs et al. (1981). Table 6 indicates the descriptive statistics of the three groups. For the first part, the five subcomponents were analyzed by dividing no mapping, individual mapping and collaborative mapping groups with split file.

Table 6. Descriptive Statistics for Task 0 in terms of the ESL Composition Profile

	Control				Individual				Collaborative			
	Mean (SD)	Mdn	Min	Max	Mean (SD)	Mdn	Min	Max	Mean (SD)	Mdn	Min	Max
Content	16.20 (2.74)	16.00	13.00	22.00	17.09 (2.55)	17.00	14.00	23.00	16.80 (2.39)	17.00	13.00	21.00
Organization	12.10 (2.85)	11.00	9.00	18.00	11.64 (2.84)	11.00	8.00	16.00	10.30 (2.45)	11.00	7.00	15.00
Vocabulary	11.00 (2.16)	10.50	8.00	14.00	11.64 (2.77)	11.00	8.00	16.00	10.80 (2.15)	10.00	8.00	15.00
Language Use	10.60 (3.50)	9.50	7.00	18.00	12.36 (3.35)	11.00	8.00	18.00	10.90 (3.28)	10.50	6.00	18.00
Mechanics	3.10 (1.10)	3.00	2.00	5.00	3.18 (0.75)	3.00	2.00	5.00	2.80 (0.92)	2.50	2.00	4.00

When the median values of the three groups were compared, they were observed to be very close to one another. The Kruskal-Wallis test was conducted since there were three independent groups. The Kruskal-Wallis test did not reveal a statistically significant difference in writing performance across three different groups in terms of content, $H(2) = .728$, $p = .70$; organization, $H(2) = 1.141$, $p = .58$; vocabulary, $H(2) = .433$, $p = .81$; language use, $H(2) = 1.880$, $p = .41$; and mechanics, $H(2) = 1.036$, $p = .59$. Before the experiment, the three groups did not differ from one another in writing performance according to content, organization, vocabulary, language use or mechanics.

4.2.2 Task 1

As explained in the methodology, experimental groups were trained on computerized concept maps in computer laboratories and they were allowed to work on their maps as much time as long as they needed. As for data analysis, no mapping, individual mapping and collaborative mapping groups were divided with split file and content, organization, language use, vocabulary and mechanics scores were obtained. Table 7 illustrates the descriptive statistics of the first task, opinion essay.

Table 7. Descriptive Statistics for Task 1 in terms of the ESL Composition Profile

	Control				Individual				Collaborative			
	Mean (SD)	Mdn	Min	Max	Mean (SD)	Mdn	Min	Max	Mean (SD)	Mdn	Min	Max
Content	16.87 (3.14)	17.00	13.00	23.00	20.80 (4.30)	21.00	15.00	29.00	19.13 (4.24)	20.00	14.00	27.00
Organization	11.67 (2.92)	11.00	8.00	18.00	14.67 (3.09)	15.00	9.00	20.00	13.27 (3.49)	15.00	9.00	18.00
Vocabulary	11.47 (2.20)	12.00	9.00	16.00	13.07 (2.43)	13.00	9.00	17.00	12.33 (1.99)	12.00	8.00	17.00
Language Use	10.67 (2.92)	10.00	7.00	15.00	12.07 (3.33)	11.00	8.00	21.00	11.87 (3.16)	11.00	8.00	18.00
Mechanics	2.94 (0.88)	3.00	2.00	4.00	3.00 (1.07)	3.00	2.00	5.00	3.07 (0.80)	3.00	2.00	4.00

When the Kruskal-Wallis test was calculated for the first task, there was no significant difference on the writing performance among three groups for vocabulary, $H(2) = 3.765$, $p = .16$; language use $H(2) = 1.831$, $p = .41$ and mechanics $H(2) = .271$, $p = .89$. However, writing performance was significantly affected by mapping condition in terms of content, $H(2) = 6.352$, $p = .39$ and organization, $H(2) = 6.203$, $p = .44$. The confidence interval for significance illustrated that with 10000 Monte Carlo samples, the exact p value was contained within the boundaries both for content [.034, .044] and organization [.038, .049] with 99% confidence.

The Mann-Whitney test was used to identify the differences in terms of content. A Bonferroni correction was applied and so all effects were reported at a .0167 level of significance. It appeared that writing performance was not contentwise different when the scores of no mapping group ($U = 79.50, z = -1.38, p = .18, r = -.25$) or individual group ($U = 84.50, z = -1.17, p = .25, r = -.21$) were compared to collaborative mapping group. However, individual mapping group ($Mdn = 21.00$) had significantly higher content scores than no-mapping group ($Mdn = 17$), $U = 53.00, z = -2.48, p = .010, 99\%CI [.008, .013], two-tailed$. The effect size was calculated as $r = -.45$, so the contentwise effect was medium between no-mapping and individual mapping condition. We can conclude that individual mapping condition had beneficial effects on writing performance in terms of content in comparison to no-mapping condition in opinion essays; however, collaborative mapping condition did not lead to a significant improvement on writing performance in terms of content compared to other two conditions.

Another Mann-Whitney test was used to follow up organization results. A Bonferroni correction was applied again for $p = .0167$ level of significance. Likewise, collaborative concept mapping ($Mdn = 15.00$) did not have a significant impact on the organization of the essays in comparison to individual concept mapping ($Mdn = 15.00$), $U = 89.00, z = -.98, p = .35, r = -.18$ or no-mapping ($Mdn = 11.00$), $U = 82.00, z = -1.27, p = .21, r = -.23$. However, when individual mapping was implemented, organization scores were significantly higher than no mapping condition, $U = 50.50, z = -2.58, p = .010, 99\%CI [.007, .013], two-tailed$. Moreover, this measure had medium level effect size, $r = -.47$. It was concluded that individual concept mapping prior to the actual writing significantly improved the organization of opinion essays in comparison to no concept mapping; yet collaborative mapping

did not have any statistically significant impact on the organization of opinion essays when it was compared to individual mapping or no mapping at all.

4.2.3 Task 2

For the first step, the three groups were split and table 8 was created in line with the subdivisions. The medians of content were appeared to be different from one another such as as no mapping ($Mdn = 18.00$), individual mapping ($Mdn = 23.00$) and collaborative mapping ($Mdn = 20.00$). Likewise the organization medians illustrated some variation for control group ($Mdn = 12.00$), individual mapping ($Mdn = 16.00$) and collaborative mapping ($Mdn = 14.00$).

Table 8. Descriptive Statistics for Task 2 in terms of the ESL Composition Profile

	Control				Individual				Collaborative			
	Mean (SD)	Mdn	Min	Max	Mean (SD)	Mdn	Min	Max	Mean (SD)	Mdn	Min	Max
Content	17.67 (3.60)	18.00	14.00	28.00	22.13 (4.85)	23.00	15.00	30.00	21.13 (3.67)	20.00	15.00	29.00
Organization	12.47 (2.92)	12.00	7.00	18.00	15.67 (3.48)	16.00	9.00	20.00	15.13 (2.17)	14.00	12.00	19.00
Vocabulary	11.27 (2.31)	11.00	9.00	18.00	13.20 (3.21)	13.00	9.00	18.00	12.80 (2.62)	13.00	9.00	17.00
Language Use	11.87 (3.50)	12.00	7.00	20.00	13.13 (4.64)	11.00	8.00	23.00	12.73 (3.73)	11.00	8.00	19.00
Mechanics	3.07 (0.96)	3.00	2.00	5.00	3.07 (0.96)	3.00	2.00	5.00	2.60 (0.83)	2.00	2.00	4.00

The Kruskal Wallis test revealed no significant difference among three groups for the scores of vocabulary, $H(2) = 3.589$, $p = .17$; language use $H(2) = .367$, $p = .83$ and mechanics $H(2) = 2.596$, $p = .28$. However, the results suggest a statistical significant difference in terms of content, $H(2) = 9.881$, $p = .006$ and organization, $H(2) = 8.585$, $p = .012$. The confidence interval for significance appeared to be within the boundaries both for content $99\%CI [.004, .008]$ and organization $99\%CI [.009, .015]$, which illustrated the effect as significant.

Mann-Whitney tests were used as post-hoc tests. A Bonferroni adjustment was applied for $p = .0167$ level of significance. Firstly, all groups were compared in terms of content. There was no statistically significant difference between individual mappers and collaborative mappers when the content of the written essays was considered, $U = 100.50$, $z = -.50$, $p = .62$, $r = -.09$. On the other hand, individual mappers had better content scores than those who did not complete mapping activity (i.e. the control group), $U = 50.50$, $z = -2.58$, $p = .008$, $99\%CI [.006, .011]$, *two-tailed*. The effect size was also calculated as medium, $r = -.47$. Collaborative mappers also illustrated higher content scores than no mappers (i.e. control group) in compare and contrast essays, $U = 45.00$, $z = -2.83$, $p = .004$, $99\%CI [.002, .006]$, *two-tailed*. The effect size was between medium to high, $r = -.52$. One can conclude that concept mapping resulted in significantly greater content scores than no mapping in compare and contrast essays but there was no significant difference between individual and collaborative concept mapping.

The organization showed similar results. There was no statistically significant difference in the organization of compare and contrast essays between individually completed computerized concept mapping and collaboratively constructed computerized concept mapping group, $U = 95.00$, $z = -.73$, $p = .48$, $r = -.13$. However, individual mappers organized their compare and contrast essays significantly better than no mappers, $U = 55.00$, $z = -2.40$, $p = .014$, $r = -.44$. The Monte Carlo confidence interval assured with 99% confidence, the true p value was between .011 and .017, with the upper bound just on the limit. The organization scores of the collaborative mappers were also significantly higher than no mappers in the second task, $U = 50.50$, $z = -2.60$, $p = .009$, $r = -.47$, $99\%CI [.007, .011]$, *two-tailed*. In other words, computerized concept mapping led to better organization for

compare contrast essays compared to no mapping, but they did not significantly differ from one another.

4.2.4 Task 3

After applying the split file, the descriptive statistics for the final task was obtained as illustrated in table 9. The median scores for content and organization seemed to show variance. The highest median score for content was individual mapping ($Mdn = 23.00$) followed by collaborative mapping ($Mdn = 19.00$) and no mapping ($Mdn = 17.00$). Similarly, the organization medians were respectively individual mapping ($Mdn = 16.00$) and collaborative mapping ($Mdn = 14.00$) no mapping ($Mdn = 11.00$). The Kruskal-Wallis test was applied to illustrate whether these were statistically significant differences.

Table 9. Descriptive Statistics for Task 3 in terms of the ESL Composition Profile

	Control				Individual				Collaborative			
	Mean (SD)	Mdn	Min	Max	Mean (SD)	Mdn	Min	Max	Mean (SD)	Mdn	Min	Max
Content	17.47 (3.72)	17.00	13.00	26.00	22.27 (4.82)	23.00	14.00	30.00	19.20 (2.88)	19.00	14.00	25.00
Organization	11.27 (3.51)	11.00	7.00	18.00	14.20 (3.49)	16.00	8.00	20.00	13.33 (3.02)	14.00	7.00	18.00
Vocabulary	11.40 (2.85)	11.00	8.00	18.00	13.47 (3.20)	14.00	9.00	19.00	11.20 (2.31)	11.00	8.00	15.00
Language Use	11.07 (3.75)	11.00	6.00	20.00	12.80 (4.00)	12.00	8.00	21.00	12.33 (3.37)	12.00	7.00	18.00
Mechanics	2.93 (0.88)	3.00	2.00	4.00	2.73 (0.88)	2.00	2.00	4.00	2.93 (0.96)	3.00	2.00	5.00

Kruskal-Wallis test showed no significant difference on the cause and effect essays across three groups in terms of vocabulary, $H(2) = 4.920, p = .08$; language use $H(2) = 2.025, p = .37$ and mechanics $H(2) = .508, p = .79$. However, concept mapping for the final essay appeared to have a significant impact on content, $H(2) = 9.402, p = .009$ and organization, $H(2) = 6.692, p = .035$. The confidence interval for

significance was observed to be within the boundaries in terms of content 99%CI [.007, .011] and organization 99%CI [.030, .040].

