THE PEOPLE'S DEMOCRATIC REPUBLIC OF ALGERIA
MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH
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Enhancing EFL Students' Writing Skill through Mind Mapping Strategy.

Case Study: Bachelor Science Learners, HCS Private School, El Kseur

A dissertation submitted in partial fulfilment
of the requirements for a **Master's degree in Linguistics**

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Academic Year: 2018 / 2019

Dedication 1

*With **ALLAH**'s help we have achieved this work, which I dedicate:*

*To The pillars of my life; my sympathetic **mother and** to the best person in my*

*life **my father** for their love, help, support and moral assistance during my*

Studies and my life.

*To my dear brother: **Mokrane** and his wife **Naima** and to my dear sisters: **Sihem***

*and her husband **Ahcen, Akila** and her husband **Nadir** who always believed in*

me and pushed me forward and helped me in all possible ways.

To my grand-mothers, my ants, my uncles and my cousins.

Without forgetting my friends.

Kenza

Dedication 2

I thank almighty god all praise to him for helping us toachieve this work.

I dedicate this work:

The candles of my life; **my mother** *and* **my father** *for their love, support,*

encourages, advices and the trust they made on me and my capacities.

To my dear brothers: **Lyes, Abd Elghani and Ahmed**

To the members of my family; my grandparents, my uncles, my aunts and my

dear cousins who helped me in a way or in another.

Best wishes to all my friends.

Selma

Acknowledgements

Abstract

Most of students consider writing as a hard task because they face difficulties in getting started and in organizing their ideas. The present research strives at exploring the relationship between mind mapping and students' writing skill. This study aims at investigating the effect of mind mapping as a pre-writing strategy on enhancing EFL students' writing skill.To achieve the research aim, a pre-experimental study was conducted. To test our hypothesis, we used a pre-experiment study based on both quantitative method (pre-posttest, pre-post questionnaire) and qualitative method (textual analysis) of data collection. The participants were 18 bachelor science students in High courses private school. The results obtained confirm our hypothesisthat is; the participants have improved their writing skill.

Key words: Writing Skill, Mind Mapping, Bachelor Science Learners, EFL

Table of the Contents

General Introduction

Chapter One/ an Overview about Writing Skill and Mind Mapping

Section One: Writing Skill

Section two: An Overview about mind mapping

Chapter two: Practical Chapter

List of Abbreviations

EFL: English Foreign Language.

HCS: High Courses School

List of tables

List of Figures and Graphs

General Introduction

Introduction

The writing skill is one of the essential skills in teaching and learning English as a foreign language. In this sense, Suleiman, (2000, p. 155 in Abedin et al, 2013) states that "writing is a central element of language". During the learning process, learners do not only focus on being a good writer but also to understand what a good writer is. As it was claimed by Joseph Defazio et al (2010, p .1), "there is a significant need for students at all levels not only to be a good writer communicator but also to understand the importance of good writing skill".

Moreover, Mayers (2005, p. 2 in Al Kamli, 2018) states that "writing is also an action a process of discovering and organizing your ideas, putting them on paper and reshaping and revising them. It means that writing can be used to express ideas or thoughts on a paper". Accordingly, it is a form of communication that allows students to put their feelings and ideas on paper, to organize their knowledge and beliefs into convincing arguments, and to convey meaning through structured written texts. So, as students learn the steps of writing and as they build new skills upon oldknowledge, writing develops from the first simple sentences to elaborate stories and essays.

I.   Statement of the Problem

Writing is a skill that cannot be neglected in the EFL classroom because of its high importance. Furthermore, Alkamli (2019, p.1) asserts that "along with reading and understanding, writing is an indispensable part of the acquisition of a foreign language."

Despite the importance of writing, it is considered by teachers and learners as a hard and difficult skill to be taught and learned. In this sense, Nick et all. (2010, p .8 in Fareed et al, 2016) claim that "it is widely recognized that writing is one of the most challenging skills for students to master". Besides, Nunan, (1989, p .36) points out that "writing is an extremely complex, cognitive skill for everyone because in this activity, the writer has to show control

of some variables simultaneously". Hence, writing is generally viewed as a hard skill and the majority of EFL learners face difficulties in writing. Based on our prior data, these difficulties lie in getting started and in organizing their thoughts. We observed that when collecting information about a particular topic, learners do not know how to classify and organize them in their drafts and how to transform them into a paragraph. Various techniques are used by both teachers and learners to support and develop the writing skill. As the results showed that most of students have difficulties to get started, we assume pre-writing strategies to be a key to overcome these difficulties. For this, we suggest the implementation of mind mapping strategy in the classroom to help learners develop their writing skill. De porter et all. (1999, p. 175 in Khudhair, 2016) states that "mind mapping is a creative note taking method, which eases us to remember information". This means that this strategy helps learners in the memorization of ideas.

Mind mapping can serve as a useful tool that helps learners to better plan and classify their ideas and thoughts; it also helps them understand the importance of concepts in books and conferences. Therefore, McGriff (2000, p. 9 cited in Naqbi, 2008) stated that "mind map is an excellent way to help learners organize knowledge, empower themselves to better comprehend the key concepts, and principals in lectures, reading or other instructional materials".

Thus, the main issue of our research is investigating the effect of mind mapping as one of the pre-writing strategies as a remedy for learners' difficulties and to enhance EFL learners writing skill.

II.   Research Questions

To carry out this study, the following research questions are addressed:

1)Does mind mapping play a causal role in helping EFL students to improve their writing skill?

2)How can mind mapping improve EFL students' writing skill?

3)What are students' attitudes toward the mind mapping strategy?

III. Research Hypothesis

Writing is considered by learners as a difficult skill; one of the reasons is that they fail in organizing their thoughts before starting a piece of writing. As Bukhari (2016, p.60)states "the development of writing requires the organization of thoughts to flow from a smaller idea to a bigger concept related to a topic". Hence, students' writing difficulties may be related to the lack of use of prewriting strategies. Accordingly, we propose mind mapping as a prewriting strategy in order to remedy to these difficulties and develop students' writing skill. For this, we hypothesis that:

"If EFL learners use mind mapping strategy before writing, they would improve their writing skill".

IV. Aim of the Study

The objective of the present work is to investigate the mind mapping strategy to improve students' writing skill. Mind map is a scheme used to organize information; it shows relationships among pieces of the whole. It is often created around a single concept, drawn as an image in the center of a blank page, to which are associated representations of ideas such as images, words and so on. Major ideas are connected directly to the central concept.

According to Buzan (1993 in Al Kamli, 2018), mind mapping process begins with writing the theme at the center of the graphic. the important ideas and phrases are all around and linked to the center topic on branches which can continue to branch into other ideas and phrases.

V.   Significance of the Study

Prewriting strategies help learners to succeed in developing their writing skill. In this sense, Chastain (1988, p .255 in Khudhair, 2016) asserts that "the teacher's role during the prewriting phase is to get students recall related information and skills from their past, activate their imagination beyond their own experience, and motivate students through using many effective techniques". Prewriting strategies are needed in the EFL classroom in order to help the learners plan their ideas and express themselves logically in an organized way. Therefore, the significance of our study lies in implementing mind mapping as one of the prewriting strategies to help learners to get started and to deal with the difficulties they find in writing skill.

Accordingly, the central aim of our research is to implement mind mapping as one of the pre- writing strategies to improve EFL students' writing skill.

VI.   Literature Review

Writing is a tool to express ideas, thoughts, feelings in a linear way. In this sense Clearly et all. (1993 cited in Bukhari, 2016, p. 58) states that "writing is a disciplined way of producing meaning and an effective method to display one's own thoughts".

Besides to produce a structured writing piece student pass through writing stages which are planning, drafting, editing and final draft. These stages are used by students toachieve a final product. As it was sustained by Harmer (2007, p. 4), "writing is a processthat is, the stages the writer undergoes to write something in its final form… This process has four main elements which are planning, drafting, editing and final draft."

The focus of our investigation is implementing a prewriting strategy in the classroom to develop EFL learners' writing skill and to help them deal with their writing difficulties. We

suggest mind mapping which is a strategy that can be used by the students in the prewriting phase to plan, organize, associate and connect their ideas. Accordingly, Roebuck (2012, p. 164 in Khudhair, 2016) states that "mind maps provide an effective study technique when applied to written material".

Moreover, Al- Jafr 2011 (cited in Vittuli et al. 2016 p. 4) claims that "mind mapping can represent thoughts, generate ideas, take notes, organize thinking, prioritize thoughts, integrate materials, teach vocabulary, aid memory, improve spelling, enhance writing, and develop conceptual understanding". Consequently, mind mapping helps students to express their thinking in a recursive way. In addition, it is a supportive technique in teaching and learning which allows students to develop their writing process since it is used as a pre-writing strategy.

VII. Methodology

VII.1. Data Collection Method

Our research paper includes two variables, the first one is the writing skill which is the dependent variable; the second one is mind mapping the independent variable.

In order to test our hypothesis, we relied on a pre-experiment design and a mixed methodology which consists of both quantitative and qualitative methods of data collection. The quantitative method consists of including preand post-tests (paragraphs) with an experimental group, and pre and post questionnaires. The qualitative method consists of textual analysis.

VII.2. Data Analysis Tools

After gathering data, they are analyzed using Excel 2007 and comparative method which provides us with results that we need to interpret our findings.

VII.3. Population and Sample

The population of our study is the bachelor science students at HCS private school of language and training at El-kseur. The number of groups is 3 with a total number of 54 students. The administration of the school gave us a choice between a group of science bachelor students or a group of second year students of secondary school. We have selected science bachelor students because they are at the beginning level of writing paragraphs. The syllabus of the third-year secondary school level sets the main objective of learning English at this level:

> Dans une situation de communication, et sur la base d'un support oral ou écrit, l'élève doit produire un message écrit d'une vingtaine de lignes, dans un type de discours écrit choisi (descriptif, narratif, argumentatif, expositif, injonctif). Correctement et lisiblement (Algerian syllabus, 2007, p. 9).

Accordingly, bachelor students should be able to produce a correct and legible written message (paragraph) of twenty lines in a kind of written discourse of their choice such as descriptive, narrative, argumentative, expository, injunctive. Our study focuses on identifying the effectiveness of mind mapping strategy on learners' writing skill especially that bachelor science students face manydifficulties since they are in the beginning of writing.

VIII.   Structure of the Study

Our study is divided into two chapters in addition to a general introduction and a general conclusion. The first istheoretical;it introduces general background overview; it is divided into two sections. In the first section, we dealt with EFL writing. In the second section, we presented the main theoretical background about the mind mapping strategy.

The second chapter covers the practical study. It includes the research methodology, the findings, results, and discussion. Finally, it ends with limitations of the study, implications and suggestions for further research.

Chapter One/ an Overview about Writing Skill and Mind Mapping

Introduction

This research work aims at shedding light on the effect of mind mapping on enhancing EFL students' writing skill. Two main variables are discussed: the writing skill as a dependent variable and mind mapping as an independent variable. Understanding these variables and the factors that have explicit or implicit impact on them is crucial. So, this chapter aims at developing a theoretical basis of these variables. The chapter is divided into two sections: the writing skill section and the mind mapping strategy section.

Section One: Writing Skill

This section covers an overview about the writing skill. It deals with some definitions of the writing skill, approaches to teaching writing, steps in teaching writing, and EFL learners' writing difficulties.

I.   Definition of the Writing Skill

Various definitions of the writing skill are found in the literature. Accordingly, Albesher, et.al, (2012, p. 192) claimed that:

> Writing, as one of the important means for communication, is very important in English language learning particularly in academic scenario in the universities. EFL learners in different parts of the world need to be trained to write well so as to be able to communicate with English speaking people and to cope with their academic requirements.

So, writing is a key skill that opens the door to the students to be able to communicate with other foreign language speakers easily.

Writing is viewed as a complicated task, because the writer has to control the content and the form of the sentence to achieve a coherent and a cohesive piece of writing.

writing is a complex cognitive activity in which the writer is demanded to demonstrate control of a number of variables simultaneously at the sentence level including control of content, spelling, and letter, formation, and beyond the sentence structure and integrate information into cohesive and coherent paragraph and text(Bell & Burnbay cited in Nunan, 1989, p. 36).

In addition, Rivers (1968 in Sapkota, 2012) asserted that the main goal of the writer in the writing step is to have the capacity to improve and express himself in a polite language. He seeks the use of his own vocabulary, since writing means the exposition of thoughts in a linear manner to control and order the language. In other words, the learners use the writing skill in order to express their ideas and feelings in a written form using their personal vocabulary andrespecting the chronological order and the connection of ideas.

Writing is more than acquisition of copying language into linear signs; it is a matter of reflection as it is stated by White and Arndt (1991, p. 3 in Sapkota, 2012),"writing is far from being a simple matter of transcribing language into written symbols: it is a thinking process in its own right. It is a permanent record, as a form of expression and as a means of communication". Hence, writing is not only a matter of joining utterances and sentences, but it is a matter of reflection which includes several steps.It appears frequently and involves the learners' ability to create new ideas. That is to say, when writing, the learners do not have to focus on the form but they have to focus more on the content to develop their creativity.

II.   The Importance of Teaching and Learning Writing

Writing is a crucial skill to be learned for students of English as a foreign language. In line with this view, Harmer (2001) provides four reasons behind teaching writing. The first reason is that teaching writing works as an encouragement because learners consider it helpful to write down sentences using a new language. Second, it helps the learners to enrich and improve their language. Third, through teaching writing, teachers can notice learners' learning style. Fourth, writing is an important skill as reading, speaking, and listening skills. So,

writing equally with other skills, has a significant function in reinforcing and developing student's language by identifying their language level. This is used in several fields of life and it is considered as a complicated and difficult task.

III. Approaches to Teaching Writing

The teaching of writing is based on various approaches that emerged through time, each attempts to explain writing for better teaching and learning. According to Raimes (1993 in Albesher, 2012), there are three main approaches to writing: the product approach that is interested in the form, the process approach that focuses on the writer, and the genre approach that looks at the reader.

III.1. The Product Approach

Young (1978 in Albesher, 2012, p. 11) defined the product approach to writing as "the emphasis on the composed product rather than the composing process; the analysis of discourse into words, sentences, and paragraphs; the strong concern with usage (syntax, spelling, punctuation) and with style (economy, clarity, emphasis); and so on".The product approach focuses on the final product; this also includes correct grammar, vocabulary, punctuation, etc. In this sense, Nunan (1989) stated that the product approach to writing emphasizes the form and the grammatical accuracy of the act of composition.

Besides, Al-Hazmi (2006 in Al-Mahrooqi, 2014, p. 78) stated that "the product approach has traditionally dominated writing in the language classrooms of the Arab world".

Hence, the emphasis in classroom will be on the transcription, imitation, and implementation of the sentence enlargement from key words and involving sentences and

paragraphs from a variety of models. The most common features of the product approach are that it focuses on the composed product; it takes into consideration the form and the grammatical accuracy.

Teaching and learning writing process employing the product approach covers four main phases. *Familization* in which the teachers control their students by giving them exercises about what they have learned before. In this sense, Picas (1982, p.78 in Badger and White, 2000) stated that "familiarization means preparing students for actual writing by demonstrating one or other of the skills that are to be practiced". *Controlled writing* and *Guided writing* steps: the students write a text which is similar to the one presented by the teacher; in the *free writing* stage, the students write on their own another text similar to the one of their teachers (Badger and White, 2000).

Therefore, As Silva (1990 cited in Yi, 2009) affirmed the approach, however, has been the subject of much criticism because it does not encourage the thought of writers and does not develop their critical thinking and creativity because it does not describe properly the different processes implicated in writing.

III.2. The Process Approach

The rejection of the product approach gave birth to the process paradigm (Kelly & Graham, 1998; Nunan, 1989; Leki, 1991). The process approach was introduced in the mid-1960's. It is concerned with linguistic writing skills such as: planning, revising, drafting and editing, rather than linguistic writing knowledge such as structure and mechanics (Badger & White, 2000). It concentrates on teaching writing through a process of cyclical stages (Belinda, 2006 cited in Albesher, 2012).

Chapter One/ an Overview about Writing Skill and Mind Mapping

Furthermore, Badger and White (2000, p. 154) asserted that "writing in process approaches is seen as predominantly to do with linguistic skills, such as planning and drafting, and there is much less emphasis on linguistic knowledge, such as knowledge about grammar and text structure". That is to say, the process approach emphasizes on the linguistic competence which involves several stages (prewriting, drafting, revising and editing).

Besides, Hyland (2003 in Al-Mahrooqi, 2014) affirmed that "process approaches have served to instill greater respect for individual writers and for the writing process itself" (p. 17). Accordingly, the process approach gives more importance and regard tothe writerand the writing process.

Wen (2013 in Al-Mahrooqi,2014), unlike the product approach, the process approach considers writing as a nonlinear process that reinforces the learners' ability to create. The process approach to writing is believed to implicate the minds of the students and guarantee their positive feelings.

In addition, Al-Mahrooqi (2014) stated that by focusing on the process approach of writing, the learners are promoted to find meaning in their work, and take into consideration the content rather than the form. In other words, the learners focus on how writing progresses rather than the final product. Hence,writing is a recursive process rather than a systematic process. Nunan (1989) argued that:

> Those who advocate a process approach to writing see the act of composition from a very different perspective, focusing as much on the means whereby the completed text was created as on the end product itself. In order to find out more about how writers arrive at their final product, researchers' studied writers as they went about their work (p.36).

Moreover, Belinda (2006, in Albesher, 2012) asserted that in order to write freely and form a product of good quality, the students have to learn writing through its four stages : *pre-*

writing, is the basic stage of writing because in this phase the learners have to generate thoughts and ideas which should be coherent and cohesive (Bukhari, 2016);*composing* is producing words on a paper that correspond to the work plan;*revising* is re-seeing the text with the goal of making large change;*editing* is emphasizing on sentence-level such as punctuation, spelling, etc. the following figure summarizes the steps:

Pre-writing
(Specifying the task/planning and outlining/collecting data/making notes)

↓

Composing

↓

Revising
(recognizing/shifting emphasis/focusing on information and styles for your readership)

↓

Editing
(checking grammar/lexis/surface features: for example, punctuation, spelling, layout, quotation conventions, references)
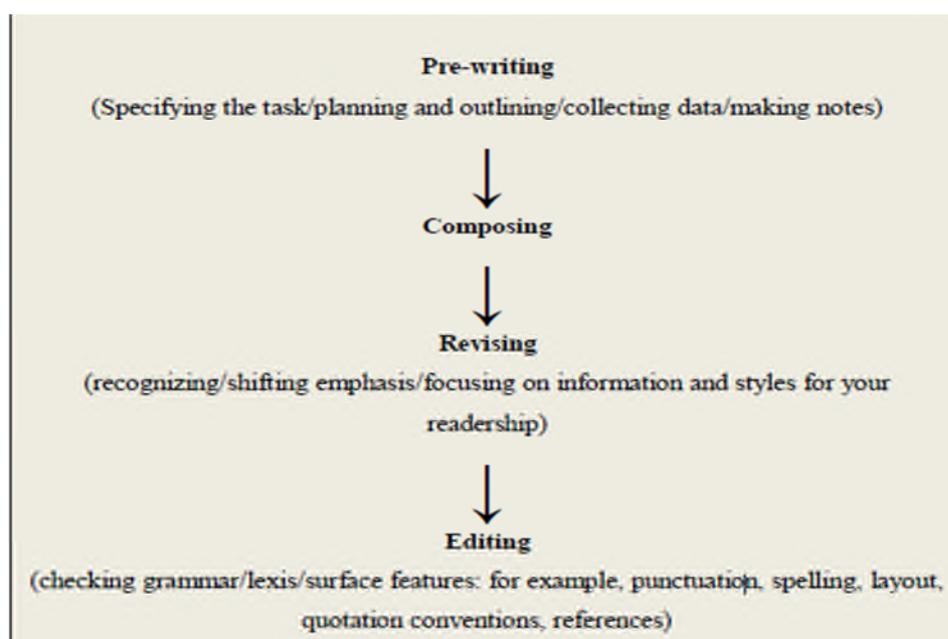
Figure (1) Stages of the process approach to writing (Albesher, 2012, p. 17).

Tribble (2003) asserted that even if the process approach to writing has positive advantages for the writer, however, it does not consider and give importance to the reader, and this is not useful for the readers who want to obtain new information from a text.

III.2.1. Steps in Teaching Writing

III.2.1.1.Pre-writing

Prewriting, as the name indicates, happens before writing. Alodwanet.al, (2014, p. 147) stated that "the pre- writing stage, or the planning stage, aims at preparing students to write

and generate ideas". It is considered as an essential step in the writing process. The writer plans what is going to be written, brainstorms and gathers information. Moreover, Brown (1989, p. 7) listed some prewriting steps:

1. *Write them down very quickly. They don't have to be in English.*
2. *Don't worry about how useful they will be.*
3. *Don't worry about neatness and correctness.*
4. *Give yourself a time limit (say two minutes).*
5. *Write as much as you possibly can on a topic.*
6. *Write whatever comes into your head.*
7. *It doesn't matter if it doesn't all makes sense. Keep writing until the time is up.*
8. *In this step, students are not required to write correctly and perfectly but just putting their general thoughts on papers.*

As a consequence, the prewriting phase begins by finding ideas and writing them down using any language comes to mind; fleshing out these ideas; selecting and choosing which ones are more suitable to use.

III.2.1.2. Drafting

In this stage, writers transform their ideas into written words. Brown (1989) claimed that the drafting stage is when the process of writing is started; the most important thing in this stage is to transform our thoughts and ideas into a written form. Spelling, grammar and punctuation are neglected in this process, it means that the writer does not have to pay attention to them. In this unit, the purpose is to write a first draft.

Drafting is a method used in the writing process to reveal, innovate and motivate student's opinion. Moreover, during this period, writers must decide which type of writing to perform (narrative, descriptive, expository or argumentative). Hence, it takes more time than other step

III.2.1.3 Revising

The revising stage is where the writers check the coherence and cohesion of their ideas and mistakes. Brown (1989) claimed that reviewing stepmay takes place in or after the drafting phase. He stated that:

1)   Revising is the most important stage in the writing process It involves checking that your content and purpose are clear and appropriate for your reader, in the particular writing situation.
2)   It is not just a matter of checking spelling, punctuation and grammar.
3)   It   involves arranging, changing, adding, leaving out words, and so on.
4)   It is a constructive part of the writing process and it is important that you see it in this way. You should give it some time and attention in all your writing, in a quick note to a friend you may not worry too much about punctuation, but you do want to make sure your message is clear. (1989, p. 20)

Accordingly, reviewing is re-reading and reconsidering what has been written at the level of ideas and structure (form and meaning).In other words, in the revision stage main changes take place. Many information may be added or omitted; the focus of the piece may change, and supporting ideas may be detailed more or even added or removed completely. Revising is more than just focusing on the spelling mistakes. This stage is often a good opportunity for writers to check their work and get a second opinion on it.

III.2.1.4. Editing

Hariss & Cury (2003, in Albesher, 2012) asserted that editing is the final phase in the process of writing. This phase focuses on the linguistic accuracy such as: grammar, spelling and punctuation. Thus, the writer has to achieve a good piece of writing without mistakes. Moreover, the editing phase encompasses checking references and formatting students' writing. In this sense, Muncie (2000, p.51 in Sheir, ND) defines editing as "putting the piece of writing into its final form".

III.3.The Genre Approach

Chapter One/ an Overview about Writing Skill and Mind Mapping

Many experts tried to define and present the concept of genre. According to Hyland (2007, p.4 in Rudi Hartono, 2012), "genre is a term for grouping texts together, representing how writers typically use language to respond recurring situations". That is to say, the word " genre "refers to a group of texts that outlines the way in which the writer generally employs the language in react to repeated situations.

