ENHANCING WRITING SKILLS IN FOREIGN LANGUAGE TEACHING THROUGH BRAIN-BASED LEARNING TECHNIQUES

Sabina GUSSEINOV
221113108

MASTER OF ARTS THESIS

Department of Foreign Languages Education
English Language Teaching Programme with Thesis
Advisor: Asst. Prof. Dr. Hakan DİLMAN

İstanbul
T.C. Maltepe Üniversitesi
Graduate School
January, 2025

ENHANCING WRITING SKILLS IN FOREIGN LANGUAGE TEACHING THROUGH BRAIN-BASED LEARNING TECHNIQUES

Sabina GUSSEINOV
221113108
ORCID: 0009-0006-6291-2445

MASTER OF ARTS THESIS

Department of Foreign Languages Education
English Language Teaching Programme with Thesis
Advisor: Asst. Prof. Dr. Hakan DİLMAN

İstanbul
T.C. Maltepe Üniversitesi
Graduate School
January, 2025



JÜRİ VE ENSTİTÜ ONAYI

Sabina Gusseinov'ın "Beyin Temelli Öğrenme Teknikleri Kullanılarak Yabancı Dil Öğretiminde Yazma Becerisinin Geliştirilmesi" başlıklı tezi 16.01.2025 tarihinde aşağıdaki jüri tarafından değerlendirilerek "Maltepe Üniversitesi Lisansüstü Eğitim ve Öğretim Yönetmeliği" nin ilgili maddeleri uyarınca Yabancı Diller Eğitimi Anabilim Dalı Yüksek Lisans/Doktora/Sanatta Yeterlik tezi oy birliğiyle/oy çokluğuyla, başarılı/başarısız olarak kabul edilmiştir.

	Unvanı. Adı ve Soyadı	İmza
Üye (Tez Danışmanı)	Dr. Öğr. Üyesi Hakan DİLMAN Maltepe Üniversitesi	.....
Üye	Prof. Dr. Aysu ERDEN Maltepe Üniversitesi	.....
Üye	Dr. Öğr. Üyesi Aybars ERÖZDEN Okan Üniversitesi	.....

Enstitü Müdürü

ETİK İLKE VE KURALLARA UYUM BEYANI

Bu belge, Yükseköğretim Kurulu tarafından 19.01.2021 tarihli "Lisansüstü Tezlerin Elektronik Ortamda Toplanması, Düzenlenmesi ve Erişime Açılmasına İlişkin Yönerge" ile bildirilen 6698 Sayılı Kişisel Verilerin Korunması Kanunu kapsamında gizlenmiştir.

ACKNOWLEDGEMENTS

First and foremost, I would like to express my deepest gratitude to my thesis advisor, Asst. Prof. Dr. Hakan DILMAN, for his priceless guidance, feedback, and assistance during this challenging process. His expertise, support, and valuable insights were encouraging in shaping this thesis and motivating me to achieve my best.

I am also profoundly grateful to all the professors in the ELT MA program at Maltepe University, Assoc. Prof. Dr. Abdullah Nejat Töngür, Prof. Aysu Erden, and Dr. Murat Özüdoğru for their contributions to my master's courses so that their knowledge and suggestions provided a solid foundation for this project.

I also would like to express my gratitude to my father who is no longer with us. He was the main source of motivation and strength throughout this process which helped me not to give up.

My wholehearted thanks go to my family for their unconditional support and understanding. Their patience and belief in me were a source of strength and motivation throughout this journey.

Finally, I would like to acknowledge the Institution and the manager of the preparatory school for their consent and the facilities necessary for conducting this research. Additionally, the support from my students and my friends has been crucial in bringing this project to achievement.