Mann-Whitney tests were applied as post-hoc tests. A Bonferroni adjustment was applied for three groups and all effects were reported at a .0167 level of significance. The contentwise comparison indicated no statistically significant difference between collaborative and individual mapping, $U = 65.00$, $z = -1.98$, $p = .46$, $r = -.36$ or collaborative and no mapping, $U = 71.00$, $z = -1.74$, $p = .09$, $r = -.31$. However, individual mapping had a statistically significant difference on the content scores of cause and effect essays when it was compared to no mapping group, $U = 47.50$, $z = -2.71$, $p = .007$, 99%CI [.004, .009], *two-tailed*. The effect size was between medium to high, $r = -.50$. In other words, individual concept mapping group had significantly higher content scores for cause and effect essays than no mapping, but the collaborative concept mapping did not reach a statistically different impact compared to individual mapping or no mapping.

In terms of organization results, collaborative concept mapping group did not result in statistically significant difference in the organization of the cause and effect essays in comparison to individual mapping, $U = 96.50$, $z = -.67$, $p = .51$, $r = -.12$ and no-mapping, $U = 65.00$, $z = -1.99$, $p = .05$, $r = -.36$. On the other hand, the organization scores of cause and effect essays indicated a significant difference for individual mapping condition than no mapping condition, $U = 56.00$, $z = -2.36$, $p = .016$, $r = -.43$. Since the p value appeared to be very close to significance level, the Monte Carlo confidence interval for significance was observed within 10000 samples. The Monte Carlo estimate showed the exact p value exceeding the boundaries [.013, .019] with 99% confidence. As a result, the results may not genuinely tell a difference. As a conclusion, individual concept mapping may have

the potential to have a significant impact on organization of cause and effect essays when used as a pre-writing activity compared to no mapping, but collaborative mapping users did not lead to significantly better organizations in comparison to individual mappers or no mappers.

To sum up, the three groups did not differ from one another in writing performance according to content, organization, vocabulary, language use or mechanics before the experiment. After using concept mapping as a pre-writing activity, participants in the individual mapping condition had significant improvement in writing performance in terms of content and organization compared to no-mapping condition in all essay tasks. Participants in collaborative concept-mapping condition also had a positive improvement in compare and contrast essays in terms of content and organization. The results did not reveal any significant difference between essays produced through individually completed computerized concept maps and collaboratively constructed computerized concept maps in terms of Jacobs et al. (1981) composition profile scores.

4.3 Survey outcomes

A pre and a post survey were given to participants to explore their perceptions of pre-writing activities. 34 participants answered the pre-survey questions while all participants answered the post-survey questions. The results of pre-survey illustrated the time spent on the pre-writing stage. Figure 4 shows the number of participants answering how much time they allocated for the pre-writing stage on previous writing tasks. The results suggest that 66.7% of the no-mapping group reported spending less than 21 minutes for planning while 72.7% of the individual mappers

and 71.4% of the collaborative group said allocating less than 21 minutes. More than half of the participants report that they plan less than twenty-one minutes.

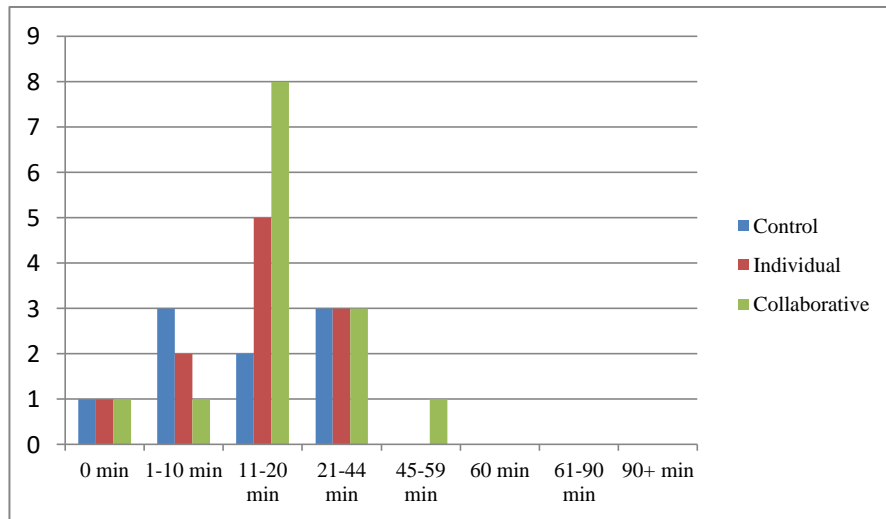


Figure 4. Self-reported time spent on pre-writing for control, individual and collaborative groups for pre-survey

The results of the post-survey showed the perceptions after the treatment, concept mapping. In the first question of the survey, the time spent on the pre-writing stage was asked. Figure 5 represents the number of participants answering how much time they allocated for the pre-writing activity. The results suggest that 60% of the no-mapping group reported spending less than 21 minutes for planning while 20% of the individual mappers and 33.3% of the collaborative group said allocating less than 21 minutes. More than half of the control group participants report that they plan less than twenty-one minutes.

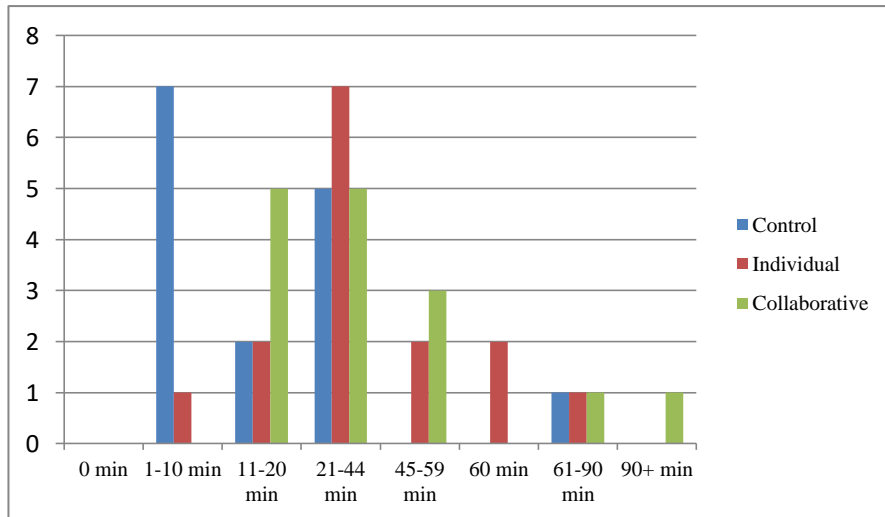


Figure 5. Self-reported time spent on pre-writing for control, individual and collaborative groups for post-survey

In the second question, participants were asked to select how important they considered pre-writing activities. 40% of the control group expressed pre-writing as very important or absolutely essential while 20% denoted little importance. However, 80% the individual and 86.7% of the collaborative mappers found the pre-writing activities either very important or absolutely essential. As a result, a majority of the mappers regarded pre-writing as a very important stage.

As explained in the data collection procedures, the class time spent on teaching opinion essays was four weeks, but only two weeks were allocated to the other two essays. In the third question, to what extent they were satisfied with the allocated planning time was investigated per task. The descriptive statistics (see Figure 6) demonstrate that the mean score of satisfaction from the first task to the third task declined. To illustrate in detail, the mean scores of satisfaction level were 3.2 for no-mappers, 3.7 for individual mappers and 4.1 for collaborative mappers in opinion essays. It decreases to $M = 3.1$ for control, $M = 2.6$ for individual, and $M = 3.3$ for collaborative groups in compare and contrast essays. For cause and effect

essays, the figures show $M = 2.9$ for control group while $M = 2.1$ for individual and collaborative mappers. The results suggest the satisfaction for the allocated planning time overall decreased for all groups.

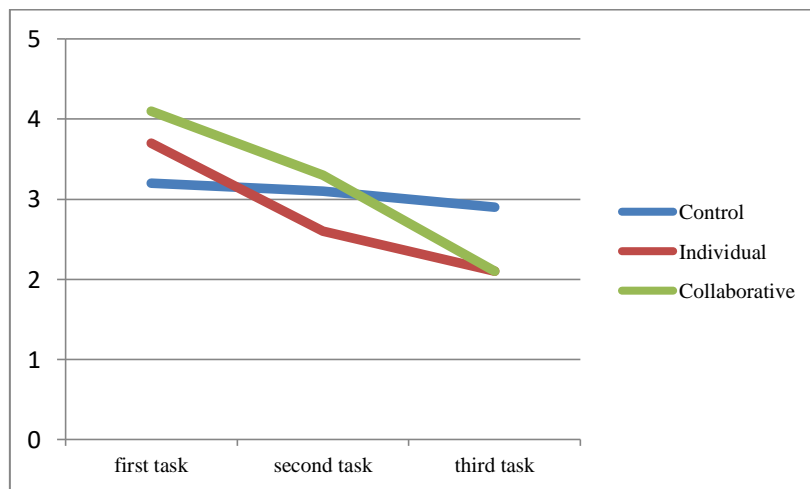


Figure 6. The level of satisfaction for provided planning time

Finally, the experimental groups were asked the mode (individual vs. collaborative) they would construct a concept map were they given a chance. 73.3% of participants in the individual mapping group showed preference for individual construction while only 26.7% of them preferred working in pairs. 60% of the participants in the collaborative mapping group, on the other hand, preferred concept mapping individually whereas 40% of them chose to work with pairs. The results revealed that more than half of the collaborative mappers would prefer to construct their own maps individually were they given a choice.

4.4 Computerized concept mapping interview outcomes

12 participants who were selected by convenience sampling agreed to participate in semi-structured retrospective interview at the end of the period. 11 of the participants completed all the concept maps across the three tasks, yet one participant completed

only one concept map and did not contribute to the others. The semi-structured retrospective interviews illustrated some views on pre-writing and computerized concept mapping in EFL classes. The responses were divided into themes. They are illustrated under four groups expressing the opinions on pre-writing stage, computerized concept mapping, collaboration and individual work and finally, language skills. The themes extracted from the interviews are thought to provide a deeper understanding of the quantitative data. The themes are explained along with some excerpts from the interview to present more comprehensible findings.

4.4.1 Views on pre-writing stage

The interview revealed that only some participants were familiar with pre-writing activities, planning before writing the essays was found to be important and useful in many ways by 91.7% of the participants. Hale indicated an increase in her planning time after the experience by saying that:

After planning, I mean, after this experience, I started planning more because I discovered that I wrote better essays and [this] affected my grades positively.

Most common themes on this topic were organization and research. 41.7% of the respondents associated pre-writing activity with systematicity, categorization or organization. They stressed that after considerable planning, they could sort out what to write, how to order paragraphs and introduce the topic. In the first question, their views of planning stage before and after the mapping experience were asked. Adil expressed an alteration in his mind about pre-writing stage, which was later acknowledged as a necessary part of writing:

I used to think it was not necessary before but I was not able to organize my thoughts. That's why; I now realize it is necessary. [My views] actually changed, yes.