Thoreau (2006 in Dirgeyasa, 2016) stated that genre in writing is a type of writing which includes three important aspects: *writing style*, refers to the utterances that are used to write down a statement for example, and the manner in which the ideas and information are ordered, planned and organized. *The specific audience*, and *the goal* refers to the reasons of writing. The genre approach focuses on the writing manner, the purpose, and the readers.

In addition, Hyland (2003 cited in Dirgeyasa, 2016) announced that the goal of the genre approach is not only topermit the writer just to write, but also toencourage him to write down following a certain objective. For instance, how to communicate and denounce about something, how to describe, how to narrate a story, how something is done or achieved, etc. In this case, the writer has to pursue certain social conventions for organizing the written piece, to help the readers in realizing, and understanding the writer' purpose.

The genre approach is considered as a useful way to help students reach different purposes in their writing. In this sense, Ann (2003) summarizes the genre approach in this way:

> In one side, genre is viewed as a type of text or writing text. It is typical model of writing product having different features and characteristics. On the other side, it is judged as one model or approach or strategy to teaching and learning writing (in Dirgeyasa, 2016, p. 46).

Moreover; Firkins, Forey and Sengupta (2007 in Rudi Hartono, 2012) suggest a number of stages through whichthe genre approach to writingcan be developed. This steps

are: first, *modeling a text*, is divided into four steps which should be used when learning: the choice of a type of genre to enhance classroom tasks; the discussion of the text genre by both teacher and students make a general study about grammar, vocabulary etc, ; then apply the procedure .

Second, *Joint construction*, in this stage: the students begin and practice writing; the teachers guide the students and help them to consult their background knowledge about a specific genre type and reviewing of the join construction stage before moving to the next stage. Third, *Independent construction of a text*, in this step, the students are asked to write a certain type of genre.

Even if the genre approach has many advantages, it is believed to affect negatively on the learners' creativity and inspiration. Badger and White (2000) claimed that the genre approach restricts students' imagination and is criticized because it neglects the natural acquisition processes and students' inspiration.

IV.   EFL Learners' Difficulties in Writing

Nunan (1989) affirmed that it has been said that teaching and learning writing correctly is the most difficult thing for all language affirmations and assertions, regardless of whether the language concerned is first, second or foreign. As a result, writing skill is hard to be taught and learned either in first or second language. Besides, Walters (1983) argued that writing is a hard task that learners find difficult to learn and generally ignore practicing it.

Moreover, Widdowson (1983:35) find that "writing is an irksome activity and an ordeal to be avoided whenever possible". Also, Nunan (cited in Al-Mahrooqi, 2014, 95) said that "producing a coherent, fluent, extended piece of writing is probably the most difficult thing

there".Accordingly, foreign language learners would consider writing as a more complex task becausefirst of its complexity as a skill and second because of the foreign language involved.

Students encounter many problems of grammar in the writing step. Fareed et al (2016:85) argued that "learners also have difficulties in grammar and syntax. They make mistakes in subject-verb agreement, pronouns, tenses, articles, prepositions and basic sentence structures". Besides, Younes & Albalawi (2015) asserted that the main current and popular grammatical mistakes in the students' writing are: mistakes in tenses, prepositions, subject-verb agreement. Furthermore; Wid (2016) claimed that students encounter difficulties in plural marks, determiners and verbs or predicates.

In addition to grammar, students encounter many difficulties in vocabulary: *in term of grammar*, the students do not know how to distinguish between singular and plural forms, verbs after modal, and present. *In term of meaning*, the students are not able to decide which noun and verbs to use in order to generate suitable meaning. Most of the students make mistakes in selecting the proper vocabulary. They do not grasp which word appertains to noun and adjective group, and they cannot transform ideas from their mother tongue into another language (Rahman 2016).

Cohesion and coherence are another writing difficulty. Repeated words along the text, the use of long sentences and misconnection between ideas are the most frequent students' problems. In the sense, Faradhebah (2017) stated that student's difficulties are in preserving their coherence in writing skill because they were not sure about their thoughts. Hence, selecting and writing down ideas, forming a meaningful idea or topic sentence and employing properly transitional words (in addition, moreover, besides and so on) in their writing represent a serious problem for EFL learners. Furthermore, spelling and punctuation are also among the recurrent writing difficulties EFL students suffer from.

Chapter One/ an Overview about Writing Skill and Mind Mapping

Section two: an Overview about Mind Mapping

Introduction

Developing learners' writing skill depends on many criteria and strategies. Mind mapping is one of the techniques that learners can use to brainstorm their ideas before writing to develop their writing skill. Buzan is the pioneer of mind maps in the 1960's.This section deals with an overview about mind mapping as a pre-writing strategy. It discusses pre-writing activities (invention activities, arrangement activities). It then draws on mind mapping as an arrangement activity. It provides definition of mind mapping, the structure of mind map, how to create it, reasons for mapping, advantages and disadvantages of mind mapping.

I.   Pre-Writing Activities

Brown (2007, P. 404 cited in Narmeen 2015) claimed that "the prewriting stage is a stage in the writing process which encourages the generation of ideas in numerous ways of strategies like: brainstorming, clustering, free writing etc". In other words, in this stage, learners generate a lot of information and classify them, it isin this stage that leaners plan and organize their thoughts before composing a piece of writing.

Furthermore Kellogg (1990 cited in Yongjin, 2013, p. 254) stated that "writers use prewriting strategies in collecting information and reflecting upon it in the very early stage of writing. Planning strategies and activities reduce constraints which may include unorganized memories and propositions….". Accordingly, pre-writing strategies are used by learners before starting any piece of writing; this means that in the first writing steps. It allows learners to gather ideas and thoughts and organize them easily.

Chapter One/ an Overview about Writing Skill and Mind Mapping

The prewriting stage, according to Mogahed (2013), is divided into two types: arranging and invention activities.Each section consists of various activities, the writers and learners select on the basis of learning styles and the nature of the topic they wish to explore.

Learners and teachers have to work on to develop students' writing skill. Go (1994 cited in Mogahed 2013) claimed that teachers of English as a second language can use prewriting activities as the earliest stage of instruction to help their learners acquire a good language skill. That is to say, the teachers have to implement the prewriting activities in their classes in the first stage of education in order to help learners obtain a good linguistic competence.

II.   I.1. Invention Activities

According to Mogahed (2013),invention activities are concerned with activities that can be employed in order to come up with good ideas and inspiration. It means that invention activities motivate students to express their thoughts. He also claimed that learners should try different invention activities until they find the one which corresponds and works best for them. Hence, the choice of the suitable prewriting activity depends on the learner's effort. In addition, each piece of writing has the activity that corresponds to it; thus, the learners should know how to work with these activities and how to manage them.The following are some invention activities:

I.1.1. Brainstorming

According to Mogahed (2013), brainstorming is a useful way of getting started or generating ideas. Thus, brainstorming is a prewriting activity that helps to produce creative ideas in the beginning of writing. Bobs-wolf (1996, in Mogahed, 2013) stated that brainstorming is a beneficial and an enriching tool in EFL classroom. This tool allows

learners to generate their ideas and thoughts to enhance their learning process. This means that brainstorming serves as a useful pre-writing technique in the EFL classrooms.

I.1.2. Free Writing

Mouser (2000, in Mogahed, 2013) stated that free writing is a non-linear activity which promotes the use of the right side of the brain that treats concepts. Moreover, when learners start to organize, edit and censor their ideas they move over the left side of the brain where the linear thinking happens.

Furthermore, Darling (2004 in Mogahed, 2013) argued that free writing helps learners to realize that not all what they produce is good, and not all what they write can be used in the final product. Besides learners have to learn how to revise their final piece of writing by omitting the unnecessary. That is to say that, in this activity, learners will mention all the ideas and information they collect about their topic, then they will organize them by deleting what is incorrect and inappropriate in order to have a structured final piece of writing.

I.1.3. Listing

According to Mogahed (2013), listing is a prewriting activity that writers find useful. In this activity, the writer or the learner has to list the possible topics and sub-lists of the things that he/she could say about a specific topic. It means that listing is to list as its name claims. Scholes (1989 in Mogahed, 2013) added that writers may use listing to write down quickly ideas and thoughts that come to their minds about a specific topic. Hence, listing is to write down sentences, ideas about the topic in a form of a list.

I.1.4. Questioning

Mogahed (2013) stated that questioning is a prewriting activity used by journalists to come up with a topic by asking questions. The answer to the *who? what? where? when?*

*why?*and how? question will form the base of the writing. Questions are a powerful way to develop a great deal of information about a topic quickly.

I.1.5. Clustering

Clustering is a prewriting activity in which the writer free associates chain of ideas around a central word or idea (Tomlinson, 1998 in Mogahed: 2013). In other words, clustering is when the writer takes a word or an idea and relates it with sub ideas from the general idea or word.

Rico (1983 in Mogahed, 2013 p.65)claimed that clustering is "a generative, open ended, non-linear, visual structuring of ideas, events, and feelings". That is to say, clustering is a recursive activity and allows the learners to express their thoughts in a visual way.

I.1.6. Interviewing

Interviewing is to talk with people who know something about a certain topic. It helps learners to analyze people and events accurately (Wood & Fisher 2000, cited in Mogahed, 2013). It means thatwhen the learners play the role of the interviewers, they learn how to examine people by asking them questions. For example, the teacher can play the role of the interviewee, and the learners will be the interviewers. This activity can help them to learn how to ask accurate questions.

I.1.7. Looping

Mogahed (2013) stated that looping is a free writing activity that allows the writers to focus their ideas and try to discover a writing topic. Looping is to free write, to look for interesting topics, ideas, phrases, or sentences and circle the interesting one, and free writes on the circled idea. So, in this activity, the writer has to write down all the ideas and information that they collect, then pick up only the essential ones and circle them. Then,they

develop those circled ideas and information into a meaningful and organized piece of writing related to the ideas they collected before.

III.   I.2. ArrangementActivities:

Arrangement activities have to do with arranging those ideas the learner come up with in the invention activities (Mogahed 2013). That is to say, the thoughts that the learners gathered in the invention activitieswill be classified in the arrangement activities. Hence, the writers' thoughts will be arranged according to the subject explored by the writer. One of the most used way of arranging ideas is graphic organizer, according to Mogahed (2013).

I.2.1. Graphic Organizer

Mogahed (2013) claimed that graphic organizer is a way to explore visual thinking. It is used by visual thinkers and writers to arrange their ideas, also named visual maps or mind mapping. It is used at all levels of learning from brainstorming ideas to present findings. It means that those arrangement prewriting activities are based on expressing ideas, feelings, thoughts visually and used in all writing steps.

The form of the graphic organizer is chosen according to the topic that learners explore (Mogahed 2013). The following are the most frequent examples of forms of graphic organizer.

Tondeur (2007) claimed that Mind maps (graphic organizers) can be used for anything and it has several types. Here are some specific uses and types.

I.2.1.1. Spider Map

Spider maps (Appendix n° 23)are used to describe a central idea or concept. In other words, it is to put an idea or word in the center and derive sub-ideas from it (Mogahed ,2013).

I.2.1.2. Series of Events Chain

Mogahed (2013) affirmed that series of events chain (Appendix n° 24) are used to describe stages of something, for example, the life cycle of an animal. It answers the key question *"what is the object"*. It is used to describe objectslogically.

I.2.1.3.Charts

Charters (Appendix n° 25) are used for writing directions or for keeping a lot of different ideas in categories (Mogahed 2013).

The (Appendix n° 25) demonstrates how a large number of ideas are classified on categories in form of a map. For example, the goals are classified into categories such as: personal, financial, work, education and social categories.

I.2.1.4.Webbing

Bada (1996 in Mogahed, 2013) noticed that this activity provides learners with a visual practice of how words or phrases connect to a topic. Web-centered activities encourage learners to make the bridge from the abstract to the concert. That is to say, webbing activities help learners to express their abstract ideas in a visual way. Thus, render them concrete.

I.2.1.5.Concept Mapping

Bada (1996, in Mogahed, 2013) claimed that concept mapping (Appendix n° 26) is a graphic organizer activity that shows the relationship among concepts circled. The relationships are shown by connecting lines with short explanations. In concept mapping activity, learners take the circled points and provide explanations in order to identify the relationship between them. This activity helps learners in visualizing how ideas are connected

and how knowledge can be organized visually. Therefore, this activity helps learners to make connection between thoughts and organize them.

Concept maps connect various ideas and these main ideas are connected to each other. It means that each main idea should be connected to the second main ideas

I.2.1.6.Mini Mind Map

Mini mind map includes a central idea and main branches radiating from it, there are no sub-branches. It aims at generating topics in central idea (Tondeur 2007). For example, if the writer writes a paragraph about pollution, hewritesthe topic in the center of the map, then he writes main ideas derived from the general topic, such as, types, impact, risks and sources of pollution, without adding sub-branches to these main ideas (Appendix n° 27).

I.2.1.7.Idea Generation Map (stage 1)

It is a type of brainstorming map in which the writer has to write as much ideas as possible about the topic in a messy way. Its objective is to get all the ideas and write them, even the unnecessary ones because the writer is in the first step of writing (Tondeur 2007). For example, the writer writes all the ideas that come up to his mind about pollution, this would help him to get started (Appendix n° 28).

I.2.1.8.Idea Generation Map (stage 2)

In this type, the writer redraws the first draft of brainstorming map (stage 1), he takes the first map and picks up all the essential ideas and points by trying to connect them to each other, then he draws a new map based on previous ideas (Tondeur 2007). It means that the writer, for example, after writing all the ideas about pollution in the first map, he takes all the important points to form main ideas and draws a new mind map and forms central ideas

(types, risks, sources, impact of pollution) and sub-ideas to the map, types(noise, atmosphere, radiation pollution); risks(chemical and contamination); sources (commercial, industry, domestic) and impact(environment and health) (Appendix n° 29).

I.2.1.9.Planning Map

It is the same with ideas generation map (stage 2), but in this map the writer can use others' ideas, such as the ideas suggested by his friend or teacher (Tondeur 2007). This planning is considered as a final writing piece. The writerhere, takes all the ideas in the generation map stage 1 and 2 and uses them to draw a final map that would be a paragraph, essay or story…. The aim of planning is to organize ideas and transform them into a final piece of writing. Accordingly, the writer gathers ideas in the two previous stages than draws a final organized map, finally transforms it into a paragraph about pollution.

I.2.1.10.Note-Taking Map

Tondeur (2017) argued that note taking map can be disordered at the first use, it depends on writers' understanding about the topic or book before taking notes. For example, the writer writes all the chapters of the book in order to have an idea about it, and then starts mapping. Besides, it is used to take notes in seminars and lectures by trying to write all the essential points taken from the book or topic in a paper, then transform them into a map. The objective of note taking map is to take notes on books, seminars, and lectures. Accordingly, the writer writes down randomly all what he collects from the sources that he read then orders them into a map at the end.

I.2.1.11. Explanation or Presentation Map

This kind of map is used to explain ideas to someone easily; it can be used when the writer is presenting to a group of people or when exposing his ideas to others or to himself (Tondeur2007). So, this map helps the writer to express his thoughts in a visual form in only one paper, and this helps the reader to understand how ideas are connected.

IV.   Mind Mapping as a Pre-writing Strategy

Mind mapping can be used as a pre-writing technique to help learners plan their ideas (Abd Karim et al 2016 referred to Riswanto & Pandika, 2012) stated that learners can use mind mapping strategy to develop any writing topic and it can be used with all types of paragraphs like narrative, descriptive, argumentative, expository etc. That is to say, this pre-writing technique can deal with all types of paragraphs and can help learners explore topics in each type of writing.

Mind maps are also beneficial for activating students' background knowledge about the topic. Harmer (2001 cited in Khudhair, 2016, p. 430) stated that "using effective mind maps as classroom strategy can assist students to activate their prior knowledge and skills to apply to the writing task, and find out what information they already have and what they still need". Thus, the use of mind mapping as a prewriting strategy in EFL classroom is valuable because it motivates learners' thinking and creativity. When trying to collect new information, learners reveal the use of their background knowledge and link it with the new knowledge.

II.1. Definition of Mind Mapping

A mind map is a scheme used by the writers to generate their ideas and thoughts in a visual form. Bukhari (2016, p. 63 referred to Buzan 2000) claimed that "amind map is a visual

tool that can be used to generate ideas, take note, organize thinking, and develop concepts".

Besides, Tee et al (2014 referred to Keles, 2012) claimed that "the mind map helps students to assimilate new information, to think and to develop their conceptual scheme". That is to say, mind mapping is a technique that aims at developing writers' imagination, thinking, creativity and inspiration in a form of a spider map.Tee et al (2014, p. 28) argued that:

> As a note-taking technique, the mind map allows individuals to organize facts and thoughts in a map format containing a central image, main themes radiating from the central image, branched with key images and key word, plus branched forming a connected nodal structure.

Hence, by the use of mind maps, learners can write down their ideas logically in a visual scheme and to develop their writing topic into a paragraph until to reach a desire number of ideas.Furthermore, Green (2015, p. 3)explained the mind map process:

> A mind map is a web like structure composed of word, pictures, or images and lines created with the soul intention of visual organization of information. In mind mapping a single concept or the main topic is drawn at the center of the structure, usually written on a blanc landscape page. From the main topic, other major concepts are drawn out; supporting words and ideas are loosely connected to these major concepts while minor topics are branching out until the very last idea is reached.

As a result, mind mapping is a visual strategy that helps learners to brainstorm their ideas and draw a large number of ideas from the general topic they wish to explore. It helps learners to make connection between ideas easily and tie the first idea with the last one. Buzan (in Bukhari, 2016, p. 62) claimed that "mind mapping is the easiest way to develop information in a human mind and take information from out of the brain. It is a creative and effective way that maps our ideas".

According to Buzan (1993, p. 59 in Bukhari, 2016), mind mapping is an "expression of radiant thinking and is therefore a natural function of human mind. It is a powerful graphic

technique which provides a universal key to unlocking the potential of technique which provides a universal key to unlocking the potential of brain". In other words, mind mapping helps the brain to come up with ideas and thoughts naturally and it is a good graphic technique to improve learning.

V.   Reasons for Mind Mapping

According to Rolf (1997), there are many reasons to use mind map. It is effective when solving problems.Mind mapping is used to expose our thinking to ourselves and to others; remember what we know about something and explore what we do not know; find patterns, reproduce themes; organize thoughts before writing them down on a paper in the form of a mind map; generate creative and new ideas, get started quickly, brainstorm, get organized and organize information.Accordingly, the mind mapping strategy can be used in different aspects of life and it is helpful in problem solving, memorization, exploration, organization and planning and it reveals learners' creativity and inspiration.

VI.   The Structure of a Mind Map

A mind map (figure n° 2) is composed of: a central word placed in the center of the paper which represents the topic that the writer wants to explore, main ideas radiating from the central topic and sub-ideas derived from these main ideas, until the write reached the desire number of information he wants to develop in his paragraph. There must be connection between all these ideas.

Chapter One/ an Overview about Writing Skill and Mind Mapping
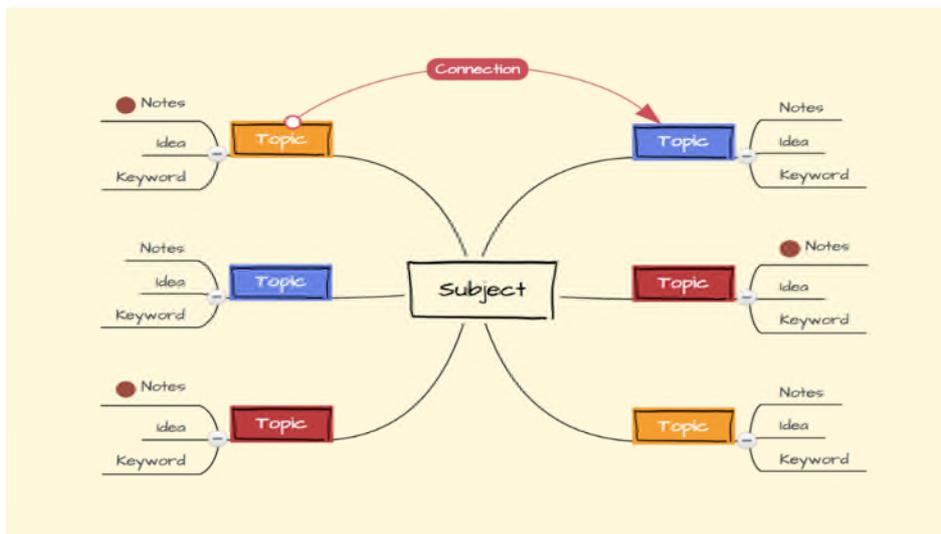
Figure (2): www.googleimages.com

VII.   Creating aMind Map

A mind map shows the relationships among ideas, which are connected directly to the central topic, and other ideas derived from those major ideas. Mind mapping represents a single topic in one draft in the form of a scheme. In this sense, Ghiles, (2016, p. 2) stated that:

> The essential elements of any mind map are (1) a main topic represented with a central image; (2) radiating themes radiating from the central image as branches;(3) branches comprised with a key image or key word printed on an associated line to form a connected nodal structure; and (4) the incorporation of color to clarify or emphasize connections.

In this path, Buzan (2018) claimed that a mind map has three essential characteristics. The first characteristic is a central image or word that captures the main subject that the learner writeson the center.For example, if the learner uses mind mapping to write a paragraph about pollution, he draws the topic of the paragraph (pollution) in the center of the paper inside a circle and places the sheet of the paper in a landscape format.

The second characteristic refers to thick branches radiating from the central word. Each branch should be represented with a different color. Here the learner draws thick branches

radiating from the central word or image.One of these branches would include for example the types of pollution. The second branch would includethe impact of pollution.The third branch; the sources of pollution; the last branch wouldcontain risks of pollution.

The third characteristic is placing a key word on each branch. It means that the learner provides each main branch with sub-ideas related to the content of the main idea contained in the branch. For example, the learner cites the types of pollution (noise, atmosphere, radiation, and water pollution; say what is the impact of pollution, such as, (the impact on environment and health); cites the sources of pollution such as, (commercial, industry, domestic) and at last he cites the risks of pollution which is the last main idea, for example, (chemical and contamination risks) as it is illustrated in figure (n°3).
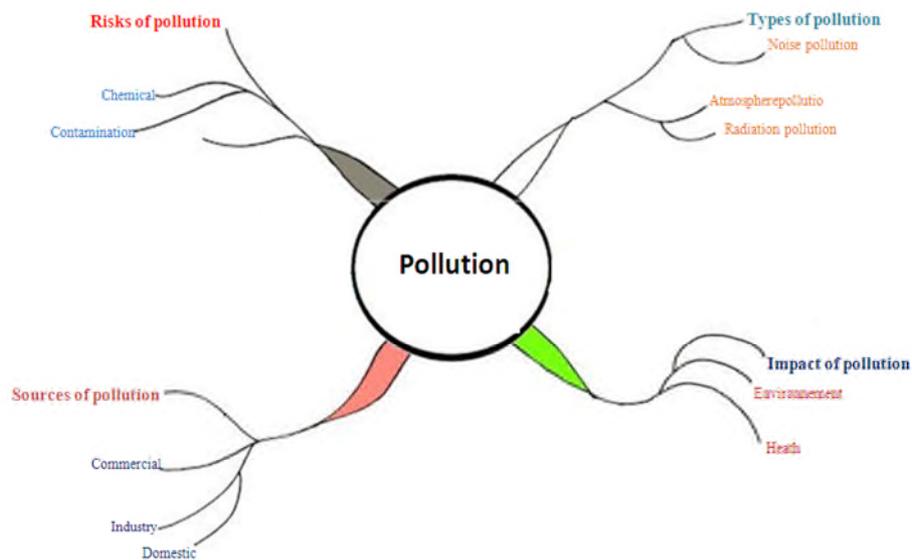
Figure (n° 3): a sample mind map on pollution (personal design)

VIII. Advantages of Mind Mapping

Mind mapping is a technique used by a large number of people because of its benefit sides. In this sense, Scott (2015, p. 6) argued that "mind mapping is truly increasing in

popularity more people find it more useful and effective than other methods". He also claimed that mind mapping is 15% to 20% more efficient in reinforcing memory and developing learning than other brainstorming and linear note taking traditional methods, besides, helping in solving problems and tasks easily. Consequently, the mind mapping technique is said to be more effective in enhancing memory because the maps include images and words. The images used in the map help learners in the retention of the thoughts.