Sabina GUSSEINOV

January, 2025

ÖZET

BEYİN TEMELLİ ÖĞRENME TEKNİKLERİ KULLANILARAK YABANCI DİL ÖĞRETİMİNDE YAZMA BECERİSİNİN GELİŞTİRİLMESİ

Sabina Gusseinov

Yüksek Lisans Tezi

Yabancı Diller Eğitimi Anabilim Dalı

İngiliz Dili Eğitimi Tezli Yüksek Lisans Programı

Danışman: Dr. Öğr. Üyesi Hakan Dilman

Maltepe Üniversitesi Lisansüstü Eğitim Enstitüsü, 2025

Bu araştırma, beyin temelli öğrenme tekniklerinin yabancı dil olarak İngilizce (EFL) yazma becerilerinin gelişimine etkisini incelemek maksadıyla Türkiye'deki bir vakıf üniversitesinin hazırlık okulunda yapılmıştır. Araştırmacının yazma derslerine katılan öğrenciler deney ve kontrol grubu olarak değerlendirilmiştir. Çalışma sürecinde deney grubunda yer alan öğrencilerin sol ve sağ beyin yarım kürelerini aktive etmeye yönelik çeşitli etkinlikler yaptırılmış ve bu etkinliklerin öğrencilerin yazma becerilerindeki ilerlemeye katkısı değerlendirilmiştir. Araştırma, öğrencilerin yazma derslerine dair tutumları, fikir üretme süreçlerinde onları motive eden faktörleri ve bu sürecin başka hangi becerilerin gelişimine katkıda bulunduğunun da belirlenmesine katkıda bulunmuştur.

Veri toplanması sürecinde; Deney grubuna uygulanan 10 haftalık beyin temelli eğitim programı öncesi ve sonrası elde edilen veriler karşılaştırılmıştır. Yarı yapılandırılmış görüşmeler ve öğrencilerin yazılı paragraflarının analizi yoluyla nitel araştırma yöntemleri kullanılmıştır. Toplanan veriler, tematik analiz yöntemiyle değerlendirilmiştir. Araştırma sonucunda, beyin temelli öğretim stratejilerinin, EFL öğrencilerinin yazma becerileri üzerinde önemli ve olumlu bir etki yarattığı belirlenmiştir. Ayrıca, beyin temelli öğrenme tekniklerine dayalı eğitim alan öğrencilerin kelime dağarcığı, dil bilgisi, bilişsel kapasiteleri, eleştirel düşünme ve analitik becerilerinde gelişmeler kaydettikleri de saptanmıştır. Görüşme bulguları, öğrencilerin yazma derslerine ve araştırmacının uyguladığı öğretim tekniklerine yönelik olumlu görüşler

sergilediklerini ortaya koymaktadır. Bu olumlu görüşler, öğrencilerin yazma becerilerine dair motivasyonlarının artmasına ve daha iyimser bir tutum geliştirmelerine katkı da sağlamıştır.

Anahtar Sözcükler: Beyin Temelli Öğrenme, Yazma Becerileri, Bilişsel Yetenekler, Öğrenci Görüşler.

ABSTRACT

ENHANCING WRITING SKILLS IN FOREIGN LANGUAGE TEACHING THROUGH BRAIN-BASED LEARNING TECHNIQUES

Sabina Gusseinov
Master Thesis
Yabancı Diller Eğitimi Anabilim Dalı
İngiliz Dili Eğitimi Tezli Yüksek Lisans Programı
Danışman: Dr. Öğr. Üyesi Hakan Dilman
Maltepe Üniversitesi Lisansüstü Eğitim Enstitüsü, 2025

The study examines the impact of brain-based learning techniques on the development of writing skills in foreign language teaching. This research was conducted with both experimental and control group students involved in writing classes at a preparatory school of a foundation university in Turkey. The research aims to determine the effect of using various activities to stimulate the left and right hemispheres of students' brains to monitor progress in writing skills. Additionally, it aims to identify the factors that encourage students' perspectives and ideas towards writing classes, as well as which other skills they are developing.

The results of the experimental group before and after the test have been compared after 10 weeks of brain-based training. A qualitative research approach has been used, such as semi-structured interviews for data collection and the analysis of written paragraphs obtained from students. The data has been analyzed by dividing it into thematic options. According to the research findings, the use of brain-based teaching strategies in English as a Foreign Language (EFL) writing classes has a significant impact on the writing skills of EFL students. Additionally, students who received brain-based education have shown improvement in their vocabulary, grammar, cognitive capacities, critical thinking, and analytical skills. Moreover, the interview findings revealed that students expressed positive feelings about the progress of their writing classes and the teaching methodology used by the researcher. In addition to this, because of the answers they provided, their

motivation has improved, and they have adopted a more optimistic attitude towards writing.

Keywords: Brain-based language teaching, Writing skills, Cognitive skills, Students' attitudes.