Esra correlated pre-writing stage with more systematicity:

At first, I was trying to do planning on my own. After the tool, I think I started planning more systematically.

25% of the interviewees defined concept mapping activity leading to more in-depth research, as well. They emphasized searching other websites, learning new information, and making a progress on the topic through planning before writing, all of which increased the possibility of constructing more ideas and developing content.

Asim further commented searching helped learning new information in his native language by saying:

The internet helped us a lot. I mean, searching other websites contributed to our knowledge. We were not aware of it before, we even could not think about the topic in Turkish.

Another one indicated he started writing faster after doing careful planning.

All in all, the pre-writing stage was considered to be essential especially for improving the organization of the compositions and enabling in-depth research on the topic.

4.4.2 Views on computerized concept mapping tool

To begin with, participants were asked whether and to what extent they consulted their concept maps during actual writing. Some differences were observed between collaborative and individual mappers. To illustrate, all individual mappers replied positively and stated they used their maps for all tasks. Adil added that effective organization was a factor for determining the use of maps during essay writing and he said:

I usually used my concept map in my writing when I had organized it effectively. I did not prefer to use it when I had not been able to organize it. I felt I wrote worse essays then.

As for collaborative mappers, there were different comments depending on the task and partners. 28.6% of the collaborative mapping participants indicated they used them for all essay tasks. Esra said that her implementation of concept mapping changed towards better:

I used my first concept map a lot. Actually, I think I should not have used it that much. I mean, I wrote full sentences at first under the headings. It was not so good at the beginning. I think it got better when I wrote some keywords. It improved my writing a lot.

42.9% percent indicated that they consulted their concept maps only for the initial tasks owing to two different reasons. Time limitation was one of these reasons as Erdinç explains:

We used them for opinion and compare contrast essays. We could not use them for cause and effect essay because we had a time problem. We had a bit rush during the learning process of this essay.

The satisfaction with the partner in collaborative groups was another reason for utilizing the concept maps or not. Kadir, for instance, confessed that he did not prefer using the concept map he had prepared with his partner; he completed another comprehensive concept map without a partner and used it instead. Similarly, Zuhail indicated she used concept mapping for her opinion essay but she did not complete other maps due to the conflicts with her partner by saying:

We tried concept mapping once with my friend. However, I could not concentrate on my writing because I was influenced by my friends' opinions. After that, we did not use it.

Only Rabia said that she used concept mapping more effectively for cause and effect essay because she got used to planning by then. As a summary, individual mappers and collaborative mappers had some differences in consulting their concept maps for the writing phase. While individual mappers expressed a tendency to use them for all

essay types, some of the collaborative mappers stated not benefiting concept maps due to time restrictions and conflicts of peer work.

Secondly, the interviewees expressed their opinions on computerized concept mapping. 91.7% of the respondents recorded positive comments for computerized mind mapping activity and 58.3% of them could not find any trouble in using it. When they were asked the most interesting aspects of computerized mapping, interviewees put forward two themes: supporting learning styles and the affordances of the tool. The tool allowed users to search for information easily. İrfan said it was both fun and informative to write the keywords and build an essay upon them. Erdinç said the maps were easy to access online. Ayşen also expressed she liked saving the content without a button. Two of the interviewees liked the colors and the schema. Another peer found the planning activity intriguing since computerized concept mapping was unusual. One respondent identified the chat application in the mind mapping effective. She said after agreeing with her peer over the phone, they continued communicating in the chat rooms of the tool meanwhile planning. Esra indicated her freedom of planning time by stating:

I think it is pretty good to write without any limitation. There was no restriction. In other words, we can write whatever we want and however we want. I liked it.

Hale indicated computerized concept mapping activity supported her learning and she said:

I think I am a visual learner. You know, there are some distinctions. I could see everything clearly; I could take step easily on my mind. I mean, my steps are clear, what I will do is clear. Everything just falls into place.

Kadir compared computerized concept mapping with pen and paper activities. When asked whether he had done any planning activity before, he expressed a positive comment for the computer:

Yes, I had but it was mostly on paper. After the tool, I did planning on the computer and I felt it was more comfortable.

Although there are manifold advantages of the computerized activity, the respondents reported that technical problems created a challenge for them. Ayşen expressed making the fonts bigger was a bit problematic. Hale indicated deleting words was sometimes difficult. Selin, one of the collaborative mappers, said there was not an undo button. The tool, in fact, has an undo button, but it only works in individual maps. To sum up, most respondents found computerized concept mapping interesting and informative thanks to its affordances, yet there are some problems on the technical level of the tool that might be improved in the future.

4.4.3 Views on collaboration and individual work

All respondents were asked whether they would have preferred to study alone or with partners. 40% of the individual group respondents expressed to work collaboratively while 60% of them preferred to work alone. Those who opted to work collaboratively focused on the theme of guidance. They expressed their future partner could lead them to write better essays. Those who preferred concept mapping alone said it was due to their character or task requirements. Moreover, results suggested that 42.9 of the collaborative mappers preferred to be alone while 57.1% opted for working on the concept maps with a peer. The themes that were frequently encountered for those who wanted to study with another person were enabling information exchange, brainstorming together, obtaining more information, being more productive and faster, and being aware of different perspectives. Rabia, who was a supporter of collaboration, defined the process of collaborative mapping in a limited extent:

Firstly, we spoke with my peer. I mean, we exchanged information on what we could write. I looked up the things that I was going to write on my part of the map, I searched for more information in detail on the internet and I wrote them on the map. After that, when I was alone, I wrote more in detail. When I directly received the map with your feedback at school, the process got better.

As it can be inferred, the stated exchange of information was deciding on what to write by speaking before the concept mapping; some mappers searched and wrote on their part of the concept maps as if it had been an individual page. The interaction part was not evident in some of the concept maps. Furthermore, the only feedback they recalled was teacher feedback; they did not mention any student feedback during the interview. The respondents of the collaborative group who did not want to work with a partner focused on their characters or task requirements, as well. 66.7% expressed they liked to work alone due to their timid personality. One participant explained the reason to work alone due to task requirements:

It is nice to do brainstorming and work with a partner. It is nice while drafting, but while writing, both of us have to compose different things. However, we complete the brainstorming together, we cannot produce different ideas no matter what we do. That's why it should be better to work individually.

To sum up, the task conditions and the personality of people were influencing factors to lead the users to individual concept mapping. There were also other participants who favored sharing information exchange and brainstorming with others during concept mapping, but some of their experiences were in a limited extent.

4.4.4 Views on language skills

83.3% of the interviewees agreed the activity had an impact on their confidence in writing. 33.3% of them expressed feeling comfortable while writing thanks to concept mapping. 16.7% also focused on the feedback issue related to writing skill. They stated it decreased their anxiety since they could detect their mistakes thanks to

getting content-based feedback. Two interviewees indicated concept mapping led to faster writing. İrfan found concept mapping comforting:

It definitely had a positive effect. It is totally functional because constructing a mind map before the essays made me write more comfortably and more clearly and in a more coherent fashion.

However, Esra remained undecided whether concept mapping improved her writing skills:

I do not know whether it had any impact on my writing skill. I cannot decide. I mean, the headings made me remember what I would write. Other than that, I think it did not have any effect.

Another advantage of using computerized concept mapping activities was indicated as developing their reading skills since they were searching for different sources and deciding on the information they would utilize. Some of them said they searched in English while others preferred in Turkish. Those who used Turkish said they later translated what they had acquired into the English language with their own words. All in all, 58.3% of the interviewees said it improved their reading skills. A small number of people ($n = 2$) also expressed an impact on their speaking skills since they “tried to speak in English before concept mapping”. However, Selinay expressed no impact of concept mapping for speaking skills:

It did not have any impact on my speaking skills since we communicated in Turkish, but it improved my reading. What we were searching was also English; that’s why, we read a lot and tried to understand them. It improved my reading and comprehension skills. I cannot say the same thing about listening.

To sum up, a majority of people expressed concept mapping led to confidence in their writing skills. People indicated concept mapping as comfortable, fun, intriguing and anxiety-reducing activity. There were also some people that indicated an improvement in their reading, comprehension and translation skills. Although 16.7% also admitted confidence for their speaking skills, 8.3% indicated they mostly spoke

in their native language before starting to concept maps. None of the participants revealed a positive link between listening and concept mapping.

4.4.5 Summary

First of all, computerized concept mappers expressed a change in their perceptions of pre-writing activities after the experiment in terms of more in-depth research on the topic and more systematic organization of the essays. However, the implementation of concept mapping altered for individual and collaborative mappers. While individual mappers stated the implementation of their maps for all essay tasks especially when they were written with an interest, collaborative mappers had some reservations due to the nature of task requirements. Moreover, participants were asked whether they would prefer to work alone or in pairs and those who preferred individual mapping for future writing tasks expressed that it was because of their timid characters and task requirements, as well. It can be inferred that the different implementation of tasks, that is planning collaboratively writing individually, created some kind of unintended results in favor of individual mapping activity. Those who preferred collaborative mapping indicated information exchange and brainstorming together positively, yet the definition of the collaboration was limited. Finally, most of the participants stated an increased confidence in their writing and reading skills.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

In the previous chapter, the analyses of quantitative and qualitative data have been reported. This chapter is based on a summary of the study, discussion of the findings, pedagogical implications, limitations of the study, recommendations for future research and conclusions.

5.2 Summary of the study

This chapter illustrates a summary of the purpose and organization of the study and the major findings in relation to computerized concept mapping practices. Next, pedagogical implications of the study will be discussed. The limitations and recommendations for future research are presented together. Finally, a conclusion is offered to the readers to provide synthesizing information about the research.

The purpose of this study was to examine the effects of individual and collaborative computerized concept mapping as pre-writing activities on intermediate level L2 learners' written outputs in three distinctive types of tasks (opinion, compare and contrast, cause and effect).

The participants were asked to fill a consent form, a pre-survey, a language background inventory and write an opinion essay prior to any experimentation. After that, training for computerized concept-mapping was held for the experimental groups and both the experimental groups and the control group completed three

different essays for the abovementioned tasks. The essays were transferred to digital format without any changes in spelling and linguistic errors and were checked for plagiarism. Two raters scored the essays in line with the ESL Composition Profile of Jacob et al. (1981). The inter-rater reliability was established between two scorers with the Pearson correlation of at least 88%. The scores from the rubric were implemented as quantitative data.

As the final step, a post-survey was administered to all participants and semi-structured interviews were conducted with participants who volunteered. The results of the semi-structured interviews and surveys were used to triangulate the findings of the quantitative data. As a result, the qualitative data put forward a deeper understanding of the study.

The participants were 45 intermediate level EFL students whose native languages were Turkish. The groups were equally distributed as 15 participants per group. The interviews were conducted with 12 participants who volunteered at the end of the period. The research questions were divided into two:

1. What are the impacts of different computerized concept mapping (no-mapping, individual-mapping, and collaborative mapping) on writing performance of intermediate level EFL learners in terms of the ESL Composition Profile of Jacobs et al. (1981)?

2. What are the students' perceptions towards computerized concept mapping as a pre-writing activity?

To answer the first question, non-parametric tests, namely, the Kruskal-Wallis tests and the Mann-Whitney U Tests were performed on SPSS 23.0. The confidence interval for significance and effect sizes were also illustrated. To answer the second

question, some questions on the surveys and responses from the interviews were grouped in terms of themes. The purpose was to enrich the study with the experiences of real-classroom setting participants.