Moreover, Scott (2015) stated that thanks to mind mapping, brains' creativity and capacity are motivated because there is active stimulation of the cells of the brain that help the learner to organize their information in a visual form. Hence, this technique helps learners to brainstorm and plan their ideas in a visual form before starting the writing step. Besides, Scott (2015) claimed that mind mapping is more conductive for the brain because it functions the same way with the brain; this is why, ideas come faster and from different areas, not only in one direction. In other words, this technique helps the brain to collect ideas faster and helps learners to come up with ideas easily.

Furthermore, the use of key words in mind mapping to emphasize and highlight the points is more effective than trying to describe or define the whole topic. Linking and grouping of concepts and ideas help learners to be more accurate in organizing their thoughts, and the more their ideas are well generated the more they dig deeper to various sub topics possible. Hence, a mind map allows the learners to have a bird view of the whole   topic and its sub topics, concepts all at a single glance. In addition to this, by using mind mapping, learners will focus only on what is essential and this would lead them to have deeper understanding of the topic hand. Mind mapping strategy is time saving because with a quick glance at their note, learners can have all the details they need (ibid).

IX.   Disadvantages of Mind Mapping

Banavar et al (2013, p. 2), pointed out that "mind mapping is an adjunct to regular reading and not a substitute to it". In other words, mind mapping is considered as a supplement to the regular reading but it cannot be replaced by it. In addition, they argued that it is difficult to shift from the linear system of note taking which everybody is taught since their childhood to a very different way; it requires great efforts. This means that learners have the habit to use the traditional method of brainstorming which is note taking. Hence, shifting to a new method of brainstorming would be time and effort consuming. Besides, they asserted that it is difficult to develop a good mind map of a totally new subject; it requires some prior information, then in such case linear note taking maybe a better option.

According to Dam (2017), the lack of a good and structured planning when drawing a mind map results in a large and incomprehensible mind map. This ambiguity in the scheme is also due to the inappropriate choice of vocabulary. Therefore, mind mapping, if not well used, becomes useless and difficult to understand. Besides, Dam argued that drawing a mind map without knowing its objective and target would make it unclear for other people.

Conclusion

Over this whole chapter, we introduced a theoretical background about our variables. The two variables have been separated into two sections. Hence, in the first section, we have introduced EFL writing, approaches and steps to teaching writing and students' difficulties in writing. In the second section,we introduced mind mapping strategy, advantages and disadvantages, reasons for mapping, how to create a mind map, prewriting activities and mind mapping as a pre-writing strategy in EFL classroom. The next chapter deals with the methodology, results interpretation and data analysis.

Introduction

The current study investigates the effects of mind mapping strategy on enhancing EFL students' writing skills. This chapter aims at providing an answer to our research questions and hypothesis. It includes the research methodology section, interpretation and discussion section, the limitations, implications of the study.

Section one: the Research Methodology

In this section, information about our method, participants, data collection tools and dataanalysis procedures are presented.

The functional relationship between our variables is cause and effect. So, we carry out an experiment on bachelor science students during English sessions.The method is pre-experimental carried with only one group.The sample will be compared under twoconditions. the first condition is before using the mind mapping strategy (pre-test)and the second one is after its implementation (post-test). Hence, a pre-questionnaire, a postquestionnaire and the implementation of mind mapping are the tools of our research.

I. Tools of Research

As the nature of the study is experimental, it required the use of questionnaires (pre-post), and test paragraphs (pre-posttest) precedingand following the training programrespectively.

I.1. Pre-Questionnaire

Wilson and McLean (1994 in Cohen, et al, 2000, p. 377) stated that "the questionnaire is a widely used and useful instrument for collecting survey information, providing structured, often numerical data, being able to be administered without the presence of the researcher, and often being comparatively straightforward to analyze".

The students' pre-questionnaire tool usedin this research aims at collecting information about our participants before the implementation of mind mapping.It iscomposed of twenty

four (24) questions ranged from open-ended, close-ended to multiple choice questions. Eighteen (18) questionnaires were distributed to bachelor science students.

The pre-questionnaire includes four parts: the first part is "General Information". It comprises four questions intending at collecting general information about our participants(age, gender, years of studying English and whether they like English or not). The second part is "Students' points of view about writing"; it involves six questions aiming at collecting information about learners' attitudes toward writing. The third one is the pre-writing stage, it involves seven questions about writing(whether students organize, plan and brainstorm their ideas before writing or not) and the fourth one is mind mapping.

I.2. Post-Questionnaire

It aims at collecting data about the students' attitudes about the mind mapping strategy after its implementation. The post questionnaire includes only one part which is students' attitudes towards mind mapping technique. It comprises six main questions, three close-ended and three open ended questions.

I.3. Pre-Test Paragraph and Post-Test Paragraph

In order to achieve the aim of our study, a pre- and post-tests paragraphs have adopted.

I.3.1. Pre-Test Paragraph

It is a pre-study aiming at gathering data about the participants' level in writing before the implementation of the mind mapping strategy. In the first session of the experiment, the participants were asked to write a paragraphof 10 to 15 lines about a free topic. This was held on march 21st ,2019 at 13:00 a.m., room 4. All the students' paragraphs have been collected the same day.

I.3.2. Post-Test Paragraph

It is adopted at the end of our experiment and it aimed at discovering the students' writing level after the implementation of the mind mapping strategy in the classroom. In the last session of our experiment, the students were asked to write a paragraph on a free topic by drawing a mind map than transform it into a paragraph. It is addressed on April 4th ,2019 at 13:00 a.m. to 14:00 a.m. room 4 in the private school.

I.4. The Training Program

The experiment is based on 7 sessions: we first started by teaching the learners on how to use the mind mapping strategy, providing them examples. Then, our participants were asked to write a paragraph by using the mind mapping strategy. Seven minutes were given for the students as a time to draw a mind map for each specific topic, after the seven minutes, the mind mapping sheets were picked out.

In the first session, we have given to the students' information about the process of writing and at the end of the session we have asked them to write a paragraph about a topic of their choice. In the second session, we have introduced the strategy; the mind mapping strategy which aims at encouraging the students to plan before starting to write and organize their ideas. The third session, we have involved the use of mind mapping technique to write a narrative paragraph. In the fourth session, we have taught the students how to use this planning technique to write a descriptive paragraph. In the fifth session, we have taught them how to use mind mapping technique to write an argumentative paragraph.In the sixth session, we have explained to students   how to write an expository paragraph using the mind mapping strategy. In the seventh session, the students were asked to write a paragraph about a topic of their choice relying on one of the types dealt with in the experiment.

I.5. Qualitative Method

In our research, the qualitative method consists of analyzing learners' paragraphs. Since we are investigating the effect of mind mapping strategy on learners' writing skill, we analyzed the students' paragraphs based on how they map their ideas and organize them in the paragraph. We obtained a sample of 18 paragraphs for 4 types of paragraphs in addition to thepre and post-test. This makes a total of 18 paragraphs.

II.   Sample and Population

Our population is Science Bachelor students registered at the HCS'chool: A private school at EL Kseur, Bejaia. The number of the whole population is 54 students consisting of 03 groups of 18 students each. The students of our sample were enrolled in group two. It includes 18 students who attended the courses regularly. The background information got from the pre-questionnaire detects that our sample consists of 14 females representing 77.77% of the whole sample and 4 males representing 22.22% of the whole sample ranging from 18to 21 years old.

III.   Data Collection Procedures

We distributed the questionnaires on the beginning of our first training session on march 21st.The rest of the sessions we implemented the experiment. The experiment lasted two weeks (3 to 4 sessions a week) from Saturday, 21st march to Saturday, 4th April. The first week we had three sessions, the first one was on Saturday from 13: 00a.m.to 14:00 a.m. The second session was held on Monday from 10:00 a.m. to 11:00.a.m.The last session took place on Wednesday from 14:00 a.m. to15:00 a.m.

The second week, we had four sessions.The first one was on Sunday from 13:00 a.m. to 14:00a.m. The second was on Tuesdayfrom 10:00 a.m. to 11:00 a.m. The third Thursday from 13:00 a.m. to 14:00 a.m. The last session was on Saturday from 13:00 a.m. The duration of each session was 60 minutes and all the sessions took place in room 4. In the last session, on

April 4th,we asked students to write a paragraph about a topic of their choice relying on one of the types dealt with in the experiment.

IV.   Data Analysis Procedures

The data collected from the pre and post tests and pre-post questionnaires have been analyzed using comparative method and Excel 2007. We relied on number of students and percentages to interpret our data. Concerning the qualitative data, we evaluated students' paragraphs. The textual analysis consisted of describing the students' paragraphs. It is based the maps they created before writing.

Chapter Two: Practical Chapter

Section two: Results and Discussion

The results and discussion chapter presents the data collected and discussed with reference to the literature review of the first chapter.

I. Results

I.1. Pre-questionnaire

The pre-questionnaire part contains 24 questions, divided into four parts: general information (intending to collect information about the participants); students' points of view about writing (how students perceive writing) ; the pre writing step (information about our participants first steps before writing) ; and mind mapping (our participants' opinion about mind mapping strategy).

I.1.1. General Information

I.1.1.1. Age.

Age	Number of students	Percentages
18 – 19	9	50 %
20 – 21	9	50%
Total	18	100%

Table 1: *Students' age*
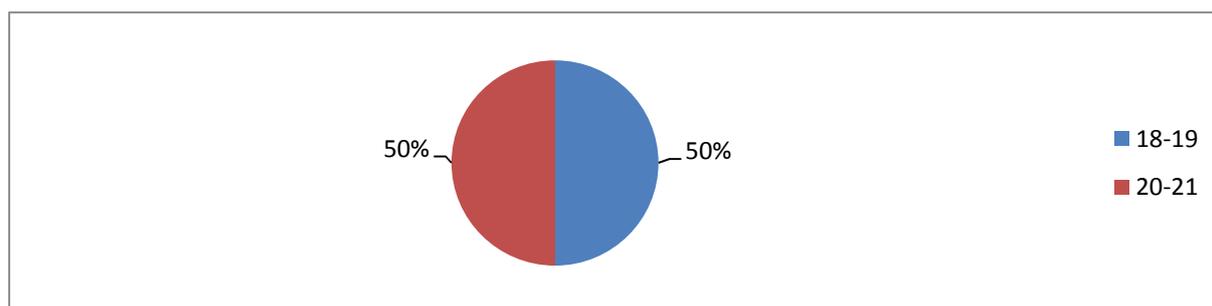
Figure 4: *Students' age*

Items in table (1) and figure (4) show that 50% of the students are aged between 18 to 19 years old whereas 50% are aged between 20 to 21 years old. The results indicate that the students are adults and aware of the importance of writing.

I.1.1.2. Gender.

Gender	Number of students	Percentages
Male	4	22.2%
Female	14	77.8%
Total	18	100%

Table 2: *Students' gender*
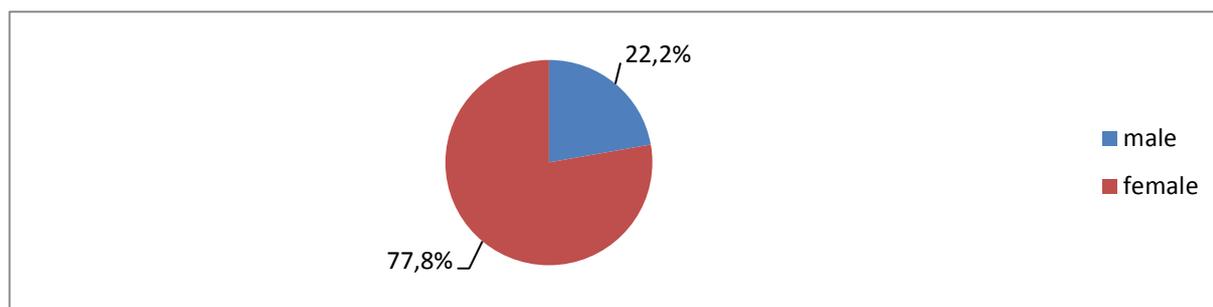
Figure 5: *Students' gender*

We deduce from the table (2) and figure (5) above that the majority of our sample is females 77.8% and22.2% of the whole participants are males. This may refer to the fact that females like and prefer foreign languages more than males.

I.1.1.3. How do you evaluate your English level?

Level	Number of students	Percentages
Outstanding	0	0%
Good	10	55.5%
Average	5	27.8%
Low	3	16.7%
Very low	0	0%
Total	18	100%

Table 3: *students' perceived level in English*
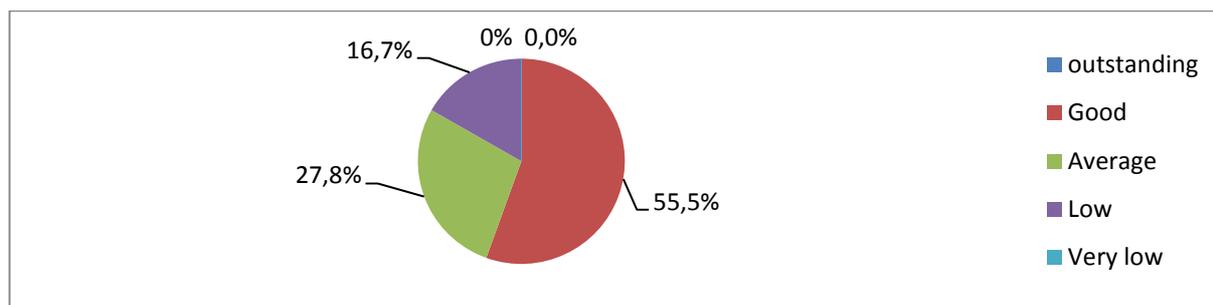
Figure 6: *students' perceived level in English*

We notice from table (3) and figure (6) that the highest percentage 55.5% of our participants claim to have a good level in English whereas 27.8% argue to have an average level, while the remaining participants 16.7% claim a low level in English.

I.1.1.4. How long have you been studying English?

Years	Number of students	Percentages
Nine	3	16.7%
Seven	15	83.3%
Total	18	100%

Table 4: *Years of studying English*
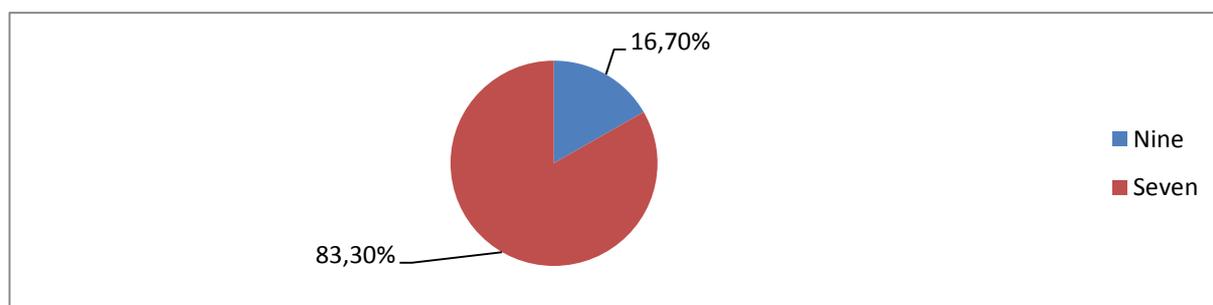
Figure 7: *Years of studying English*

Table (4) and figure (7) indicate that 83.3%, which represents the majority of our participants, argue that they have been studying English for seven years, whereas 16.7% of the participants claim that they have been studying English for nine years.

I.1.2. Students' points of view towards writing

I.1.2.1. Do you enjoy writing?

Option	Number of students	Percentages
Yes	17	94.4%
No	1	5.6%
Total	18	100%

Table 5: *students' enjoying writing*
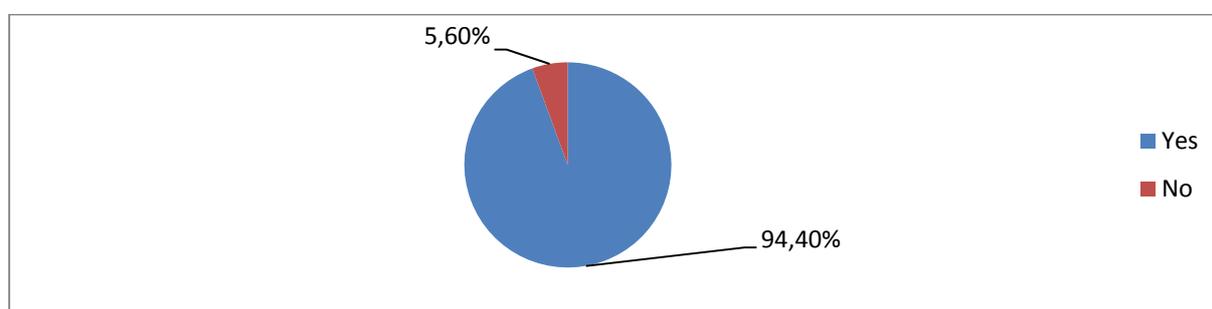
Figure 8: *students' enjoying writing*

The results obtained from this question show that the majority of our participants 94.4% assume that they enjoy writing. While 5.6% state that they do not enjoy it (Table n°5 and figure n°8). These results indicate that most of the students find writing interesting and like practicing it.

I.1.2.2. Why do you enjoy writing?

Answers	Number of students	Percentages
No response	2	11.1%
Getting information	1	5.6%
Expressing ideas	12	66.6%
Enriching vocabulary	1	5.6%
Expressing feeling	2	11.1%
Total	18	100%

Table 6: *The students' reasons behind enjoying writing*
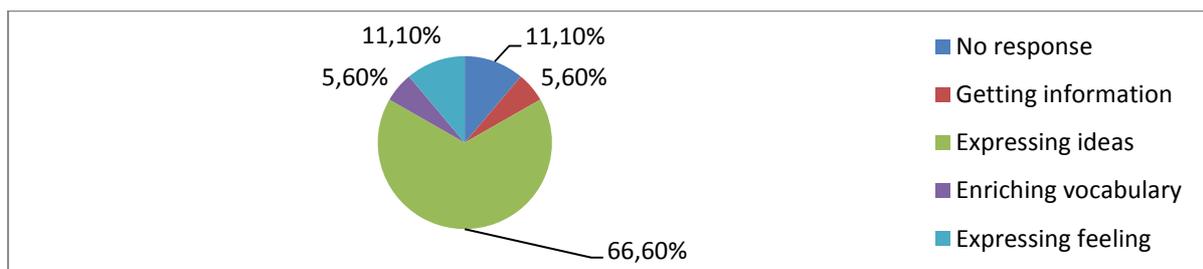
Figure 9: *The students' reasons behind enjoying writing*

The results obtained from table (6) and figure (9) indicate that the majority of respondents 66.6% enjoy writing because it allows them to express their ideas. 11.1% of them enjoy writing because it is a means of expressing feeling, 5.6% of our participants enjoy writing because it helps them to get information, and 5.6% enjoy writing because it enriches their vocabulary. 11.1% did not answer the question. From the obtained results; we notice that our participants do not just practice writing to develop it as a skill to improve their language, but also as a means of self-expression and vocabulary development

I.1.2.3. In your opinion what is writing?

Opinion	Number of students	Percentages
No response	4	22.2%
Module	6	33.3%
Skill to improve language	4	22.2%
Means of expression	4	22.2%
Total	18	100%

Table 7: *Students' opinions about writing*
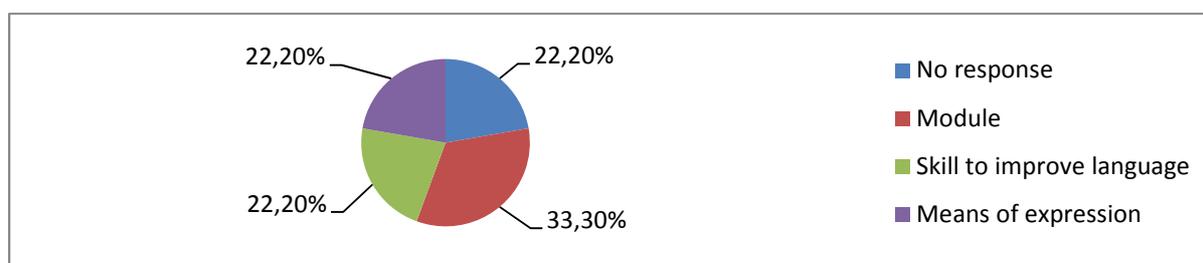
Figure 10: *Students' opinions about writing*

Table (7) and figure (10) show that 33.3% of our participants see writing as a module, 22.2% of them consider it as a skill to improve their language and 22.2% consider it as a means of self-expression and the rest of our sample 22.2% do not give an answer to this question. From this result, we notice that most of our participants see writing as a useful skill.

I.1.2.4. Do you like English writing activity?

Option	Number of students	Percentages
Yes	15	83.3%
No	3	16.7%
Total	18	100%

Table 8: *Students' feelings on English writing activity*
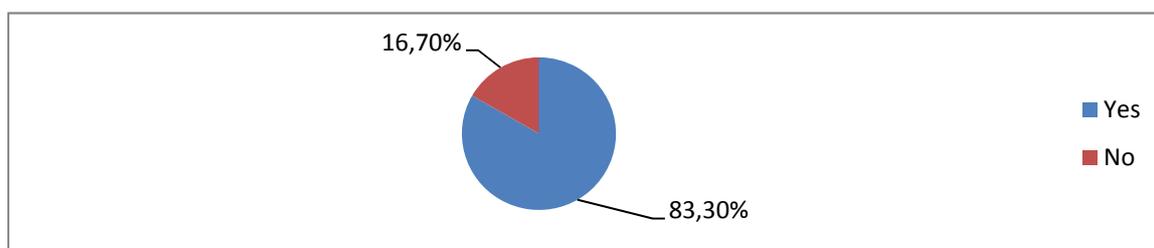
Figure 11: *Students' feelings on English writing activity*

The majority of our participants 83.3% indicate that they like writing as it is illustrated in table (8) and figure (11) 16.7% of our sample dislike English writing activity. This demonstrates that the majority of the students are aware of the importance of practicing writing.

I.1.2.5. Do you think that writing activity is essential and useful?

Option	Number of students	Percentages
Yes	18	100%
No	0	0%
Total	18	100%

Table 9: *Students' thoughts about writing activity*
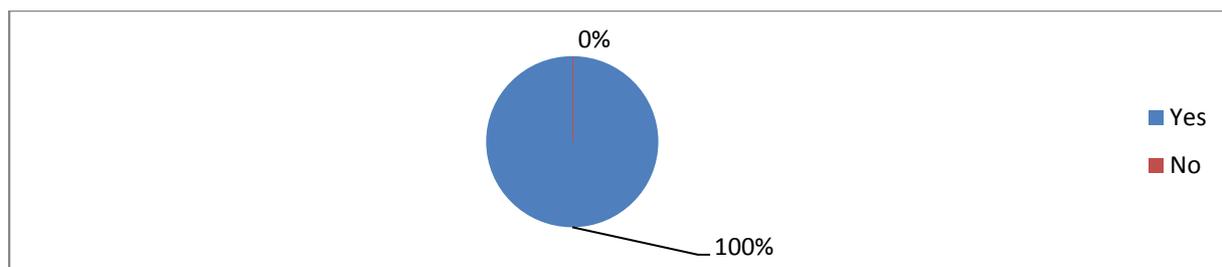
Figure 12: *Students' thoughts around writing activity*

All the participants (100%) indicate that English writing activity is essential and useful as it is shown in table (9) and figure (12). This indicates that the whole of the respondents understand the value of writing for their studies.