GENİŞLETİLMİŞ ÖZET

BEYİN TEMELLİ ÖĞRENME TEKNİKLERİ KULLANILARAK YABANCI DİL ÖĞRETİMİNDE YAZMA BECERİSİNİN GELİŞTİRİLMESİ

Bu çalışma, beyin temelli öğrenme tekniklerinin yabancı dil öğretiminde yazma becerilerini nasıl geliştirdiğini ayrıntılı bir şekilde araştırmaktadır. Beyin temelli öğrenme, eğitim stratejilerinin oluşturulmasında beyin bölümlerinin işlevlerini göz önünde bulundurma sürecidir. (Jensen,1996) Bu çalışma, öğrencilerin yazma becerilerindeki gelişimi izlemek amacıyla beynin sol ve sağ yarım kürelerini uyararak çeşitli etkinliklerin etkisini belirlemeyi hedeflemiştir.

Çalışma, bir vakıf üniversitesinin hazırlık okulunda gerçekleştirilmiştir. Araştırmaya hem deney hem de kontrol grubu öğrencileri katılmıştır. Her grupta, on dokuz ila yirmi bir yaşları arasında, alt-orta ile orta düzeyde İngilizce becerisine sahip yirmi öğrenci yer almıştır. Deney grubu on hafta boyunca beyin temelli eğitim almıştır. Dersler, beyin yarım kürelerini uyaran çeşitli etkinlikleri ve teknikleri içermiştir. Araştırmanın birinci amacı, bu eğitim sürecinin öğrencilerin yazma becerilerini nasıl etkilediğini belirlemektir. Bu çerçevede, öğrencilerin araştırma öncesi ve sonrasında yazma performansları karşılaştırılmıştır.

Deney aşamasında, her biri kırk beş dakikalık, haftada dört oturum sunularak öğrencilerin yazma becerileri geliştirilmeye çalışılmıştır. Alan yazından belirlenen on adet beyin temelli öğrenme tekniğinin her biri, her hafta deney grubuna öğretilmiştir. Deney grubundaki öğrencilerden, öğretilen tekniği kendilerine verilen ve sınıfta araştırmacının gözetiminde yazdıkları metinde kullanmaları istenmiştir. Deney grubu öğrencileri her hafta 200 kelimeden az olmamak kaydıyla bir yazı yazmışlardır. Bu paragraflar araştırmacı tarafından analiz edilmiş ve her öğrencinin tekniği kullanıp kullanamadığı, kullandıysa bunu metinde nasıl yansıttığı saptanmıştır. Hem deney grubu bazında bireysel olarak, hem de grubun tamamında tekniğin öğrenildiği ve uygulanabildiği ya da öğrenilemediği ve uygulanamadığı konusunda söylem analizi yapılarak karara varılmıştır.

Verilerin toplanması için iki nitel araştırma yöntemi kullanılmıştır: odak grup görüşmeleri ve yazılı paragrafların analizi. Dokuz katılımcıyla yapılan görüşmeler, öğrencilerin eğitim süreci hakkındaki görüşlerini ve yazma becerilerindeki değişiklikleri değerlendirmeleri amaçlamıştır. Yazılı paragrafların analizi ise öğrencilerin yazma becerilerindeki ilerlemeleri değerlendirmek için kullanılmıştır.

Araştırma sonucuna göre, İngilizceyi yabancı dil olarak öğrenen öğrencilerin yazma becerileri üzerinde beyin temelli öğretim stratejilerinin önemli ölçüde olumlu bir etkiye sahip olduğu görülmüştür. Bu etkinin, öğrencilerin kelime dağarcığını, dilbilgisi kullanımını, bilişsel yeteneklerini, eleştirel düşünme becerilerini ve analitik becerilerini geliştirdiği de belirlenmiştir. Bunlara ilaveten, görüşmelerin sonuçları öğrencilerin yazma derslerinin işlenişi ve kullanılan öğretim teknikleri hakkında olumlu görüşlere sahip olduklarını ortaya koymaktadır. Ayrıca, görüşme sonuçlarına göre katılımcıların daha yaratıcı oldukları ve yeni bakış açılarına sahip oldukları da görülmüştür. "Öğrenciler, araştırmadan önce daha kaygılı olduklarını ve kolayca cümle üretemediklerini belirtmişlerdir; ancak süreçten sonra, kırk beş dakikalık bir sürede 250-280 kelime arasında rahatça bir paragraf yazabildiklerini ve yazmadan önce farklı aktiviteler yapmaları ile aldıkları geri dönütler sayesinde yazma dersinde kendilerini daha rahat hissettiklerini ifade etmişlerdir." Katılımcılar çeviri programlarına ihtiyaç duymadıklarını ve yazı yazmak hakkında zihinlerinde bazı planlar oluşturabildiklerini açıklamışlardır. Kullanılan tekniklerden Beyin fırtınasının ve zihin haritasının büyük bir etkisi olduğunu da belirtmişlerdir.