5.3 Findings

This section illustrates the findings of the two research questions in four sub-headings explaining the effects of individual and collaboratively computerized concept mapping on writing performance of intermediate level EFL students separately, comparing the effects of these two mapping activity with one another and illustrating the perceptions towards computerized concept mapping.

5.3.1 Effects of individually completed computerized concept maps on EFL students' writing

Initially, the effect of individually constructed computerized concept maps on EFL learners' writing performance was explored in three different tasks. The findings revealed that students using individual computerized concept mapping had improvement, especially in content-based skills in all tasks compared to no mappers. This finding is consistent with the previous findings (Abrams & Byrd, 2016; Al-Shaer, 2014; Kellogg, 1990; Lee, 2013; Liu, 2011; Ojima, 2006; Schultz, 1991; Sturm & Rankin-Erickson, 2002; Zhang, 2018; Zaid, 2011) which illustrated that the implementation of concept mapping was helpful especially for generating ideas and organizing them. The findings from qualitative data also support this phenomenon. Many interviewees considered concept mapping necessary particularly in terms of organizing and searching information for the topic. As a result, concept mapping on the computer might have helped the EFL students focus their attention on the topic,

construct ideas, search for more information, illustrate relationships visually, and facilitate the organization (Grabe & Kaplan, 1996; Novak & Gowin, 1984).

While the individual computer-aided concept mapping group outperformed control group in terms of content and organization, it did not have any significant impact on vocabulary, language use, and mechanics. Likewise, some concept mapping studies also indicated an improvement in the content and organization of written outputs; but not in the use of language (Abrams & Byrd, 2016; Ojima, 2006; Zhang, 2018). There were two reasons for explaining the lack of linguistic improvement in the reviewed literature by Zhang (2018). First explanation is the limited time, in other words, it is argued that the grammatical improvements could not be observed in eight weeks of lecture, in other words, it might be too early to see linguistic improvements. Another argument is that the cognitive process of concept mapping activity may hinder improvements in language use as the learners' focus is on ideas and content, not on grammatical accuracy.

Individual computerized concept mapping group had significant gains in the content and organization scores across three tasks and the interviews backed up these findings with the common references of participants to facilitation of organization and research during concept mapping. Flower and Hayes (1981) explained the significance of planning with limited attentional resources which are on display in the process of writing, in other words, they pointed out the demands of the translating stage could be so high that this extra burden may exceed the capacity of short term memory. According to Flower and Hayes (1981) planning can aid to reduce the cognitive burden by generating, organizing ideas and goal setting and lead to better compositions. Research findings also support that individual concept mapping as a pre-writing strategy might effectively lessen the attentional overload in

composition process and help better produced essays (Al-Shaer, 2014; Flower & Hayes, 1981; Kellogg, 1990; Lee, 2013; Zhang, 2018); yet it is not accurate to give all the credits to concept mapping strategy itself. Improvements in the essays mappers produced can be moderated by direct instruction in the use of composing strategies (Johnson, 2014). As Johnson (2014) compared findings of the L1 studies with L2 studies, he illustrated that those positive findings of the L1 studies were probably due to explicit instruction in the implementation of strategies such as writing prompts, on-line planning, attention to the purpose or sub-processes rather than the impact of pre-task planning itself. In the present study, computerized mappers had the opportunity to receive teacher feedback, albeit not in detail, and they were explicitly trained how to organize information and paragraphs. The information embedded in the mapping training, as well as the teacher feedback, might have also led to better writing for all three tasks. In other words, the focus on the concept mapping and the availability of content-based feedback opportunity might have triggered the positive impacts on the produced outputs, not exclusively constructing computerized mapping.

5.3.2 Effects of collaboratively completed computerized concept maps on EFL students' writing

The results suggested that collaborative concept mapping outperformed the control group in compare and contrast essay task in terms of content and organization, but not in the other two tasks. The interviews and survey responses were used to gain a deeper understanding why collaborative concept mapping was not helpful in all tasks. First of all, the collaborative group participants of the interview defined their experience of collaboration to a limited extent. As illustrated in interview responses

earlier, the collaboration was mainly restricted to the selection of appropriate topics prior to the mapping activity. During concept mapping, the individuals preferred to write down their own part of the map as if it had been an individual one. Secondly, some mappers did not prefer sharing their ideas due to differentiation in task requirements. The students were expected to plan collaboratively prior to the writing stage, but they were evaluated alone for their written output. As a result, some students might not have wanted to share their opinions with others. Finally, some respondents expressed their timid personality as the reason for not writing their ideas even in an online platform. They simply did not want to be heard or in this case, read. Even if they had planned collaboratively, it was also observed from the interviews that some collaborative mappers had not preferred consulting to their maps during writing. Only 28.6% of the collaborative mapping interviewees indicated that they used their maps for all essay tasks. The survey results also confirmed that 60% ($n = 9$) of these mappers would prefer individual concept mapping were they given a chance. The results indicated that some mappers could not benefit the most from collaborative computerized mapping and the collaborative mapping strategy did not provide any significant improvements for opinion and cause and effect essay tasks. The learners might have had reservations for collaborative activities since they were not used to such activities and they were not specifically trained on how to collaborate with each other.

The findings revealed an improvement for the second task in terms of content and organization. The result supports the findings of Shehadeh (2011) and Lee (2013) who expressed a positive influence on the collaboratively written works for meaning-based areas like content, organization, and vocabulary. The present study, on the other hand, did not suggest a significant improvement on vocabulary, which

can be due to the design of the study. The present study allowed the use of a dictionary during the writing stage in classrooms for all conditions. Since all participants were allowed to consult the dictionaries, the study failed to differentiate an improvement in the knowledge of vocabulary across control and experimental groups. Furthermore, in Shehadeh's (2011) study, collaborative group (i. e. two participants) was requested to compose an essay in 40 minutes while control group (i.e. one individual) composed in 30 minutes. The extra time given to the experimental group and writing all essay collaboratively might have led to better vocabulary scores compared to the control group. The present study, on the other hand, provided equal time (60 minutes) for individual learners of all groups.

The present study did not reveal an improvement in the accuracy scores deriving from the guidance or collaboration among peers. As evidenced by the review of literature, Lee (2013) expressed slightly higher results for language use and mechanics as potential improvements in linguistic aspects. Similarly, Liu (2011) concluded that especially low and middle-level participants of collaborative concept mapping group improved their compositions in all aspects including language accuracy (i.e. errors of vocabulary, grammar, spelling or punctuation). However, the present study did not support these findings. The reason behind the lack of significant improvements in mechanics can be that mechanical rules and conventions can easily be mastered by everybody (Shehadeh, 2011); as a result concept mapping did not lead to improved mechanics. There are two reasons that might account for the lack of significant differences in language accuracy. Firstly, the participants might not have preferred giving corrective feedback to one another. This could be due to the level of learners which was too low to aid one another in the linguistically (Shehadeh , 2011). Secondly, even if the correct peer feedback had been given and

understood correctly; learners might have considered their peers as incompetent and preferred not to use their feedback during writing their composition as witnessed in Neumann & McDonough's (2015) study.

5.3.3 Effects of collaborative concept mapping as opposed to individual concept mapping

When the effects of two computerized concept mapping conditions on intermediate level EFL students writing were compared, the results did not reveal any significant differences in terms of the rubric of Jacobs et al. (1981). The findings were similar to the studies that investigated the difference in performance between the individual and collaborative computerized concept mapping (Chiou, 2015; Lee, 2013; Liu, 2011). Chiou (2015) did not indicate any significant difference in achievement scores between the two computerized groups. Liu (2011) did not reveal any significant difference between individual and collaborative mapping effects on the low and middle-level learners' writing outputs according to the scale of Hamp-Lyons and Henning (1991). Having evaluated the essays in terms of the composition profile of Jacobs et al. (1981), Lee (2013) declared no significant impact of computerized mappings. As a result, the present study is compatible with the findings of the literature. The reason for no difference could be due to the limited collaboration on computerized concept maps. Some interviewees expressed using collaborative concept maps by dividing it into two parts, jotting down ideas on their own part. Therefore, they might have constructed two maps on one mapping screen rather than one joint map.

5.3.4 Students' perceptions towards computerized concept mapping

Initially, the learner perceptions towards the pre-writing stage were recorded by the survey and interview outcomes. The post-survey outcomes demonstrated that while 40% of the control group expressed pre-writing activities as very important or absolutely essential, the ratio for the same question was 80% for individual and 86.7% for the collaborative concept mapping group. The interviews conducted with the concept mappers confirmed this finding as 11 out of 12 respondents regarded planning prior to writing as important and beneficial in many ways particularly for improving the organization of the compositions and enabling in-depth research on the selected topic. The results of post-survey and interviews put forward that the computerized concept mappers regarded pre-task planning as a necessary stage particularly in terms of organizing and searching information for the topic.

The interview and the post-survey also revealed that the learners enjoyed working on concept maps, which is compatible with the reviewed studies (Chiou, 2015; Ojima, 2006; Schultz, 1999; Sturm & Rankin-Erickson, 2002; Zhang, 2018). The interviewees also denoted not only the writing skills but also reading skills of the learners developed thanks to the mapping. Although there were some technical problems on the tool, especially on collaborative map platform (i.e. no undo button, making the fonts bigger, deleting words), computerized concept mapping drew EFL learners' interest by allowing the participants to search for information and present them in an easy-to-access platform, getting feedback prior to the writing stage, and connecting the outside activities into the classroom (Zheng & Warschauer, 2017). The computerized concept mapping removed the problem of time limitation experienced during planning, which was encountered in the studies of some scholars like Ojima (2006) and Zhang (2018). The participants expressed that they liked the

mapping activity without any space or time restrictions. The results suggest computerized concept mapping extends the learning outside the classroom and makes learners active participants in searching and figuring out their interests for the learning area (Godwin-Jones, 2015).

While some scholars such as Chiou (2015) and Sturm and Rankin-Erickson (2002) witnessed a positive attitude towards writing; Zaid (2011) observed a boost in the level of learners' writing anxiety due to the novelty and intricacy of the digital pre-writing activities. The present study confirmed the former findings. A majority of people expressed concept mapping led to confidence in their writing skills. The learners defined computerized concept mapping as fun, intriguing and anxiety-reducing activity. Some participants found the computerized concept mapping more comfortable than pen-and-paper mapping. It was encountered in the interviews that the affordances of the computerized platform such as saving maps automatically, adding and removing concepts easily and rapidly, adding images from the web, chatting on the map, and receiving instant feedback eased the concept mapping process. All of these affordances were also supported in the previous studies which observe the advantages of computerized concept mapping (Anderson-Inman & Zeitz, 1993; Liu et al., 2010; Sturm & Rankin-Erickson, 2002). Zaid (2011) associated the increased apprehension level with the pressure of using "special software that was highly demanding and sophisticated" (p. 82). However, the comment on the tool done by Adil summarizes the perception of today's digital-natives:

In fact, it was not that difficult because it is technology after all. Now, what could be interesting for us and to what extent?

Moreover, the implemented concept mapping platform was described easy-to-use and access; as a result, the mappers did not indicate any anxiety due to the tool.