I.1.2.6. Indicate to which extent do you agree or disagree with these statements.

option statements	Strongly disagree	disagree	Neither agree or disagree	Agree	Strongly agree
1) Writing is the most complicated skill	16.7%	44.4%	11.1%	27.8%	0%
2) Writing a paragraph is difficult	11.1%	22.2%	0%	55.6%	11.1%
3) I rely on my previous knowledge when writing	11.1%	16.7%	0%	44.4%	27.8%
4) The more I brainstorm my ideas before writing, the more my writing will be good	0%	0%	5.6%	83.3%	11.1%
5) I think it is easier to express our ideas in the writing form rather than the spoken one	0%	16.7%	5.6%	33.3%	44.4%
6) My language competence is used to create pieces of writing	16.7%	11.1%	5.6%	44.4%	22.2%
7) My teacher provide me with writing techniques and information	50%	0%	27.8%	22.2%	0%
8) I write for pleasure in my free time in English	11.1%	0%	5.6%	50%	33.3%

Table 10: *Students' points of view about writing*

Table 10 shows the participants' responses to 8 items about writing:

1) Writing is the most complicated skill.

27.8% of the participants agree with this view, yet 44.4% do not find writing as a complicated skill, and 16.7% strongly disagree. In addition, 11.1% of the students are uncertain. So, they do not agree and they do not disagree. Hence, more than half of the population do not claim writing as a complicated skill.

2) Writing paragraph is difficult.

The majority of the participants' consider writing paragraph as a difficult skill, 55.5% agree with this view, and 11.1 % strongly agree. Besides, none of the participants is neither agree or disagree. 11.1% strongly agree with this view, and 22.2% disagree.

3) I rely on my previous knowledge when writing.

44.4% of them agree with this statement; it means that they use their background knowledge. 27.8 of the students state that they strongly rely on their previous knowledge. 16.7% of them disagree with the statement, yet 11.1% of the participants state that they do not rely on their previous knowledge. So, they strongly disagree and no one of them neither agree nor disagree.

4) The more we brainstorm our ideas before writing, the more our writing will be good.

The majority of participants recognize the importance of brainstorming in writing; this was expressed by 83.3% of them who agree and 11.1% of them who strongly agree. 5.6% of them are neither agree nor disagree about the statement.

So, the majority of the respondents acknowledge the benefits of brainstorming before writing.

5) I think it is easier to express our ideas in the writing form rather than the spoken one.

Most of our participants prefer to express their ideas in the written form than in the spoken one; this was expressed by 44.4% of them strongly agree and 33.3% who agree that it is easier to express their ideas in the written form rather than the spoken one. Yet 16.7% of the participants disagree, and 5.6% of them do neither agree nor disagree.

6) My language competence is used to create pieces of writing.

44.4% of our participants answered that they use their language competence to create a piece of writing, and 22.2% of them who strongly agree, yet 11.1% stated that they do not use their language competence when writing, so they disagree. 16.7% of them strongly disagree. 5.6% of our participants do neither agree nor disagree.

7) My teacher provides me with writing techniques and information.

Half of our participants argue that they do not deal with writing techniques with their teachers; this was expressed by 50% of them who strongly disagree, and 22.2% of them assert that their teacher suggests for them writing techniques and 27.8% of them are not sure whether they know the writing techniques or no.

8) I write for pleasure in my free time in English.

Our participants claim that they write in English in their free time, this was expressed by half of them 50% who agree and 33.3% of them who strongly agree. (11.1%) of them assert that they do not write in English for pleasure in their free time, so they strongly disagree, and the remaining participants (5.6%) do neither agree nor disagree about the statement. From the results we notice that most of the participants like to write in English since they write for pleasure in their free time.

I.1.2.7. Which kind of difficulties do you face in writing?

Difficulties	Number of students	Percentages
Vocabulary	8	44.4%
Grammar	5	27.8%
Punctuation	1	5.6%
Coherence	1	5.6%
Organization of writing	3	16.7%
Total	18	100%

Table 11: *Students' difficulties in writing*
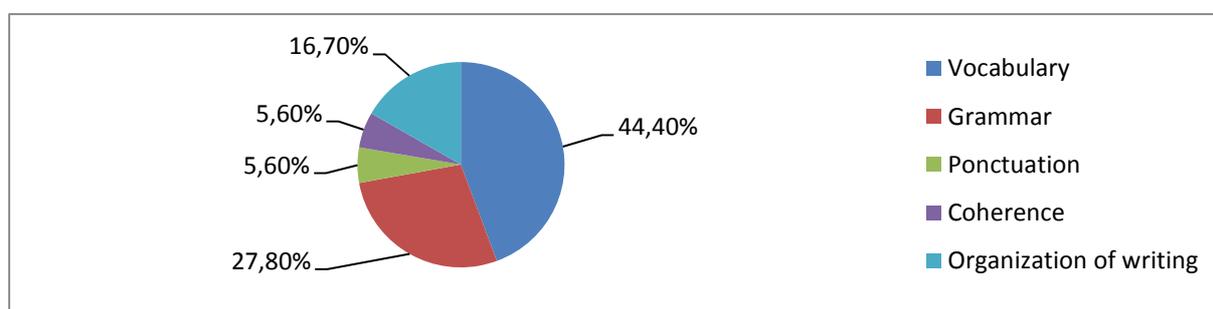
Figure 13: *Students' difficulties in writing*

The results obtained show that the respondents have writing difficulties of many kinds: vocabulary 44.4%, grammar 27.8% and the organization of writing 16.7% were the most common difficulties among students followed by equal percentages in punctuation 5.6% and coherence 5.6%. Though they vary in frequency of occurrence. (table n° 11 and figure n° 13).

I.I.3. Pre-writing step

I.1.3.1. Do you organize your ideas before writing a paragraph?

Option	Number of students	Percentages
Yes	3	16.7%
No	15	83.3%
Total	18	100%

Table 12: *Student's organization of ideas before writing a paragraph*
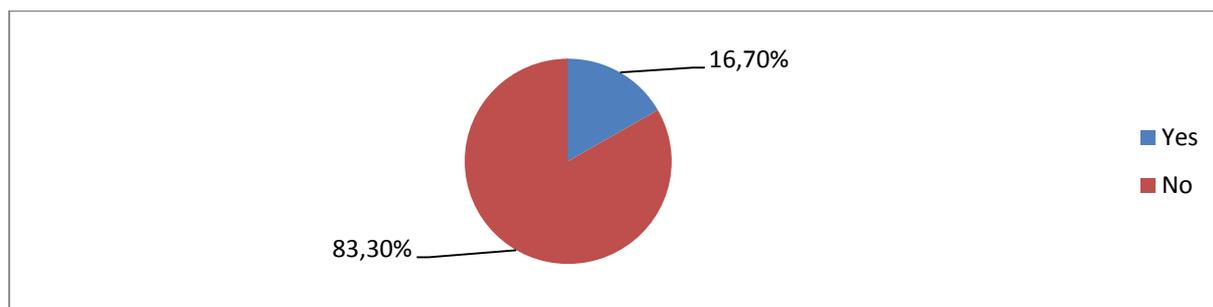
Figure 14: *Student's organization of ideas before writing a paragraph*

From the table and figure above, we notice that 16.7% of our participants organize their ideas before writing a paragraph, whereas 83.3% of our sample do not organize their ideas before writing. This may be due to the fact that they do not learn the pre-writing strategies.

I.1.3.2. Do you work with your classmates on assignments or handouts?

Option	Number of students	Percentages
Yes	11	61.1%
No	7	38.9%
Total	18	100%

. **Table 13:** *Students working with their classmates on assignments or handouts*
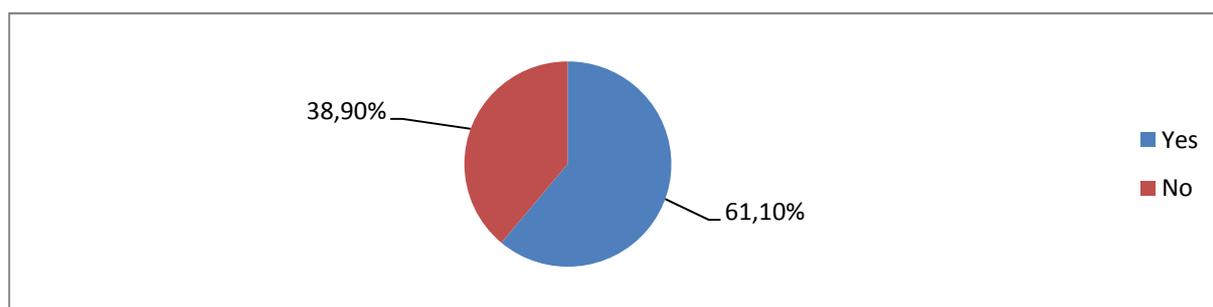
Figure 15: *Students working with their classmates on assignments or handouts*

The table (13) and figure (15), highlight that the majority of the participants (61.1%) work with their classmates on assignments or handout whereas the remaining participants (38.9%) do not work with their classmates on assignments or handouts.

I.1.3.3. Do you consider the task or assignments before writing?

Option	Number of students	Percentages
Yes	13	72.2%
No	5	27.8%
Total	18	100%

Table 14: *The student's consideration of the assignments carefully before writing*
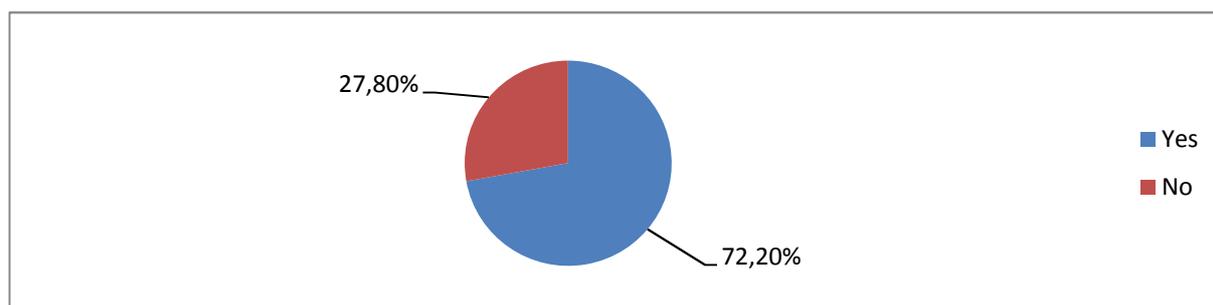
Figure 16: *The student's consideration of the assignments before writing*

Table (14) and figure (16) show the participants' answers about whether they consider the task or assignment before writing or not. The table and figure above declare that more than half of the participants 72.2% claim that they consider the assignment carefully before writing, and only 27.8% of them assert that they do not consider the task before writing.

I.1.3.4. Do you brainstorm and write down ideas before you begin to write?

Option	Number of students	Percentages
Yes	2	11.1%
No	16	88.9%
Total	18	100%

Table 15: *Students' brainstorming of ideas before writing*
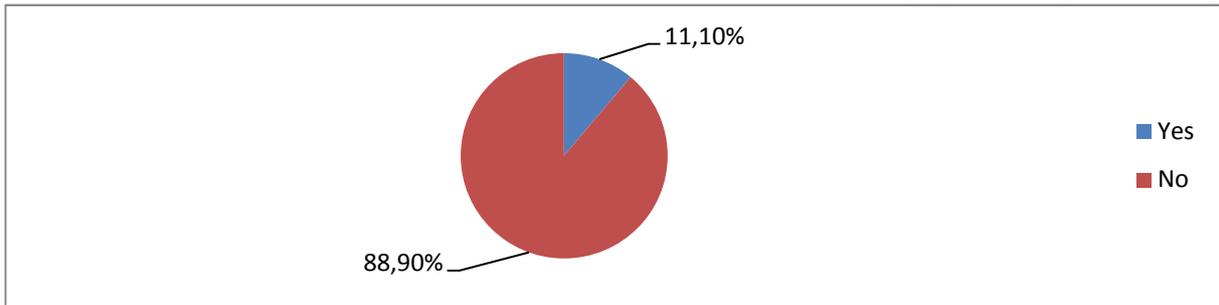
Figure 17: *Students' brainstorming of ideas before writing*

Table (15) and figure (17) point out that most of the students (88.9%) assert that they do not brainstorm and do not write down ideas before starting to write. However, 11.1% claim that they brainstorm and write down ideas before writing. The results obtained from the table and figure imply that most of our participants do not know how to brainstorm.

I.1.3.5. Do you plan or take notes before writing?

Option	Number of students	Percentages
Yes	3	83.3%
No	15	16.7%
Total	18	100%

Table 16: *Students' taking notes before writing*
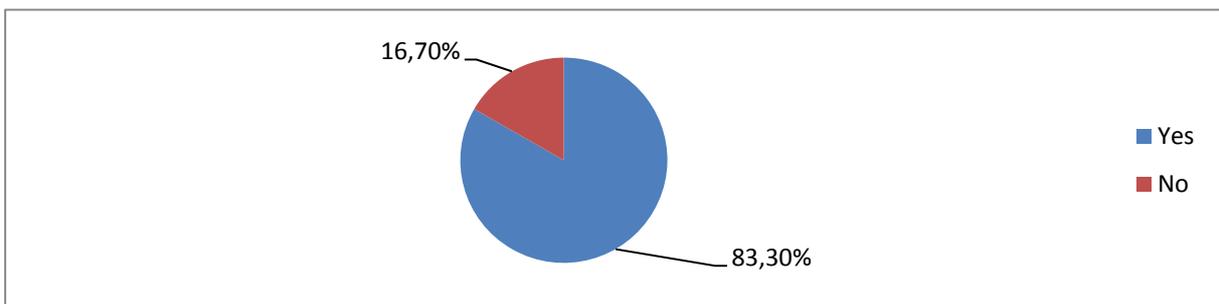
Figure 18: *Students' taking notes before writing*

From table (16) and figure (18), we notice that the majority of the students (83.3%) claim that they do not plan or take notes before writing. Whereas, 16.7% of them assert that they plan and take notes before writing.

I.1.4. Mind mapping

I.1.4.1.Do you know what mind mapping is?

Option	Number of students	Percentages
Yes	1	5.6%
No	17	94.4%
Total	18	100%

Table 17: *students' awareness of mind mapping*
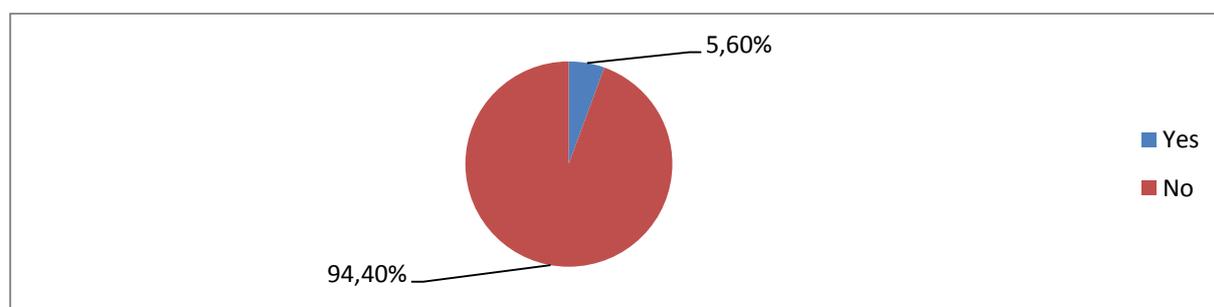
Figure 19*: students' awareness of mind mapping*

The table (17) and figure (19) describe high percentage of participants 94.4% who confirm that they do not know what mind mapping is 5.6% argue that they know it. Results show that mind mapping is not a usual technique in writing classes.

I.1.4.2. What do you do first when you are given to write a paragraph?

Option	Number of students	Percentages
No response	1	5.6%
Collecting information	12	66.7%
Dividing and understanding the topic	5	27.2%
Total	18	100%

Table 18: *Students' first step when given to write*

Pie chart: 5,60% No response; 66,70% Collecting information; 27,20% Dividing and understanding the topic
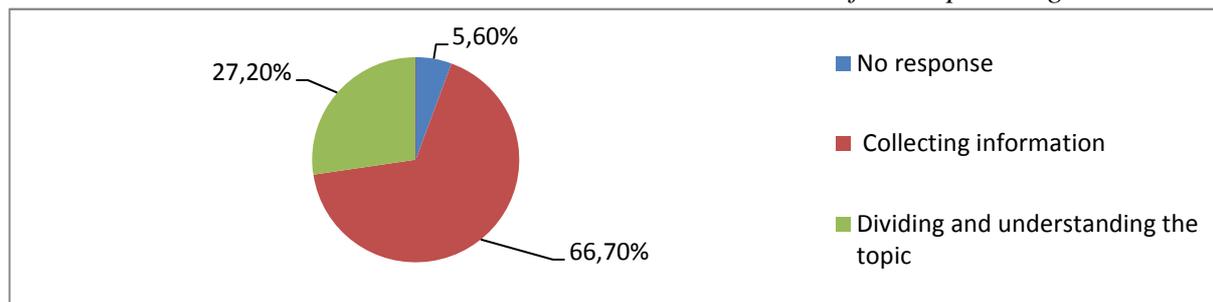
Figure 20: *Students' first step when given to write*

The majority of students (66.7%) declare that when they are given to write a paragraph, they first collect information which are relevant to the topic. Whereas the rest of the participants(27.2%) start their writing by "dividing and understanding the topic." 5.6% of them provide no answer to the question (table n°18 and figure n°20).

I.1.4.3. Do you think that planning before writing is necessary?

Option	Number of students	Percentages
Yes	18	100%
No	0	0%
Total	18	100%

Table 19: *The student's opinions about planning before writing*

Pie chart: 0% No; 100% Yes
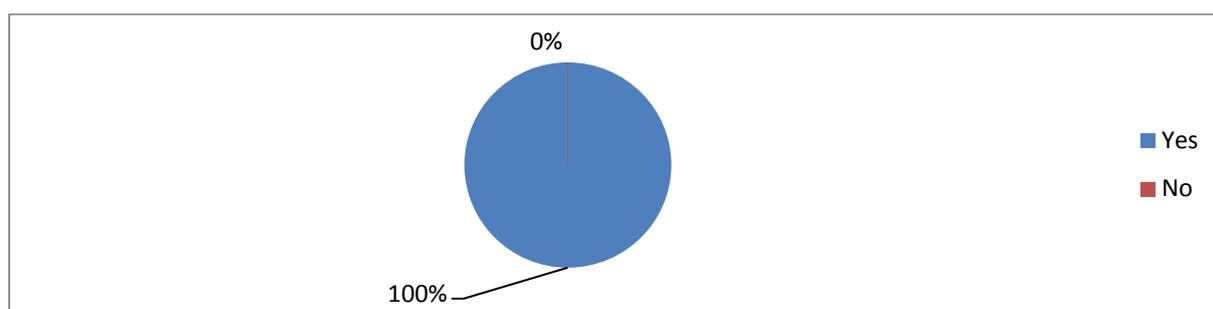
Figure 21:*The student's opinions about planning before writing*

The table (19) and figure (21) discuss students' answers about necessity planning before writing. We notice that the whole participants (100%) are aware of the significance of planning before writing.

I.1.4.4. the reasons behind considering planning as a necessary step

Option	Number of students	Percentages

Organizing ideas	13	72.2%
Avoid missing ideas	2	11.1%
Make the text coherent	3	16.7%
Total	18	100%

Table 20: *The students' reasons behind considering planning as a necessary step*
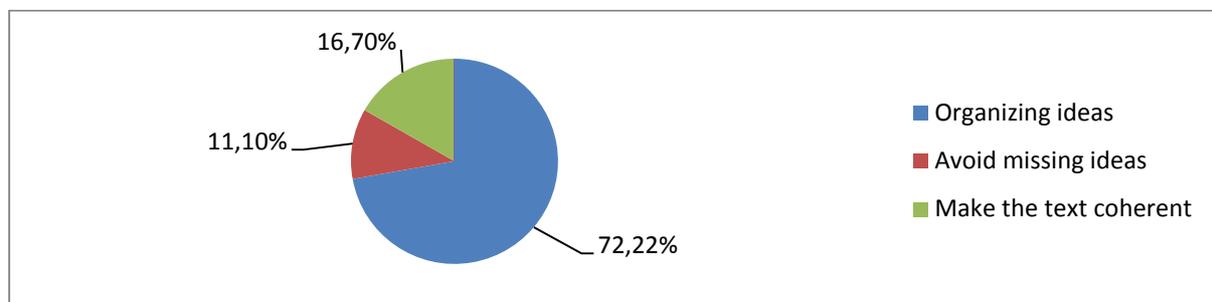
Figure 22: *The students' reasons behind considering planning as a necessary step*

Table (20) and figure (22) show the various reasons behind considering planning as a necessary step. Most of the students (72.2%) relate the effectiveness of planning to organize ideas, and 16.7% of students relate it to the organization of a coherent. While 11.1% of the respondents assert that planning helps in avoiding and missing ideas.

I.1.4.5. If yes, do you plan your ideas before writing?

Option	Number of students	Percentages
Yes	3	16.7%
No	15	83.3%
Total	18	100%

Table 21: *students' use of planning technique*
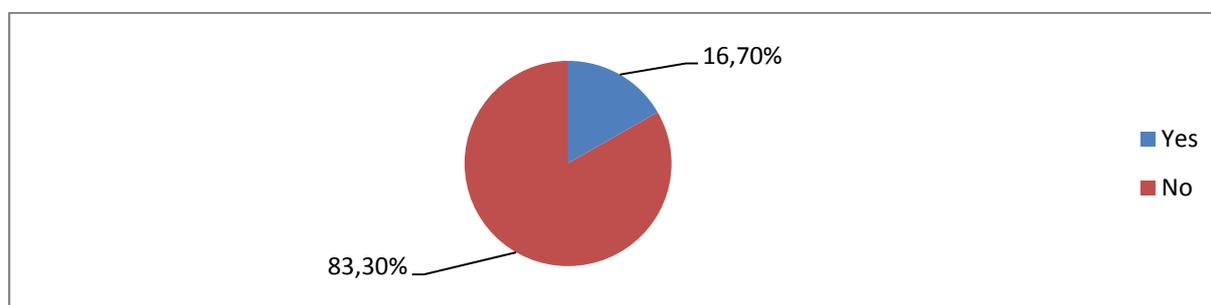
Figure 23: *students' use of planning technique*

The results obtained from this question indicate that the majority the students (83.3%) assert that they do not plan their ideas before writing and the rest of participants 16.7% claim that they plan before writing. (table n° 21 and figure n° 23)

I.1.4.6. Please, say how?

Answer	Number of students	Percentages
Classify ideas in main and secondary ideas	2	66.7%
Collect all the information about the topic	1	33.3%
Total	3	100%

Table 22: *Students' planning manner*
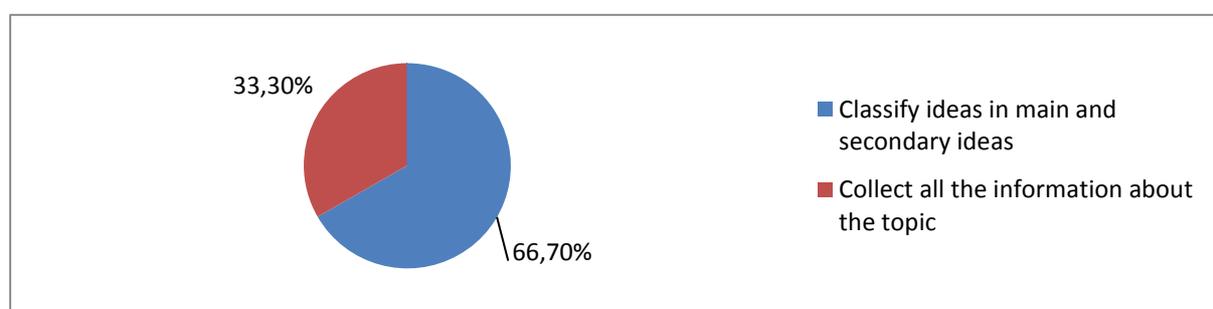
Figure 24: *Students' planning manner*

The answer to this question concern only the 16.7% of the sample who answered to the previous question by "yes".