5.4 Pedagogical implications

The results of this study can inform the educators about the use of computerized concept mapping individually and collaboratively as a pre-writing strategy in foreign language education context. Flower and Hayes (1981) and Bereiter and Scardamalia (1987) constructed cognitive writing models to attract writing scholars' attention to writing-as-process approach. In the present study, learners' content and organization significantly developed as a result of computerized concept mapping activity prior to starting to writing essays. With respect to the survey and semi-structured interviews, learners' responses also attribute the benefits of organization and in-depth research. As a result, those who are interested in teaching writing in EFL could provide computerized concept mapping as a strategy for the learners to acknowledge the importance of planning and improve their compositions. Language instructors can highlight writing as a process approach, specifically the pre-writing stage by providing extended planning time and giving content-based feedback. Considering the findings of this research, the instructors also ought to familiarize learners with computerized concept mapping strategy and train learners on how to make a plan properly rather than allowing some extra time to plan.

Secondly, computerized maps can also be used as a pedagogical tool to promote learner collaboration outside the classroom in the EFL context. The present study successfully used computerized concept mapping tool in order to track the contributions of the learners. Therefore, language instructors can integrate computerized concept maps into collaborative writing practices to enhance collaboration in the foreign language context. However, they should provide the appropriate educational environment that fully supports collaborative activities, encourage some strategies on effective collaboration, observe the contributions of the

learners, and promote peer feedback. Firstly, language learners can be specifically trained on the benefits of collaboration, peer correction, and strategies of effective collaboration to get the most from collaborative computerized mapping. For doing this, instructors can supply the learners with some bullet points including specific areas to focus on during peer feedback. Secondly, instructors should decide on how to organize collaborative groups, i.e. how many people they consist, whether they are allowed to choose their partners, whether they will work with the same partners across the tasks, how they will be evaluated at the end. Finally, after the training session, writing instructors should be aware of learners' desire to work alone or with a partner and respect their preference.

Furthermore, the present study suggests a link between inside and outside classroom activities through computerized concept mapping and as a result, endorses the technological tools for successful writing classes (Godwin-Jones, 2015). With this way, students can consider computerized mapping as an activity to extend their learning beyond the classroom. Instructors can have the opportunity to examine the ideas of these students and lead them to better written compositions through content-based feedback. They should also be aware of the availability of computers and learners' comfort level while using computerized maps. Therefore, should they want an effective pre-writing stage, they may provide students with the tools that are both easy to access and easy to use. In other words, the tools or software should be user-friendly and aid learners to focus on their maps rather than trying to solve how to use them.

5.5 Limitations and recommendations for future research

A number of limitations that might affect the interpretation of the findings were revealed. The design of the study, quasi-experimental design, resulted in some limitations beyond the researcher's control. Firstly, the participants were assigned by school administration and the researcher did not have any control on the allocation of the students to classes. Therefore, participants could not be randomly assigned into control or experimental groups. Secondly, the level of the students was identified as intermediate based on the institution's exam, more reliable and valid exams can be used for further studies. Thirdly, the tasks, the books, and the rubrics were selected by Materials Office. Therefore, the researcher could not control the differences derived from the task types. For future research, the study should be replicated with different tasks in line with the purpose of the study and valid exams such as TOEFL or IELTS can be implemented to identify each participant's proficiency levels. Fourthly, the experimental classes were instructed by researcher while the control group was taught by another instructor. Further studies can be taught by the same instructor.

Another limitation was the duration of the study, it lasted eight weeks due to the modular system. The study was conducted in the last period of the institution and it was the first time the learners had been instructed on writing essays and for the experimental groups, it was their first experience planning with computerized mapping tool. In order to decrease the novelty effect, the learners were asked to write an essay prior to mapping. Moreover, in order to familiarize students with the tool; the learners were trained on computerized mapping in the computer labs. On the other hand, more conclusive findings could have been revealed if the learners had worked on writing essays and computerized mapping tool for the third period and the

data were collected during the last period. For future studies, the study can be replicated by allocating a longer time in order to familiarize the learners with the concept mapping and writing essays.

Furthermore, the schedule of the fourth period, which was prepared by Materials Office allotted four weeks for the introduction and opinion essays, two weeks for compare and contrast, and last two weeks for cause and effect essays. As it was expressed by one of the interviewees, some participants felt a bit rush during the learning process of the final essay type. As a result, it may have created a burden for the learners. Some students could have benefited more time to learn cause and effect essays and complete their mapping and writing more properly. Future studies can be replicated by allocating more time to fully comprehend the essay type and then complete the task. Moreover, the learners were allowed to choose between two topics depending on their interests. Based on their topic, their scores might have been influenced. Further studies should take the topic and the difficulty of it into consideration.

Additionally, the major limitation of statistical tests reported in the quantitative part of the results chapter was small sample size. The participants of the study were 45 intermediate level EFL students studying at the preparatory school of a state university. They had been learning English for at least nine years and all of their native language was Turkish. Because there were three intact classes with a limited number of participants, the present study utilized non-parametric tests. This study should be replicated with a larger sample size so that parametric tests can be applied and progress among the tasks can be observed more accurately. Moreover, future studies can observe different proficiency level learners in other contexts to generalize the findings to other EFL population.

Fifthly, the convenience sampling, which was the sampling method of the present study might have influenced the findings of the qualitative study. More specifically, the respondents of the interviews were chosen based on their availability on the last week of the study. The participants who had completed all three tasks were selected for most of the time. Only one participant could not complete all the concept map tasks. As a result, the majority of learners may have represented the populations who had positive attitudes towards concept mapping and language learning. Future studies should include more participants who could not finish concept mapping or who were reluctant to write essays in English.

Sixthly, collaborative mappers were allowed to choose their partners. Although most of the collaborative mapping group did not change their partners throughout the tasks, some altered their groups. These new working groups might have affected the performance of the participants. Other studies can reconsider this situation and prevent changing the partners during the experiment to eradicate the impact of group dynamics on individuals' performance in the study. In addition, the interviews suggested collaborative mappers did not completely apply collaborative work on the concept maps. Further studies can focus on the notion of collaboration and lead the language learners to give more feedbacks to one another.

Finally, in this study, experimental group participants were given their maps with instructor feedback. Therefore, the availability of instructor feedback might have created an advantage and became a confounding variable affecting learners' written performance (Johnson et al., 2012; Johnson, 2014). As a result, it requires a great deal of caution to interpret the findings in which the effect of mapping and receiving feedback might be intertwined together. Further studies should provide adequate control for all of these variables. The mapping practices of the learners

were not investigated in detail, so the concept maps constructed by the learners can be worthy of further investigation to build a clearer picture on what is going on during concept mapping.

5.6 Conclusion

The findings revealed that the individual computerized concept mappers outperformed the control group in content-based skills, which is compatible with other studies (Abrams & Byrd, 2016; Al-Shaer, 2014; Kellogg, 1990; Lee, 2013; Liu, 2011; Ojima, 2006; Schultz, 1991; Sturm & Rankin-Erickson, 2002; Zhang, 2018; Zaid, 2011). The findings from qualitative data also supported that learners considered concept mapping necessary particularly in terms of organizing and searching information for the topic. However, improvements in the essays of individual mappers might be moderated by direct instruction in the use of writing strategies (Johnson, 2014). In other words, the information embedded in the mapping training and the availability of content-based feedback opportunity might have also led to better writing for all three tasks, not exclusively constructing computerized mapping. The collaborative concept mapping group performed better than the control group in terms of content and organization in compare and contrast essay task. The learners might have had reservations for collaborative activities since they were not used to such activities and they were not specifically trained on how to collaborate with each other. The interviews revealed that the differentiation in task requirements (i.e. planning collaboratively, writing individually) might also have resulted in limited collaboration. There was not any significant difference on the performance of individual and collaborative mappers, and this finding is consistent with other studies (Chiou, 2015; Lee, 2013; Liu, 2011). The semi-structured interviews and the survey illustrated positive attitudes towards writing in EFL context after computerized

concept mapping. The learners of experimental group expressed they enjoyed working on concept maps. Therefore, these results supported previous studies, (Chiou, 2015; Ojima, 2006; Schultz, 1999; Sturm & Rankin-Erickson, 2002; Zhang, 2018).

APPENDIX A

ESL COMPOSITION PROFILE OF JACOBS ET AL. (1981)

ESL COMPOSITION PROFILE			
Score	Level	Criteria	Comments
CONTENT	30-27	EXCELLENT TO VERY GOOD: knowledgeable; substantive, thorough development of thesis; relevant to assigned topic	
	26-22	GOOD TO AVERAGE: some knowledge of subject; adequate range; limited development of thesis; mostly relevant to topic, but lacks detail	
	21-17	FAIR TO POOR: limited knowledge of subject; little substance; inadequate development of topic	
	16-13	VERY POOR: does not show knowledge of subject; non substantive; non pertinent OR not enough to evaluate	
ORGANIZATION	20-18	EXCELLENT TO VERY GOOD: fluent expression; ideas clearly stated; supported; succinct; well-organized; logical sequencing; cohesive	
	17-14	GOOD TO AVERAGE: somewhat choppy; loosely organized; organized but main ideas stand out; limited support; logical but incomplete sequencing	
	13-10	FAIR TO POOR: non-fluent; ideas confused or disconnected; lacks logical sequencing and development	
	9-7	VERY POOR: does not communicate; no organization; OR not enough to evaluate	
VOCABULARY	20-18	EXCELLENT TO VERY GOOD: sophisticated range; effective word/idiom choice and usage; word form mastery; appropriate register	
	17-14	GOOD TO AVERAGE: adequate range; occasional errors of word/idiom form, choice, usage <i>but meaning not obscured</i>	
	13-10	FAIR TO POOR: limited range; frequent errors of word/idiom form, choice, usage; <i>meaning confused or obscured</i>	
	9-7	VERY POOR: essentially translation; little knowledge of English vocabulary, idioms, word form OR not enough to evaluate	
LANGUAGE USE	25-22	EXCELLENT TO VERY GOOD: effective complex constructions; few errors of agreement, tense, number, word order/function, articles, pronouns, prepositions	
	21-18	GOOD TO AVERAGE: effective but simple constructions; minor problems in complex constructions; several errors of agreement; number, tense, word order, articles, pronouns, prepositions <i>but meaning seldom obscured</i>	
	17-11	FAIR TO POOR: major problems in simple/complex constructions; frequent errors of negation, agreement, tense, number, word order/function, articles, pronouns, prepositions and/or fragments, run-ons, deletions; <i>meaning confused or obscured</i>	
	10-5	VERY POOR: virtually no mastery of sentence construction rules; text dominated by errors; does not communicate; OR not enough to evaluate	
MECHANICS	5	EXCELLENT TO VERY GOOD: demonstrates mastery conventions; few errors of spelling, punctuation, capitalization, paragraphing	
	4	GOOD TO AVERAGE: occasional errors of spelling, punctuation, capitalization, paragraphing <i>but meaning not obscured</i>	
	3	FAIR TO POOR: frequent errors of spelling, punctuation, capitalization, paragraphing; <i>meaning confused or obscured</i>	
	2	VERY POOR: no mastery of conventions; dominated by errors of spelling, punctuation, capitalization, paragraphing OR not enough to evaluate	
Total score	Reader	Comments	

APPENDIX B

THE TOPICS OF THE ESSAY TASKS

1. Task 0: Opinion essay task

Write an opinion essay for the topic stated below:

“Should school uniforms be compulsory for high school students?”

2. Task 1: Opinion essay task

Write an opinion essay for one of the topics stated below:

“Should preparatory schools be compulsory for university students?”