Table (22) and figure (24) demonstrate that 66.7% of the students plan by classifying ideas into essential and secondary ideas, and 33.3% of our participants plan by collecting all the information about the topic.

I.1.4.7. Do you think that the mind mapping strategy can help you to organize your ideas before writing?

Option	Number of frequencies	Percentages
Yes	18	100%
No	0	0%
Total	18	100%

Table 23: *students' opinions of mind mapping advantages*
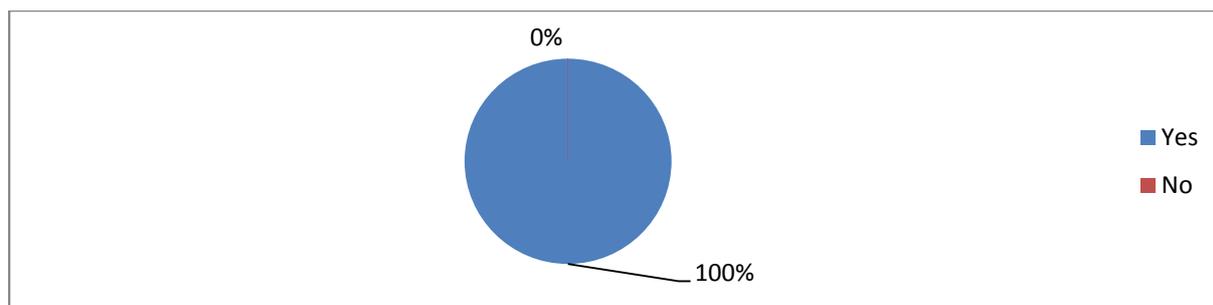
Figure 25: *students' opinions of mind mapping advantages*

From the table (23) and figure (25), we notice that the whole participants (100%) are convinced of the effectiveness of mind mapping in organizing ideas before writing. Though, students do not know what mind mapping is, the researchers provided a brief definition at the end of the questionnaire, hence give the students an idea about it.

I.1.4.8. Would you add any suggestions or comments on pre-writing strategies?

Answer	Number of students	Percentages
No response	11	61.1%
The implementation of the new writing strategies in the beginning step of writing paragraph	4	22.2%
The use of the pre-writing strategies by the teachers as an obligation rather than a choice	3	16.7%
Total	18	100%

Table 24: *Students' suggestions or comments on the writing strategies*
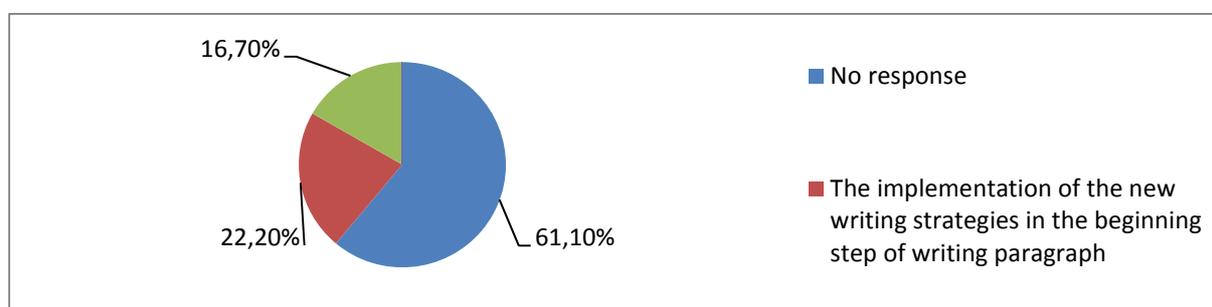
Figure 26: *Students' suggestions or comments on the writing strategies*

From the results obtained in the table (24) and figure (26), we notice that 22.2% of the participants suggest the implementation of the writing strategies in the beginning steps of writing paragraphs, (16.7%) of the participants opt for the use of pre-writing strategies by teachers as an obligation rather a choice.22.2% of the students do not give any response concerning the pre-writing strategies.

I.2. Post-Questionnaire

The post questionnaire part contains six questions. It is completed after the implementation of mind mapping strategy in the classroom. These questions are about students' views and attitudes toward mind mapping in writing paragraph.

I.2.1. After performing mind mapping strategies, did you find it helpful?

Option	Number of students	Percentages
Yes	18	100 %
No	0	0%
Total	18	100%

Table 25*: Students' opinions about mind mapping after its implementation*
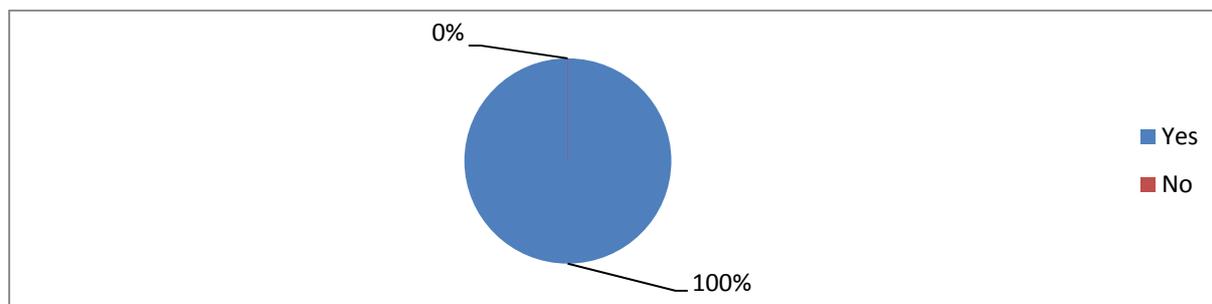
Figure 27: *Students' opinions about mind mapping after its implementation*

The table (25) and figure (27) show that all the participants (100%) find that mind mapping strategy is helpful.

I.2.2. If yes, explain how?

Explanation	Number of Students	Percentages
Collecting a lot of information	5	27.8 %
Writing a meaningful paragraph	10	55.6%
Avoiding mistakes	3	16.7%
Total	18	100%

Table 26: *Students' way of benefiting from mind mapping*
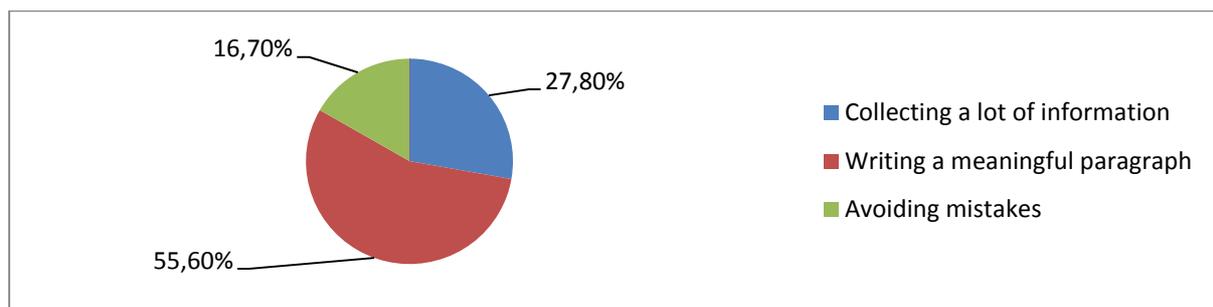
Figure 28: *Students' way of benefiting from mind mapping*

From the table (26) and figure (28), we may claim that mind mapping is useful for theparticipants. For 55.6%of the students, mind mapping helps them to write a meaningful paragraph. 27.8% of them think that mind mapping is helpful for collecting a lot of information and 16.7% claim that mind mapping strategy helps them to write without mistakes.

I.2.3. Do you find that mind mapping strategy is helpful in writing different types of paragraphs?

Option	Number of students	Percentages
Yes	18	100 %
No	0	0%
Total	18	100%

Table 27: *Students views about mind mapping strategy in writing different types of paragraphs*
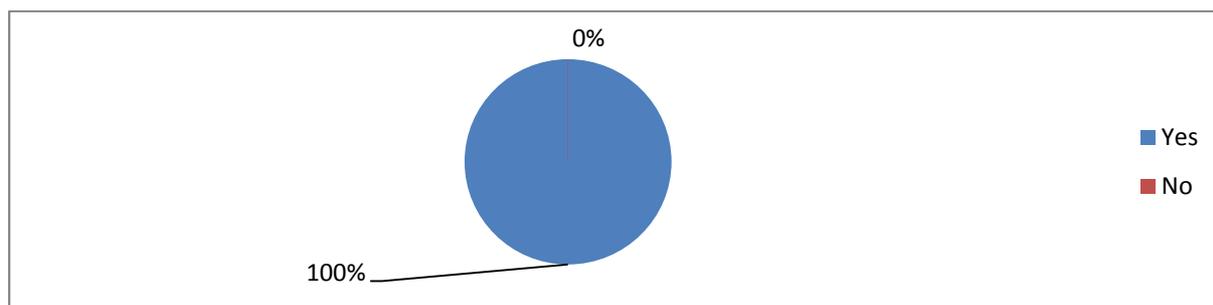
Figure 29: *Student's views about mind mapping strategy in writing different types of paragraphs*

Table (27) and figure (29) show that all the participants (100%) recognize the helpfulness of mind mapping after experiencing it. The students benefit from mind mapping in writing different types of paragraphs.

I.2.4. Do you think that seven 7 minutes are enough to draw a mind map?

Option	Number of students	Percentages
Yes	4	22.2 %
No	14	77.8%
Total	18	100%

Table 28: *time to draw a mind map*
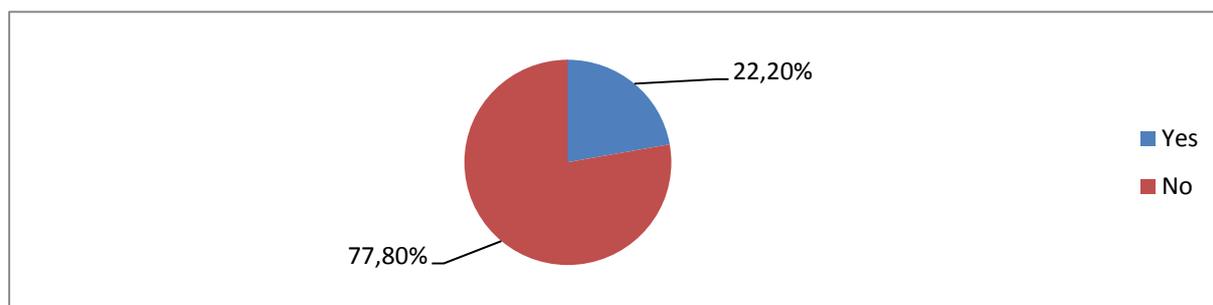
Figure 30: *time to draw a mind map*

The results obtained from table (30) and figure (27) reveal that 77.8% of the participants are not given sufficient time for drawing a mind map. On the other hand, 22.2% believe that the time given is sufficient. The majority of the participants think that the time allotted to mind mapping is insufficient.

I.2.5. if no, say why please,

Option	Reasons	Number of students	Percentages
No	Planning is the basis of writing	4	22.2 %
	Drawing a mind map to general ideas needs more time	10	77.8%

Table 29: *Student's reasons for the insufficient time allotted to mind mapping*
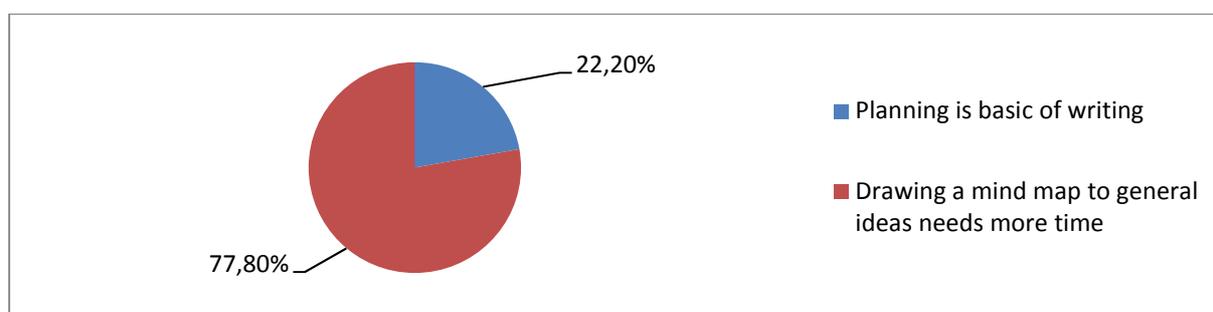
Figure 31: *Students' reasons for the insufficient time*

The table (29) and figure (31) show the reasons behind why students say that seven minutes are not enough for drawing a mind map. 22.2% claim that planning is the basis of writing, so, it needs more time, and 77.8% of the respondents state that seven minutes are not enough since drawing a mind map by generating ideas need more time.

I.2.6. Drawing a mind map.

Option	Number of students	Percentages
Content (connecting ideas)	6	33.3 %
Form (to avoid mistakes and errors)	0	0%
Both of them (contented form)	12	66.7%
Total	18	100%

Table 30: *Students' focus during drawing a mind map*
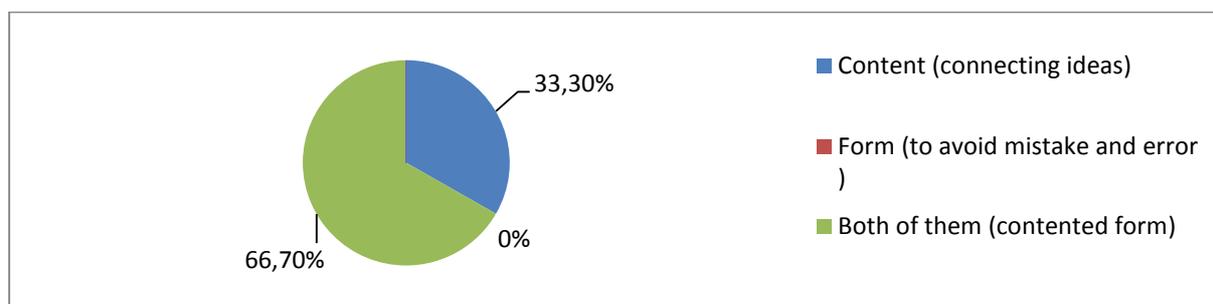
Figure 32: *Students' focus during drawing a mind map*

From table (30) and figure (32), we notice that more than half of the participants (66.7%) focus on both the form and the contentwhen drawing a mind map.That is why they believe that mind mapping is helpful in brainstorming and planning their ideas. 33.3% of them focus on the content rather than the form when drawing a mind map. Moreover, none of the participants focus only on the form when mapping.

I.2.7. Do you think that mind mapping strategy helped you to write easily and avoid errors?

Option	Number of students	Percentages
Yes	18	100 %
No	0	0%
Total	18	100%

Table 31: *Students' views about the positive effect of mind mapping on their writing*
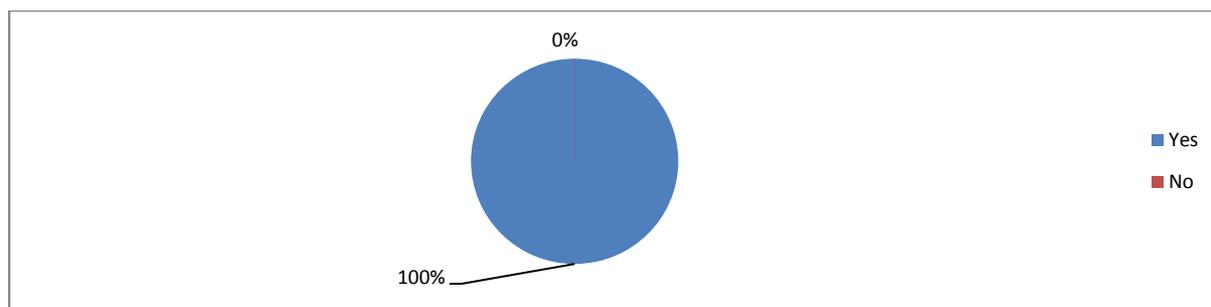
Figure 33: *Students' views about the positive effect of mind mapping on their writing*

Data obtained in the table (31) and figure (33), reveal that all the participants support the view that mind mapping strategy helped them to write easily and avoid errors.

I.2.8. Do you think that mind mapping strategy should be used by the teachers as a very important process?

Option	Number of students	Percentages
Yes	18	100 %
No	0	0%
Total	18	100%

Table 32: *students' opinions about the use of mind mapping strategy*
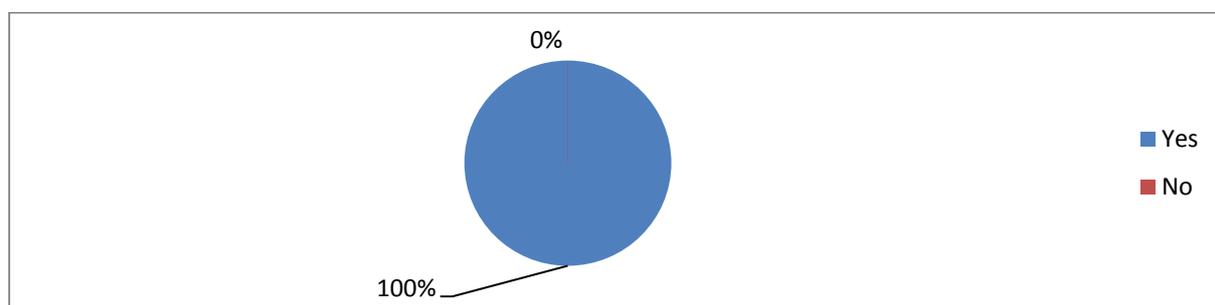
Figure 34: *students' opinions about the use of mind mapping strategy*

The table (32) and figure (34) show that all the participants (100%) find that mind mapping strategy should be used by the teachers as a very important process.

I.2.9. Why mind mapping should be used by the teacher?

Explanation	Number of students	Percentages
Mind mapping is a very important strategy	15	83.3 %
If the teachers use the mind mapping strategy, the student's writing would be more organized	3	16.7%
Total	18	100%

Table 33: *students' beliefs about teachers 'reasons for using mind mapping strategy*

16,70%

83,30%

- Mind mapping is very important strategy

- If the teachers use the mind mapping strategy, the student's writing will be more organized
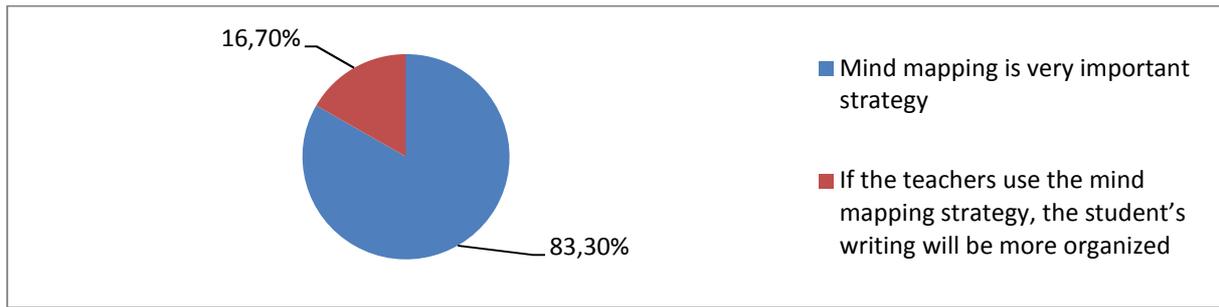
Figure 35: *students' beliefs about teachers' reasons for using mind mapping strategy.*

Table (33) and figure (35) represent the participants' reasons behind thinking that mind mapping should be used and taught by the teachers in the classroom. The majority of the participants (83.3%) claim that mind mapping is a very important strategy in the writing skill. For this, teachers should emphasize it.16.7% of them claim that if teachers use mind mapping strategy, students' writing would be more organized and enhanced.

I.3.the analysis of the students' paragraphs

I.3.1. Pre-Post Test Paragraphs

This part compares the results obtained from the analysis of the students' paragraphs before and after the experiment.

Surdents	Pre-test paragraph 10/10	Post-test paragraph 10/10
S1	4.5	6
S2	7	7.5
S3	5	7
S4	5.5	8
S5	5	6
S6	8.5	9
S7	7	8.5
S8	5	7.5
S9	4.5	6
S10	7	8.5
S11	4	5.5
S12	8	8.5
S13	6.5	7
S14	4.5	6
S15	5	8
S16	7.5	8.5
S17	4	5
S18	6	7
Mean scores	5.80	7.19

Table 34. *Students' scores in the pre-posttests.*

Table (33), represents students' scores in the pre-test paragraph before using mind mapping strategy and the post-test paragraph after implementing the mind mapping strategy. Then, the mean score of the whole group is used to compare the tests.

pre-post test means scores
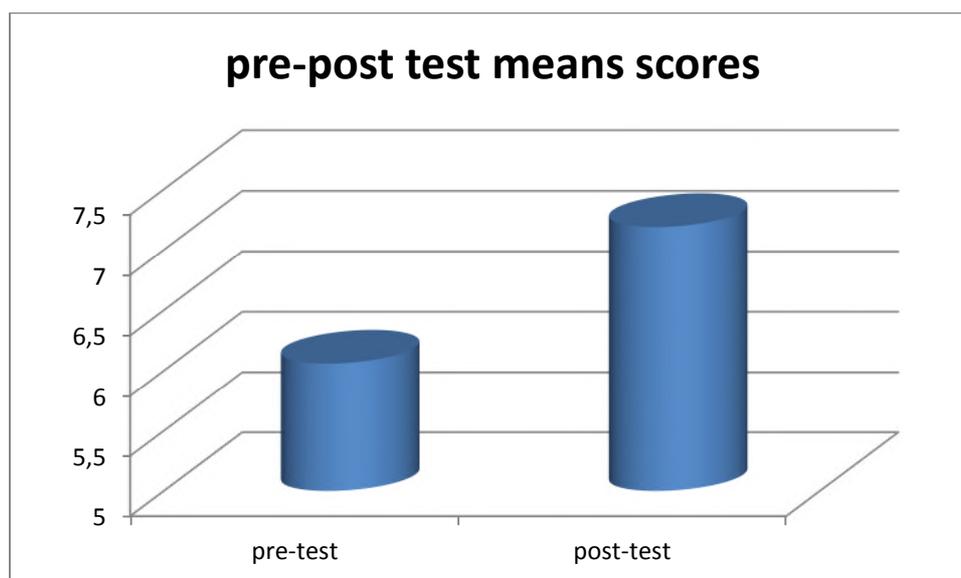
Graph 1. Comparison between pre-post tests' mean scores

Table (34) and graph (1)Illustrates the mean scores of both pre and posttests. By comparing the means, we notice that bachelor science students' writing is improved after implementing the mind mapping strategy.

Surdents	Descriptive paragraph	Narrative paragraph	Argumentative paragraph	Expository paragraph	Post-test paragraph
Group 1 (4)Students	1/4	2/4	3/4	4/4	4/4
Group 2 (4)Students	2/2	2/4	3/4	4/4	2/2
Group 3 (5)Students	1/3	2/3	2/2	4/4	3/3
Group 4 (5)Students	1/2	2/2	2/3	¾	4/4

Table 35: *the numbers of elements drawn in the map and included in each paragraph*

Group 1:

- Students when writing the descriptive paragraph, they mentioned four characteristics in the map, and in the paragraph, they included only one characteristic.

- When writing the narrative paragraph, students mentioned four main ideas in the map and only two were cited in the paragraph.

- Concerning the argumentative paragraph, the participants wrote four main arguments in the map and only three of them were cited in the paragraph.

- In the expository paragraph, students mentioned four main points in the map and all these points were developed in the paragraph.

- Concerning the post-test paragraph, students included in the paragraph all the points cited in the map.