“Does learning to play sport teach valuable life skills?”

3. Task 2: Compare and contrast essay task

Write a compare and/or contrast essay for one of the topics stated below:

“What are the major similarities and/or differences between individual sports, like tennis or swimming, and team sports, like football or basketball?”

“What are the major similarities and/or differences between the contributions of artists to society with the contributions of scientists to society?”

4. Task 3: Cause and effect essay task

Write a cause or effect essay for one of the topics stated below:

“What are the causes or effects of overeating?”

“What are the causes or effects of overpopulation?”

APPENDIX C

THE INVENTORY OF ENGLISH LANGUAGE

Please fill in the information sheet below. All the answers will be used as background information for the sake of the study and will be kept confidential.

1. Your Name and Surname: _____

2. Your Class: _____

3. Your Department: _____

4. What is your native language?

Turkish

Other (Please Specify) _____

5. Where and how long have you studied English?

Elementary school: _____ years

Middle school: _____ years

High school: _____ years

College: _____ years

6. Have you ever studied English at a place other than schools?

i. Where?

ii. For how long?

7. Have you ever traveled or lived in an English-speaking country?

i. Where? (Please specify)

ii. For how long? (Please specify)

8. Have you studied any other languages other than English? What are they?

APPENDIX D

THE PARTICIPANTS' ENGLISH LANGUAGE EXPERIENCE

	individual concept mapping group (n = 15)	collaborative concept mapping group (n = 15)	control group (n = 15)
Gender			
Male	6	8	6
Female	9	7	9
Departments			
History*	6	3	4
Molecular Biology and Genetics*	4	5	2
Political Science*	2	2	4
Business Administration			1
Electrics and Electronic Engineering		1	1
Gastronomy			1
Health Management	1	1	1
Information and Document Analysis			1
Philosophy	1		
Physics Engineering		1	
Psychological Counseling		1	
Sociology	1		
Turkish Language		1	
The English Language Education			
Primary/Secondary	15	15	15
High School	15	15	15
University	1	1	
<i>Note.</i> The departments of History, Molecular Biology and Genetics, and Political Science use English as medium of instruction. Other departments use Turkish as a medium of instruction.			

APPENDIX E

SEMI-STRUCTURED INTERVIEW QUESTIONS FOR INDIVIDUAL CONCEPT MAPPING GROUP

1. Bu deneyimden önce yazı öncesi aktiviteler ve planlama aşaması hakkında ne düşünüyordun? Bunlar deneyiminden sonra değişti mi?

(What was your view and perception of pre-writing activities and planning stage before the experience? Did these change after the experience?)

2. Yazı öncesi bireysel aktiviteler, diğer bir deyişle yazı öncesi planlama aşamaları hakkındaki görüşlerin neler? Bu deneyimi nasıl buldun?

(What is your view on individual pre-writing activities, in other words planning before writing? How did you find the experience?)

3. Bireysel hazırladığın grafik organizelerini ilk taslağını yazmadan önce kullandın mı? Eğer öyleyse, ne ölçüde kullandın?

(Did you use the graphic organizer that you prepared individually before writing your first draft? If so, to what extent did you use it?)

4. Aktivitenin en ilginç yanı neydi, en çok nesini sevdi? Niçin?

(What was the most interesting part of the activity, or the part you liked most? Why?)

5. Aktivitenin en zorlayıcı kısmı neydi? Niçin?

(What was the most difficult part of the activity? Why?)

6. Aktivite boyunca boyunca bireysel çalıştın? Bir seçeneğin olsaydı, tek başına mı çalışmak isterdin yoksa partner ile çalışmak mı isterdin?

(You worked individually throughout the prewriting activity? If you had a choice, would you prefer to work alone or write with a partner?)

7. Aktivite yazma becerine güvenin konusunda olumlu ya da olumsuz herhangi bir etkiye sahip miydi? Lütfen belirt.

(Did the activity have any positive or negative effect on your confidence in your writing ability? Please specify.)

8. Aktivite konuşma, okuma, dinleme gibi diğer dil becerileri üzerinde olumlu ya da olumsuz herhangi bir etkiye sahip miydi? Lütfen belirt

(Did the activity have any positive or negative effect on your other language skills such as e.g., speaking, reading, listening? Please specify.)

9. Gelecekte buna benzer bireysel yazı aktiviteleri yapmak ister misin?

(Would you like to do similar individual writing activities/tasks in the future?)

APPENDIX F

SEMI-STRUCTURED INTERVIEW QUESTIONS FOR COLLABORATIVE CONCEPT MAPPING GROUP

1. Bu deneyimden önce yazı öncesi aktiviteler ve planlama aşaması hakkında ne düşünüyordun? Bunlar deneyiminden sonra değişti mi?

(What was your view and perception of pre-writing activities and planning stage before the experience? Did these change after the experience?)

2. Yazı öncesi partnerli aktiviteler, diğer bir deyişle yazı öncesi planlama aşamaları hakkındaki görüşün nedir? Bu deneyimi nasıl buldun?

(What is your view on collaborative pre-writing activities, in other words planning before writing? How did you find the experience?)

3. Partnerli hazırladığın grafik organizelerini ilk taslağını yazmadan önce kullandın mı? Eğer öyleyse, ne ölçüde kullandın?

(Did you use the graphic organizer that you prepared collaboratively before writing your first draft? If so, to what extent did you use it?)

4. Aktivitenin en ilginç yanı neydi, en çok nesini sevdi? Niçin?

(What was the most interesting part of the activity, or the part you liked most? Why?)

5. Aktivitenin en zorlayıcı kısmı neydi? Niçin?

(What was the most difficult part of the activity? Why?)

6. Aktivite boyunca boyunca bir partner ile çalıştın? Bir seçeneğin olsaydı, tek başına mı çalışmak isterdin yoksa partner ile çalışmak mı isterdin?

(You worked with one partner throughout the prewriting activity? If you had a choice, would you prefer to work alone or write with a partner?)

7. Aktivite yazma becerine güvenin konusunda olumlu ya da olumsuz herhangi bir etkiye sahip miydi? Lütfen belirt.

(Did the activity have any positive or negative effect on your confidence in your writing ability? Please specify.)

8. Aktivite konuşma, okuma, dinleme gibi diğer dil becerileri üzerinde olumlu ya da olumsuz herhangi bir etkiye sahip miydi? Lütfen belirt.)

(Did the activity have any positive or negative effect on your other language skills such as e.g., speaking, reading, listening? Please specify.)

9. Gelecekte buna benzer partnerli yazı aktiviteleri yapmak ister misin?

(Would you like to do similar collaborative writing activities/tasks in the future?)

APPENDIX G

THE ANALYTIC RUBRIC USED IN THE INSTITUTION

TASK ACHIEVEMENT (35)		INTRODUCTION PARAGRAPH (10)		BODY PARAGRAPHS (15)		CONCLUSION PARAGRAPH (10)
	9-10	<ul style="list-style-type: none"> -Has a clear and well-developed thesis statement fully appropriate to the purpose and type of the essay. -Thesis is neither too specific nor too general, and controls the essay very well. - Background information goes from general to specific relating to the thesis very well, and makes the reader familiar enough with the topic. 	13-15	<ul style="list-style-type: none"> -There are at least two body paragraphs that effectively support the thesis statement. -Each body paragraph starts with an effective topic sentence. -Points, information or arguments in the paragraphs are fully appropriate to the essay type and combined effectively with each other to support the topic. -The examples are very sufficient and clear to explain the topic. 	9-10	<ul style="list-style-type: none"> - Has a clear and well-developed concluding sentence, and it summarizes, ends or concludes the essay effectively. -There are effectively stated comments, predictions or suggestions appropriate to the essay type.
	7-8	<ul style="list-style-type: none"> - Has a satisfactory thesis statement appropriate to the purpose and type of the essay. -Thesis controls the essay well. - Background information goes from general to specific relating to the thesis well, and makes the reader familiar with the topic. 	10-12	<ul style="list-style-type: none"> - There are at least two body paragraphs that support the thesis statement well. -Each body paragraph starts with a satisfactory topic sentence. -Points, information or arguments in the paragraphs are appropriate to the essay type and combined with each other to support the topic to some extent. - The examples are sufficient enough to explain the topic. 	7-8	<ul style="list-style-type: none"> -Has a satisfactory concluding sentence appropriate to the essay type, and it summarizes, ends or concludes the essay well. -There are satisfactorily stated comments, predictions or suggestions quite appropriate to the essay type.
	5-6	<ul style="list-style-type: none"> -Has an adequate and intelligible thesis statement somehow appropriate to the purpose and type of the essay. -Thesis has some control over the essay. -There is some background information deviating from the thesis to some extent and has a problematic organization. 	7-9	<ul style="list-style-type: none"> -There is only one satisfactory body paragraph adequately supports the thesis statement. -There may not be a satisfactory topic sentence in each paragraph. -Points, information or arguments in the paragraphs are somehow related to the essay type, but they are not enough to support the topic sentence. -Few and insufficient examples are given to support the points, information.. 	5-6	<ul style="list-style-type: none"> -A concluding sentence exists, but it has problems in summarizing, ending or concluding the essay. -The paragraph may give new information instead of summarizing. -There are some comments, predictions or suggestions but they are somehow unrelated to the essay type.
	3-4	<ul style="list-style-type: none"> -Thesis statement is unsatisfactory in controlling the essay, and difficult to understand. -Background information is quite limited and/or unrelated to the topic. 	4-6	<ul style="list-style-type: none"> - The bodies are unsatisfactory in supporting the thesis statement. -Lack of a topic sentence at the beginning of each body. -Points, information or arguments in the paragraphs deviated from and the essay. -Lack of examples to support the points, information or arguments. 	3-4	<ul style="list-style-type: none"> - A concluding sentence exists, but it is unsatisfactory to conclude the essay. -Comments, predictions or suggestions are not satisfactory or absent.
	0-2	<ul style="list-style-type: none"> -Thesis statement is absent or very weak, or it is either too general or too specific. -Thesis neither is clear nor controls the essay. - Background information is absent or totally unrelated. 	0-3	<ul style="list-style-type: none"> -Main parts of bodies are missing or not related to the thesis. -There are no body paragraphs at all. 	0-2	<ul style="list-style-type: none"> -The conclusion paragraph is absent, or it exists but provides new information/totally unrelated information.