Group 2:

- In the descriptive paragraph, students wrote two main characteristics in the map which they developed also in the paragraph.

- When writing the narrative paragraph,the participants mentioned four main points in the map and only two points were dealt with in the paragraph.

- In the argumentative paragraph, students wrote four main arguments in the map and only three were developed in the paragraph.

- Concerning the expository paragraph, the students included four main points in the map and all of them were highlighted in the paragraph.

- In the post-test paragraph, the participantsdeveloped all the elements mentioned in the map.

Group 3:

- When writing the descriptive paragraph, the participants mentioned three main characteristics in the map and only one was included in the paragraph.

- In the narrative paragraph,students included three main points in the map and only two were developed in the paragraph.

- Concerning the argumentative paragraph, they wrote two main arguments in the map and cited these two arguments in the paragraph.

- In the expository paragraph, students mentioned four main points in the map and they developed them in the paragraph.

- In the post-test paragraph, the respondents discussedin the paragraph all the elements cited in the map.

Group 4:

- When writing the descriptive paragraph, students wrote two main characteristics in the map and only one was cited in the paragraph.

- In the narrative paragraph, participants included two main points in the map and dealt with these two points in the paragraph.

- The participants in the argumentative paragraph wrote three main arguments in the map and onlytwo were mentioned in the paragraph.

- In the expository paragraph, the students cited four main points in the map and the four points were developed in the paragraph.

- In the post-test paragraph, the respondents discussed in the paragraph all the elements cited in the map.

- Concerning the post-test paragraph, the students developed all the points cited in the map.

II. Discussion

The analysis ofthe first part of thestudents'pre-questionnaire has revealed that half of students (50%) were aged between eighteento nineteen and the other half (50%) were aged between twenty to twenty-one. It shows that most of the sample selected were female students, and that they have an average level in English, and the majority of them have been studying English for seven years (middle and secondary school levels).

In the secondpart of the students' questionnaire, the majority of the students enjoy writing and most of them like writing activity since the whole participants found that writing activity is useful. When inquiring about the kind of difficulties students face in writing, results revealedfive main difficulties; vocabulary (44.4%), grammar (27.8%), punctuation (5.6%), coherence (5.6%) and organization of writing (16.7%).

Vocabularyis the most frequent problem. Most of the participants (44.4%) have a limited vocabulary that is why they find it difficult to write in English. During our experiment, we have observed that the learners along their writing use dictionaries or use Arabic language then translate tothe English language. The analysis of their texts showed this difficulty in that most of the time they use inappropriate words.

In addition to vocabulary, grammar is also challenging. (27.8%) of our participants reported difficulties in grammar. Our remarks in their paragraphs were about tenses; they misuse tenses. Another grammatical problem is subject-verb agreement. This was apparent in their writing. We have noticed that most of the participants have problems specifically subject-verb agreement of the third person (she, he and it) in the present simple.Moreover, the sample (5.6%) faced problems with punctuation; When analyzing their paragraphs, we have noticed that they misuse the English punctuation, for example they use comma instead of

semicolon or dot. In addition, the students find problems in organizing their writings. (16.7%) of our participants face problems in organizing ideas. Furthermore, in the analysis of their texts, repetition of the same idea is noticed; this reveals their problems in ideas' organization. Another issue is coherence, (5.6%) of the participants fail to make the text coherent.

Concerning planning before writing, (83.3%) of our participants argued that they do notplan before writing while (16.7%) claimed that they plan.

However,when we have asked those who plan about the strategy, they used they seemed unaware andthey mixed it up with drafting mainly. Additionally, only one of our participants who plan before writing claimed using outlining that is a planning strategy. While the two remaining ones suggested drafting, that is another writing stage rather than a prewriting strategy. During our experiment, we have noticed that they did not plan before writing. This was apparent when they were asked to write a paragraph in the classroom before the implementation of the mind mapping strategy.They started directly drafting. Also, we noticed that students do not plan because they do not know how to do it, and not because they do not recognize its importance since all of them (100%) claimed that planning before writing is necessary. Finally, we noticed that when learners are taught the mind mapping strategy, they used it during writing and they recognized its usefulness.

In the post questionnaire, the whole participants (100%) reported that mind mapping strategy is helpful in writing different types of paragraphs. Moreover, during the writing sessions, students have stated thatthe time given for drawing a mind map was insufficient for them. In addition, 22.2% stated that time is insufficient because planning is basic to writing and the majority of them (77.8%) stated that drawing a mind map to generate ideas needs more time.

Concerning our main point; that is the effect of mind mapping strategy on enhancing EFL students' writing skill, the findings of the post-test showed almost different results to the

pre-test with a considerable difference. The results obtained from the post-test paragraphs affirmed that the mind mapping strategy helped our participants to improve their writing. In our study, the mean scores of the post-test (M=7.19) revealed that mind mapping strategy has affected positively students' writings in comparison to the pre-test (M=6.06).

During our experiment, we observed that the whole participants respect all the points when drawing a map (before writing); but when writing the majority of them did not follow the map. They do not follow the logical order in their ideas for example, when it is a description, they jump from physical to emotional then to physical and so on. Moreover, students when writing they do not transform all the ideas cited in the map into a paragraph.

In the first session when students were given to write a descriptive paragraph, the majority of them when drawing the map mentioned many characteristics and when writing, they included only some of them. In the second session, when students were given to write a narrative paragraph, they mentioned many points and the majority of these points were not included in the paragraph. In the third session, when students were given to write an argumentative paragraph most of them mentioned many arguments but when writing they ignored some of them but comparing with other types of paragraphs there is an improvement. In the fourth session, the students included in the expository paragraph all the points that are mentioned in the map.

II.1. Observation of the Researchers

During the seven sessions, we have observed the students' behavior and took into account their points of view and comments.

In the first session, when speaking about writing some students were somehow not interested. After explaining what is meant by the writing process, and discussing its types, students began to have interest in.When we asked them to write a short paragraph about any topic of their choice, we have observed that the students hesitated to write; they did not know

from where to begin. Most of them did not find the exact words, and others used the Arabic language than translated into the English language. During the second session, we have presented the mind mapping strategy. Accordingly, almost all the students said to us that they have never heard about it or used it before; it is a new technique for them.

In the third session, we have introduced mind mapping strategy to write a descriptive paragraph. When we told them time is limited to seven minutes for drawing a mind map and after that the sheets will be taken, they felt anxious and mixed between mapping and drafting. When the students were asked to write a descriptive paragraph, we have observed that the majority of students confused mind mapping technique with drafting. The students did not understand whether they should plan or draft or it is the same thing. Then, we have explained what is meant by drafting and planning. During the following sessions, we continued introducing mind mapping in narrative, argumentative and expository paragraphs, and the students were so motivated.They tried to understand everything about this technique, since they liked it and they said along the sessions that it is an interesting and helpful strategy.

Section three: Limitations, Implications and Suggestions for Future Research

In this section, three main elements are discussed. Limitations in which we summarizesome constraints encountered during this study. Then, we provide someimplications and we finish by giving some suggestions for future research.

I. Limitations

During the present study, we have achieved important results and findings, but it is necessary to cite the different conceptual, methodological and other limitations that we have faced. In the conceptual limitations, we make reference to the difficulty of the writing skill and the lack of prewriting strategies in the EFL classroom that would help learners to better

plan and organize their ideas. Moreover, students ignore what to do in the prewriting step. Concerning the effect of mind mapping strategy, it is related to two main aspects. The first one is the learner's level in writing; the second one is the learner's differences such as intelligence and learners' preferences and styles.

The methodological limitations are summarized in the difficulties that we faced in the pre-experiment phase. We planned to do our experiment with second year EFL learners at the university of Bejaia, we distributed the pre- questionnaire to group four and we gathered data.Unfortunately, because of the strike which lasted a long duration, we could not continue our experiment with this group and we were obliged to do it in a private language and training school where we redistributed the pre-questionnaire.

Then, the number of students is limited to only 18 and we collected data in a very short period of time since our experiment lasted only two weeks with 7 sessions and it is not enough to ensure the effect of mind mapping strategy on writing skill. In this sense, Dam (2017) stated that the mastery of mind mapping is time consuming and it requires experience, that is to say, it is not easy to become a good mind mapper as this strategy is taught through time, experience and following instructions. Since we are limited by time, we did not give the participants sufficient time to practice more and gain more experience.Therefore, the results cannot be generalized.

Besides, during our experiment, we cannot control many factors such as students' attitudes toward writing because a number of students in the first session, when we asked to write a paragraph, wrote in Arabic because they dislike writing in English, learner's motivation which differs from one student to another and their assistance.

Finally, because of all these limitations, our results and findings cannot be generalized.

II.   Implications

Our objective in the present study is to confirm the hypothesis that mind mapping strategy enhances EFL students' writing skill. Thus, through the results obtained, we address a number of implications to make others benefit from our results. Theseimplications are as follow:

II.1. Teachers should devote more time and attention to the writing skill to change learners thinking about this skill: Many students find writing difficult, teachers should sensibilize their students about the importance of writing, how much it is essential to know the different stages of writing that should not be ignored, how to move from one stage to another and the importance of each stage. So, EFL teachers should devote more attention and time when teaching students writing skill because of its invaluable importance.

II.2. Teachers should implement mind mapping as a pre-writing strategy in the classroom. From our observation and students' answers, we notice that EFL teachers of private school do not use a prewriting strategy in the classroom.That is why, we request teachers to use mind mapping in the pre-writing phase because it will help learners to better associate and organize their ideas; it also motivates learners thinking and creativity. Besides they should teach them how to use mind mapping independently to organize their ideas before starting any piece of writing.

II.3. Teachers should give their students opportunity to practice more on the writing skill. By using as much as possible writing activities in the classroom in order to practice more the writing skill and the prewriting strategies, also they should give them home work activities in order to teach them how to write in different paragraph types by using the mind mapping strategy. This would help them develop their writing skill.

III. Suggestions for future research

The findings of this research reveal that bachelor science students of HCS private school at EL KSEUR have different writing difficulties. The majority of students do not plan before writing which means that our students do not follow the writing steps, and from the comparison between pre and post test, we conclude that after investigating mind mapping strategy, students writing skill has been developed and improved. Therefore, teachers could use this finding for an effective teaching of writing in the future. After conducting the present research some suggestions and recommendations are presented:

- First, this research work is conducted in private school instead of conducting it at the university of Bejaia because of the strike. So, future research could be conducted at the department of English at the university of Bejaia.

- Second, making more research about students' difficulties in writing and suggesting other writing strategies as a solution to get rid of these difficulties.

- Third, more research on the effect of mind mapping strategy on writing skill is needed in order to generalize.

- Fourth, the results of this research cannot be largely generalized, that is why, future research could be conducted on a large population.

Conclusion

This chapter highlighted the practical part of the research, in which we provided a detailed discussion of the findings of the present study andconcluded that mind mapping technique had a positive effect on students'writing skill. Moreover, because of the small sampling and the limited period of time, theresults cannot be generalized. We have proposed some solutions to getridof the students' writing difficulties. Then finally, we have concludedwith some suggestions for future research.

General Conclusion

The objective of conducting this research was to improve students' writing skill through investigating the mind mapping strategy among bachelor science students of HCS private school at EL KSEUR. Particularly, we have hypothesized that "if EFL learners use mind mapping strategy before writing, their writing skill would be improved". We have aimed at teaching students how to use mind mapping strategy to organize their ideas and avoid mistakes. To confirm or infirmour hypothesize, a pre- experimental study was employed, and to obtain required data, pre and post questionnaires, pre and post-test paragraphs, and textual analysis were adopted.

Our results show that students' writing was developed from the first session of the experiment to the last one. So, we notice that mind mapping technique plays a causal role in helping EFL students to improve their writing skill. In addition, mind mapping as a pre-writing strategy helps students to map, organize, and plan their ideas before starting writing. Besides, the data gathered from the post questionnaire revealed the students have developed positive attitudes towards this strategy. This was observed even during the experiment.

Finally, the comparison of the pre and post tests revealed that our participants' writing skill has been developed after the implementation of the mind mapping strategy. The main results obtained confirmed the hypothesis that the use of mind mapping strategy before writing improves the students writing skill.

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Appendix 01: Students' questionnaire

This questionnaire has the aim to shed light on students' views about writing and pre-writing techniques. The responses will remain confidential. Thank you for your collaboration.

Part one: General information

1. Your age: …………… years
2. Your gender: male   [ ]   female   [ ]
3. How do you evaluate your English level?......................................
4. How long have you been studying English? ……………………

Part two: Student's point of view towards writing

5. Do you enjoy writing?

    Yes   [ ]   No   [ ]

6. Please, say why?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

7. In your opinion what writing is?

………………………………………………………………………………………………
………………………………………………………………………………………………
………………………………………………………………………………………………

8. Do you like English writing activity?

Yes   [ ]   No   [ ]

9. Do you think that writing activity is essential and useful?

Yes   [ ]   No   [ ]

10. Please indicate to which extent do you agree or disagree with this statement.

1-Strongly disagree   2-Disagree   3-Neutral   4-Agree   5- Strongly agree

Statements					
1) Writing is the most complicated skill					
2) Writing paragraph is difficult					
3) I rely on my previous knowledge when writing					
4) The more I brainstorm my ideas before writing, the more my					

writing will be good					
5) I think it is easier to express our ideas in the writing form rather than the spoken one					
6) My language competence is used to create pieces of writing					
7) My teacher provides me with writing techniques and information					
8) I write for pleasure in my free time in English					

11. Which kind of difficulties do you face in writing?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
…………………………………………………………………………………………………..

Part three:pre-writingstep

12. Do you organize your ideas before writing a paragraph?

Yes [ ]   No [ ]

13. Do you work with your classmates on assignments or handouts?

Yes [ ]   No [ ]

14. Do you consider the task or assignment before writing?

Yes [ ]   No [ ]

15. Do you brainstorm and write down ideas before you begin to writer?

Yes [ ]   No [ ]

16. Do you planor take notes before writing?

Yes [ ]   No [ ]

Part four: Mind mapping

17. Do you know what Mind Mapping is?

Yes [ ]   No [ ]

.Definition of Mind Mapping:

"A Mind Mapping is a web like structure composed of words, pictures or images, and lines created with the sole intention of visual organization of information"(Scott, 2015, p. 3).

18. What do you do firstwhen you are given to write paragraph?

……

……

19. Do you think that planning before writing is necessary?

Yes ☐   No ☐

20. Please, say why?

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………..

21. If yes do you plan your ideas before writing?

Yes ☐   No ☐

22. Please, say how?

……

……

……

23. Do you think that the mind mapping strategy can help you to organize Your ideas before writing?

Yes ☐   No ☐

Part five: Further suggestions:

24. Would you add any suggestions or comments on the prewriting strategies

……

……

……

……

……………………………………………………………………………………………….....

Thank you for your collaboration.

Appendix 02: Post questionnaire

Dear students,

After conducting our experiment, we would like you to answer this post questionnaire.

Students' attitudes about mind mapping strategy

✓ Answer the following questions Please:

1) After performing mind mapping strategies, did you find it helpful?

       a. yes   □
       b. No   □

2) If yes, explain how?

....
....
....
....

3) Do you find that mind mapping strategy is helpful in writing different types of paragraphs?

       Yes   □
       No   □

4) Do you think that ten (07) minutes is enough to draw a mind map?

       a. Yes   □
       b. No   □

5) If no, say why?...
....
....

6) On which side you emphasis when drawing a mind map?

   ➤ Content (connecting ideas).   □
   ➤ Form (to avoid mistakes and errors). □
   ➤ Both of them (content and form).   □

7) Do you think that mind mapping strategy helped you to write easily and avoid errors?

       a. Yes   □
       b. No   □

8) Do you think that mind mapping strategy should be used by the teachers as a very important process?

       a. Yes   □
       b. No   □

- Why?

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

…………………………………………………………………………………………….

Thank you for your collaboration

Appendix 03: the first session (pre-experiment)

HCS private school   *Experimental group: G2*

Grade: Bachelor science students   *Course: writing*

Session one:expanding students' knowledge about the writing skill.

Topic: the writing skill	**Aim:** Explain to students the importance of writing skill and to know that writing is not only a set of combined words and sentences but it is a creative skill. To help students: -understand well what is writing -learn the steps of writing. -know how to move from one step to another
Level: bachelor science students, G2	**Warming up:** interacting with students to know their points of view toward writing skill: - How do you begin writing down your paragraph? - did you use any prewriting techniques before writing?
Date : Saturday, March 21st,2019	**Presentation:** explaining what is meant by writing skill, the four steps of writing and how to follow them in a structured way. **Practice:** The students will be asked to write a paragraph about a topic of their choice **Evaluation:** collecting students copies and correct them
Time:13:00-14:00	

Appendix 04: the second session (pre-experiment)

HCS private school   *Experimental group: G2*

Grade: Bachelor science students   *Course: writing*

Topic: Mind Mapping strategy

Session tow: organizingand planning your ideas before writing a paragraph.

Topic: Mind Mapping strategy	**Aim:** implementing mind mapping as prewriting technique to : -help students learn how to start their writing. -guide them to organize and plan their ideas. -help students record, connect and output their information in a visual expressive way and a structured paragraph.
Level: bachelor science students, G2	**Warming up:** ask students about mind mapping and its effect on their writing. **Procedures:** we start to explain what mind mapping is by giving an example about how to use it (drawing a mind map about pollution) and transform this mind map into a paragraph with the help of the students.
Date: Monday, March 23ˢᵗ, 2019	**Practice:** ask students to draw a map about a topic of their choice (7minutes) than transform the map into a paragraph. **Evaluation:** collecting students maps and paragraphs and correcting them
Time:10:00-11:00	

Appendix 05: the third session (pre-experiment)

HCS private school   *Experimental group: G2*

Grade: Bachelor science students   *Course: descriptive paragraph*

Topic: Mind Mapping strategy

Session three:. Implementing mind mapping strategy in a descriptive paragraph.

Topic: Mind Mapping strategy in a descriptive paragraph	**Aim:** at the end of this session, students will: -provided with more information about descriptive paragraph. - be able to write a descriptive paragraph by using mind mapping technique.
Level: bachelor science students, G2	**Warming up:** activating students' knowledge about mind mapping by asking them about its importance during writing a descriptive paragraph.
	Procedures: **-**First, we take a prepared descriptive paragraph (about the father) and transform it together into a map.
Date : Wednesday, March 25th,2019	-Second, we draw together a map for the chosen topic (describing our country) than transform the ideas included in the map into a paragraph. **Practice:** ask students to write a paragraph about describing their mother by a mind map. **Evaluation:** collecting students maps and paragraphs and correcting them.
Time:14:00-15:00	

Appendix 06: the fourth session (pre-experiment)

HCS private school   *Experimental group: G2*

Grade: Bachelor science students   *Course: narrative paragraph*

Topic: Mind Mapping strategy

Session four: Using mind mapping strategy in a narrative paragraph.

Topic: Mind Mapping strategy in a narrative paragraph	**Aim:** at the end of this session, students will : - Know how to use the mind mapping as an effective strategy to organize their ideas and make a plan for writing a narrative paragraph. **Warming up:** activating students' knowledge about mind mapping by asking themabout its significant function during writing a narrative paragraph.
Level: bachelor science students, G2	**Procedures:** **-**First, we take a prepared story (about desperate house wives) and transform it together into a map.
Date : Sunday, March 29th,2019	-Second, we draw together a map for the chosen topic (whit snow and seven dwarfs) than transform the ideas included in the map into a paragraph. **Practice:** ask students to write a paragraph about narrating their first day in high school by using a mind map. **Evaluation:** collecting students maps and paragraphs and correcting them.
Time:13:00-14:00	

Appendix 07: the fifth session (pre-experiment)

HCS private school   *Experimental group: G2*

Grade: Bachelor science students   *Course: argumentative paragraph*

Topic: Mind Mapping strategy

Session five: Introducing mind mapping strategy in an argumentative paragraph.

Topic: Mind Mapping strategy in an argumentative paragraph	**Aim:** at the end of this session, students will : - Know how to use the mind mapping as an effective strategy to organize their ideas and make a plan for writing an argumentative paragraph.
Level: bachelor science students, G2	**Warming up:** activating students' knowledge about mind mapping by asking them about its significant function during writing an argumentative paragraph. **Procedures:** **-**First, we take a prepared argumentative paragraph (why smoking in public places has to be banned?) and transform it together into a map. -Second, we draw together a map for the chosen topic (why do you prefer living in the city?) than transform the ideas included in the map into a paragraph.
Date : Tuesday, March 31st,2019	**Practice:** ask students to write an argumentative paragraph about why English language is important by using a mind map. **Evaluation:** collecting students maps and paragraphs and correcting them.
Time:10:00-11:00	

Appendix 08: the sixth session (pre-experiment)

HCS private school   *Experimental group: G2*

Grade: Bachelor science students   *Course: expository paragraph*

Topic: Mind Mapping strategy

Session six: Introducing mind mapping strategy in an expository paragraph.

Topic: Mind Mapping strategy in an expository paragraph	**Aim:** at the end of this session, students will : - Know how to use the mind mapping as an effective strategy to organize their ideas and make a plan for writing an expository paragraph.
Level: bachelor science students, G2	**Warming up:** activating students' knowledge about mind mapping by asking them about its significant function during writing an expository paragraph. **Procedures:** -First, we take a prepared expository paragraph (maxi power vacuum cleaner) and transform it together into a map. -Second, we draw together a map for the chosen topic (oxford dictionary) than transform the ideas included in the map into a paragraph.
Date : Thursday, April 2nd,2019	**Practice:** ask students to write an expository paragraph about phytomax (dietary supplement) by using a mind map. **Evaluation:** collecting students maps and paragraphs and correcting them.
Time: 13:00-14:00	

Appendix 09: the seventh session (post-experiment)

HCS private school   *Experimental group: G2*

Grade: Bachelor science students   *Course: writing*

Session seven:evaluating students' levelwhen usingmind mapping.

Topic: writing a paragraph using mind mapping	**Aim:** help students to use mind mapping technique individually (without the help of the teacher) in any paragraphs' type. **Warming up:** interacting with students to know their points of view toward the mind mapping strategy
Level: bachelor science students, G2	**Presentation:** summarizing all what we have dealt with in the previous sessions. **Practice:** The students will be asked to write a paragraph about free topic by using mind mapping strategy. **Evaluation:** collecting students copies and correct them
Date : Saturday, April 4th,2019	
Time:13:00-14:00	

Appendix 10: The First Sample of Students' pre-test paragraphs

Note Book

In the modern world, different forms of pollution take oxygen from the air, rivers and oceans. In our cities, vehicles and factories swallow oxygen, and their fumes poisons the air with carbon dioxide.

This urban pollution spoils the air we breathe. It is the major cause of ~~these~~ diseses such as lung and skin cancers. If nothing is dotol reduced carbon dioxide emissions, most of us will died of these diseases.

In the countryside, fertilisers which contains phosphorus and nitroge spill over into rivers. As a result, fish is dying in increasing numbers, and, aquatic life is sufocating from lack of oxygen.

Appendix 11: The second Sample of Students' paragraphs

In The modern world, different forms of population take oxygen from the air, rivers and oceans. In our cities, vehicles and factories swallow oxygen, and Their fumes poisons the aire with carbon dioxide.

This urbane pollution spoil the air we breathe.

It is the major cause of diseses such as lung and skin cancers. If nothing is do to reduse carbon dioxide emissions, most of us will diecle of thise diseases. In the contryside fertilisers wich contains phosphorus antd nitrogen spill over into rivers. As a result, fish is dying in increasing numbers, and aquatic life is sufocating from lack of oxygen.

Appendix 12: The third Sample of Students' descriptive paragraphs

My Mother is my Number one favorite Person in My life. She is Present in all the beautiful and the bad Moments of My life. She is a Precious gift to Me. My Mother is So beautiful in my eyes, She is tall and fat a little bit, She have a nice Smile and When She Smiles at me I feel good.