GRAMMAR (20)	17-20	-Level appropriate structures with almost no mistake. -Consistent ability in sentence formation.
	13-16	-Level appropriate structures with a few mistakes. -Ability in sentence formation with minor errors.
	9-12	-A number of errors interfering with the meaning to some extent. -May demonstrate inconsistent ability in sentence formation with limited range of correct structures.
	5-8	-Significant errors such as fragments interfering with the meaning.
	0-4	-Full of fragments and almost no correct sentences, which hinders the meaning.
VOCABULARY (20)	17-20	-Level and topic appropriate word choice or word use with almost no mistake.
	13-16	-Level and topic appropriate word choice or word use with a few mistakes.
	9-12	- A number of errors in word choice or word use interfering with the meaning to some extent.
	5-8	-Significant errors in word use or word choice interfering with the meaning.
	0-4	-Lack of words, or wrong word choice or word use resulting in awkward sentences.
COHESION - COHERENCE (15)	13-15	-Expresses one definite main idea with no irrelevant sentences. -Has logical flow and progression of ideas, events or information with correct conjunctions or transition signals within and across the paragraphs.
	10-12	-Expresses one definite main idea, but there are minor problems linking the supporting sentences within and across the paragraphs. -Has logical flow and progression of ideas, events or information with a few problems in the use of conjunctions or transition signals.
	7-9	-Problems in expressing one definite main idea with some irrelevant sentences. -There are a lot of problems in the flow and progression of ideas, events or information because of problematic use of conjunctions or transition signals within and across the paragraphs.
	4-6	-Unorganized and unfocused flow of ideas with significantly problematic use of conjunctions or transition signals and irrelevant sentence within and across the paragraphs. -Expressing more than one topic but still shows some understanding of the basic essay structure and the topic.
	0-3	-No evidence of understanding the topic, basic essay structure with more than one main idea, a lot of irrelevant sentences, or no attempt to write.
PUNCTUATION (5)	5	-Correct punctuation with almost no mistake.
	4	-Good control of punctuation marks with a few mistakes.
	3	-Adequate control of punctuation marks but has some mistakes.
	2	-Unsatisfactory control of punctuation marks with lots of mistakes.
	0-1	-Significant and frequent errors in punctuation resulting in fragments which makes the essay confusing.
		SPELLING (5)
	5	- Correct spelling and capitalization with almost no mistake.
	4	-Good control of spelling and capitalization with a few mistakes.
	3	-Adequate control of spelling and capitalization but has some mistakes.
	2	-Unsatisfactory control of in spelling and capitalization.
	0-1	-Significant and frequent errors in spelling and capitalization resulting in awkward words, phrases and sentences.

ATTENTION! *DO NOT CUT ANY POINTS FOR MARGINS. *CUT 5 POINTS FOR EACH:

- If there is no title (-5)
- If there are two or more missing indents (-5)
- If there is only ONE paragraph, give "0" to the paper

While evaluating the punctuation, please consider this chart below

SVO (,) and SVO.	SVO (,) but SVO.	SVO because SVO.	When SVO, SVO.	After SVO, SVO.	Before SVO, SVO.	If SVO, SVO.	SVO. However, SVO.
SVO and VO. SVO and O.	SVO (,) so SVO.	Because SVO, SVO.	While SVO, SVO.	SVO after SVO.	SVO before SVO.	SVO if SVO.	SVO; however, SVO.

APPENDIX H

INTER RATER RELIABILITY SCORES

	Number	Pearson Correlation Coefficient r
Content	83	.88
Organization	83	.92
Vocabulary	83	.90
Language Use	83	.89
Mechanics	83	.96

APPENDIX I

THE SCORING OF AN EXAMPLE ESSAY

Why English

Have you ever heard about the aphorism which says “to have a second language is to have a second language is to have a second soul.”? People who speak only one language can just communicate with people who speak that language, read books and surf the internet also in that language. On the other hand, people who speak another language, especially English, have the opportunity to create relationships with more people, the thing which is useful for students. From my way of view, all universities should make the preparatory year as a main part of the department to graduate well educated students.

Students should learn English in the preparatory year because it will help them while studying and also after graduation. To begin with, English is the language of the internet. To illustrate, most trustworthy websites are in English. When lecturers ask students to research about a topic they will get the clearest information from those websites. The second point is that English is important for students who are planning to continue studying with a master abroad. Take the European continent. The main language of most universities there is English. Students who had already learnt English will go through that barrier easily. Finally, English is a magical advantage for more job opportunities. For instance, approximately most of companies give the priority for students who speak English to hire them first. Also that might help students to get higher salary. English language is the friend who will rescue students during their life in different situations.

Others claim that students might feel anxious because of the overload number of years they are going to study and feel they are far away from the graduation year and also from the job. They have a point. Most of students want to achieve their goals as soon as possible and start earning money. However, most of students in different countries cannot find job opportunities as soon as they finish university. They might lose at least one year. Instead, students should exploit this year and learn English for standing out from others.

In a nutshell, as time passes English is spreading out to many different sides of the world. In the future it will be used approximately at most universities in the world. If a government wants its country to be in the summit it should make the preparatory year compulsory for all departments.

ESL COMPOSITION PROFILE			
Score	Level	Criteria	Comments
CONTENT	30-27	EXCELLENT TO VERY GOOD: knowledgeable; substantive, thorough development of thesis; relevant to assigned topic	(29) The opinion of the writer is clear, there are three relevant arguments in the first body paragraph, and one counter argument with a substantive refutation sentence in the second body paragraph. The conclusion summarizes the essay adequately, albeit a bit limited.
	26-22	GOOD TO AVERAGE: some knowledge of subject; adequate range; limited development of thesis; mostly relevant to topic, but lacks detail	
	21-17	FAIR TO POOR: limited knowledge of subject; little substance; inadequate development of topic	
	16-13	VERY POOR: does not show knowledge of subject; non substantive; non pertinent OR not enough to evaluate	
ORGANIZATION	20-18	EXCELLENT TO VERY GOOD: fluent expression; ideas clearly stated; supported; succinct; well-organized; logical sequencing; cohesive	(20) The opinion of the writer observed in the thesis statement of the introduction. There are three arguments in the first body paragraph with a logical sequence, and one counter argument with a substantive refutation sentence in the second body paragraph. The conclusion summarizes the essay. The cohesive devices are appropriately used.
	17-14	GOOD TO AVERAGE: somewhat choppy; loosely organized; organized but main ideas stand out; limited support; logical but incomplete sequencing	
	13-10	FAIR TO POOR: non-fluent; ideas confused or disconnected; lacks logical sequencing and development	
	9-7	VERY POOR: does not communicate; no organization; OR not enough to evaluate	
VOCABULARY	20-18	EXCELLENT TO VERY GOOD: sophisticated range; effective word/idiom choice and usage; word form mastery; appropriate register	(16) Occasional errors of word choice are observed (a main part of the department, clearest information, overload number of years, go through the barrier, finish university), but meaning is not obscured. Adequate knowledge of English vocabulary is also observed.
	17-14	GOOD TO AVERAGE: adequate range; occasional errors of word/idiom form, choice, usage <i>but meaning not obscured</i>	
	13-10	FAIR TO POOR: limited range; frequent errors of word/idiom form, choice, usage; <i>meaning confused or obscured</i>	
	9-7	VERY POOR: essentially translation; little knowledge of English vocabulary, idioms, word form OR not enough to evaluate	
LANGUAGE USE	25-22	EXCELLENT TO VERY GOOD: effective complex constructions; few errors of agreement, tense, number, word order/function, articles, pronouns, prepositions	(20) There are effective simple constructions and some attempts to use complex structures (e.g. relative clauses or if clauses). Several errors of number (approximately most of companies, approximately at most universities), tense (past perfect-future), article (student), pronoun (most of student) agreement (student who speak, most of student want, a government want) are witnessed. Meaning is seldom obscured.
	21-18	GOOD TO AVERAGE: effective but simple constructions; minor problems in complex constructions; several errors of agreement; number, tense, word order, articles, pronouns, prepositions <i>but meaning seldom obscured</i>	
	17-11	FAIR TO POOR: major problems in simple/complex constructions; frequent errors of negation, agreement, tense, number, word order/function, articles, pronouns, prepositions and/or fragments, run-ons, deletions; <i>meaning confused or obscured</i>	
	10-5	VERY POOR: virtually no mastery of sentence construction rules; text dominated by errors; does not communicate; OR not enough to evaluate	
MECHANICS	5	EXCELLENT TO VERY GOOD: demonstrates mastery conventions; few errors of spelling, punctuation, capitalization, paragraphing	(2) 16 spelling (aphorism, communicat, withe, anothere, creat, well educated, studing, trustworthy, clearest, planing, continet, easliy, e, megical, mots, sines), 2 capitalization (students, instead) and 3 punctuation (also, in the future, summit) errors were detected. The errors in mechanics made the reading of the essay very difficult.
	4	GOOD TO AVERAGE: occasional errors of spelling, punctuation, capitalization, paragraphing <i>but meaning not obscured</i>	
	3	FAIR TO POOR: frequent errors of spelling, punctuation, capitalization, paragraphing; <i>meaning confused or obscured</i>	
	2	VERY POOR: no mastery of conventions; dominated by errors of spelling, punctuation, capitalization, paragraphing OR not enough to evaluate	
Total score	Reader	Comments	

APPENDIX J

PRE-SURVEY FOR ALL GROUPS

The Perceptions of IMU Prep Students on (Pre)Writing

Dear Students,

Thank you for participation in this research.

In order to better understand the importance of prewriting for EFL classes, we would like you to answer the following question based on your views, perceptions, and experience of the writing activities used throughout the periods. You are expected to put forward your views frankly. Do not forget that your answers will be used merely for research purposes and will not affect your grades in any way. Your answers will also remain anonymous to everyone.

1. Please select how much you spend on each writing task.

	0 minute (none)	1-10 minutes	11-20 minutes	21-44 minutes	45 minutes	46-60 minutes	61-90 minutes	91+ minutes
Prewriting Activities								
First Draft								
Second Draft								

APPENDIX K

POST-SURVEY FOR CONTROL GROUP

The Perceptions of IMU Prep Students on (Pre)Writing

Dear Students,

Thank you for participation in this research.

In order to better understand the importance of prewriting for EFL classes, we would like you to answer the following questions based on your views, perceptions, and experience of the writing activities used throughout the periods. You are expected to put forward your views frankly. Do not forget that your answers will be used merely for research purposes and will not affect your grades in any way. Your answers will also remain anonymous to everyone.

1. Your Name and Surname _____

2. Your Birthday (DD/MM/YYYY) ____/____/____

3. Please select how much you spend on each writing task.

	0 minute (none)	1-10 minutes	11-20 minutes	21-44 minutes	45 minutes	46-60 minutes	61-90 minutes	91+ minutes
Prewriting Activities								
First Draft								
Second Draft								

4. Please select the importance level of each stage.

	not important at all	of little importance	of average importance	very important	absolutely essential
Prewriting Activities					
First Draft					
Second Draft					

5. Please select the level of satisfaction for the provided planning time.

	very dissatisfied	dissatisfied	unsure	satisfied	very satisfied
Opinion Essay					
Compare & Contrast Essay					
Cause & Effect Essay					

APPENDIX L

POST-SURVEY FOR EXPERIMENTAL GROUPS

The Perceptions of IMU Prep Students on (Pre)Writing

Dear Students,

Thank you for participation in this research.

In order to better understand the importance of prewriting for EFL classes, we would like you to answer the following questions based on your views, perceptions, and experience of the writing activities used throughout the periods. You are expected to put forward your views frankly. Do not forget that your answers will be used merely for research purposes and will not affect your grades in any way. Your answers will also remain anonymous to everyone.

1. Your Name and Surname _____

2. Your Birthday (DD/MM/YYYY) ____ / ____ / ____

3. Please select how much you spend on each writing task.

	0 minute (none)	1-10 minutes	11-20 minutes	21-44 minutes	45 minutes	46-60 minutes	61-90 minutes	91+ minutes
Prewriting Activities								
First Draft								
Second Draft								

4. Please select the importance level of each stage.

	not important at all	of little importance	of average importance	very important	absolutely essential
Prewriting Activities					
First Draft					
Second Draft					

5. Please select the level of satisfaction for the provided planning time.

	very dissatisfied	dissatisfied	unsure	satisfied	very satisfied
Opinion Essay					
Compare & Contrast Essay					
Cause & Effect Essay					

6. How did you complete the online planning activities?

- individual (by myself)
- in pairs (with one of my friend)

7. If you were given an option, how would you complete online planning activities?

- individual (by myself)
- in pairs (with one of my friend)

APPENDIX M

WRITING PROMPTS AND EXPERT SKELETON MAPS FOR INDIVIDUAL GROUPS

Task 1: Opinion essays

Ind Opinion Essay - prep

📅 Apr 21, 2018

[See how assignments work](#)

Access code
uMksM

People often talk about English as a global language or lingua franca. As part of the education system, some schools find learning English as a must and require a level of proficiency while other schools offer the English language with elective courses. Write an essay in which you agree or disagree with the following topic:

- **Preparatory schools should be compulsory for university students.**

Why should prep classes be compulsory?

Why don't we need mandatory prep classes?

Tips & tricks for your mind map:

- use short words and phrases
- use a lot of images (your computer, the internet or Mindomo's gallery) and videos (YouTube, Vimeo)
- complete the given topics in line with your opinion. Add branches for more ideas and examples.
- you can use icons from the Mindomo gallery.



Ind Opinion Essay - prep

Each student will use this mind map as a starting point to develop his own map ⓘ

[Edit Map](#)

Ind Opinion Essay - sport

📅 Apr 21, 2018

[See how assignments work](#)

Access code
sCfir

Many schools offer participation in sports as part of the curriculum. However, other schools do not. They claim that their job is to teach skills such as reading and math. Write an essay in which you agree or disagree with the following topic:

- **Learning to play sport teaches valuable life skills.**

What are the benefits of learning to play sports at school?

What are the disadvantages of learning to play sports at school?

Tips & tricks for your mind map:

- use short words and phrases
- use a lot of images (your computer, the internet or Mindomo's gallery) and videos (YouTube, Vimeo)
- complete the given topics in line with your opinion. Add branches for more ideas and examples.
- you can use icons from the Mindomo gallery.



Ind Opinion Essay - sport

Each student will use this mind map as a starting point to develop his own map ⓘ

[Edit Map](#)

Task 2: Compare and/or contrast essays

Ind Compare&Contrast Essay sports

May 05, 2018

[See how assignments work](#)

Access code

aaGaW

According to Australian Sports Commission, sports is defined as a human activity capable of achieving a result requiring physical exertion and/or physical skill, which, by its nature and organization, is competitive. There are distinct categories related to sports such as indoor and outdoor, team and individual etc.

- **What are the major similarities between individual sports, like tennis or swimming, and team sports, like football and basketball?**
- **What are the major differences between individual sports, like tennis or swimming, and team sports, like football and basketball?**

Tips & tricks for your mind map:

- Use short words and phrases.
- Use images (your computer, the internet or Mindomo's gallery), videos (YouTube, Vimeo) or icons from Mindomo gallery
- Complete the given topics in line with your ideas. Write as many examples & anecdotes as you can.



Ind Compare & Contrast sports

Each student will use this mind map as a starting point to develop his own map

[Edit Map](#)

Ind Compare & Contrast Essay art&science

May 05, 2018

[See how assignments work](#)

Access code

aZcnB

It is generally agreed that society benefits from the work of its members. **Compare the contributions of artists to society with the contributions of scientists to society.** Which type of contribution do you think is valued more by your society?"

- **What are the similar contributions of both scientists and artists?**
- **What are the different contributions of scientists and artists?**

Tips & tricks for your mind map:

- Use short words and phrases.
- Use images (your computer, the internet or Mindomo's gallery), videos (YouTube, Vimeo) or icons from Mindomo gallery
- Complete the given topics in line with your ideas. Write as many examples & anecdotes as you can.



Ind Compare & Contrast art&sci

Each student will use this mind map as a starting point to develop his own map

[Edit Map](#)

Task 3: Cause and effect essays

Ind Cause & Effect Essay eating

May 19, 2018

[See how assignments work](#)

Access code

bejvc

A basic definition of overeating is, simply put, excessive eating—consuming more calories than necessary and generally consuming in large portions that cause a person to feel uncomfortably full.

In this assignment, you are supposed to write causes and effects of overeating.

You can watch these videos for further info:

'The Causes of Binge Eating':

<https://www.youtube.com/watch?v=nJhq4YU9Kcc>

'Why do I overeat?':

<https://www.youtube.com/watch?v=qxiFzgBDuQw&t=219s>

'17 effects of overeating':

<https://www.youtube.com/watch?v=dBHOpQnhDz4&t=53s>

- What causes & results in overeating?
- What are the consequences of & the results of & the effects of overeating?

Tips & tricks for your mind map:

- Use short words and phrases.
- Use images (your computer, the internet or Mindomo's gallery), videos (YouTube, Vimeo) or icons from Mindomo gallery.
- Complete the given topics in line with your ideas. Write as many examples & anecdotes as you can.



Ind Cause Effect eating

Each student will use this mind map as a starting point to develop his own map

[Edit Map](#)

Ind Cause & Effect city

May 19, 2018

[See how assignments work](#)

Access code

URaW7

Overpopulation is defined as the condition of having a population so dense as to cause environmental deterioration, an impaired quality of life, or a population crash.

In this assignment, you are supposed to write causes and effects of overpopulation.

You can watch these videos for further info:

Overpopulation – The Human Explosion Explained

<https://www.youtube.com/watch?v=QsBT5EQt348>

Overpopulation: Will we run out of space?

<https://www.youtube.com/watch?v=VUTP93qWV7I>

- What causes & results in overpopulation?
- What are the consequences of & the results of & the effects of overpopulation?

Tips & tricks for your mind map:

- Use short words and phrases.
- Use images (your computer, the internet or Mindomo's gallery), videos (YouTube, Vimeo) or icons from Mindomo gallery.
- Complete the given topics in line with your ideas. Write as many examples & anecdotes as you can.



Ind Cause Effect city

Each student will use this mind map as a starting point to develop his own map

[Edit Map](#)

APPENDIX N

WRITING PROMPTS AND EXPERT SKELETON MAPS FOR COLLABORATIVE GROUPS

Task 1: Opinion essays

Col Opinion Essay - prep

📅 Apr 21, 2018

[See how assignments work](#)

Access code

W3gdE

People often talk about English as a global language or lingua franca. As part of the education system, some schools find learning English as a must and require a level of proficiency while other schools offer the English language with elective courses. Write an essay in which you agree or disagree with the following topic:

- **Preparatory schools should be compulsory for university students.**

Why should prep classes be compulsory?

Why don't we need mandatory prep classes?

Tips & tricks for your mind map:

- use short words and phrases
- use a lot of images (your computer, the internet or Mindomo's gallery) and videos (YouTube, Vimeo)
- complete the given topics in line with your opinion. Add branches for more ideas and examples.
- you can use icons from the Mindomo gallery.



Col Opinion Essay - prep

Students will work collaboratively in groups of 2 to create a new map using this map as a starting point

[Edit Map](#)

Col Opinion Essay - sport

📅 Apr 21, 2018

[See how assignments work](#)

Access code

2FV2e

Many schools offer participation in sports as part of the curriculum. However, other schools do not. They claim that their job is to teach skills such as reading and math. Write an essay in which you agree or disagree with the following topic:

- **Learning to play sport teaches valuable life skills.**

What are the benefits of learning to play sports at school?

What are the disadvantages of learning to play sports at school?

Tips & tricks for your mind map:

- use short words and phrases
- use a lot of images (your computer, the internet or Mindomo's gallery) and videos (YouTube, Vimeo)
- complete the given topics in line with your opinion. Add branches for more ideas and examples.
- you can use icons from the Mindomo gallery.



Col Opinion Essay - sport

Students will work collaboratively in groups of 2 to create a new map using this map as a starting point

[Edit Map](#)

Task 2: Compare and/or contrast essays

Col Compare&Contrast Essay sports

May 05, 2018

[See how assignments work](#)

Access code

XigfY

According to Australian Sports Commission, sports is defined as a human activity capable of achieving a result requiring physical exertion and/or physical skill, which, by its nature and organization, is competitive. There are distinct categories related to sports such as indoor and outdoor, team and individual etc.

- What are the major **similarities** between individual sports, like tennis or swimming, and team sports, like football and basketball?
- What are the major **differences** between individual sports, like tennis or swimming, and team sports, like football and basketball?

Tips & tricks for your mind map:

- Use short words and phrases.
- Use images (your computer, the internet or Mindomo's gallery), videos (YouTube, Vimeo) or icons from Mindomo gallery
- Complete the given topics in line with your ideas. Write as many examples & anecdotes as you can.



Col Compare & Contrast sports

Students will work collaboratively in groups of 2 to create a new map using this map as a starting point

[Edit Map](#)

Col Compare & Contrast Essay art&science

May 05, 2018

[See how assignments work](#)

Access code

EaqBX

"It is generally agreed that society benefits from the work of its members. **Compare the contributions of artists to society with the contributions of scientists to society.** Which type of contribution do you think is valued more by your society?"

- What are the similar contributions of both scientists and artists?
- What are the different contributions of scientists and artists?

Tips & tricks for your mind map:

- Use short words and phrases.
- Use images (your computer, the internet or Mindomo's gallery), videos (YouTube, Vimeo) or icons from Mindomo gallery
- Complete the given topics in line with your ideas. Write as many examples & anecdotes as you can.



Col Compare & Contrast art&sci

Students will work collaboratively in groups of 2 to create a new map using this map as a starting point

[Edit Map](#)

Task 3: Cause and effect essays

Col Cause & Effect Essay eating

May 19, 2018

[See how assignments work](#)

Access code

J6eaW

A basic definition of overeating is, simply put, excessive eating—consuming more calories than necessary and generally consuming in large portions that cause a person to feel uncomfortably full.

In this assignment, you are supposed to write causes and effects of overeating.

You can watch these videos for further info:

The Causes of Binge Eating:

<https://www.youtube.com/watch?v=nJhq4YU9Xcc>

Why do I overeat?:

<https://www.youtube.com/watch?v=qxIFag8DuQw&t=219s>

17 effects of overeating:

<https://www.youtube.com/watch?v=d8HOpQnhDz4&t=53s>

- What causes & results in overeating?
- What are the consequences of & the results of & the effects of overeating?

Tips & tricks for your mind map:

- Use short words and phrases.
- Use images (your computer, the internet or Mindomo's gallery), videos (YouTube, Vimeo) or icons from Mindomo gallery
- Complete the given topics in line with your ideas. Write as many examples & anecdotes as you can.



Col Cause Effect eating

Students will work collaboratively in groups of 2 to create a new map using this map as a starting point

[Edit Map](#)

Col Cause & Effect city

May 19, 2018

[See how assignments work](#)

Access code

XhwXW

Overpopulation is defined as the condition of having a population so dense as to cause environmental deterioration, an impaired quality of life, or a population crash.

In this assignment, you are supposed to write causes and effects of overpopulation.

You can watch these videos for further info:

Overpopulation – The Human Explosion Explained

<https://www.youtube.com/watch?v=QsBT5EQ348>

Overpopulation: Will we run out of space?

<https://www.youtube.com/watch?v=VUTP93qWV7I>

- What causes & results in overpopulation?
- What are the consequences of & the results of & the effects of overpopulation?

Tips & tricks for your mind map:

- Use short words and phrases.
- Use images (your computer, the internet or Mindomo's gallery), videos (YouTube, Vimeo) or icons from Mindomo gallery
- Complete the given topics in line with your ideas. Write as many examples & anecdotes as you can.



Col Cause Effect city

Students will work collaboratively in groups of 2 to create a new map using this map as a starting point

[Edit Map](#)

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