My Mother is full of Tenderness, She has a Kind and caring heart, She is so Sensitive that She cries When Someone cries in front of her. She loves people and helps them.

Appendix 13: The third Sample of Students' narrative paragraphs

My first day in high school was different,
I was too stressed and scared at the same time.
I was afraid of the chaange, it Was a New
involvement: New place, New class, New People,
New teachers, ..., and I was too afraid of the
change of syllabus because we had New
reasons different of the one of the secondry
school and we had a lots of information to
Memorize.

But Most importantly, I was Now in high
School and I wasable to see my friends who
I didn't See all Summer.

Appendix 14: The fourth Sample of Students' argumentative paragraphs

English is the language of Science and tourism. It is very important in our life, it permets to communicat easily with your fellow global citizens. We can use it to chating with foreingn people, it an international launguage, We can use it every where around the world and it permet to find a job in different countries in the world.

English is the dominant business language and it is very important to people to speak English in business. This is why English is really important for a person in these times.

Appendix 15: The fifth Sample of Students' expository paragraphs

Philomax is a medical product, you can buy it in the pharmacy, it consist of capsules for both men and women, this capsules will make your dream of having children come true, many studies have been done in laboratories before testing this medicament so their is no need to be afraid and I advice you to buy it and test it, this medicament is without side effects, it is make with naturel ingrediants.

Appendix 16: The sixth Sample of Students' post-test paragraphs

I celebrated my birthday yesterday, I woke up early in the morning, I prepared the birthday room with my mother. We decorated it with beautiful candles and ballons we also prepared the food and my favorite chocolate cake. In The afternoon my friends, classmates and members of my family have arrived, they brought me back beautiful gifts such as: Jewelries, clothes, perfumes, I was so happy. The best moment of the birthday arrived, we cut the cake, I blew the candles than I made a wish. we danced and played together the rest of the party, we had too much fun It was a very beautiful day I am gratful to my dear mom and the gusts the guests who made this day wonderfull.

Appendix 17: The First Sample of Students' mapping sheets

The air
↳ vehicles
↳ factories

rivers
↳ carbon dioxide

Pollution

oceans
↳ Urban

Maladies
↳ cancers
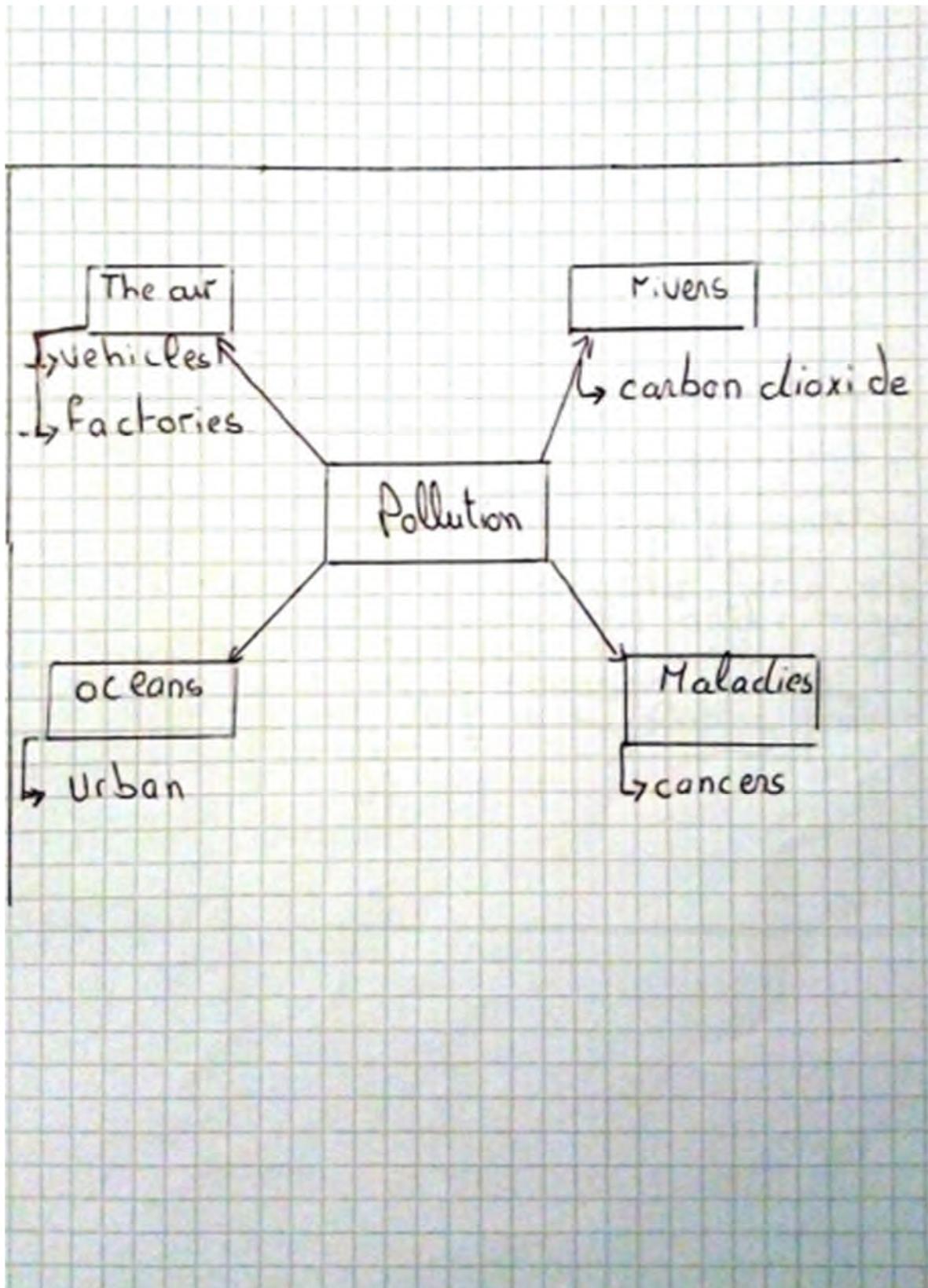
Appendix 18: The second Sample of Students' mapping sheets (Descriptive)

Descriptive Paragraph

Moral qualities
→ Tenderness
→ Kind
→ caring heat

My Mother

Physical qualities
→ beautiful
→ tall
→ fat
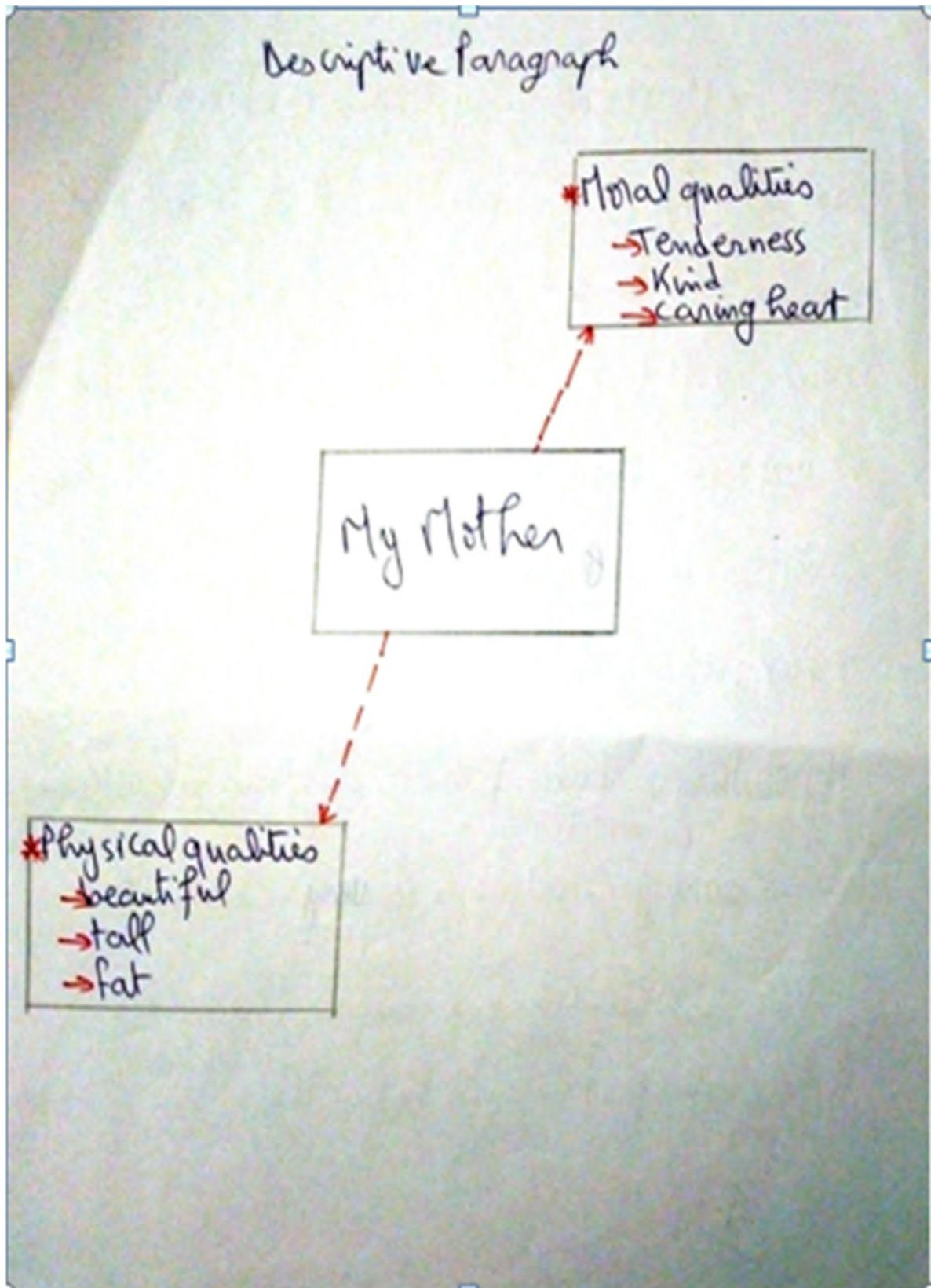
Appendix 19: The third Sample of Students' mapping sheets (Narrative)
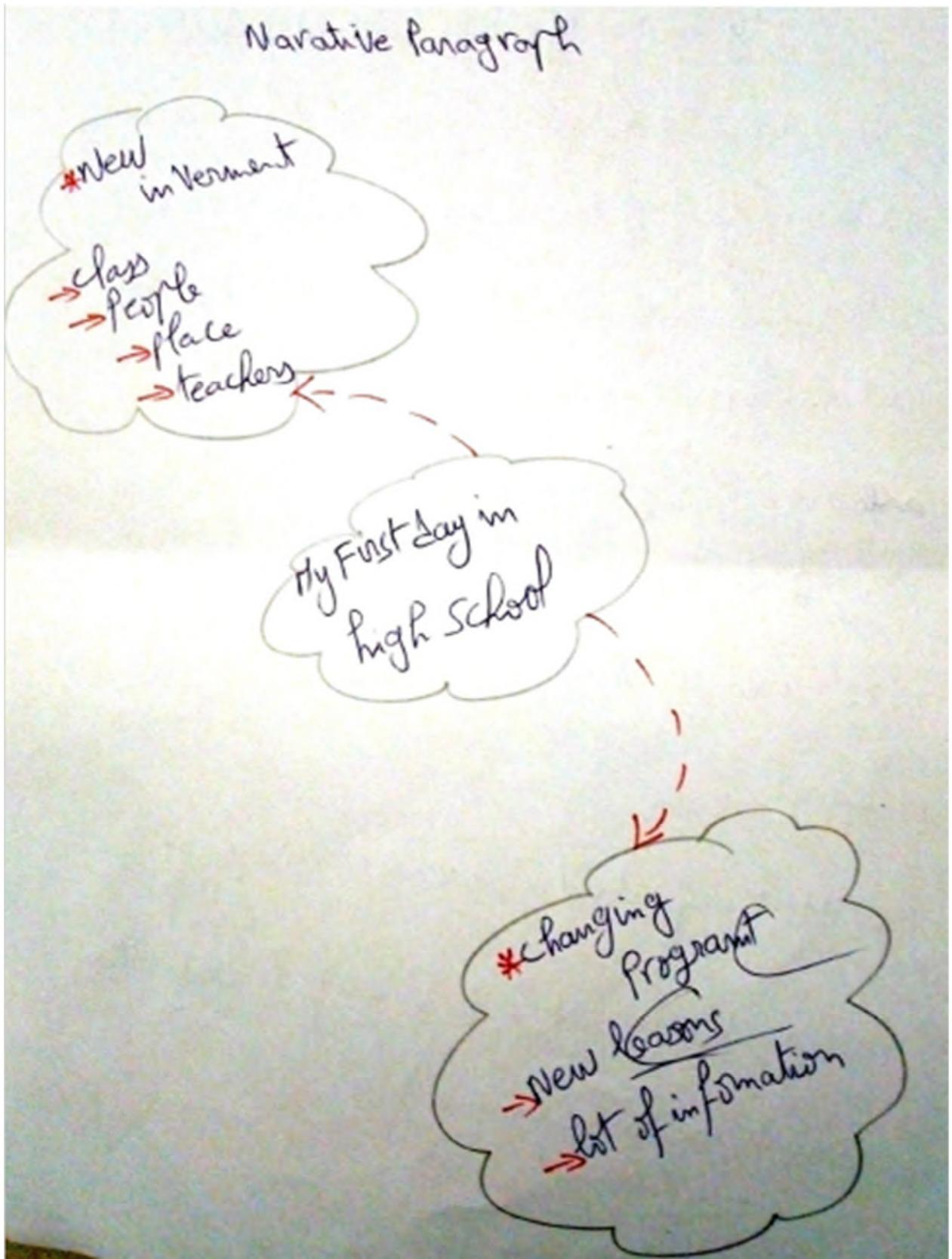
Appendix 20: The Fourth Sample of Students' mapping sheets
(argumentative)

Arguementative paragraph.

* JOB
→ you can work in different countries in the world.

* business
→ Necessity to speak English in business.

English is important

* International language → can use it every where around the world.

* communicate easily with fellow global citizens → chating with people foreign.
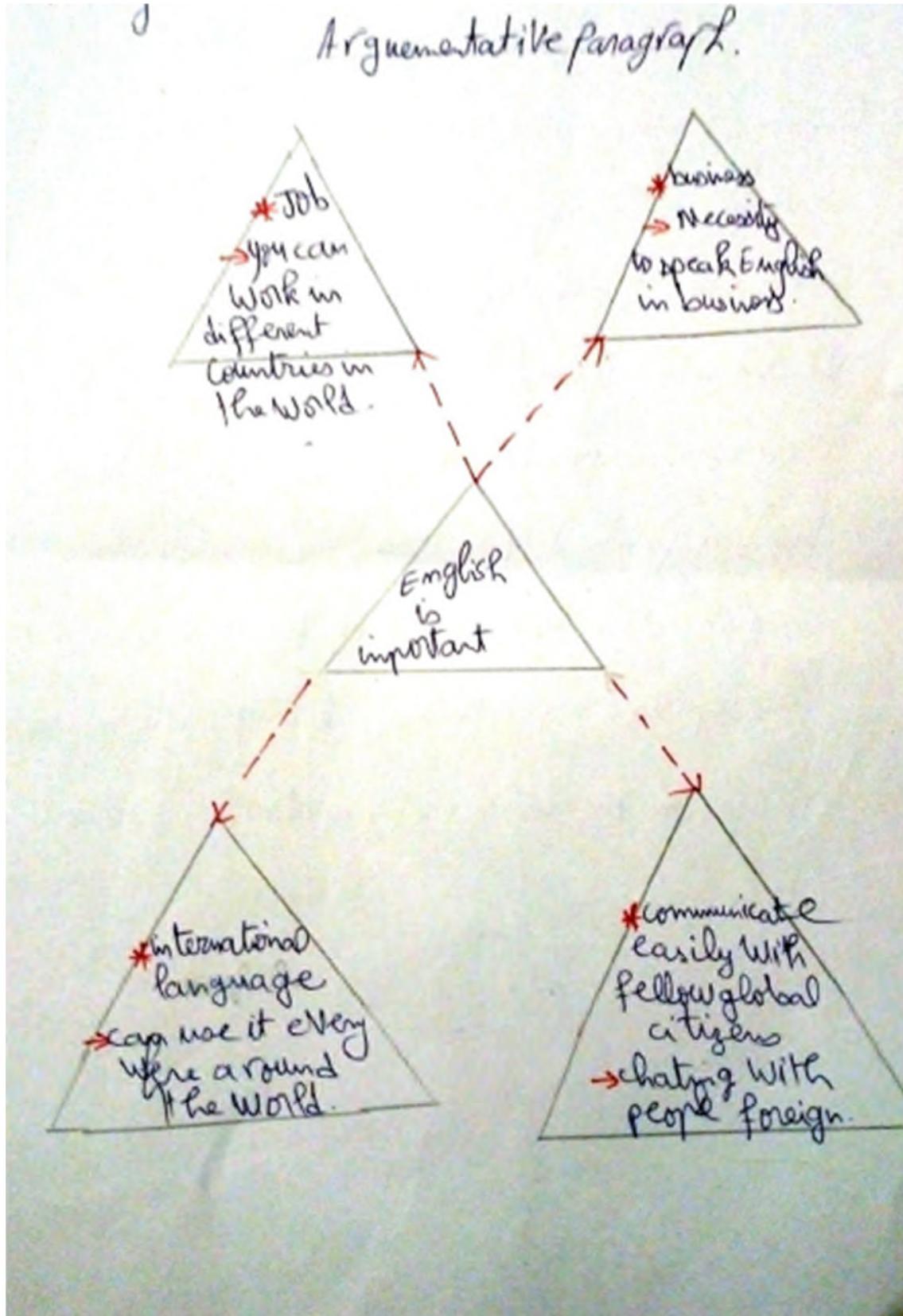
Appendix 21: The Fifth Sample of Students' mapping sheets (Expository)

Expository paragraph.

dream

→ dream of having children come True.

a medical product

→ for both men and women

phitomax

experiment → Studies done before testing the product.
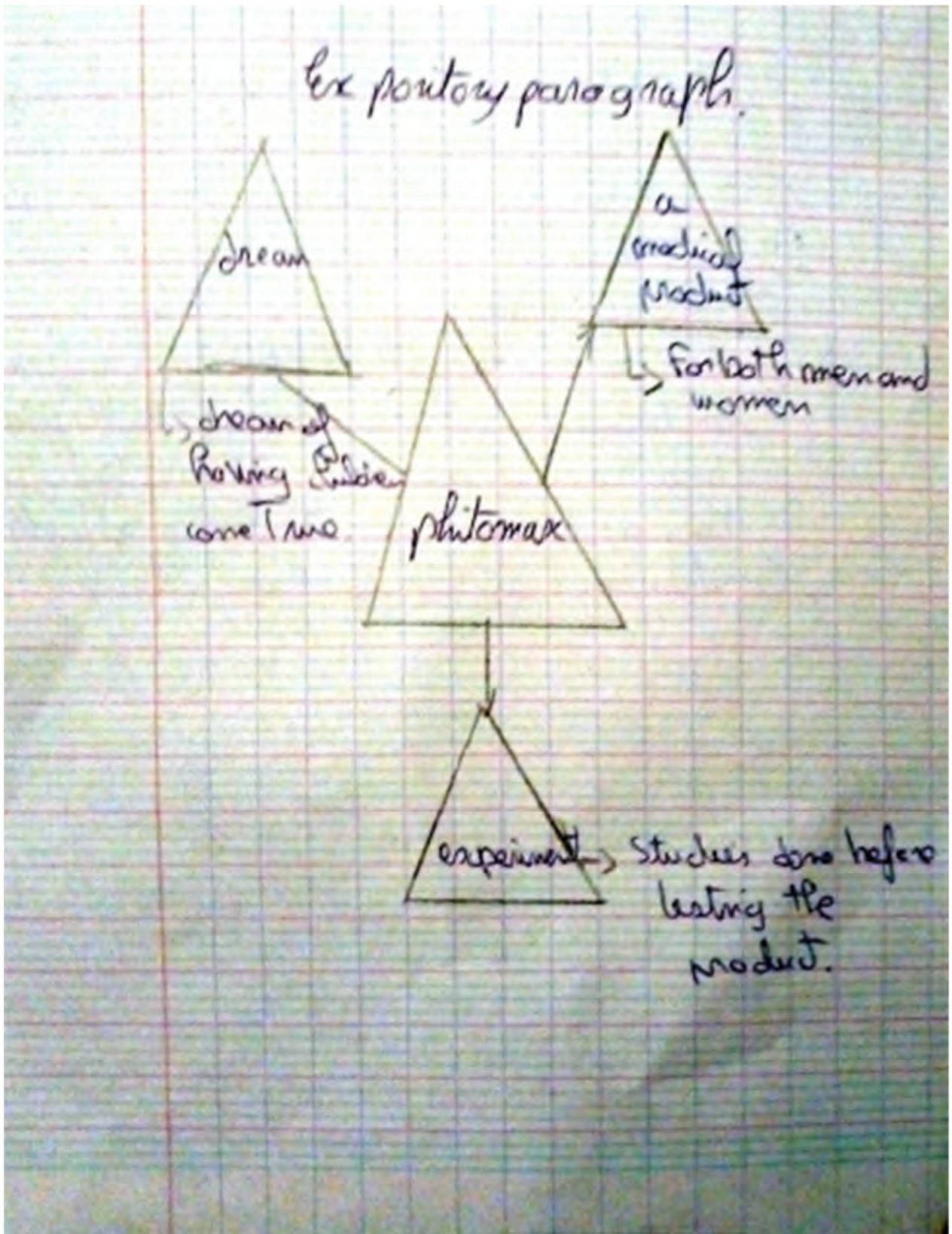
Appendix 22: The sixth Sample of Students' mapping sheets

Decoration
- candls
- Ballons

Date

party
- cake
- food
- chadat

Birthday

Inchitation
- Family
- Friends
- classmates

- Gifts
- perfume
- Jewelry
- clothes
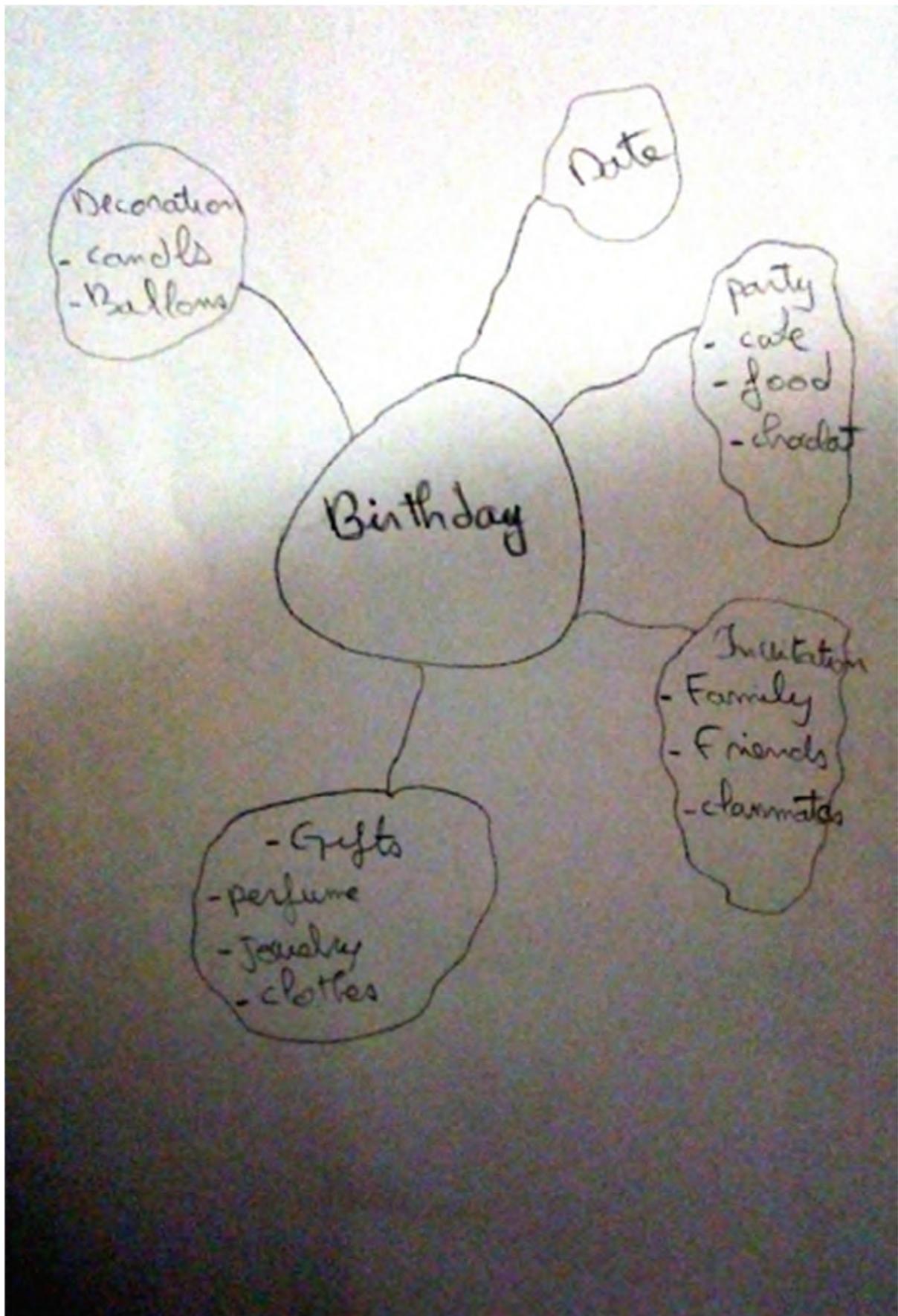
Appendix 23: Spider Map

Appendix 24 : Series of Events Chain

TREES

give   give

OXYGEN   WOOD

is important to   is important to

is important to

is used to build   is used to make   is used to make

Humans   Plants   Animals   Houses   Paper   Furniture
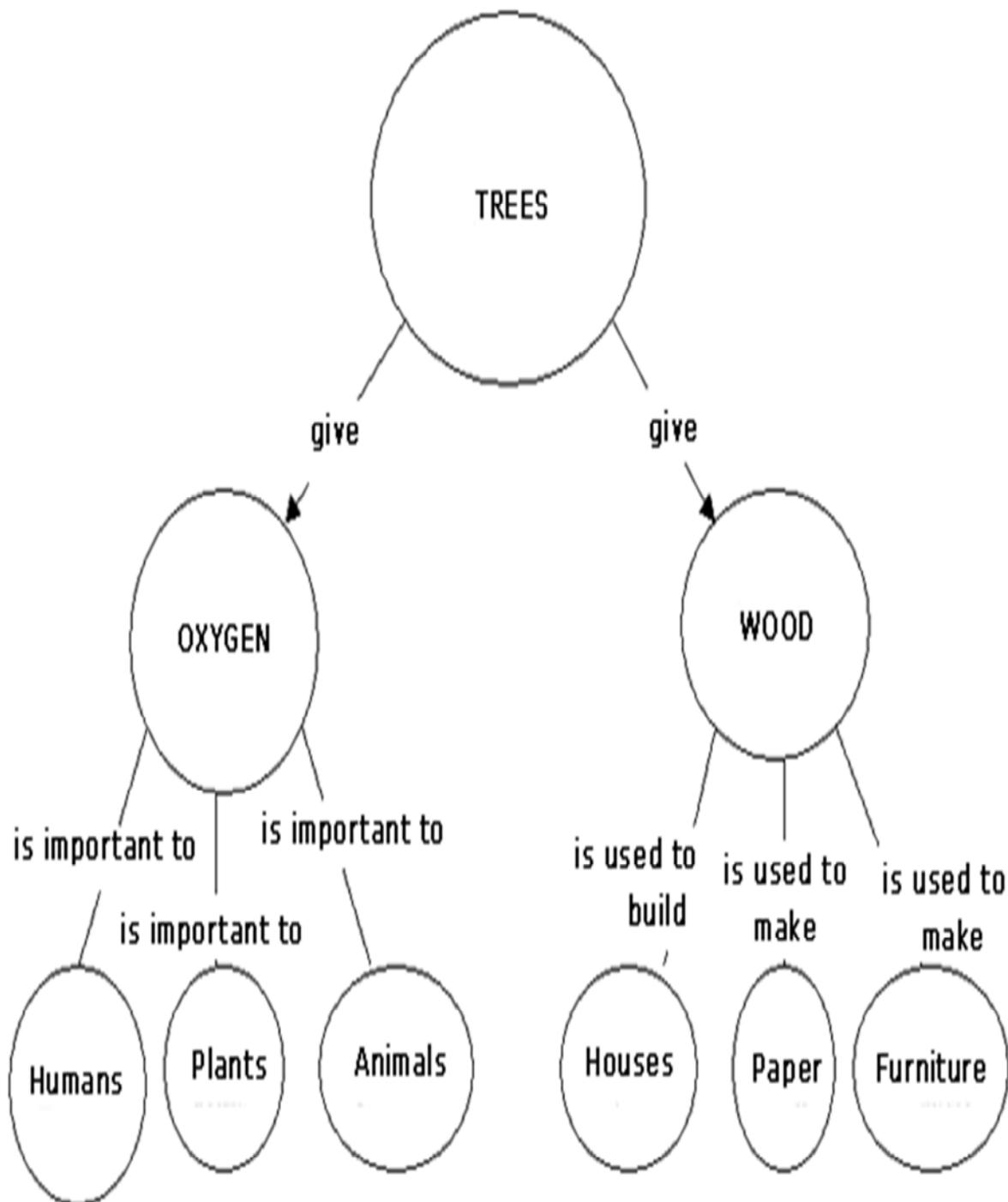
Appendix 25: Charts

Appendix 26: Concept Maps

Concept Maps
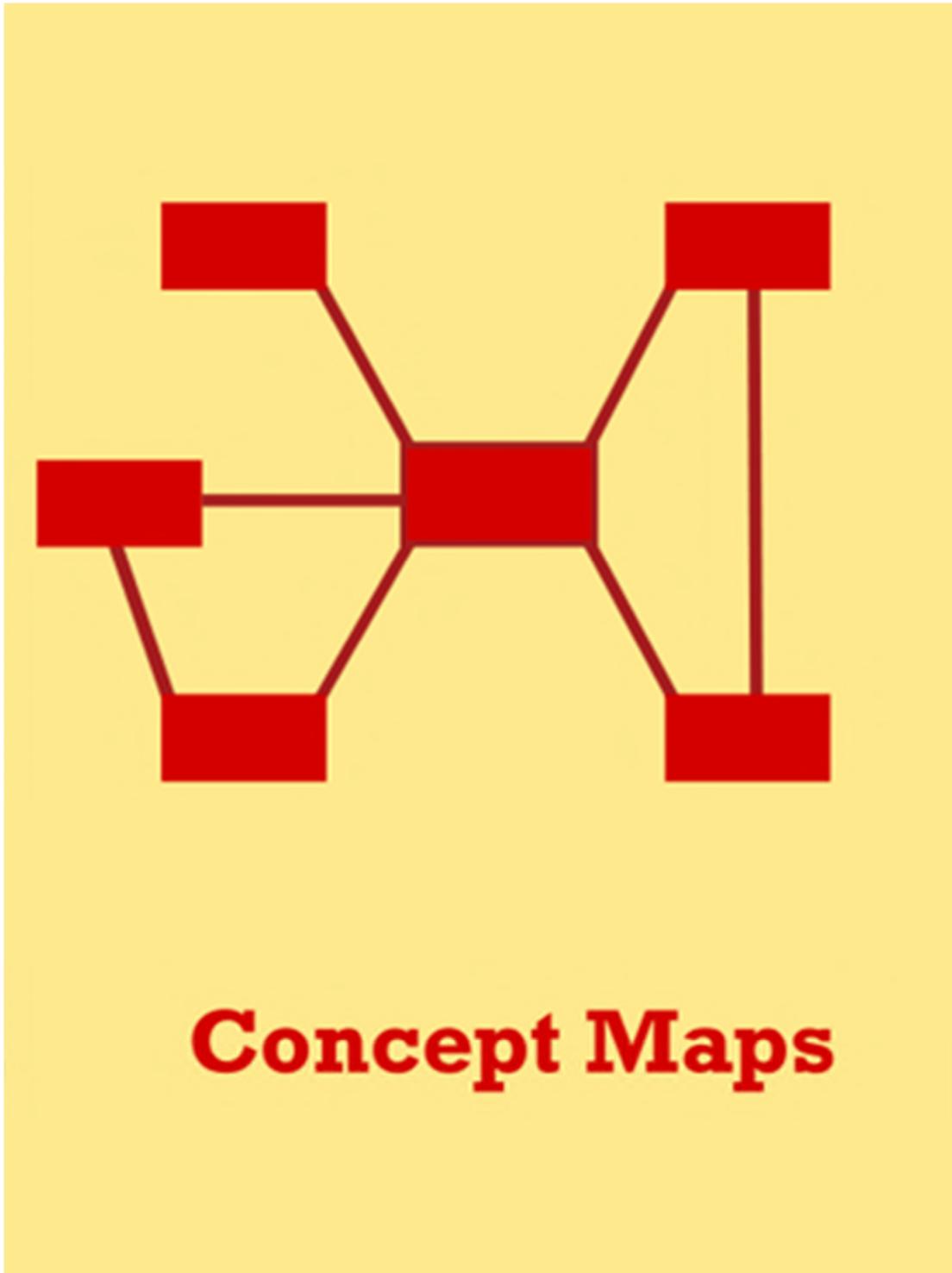
Appendix 27: Mini Mind Map
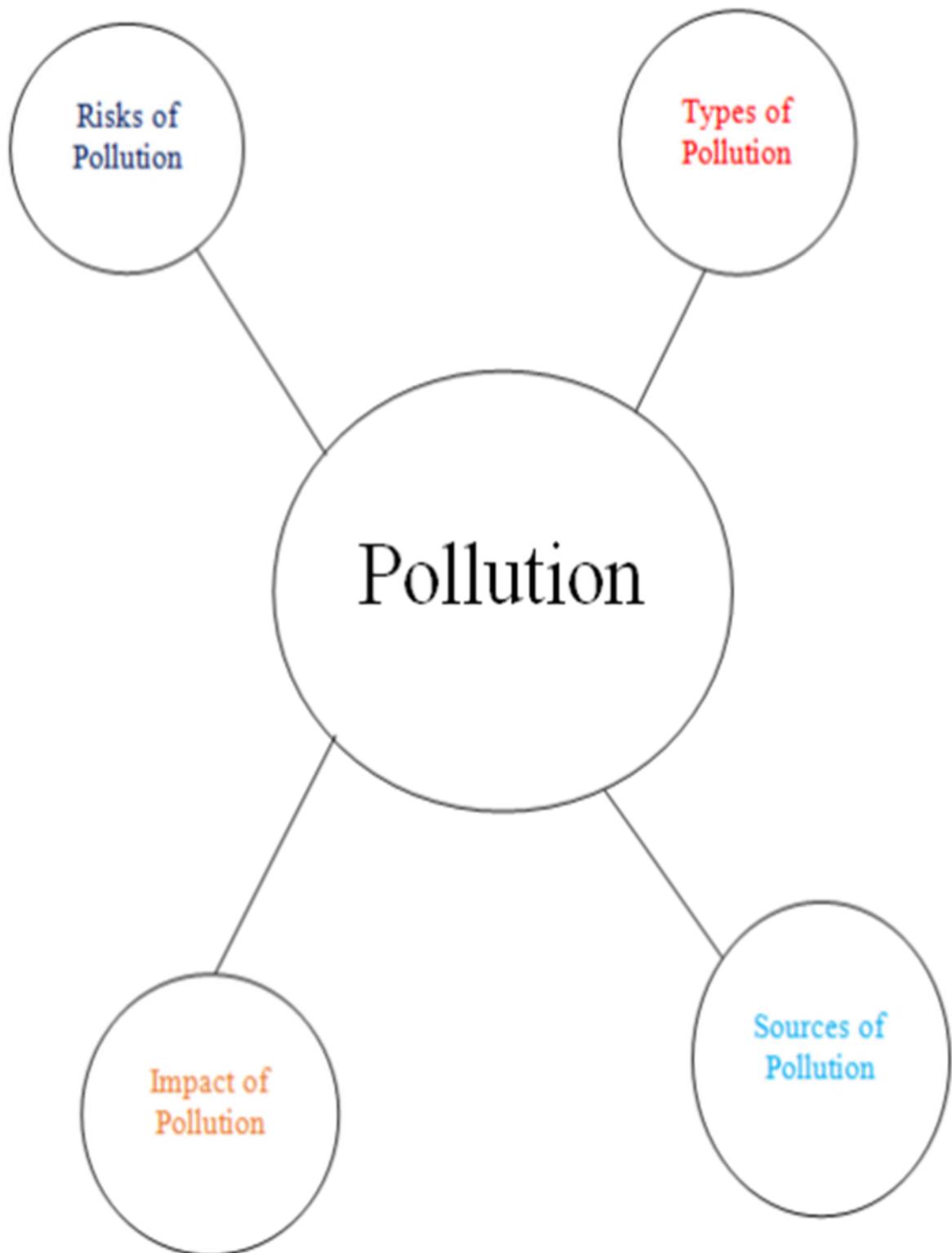
Personal design

Appendix 28: Idea Generation Map (stage one)

- COMERCIAL INDUSTRY
- CHEMICAL CONTAMINATIO
- OIL NOISE
- DOMESTIC
- POLLUTION
- SOURCES IMPACT
- ENVIRENMENT ATMOSPHERE
- FACTORIES RECYCLING
- CARS BOAT
- TYPES FACTORIES
- LEND AIR
- RADIATION POLLUTION
- HEALTH
- WATER GAS
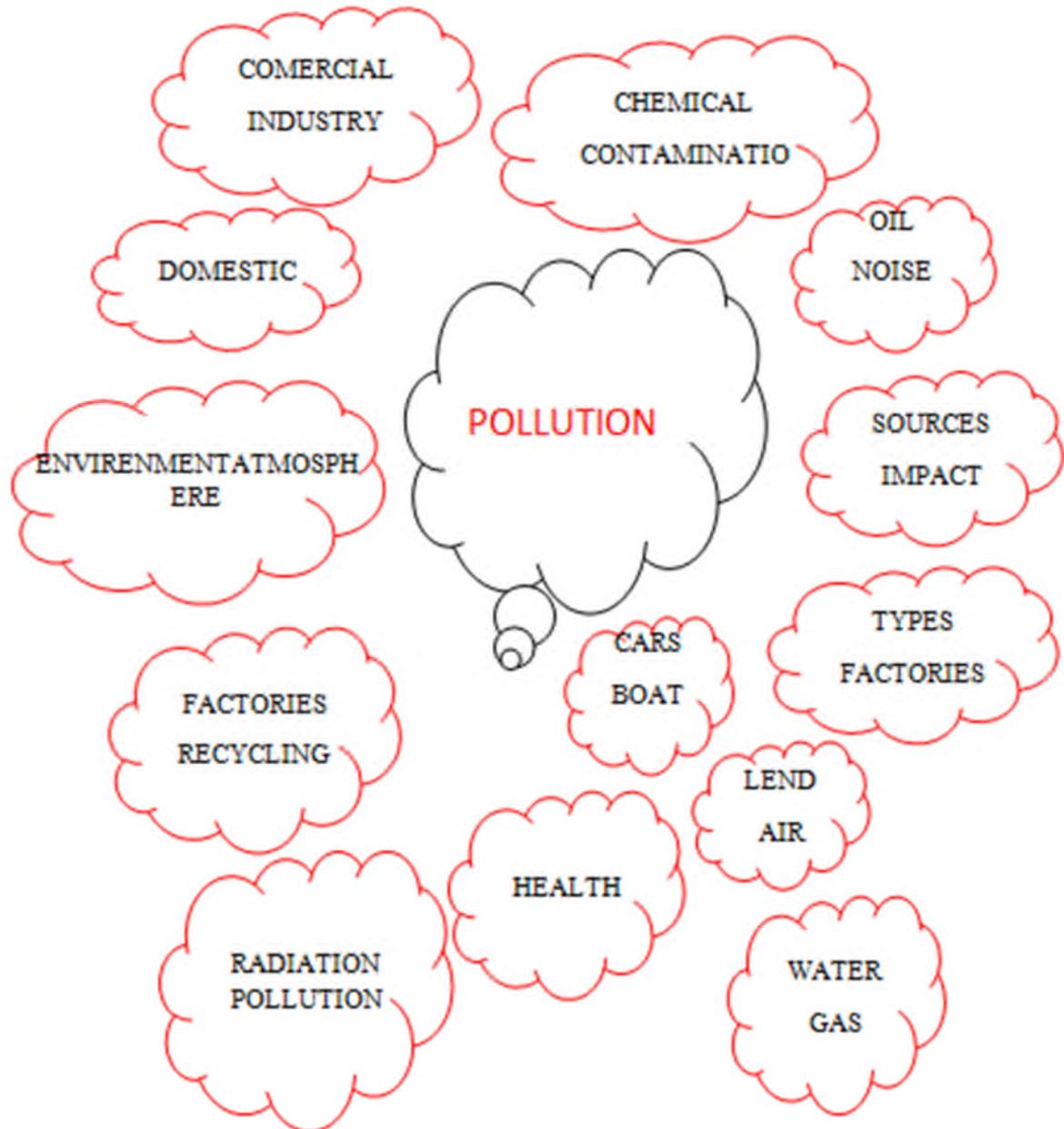
Personal design

Appendix 29: Idea Generation Map (stage two)

RISKS OF POLLUTION :

1. Chemical risks
2. Contamination risks

TYPES OF POLLUTION :

1. Noise pollution
2. Atmosphere pollution
3. Radiation pollution
4. Water pollution

POLLUTION

IMPACT OF POLLUTION :

2. On environment
1. On health

SOURCES OF POLLUTION :

1. Commercial sources
2. Industry sources
3. Domestic sources

Personal design
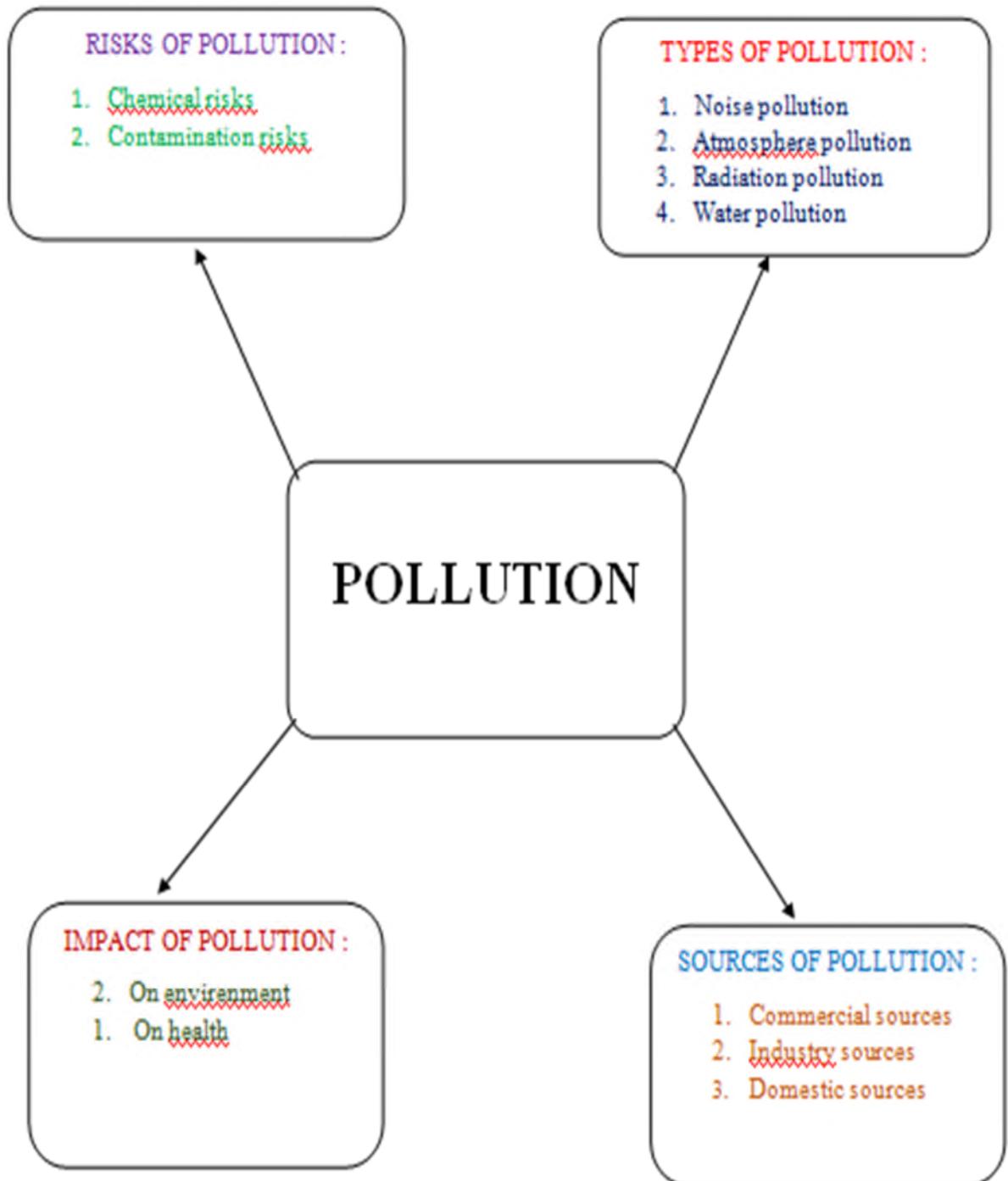
Appendix30 : the Participants' Scores in the Pre and Post Tests

Students		Pre-testparagraph /10	Descriptive paragraph	narrativeparagraph	Argumentative paragraph	Expository paragraph	Post-test paragraph /10
Section 1	S1	4.5	1/4	2/4	3/4	4/4	6
	S2	7					7.5
	S3	5					7
	S4	5.5					8
Section 2	S5	5	2/2	2/4	3/4	4/4	6
	S6	8.5					9
	S7	7					8.5
	S8	5					7.5
Section 3	S9	4.5	1/3	2/3	2/2	4/4	6
	S10	7					8.5
	S11	4					5.5
	S12	8					8.5
	S13	6.5					7
Section 4	S14	4.5	1/2	2/2	2/3	3/4	6
	S15	5					8
	S16	7.5					8.5
	S17	4					5
	S18	6					7
	Meanscorces	5.80					7.19

Résumé

La plupart des étudiants considèrent l'écriture comme une tâche difficile car ils ont du mal à se lancer et à organiser leurs idées. La présente recherche vise à explorer la relation entre la cartographie de l'esprit et les compétences rédactionnelles des étudiants. Cette étude a pour objectif d'examiner l'effet de la cartographie mentale en tant que stratégie de pré-écriture sur le renforcement des compétences en écriture des étudiants EFL. Pour atteindre l'objectif de la recherche, une étude pré-expérimentale a été réalisée. Pour tester notre hypothèse, nous avons utilisé une étude pré-expérimentale basée à la fois sur une méthode quantitative (pré-post-test, pré-post-questionnaire) et sur une méthode qualitative (analyse textuelle) de la collecte de données. Les participants étaient 18 étudiants en sciences de la licence dans une école privée de cours secondaire. Les résultats obtenus confirment notre hypothèse, à savoir; les participants ont amélioré leurs compétences en écriture.

Mots-clés: compétences en rédaction, cartographie mentale, apprenants bacheliers en sciences, EFL