Öğrencilerin görüşlerine göre, hayatlarında ilk kez bir İngilizce yazıyı organize ederek yazma deneyimi yaşamışlardır. Ancak bu sürece başlamadan önce, yaklaşık bir veya iki ders boyunca, öğretmen rehberliğinde çeşitli örnekler üzerinde konuşmuşlardır. Bu derslerde, öğretmen öğrencilere neler yapabilecekleri konusunda bilgi vermiştir. İşlenen konular genellikle soyut olmasına rağmen, öğretmen bu fikirleri sürekli somutlaştırarak öğrencilerin anlamasını kolaylaştırmıştır. Bu yöntem sayesinde, öğrenciler evde çalışırken bile henüz konu belirlememiş olsalar dahi, yazılarını eksiksiz bir şekilde yazabilecek bir seviyeye ulaşmışlardır. Öğretmenin soyut fikirleri somutlaştırma yaklaşımı, öğrencilerin bu yöntemi içselleştirmelerine yardımcı olmuş ve böylece fikirlerin nasıl şekilleneceğini ve ne düşüneceklerini öğrenmişlerdir.

Beyin temelli eğitim süreci, öğrencilerin daha motive olduğunu ve yazma becerileri konusunda daha iyimser olduklarını göstermiştir. Bu durum, beyin temelli öğrenme stratejilerinin öğrencilerin akademik başarısını ve genel motivasyonunu olumlu yönde etkilediğini de ortaya koymaktadır. Bu çalışma, beyin temelli öğrenme yöntemlerinin yabancı dil eğitiminde etkili bir şekilde kullanılabileceğini ve yazma becerilerinin geliştirilmesinde önemli ölçüde katkıda bulunabileceğini de göstermektedir. Elde edilen sonuçlar, yabancı dilde yazma becerisinin geliştirilmesi, öğrencilerin yazı yazma konusunda isteksizliklerinin üstesinden gelinmesinde beyin temelli tekniklerin kullanılabileceğini ortaya koymaktadır.

TABLE OF CONTENTS

JÜRİ VE ENSTİTÜ ONAYI ii

ETİK İLKE VE KURALLARA UYUM BEYANI iii

ACKNOWLEDGEMENTS iv

ÖZET v

ABSTRACT vii

GENİŞLETİLMİŞ ÖZET ix

TABLE OF CONTENTS xii

LIST OF TABLES xv

LIST OF FIGURES xvi

CHAPTER 1. INTRODUCTION 1

1.1 Statement of the Problem 6

1.2 Aim of the Study 7

1.3 Significance of the Study 7

1.4 Assumptions 8

1.5 Limitations 8

1.6 Keywords and Identification 9

CHAPTER 2. LITERATURE REVIEW 10

2.1 Introduction 10
2.2 The Structure and Functions of the Brain 10
2.2.1 Making connections 10
2.2.1.1 Nature and nurture 13
2.2.1.2 Regions of the brain 14
2.3 Writing Skills and Strategies 17
2.4 Brain-Based Teaching Model 20
2.5 Brain-Based Teaching and Writing Skills 27
2.6 Relevant Studies on the Brain-Based Teaching Model 28
CHAPTER 3. METHODOLOGY 33
3.1 Research Design 33
3.2 Setting and Participants 35
3.4.1 Data collection tools 35
3.4.1.1 Pre-test and post-test. 36
3.4.1.2 Student interviews 36
3.5 Data Collection Procedure 37
3.6 Data Analysis Procedure 38
CHAPTER 4. FINDINGS AND DISCUSSION 39
4.1 The findings of Qualitative Data 39
4.1.1 The findings of the Pre-Test 39
4.1.2. The findings of Post-Test 43

4.1.3 The Comparison of Pre-Test and Post-Test results 49

4.1.4 The findings of students' writings 51

4.1.5 Findings of Student Interviews 96

4.2 Discussion of Major Findings 106

CHAPTER 5. CONCLUSION AND SUGGESTIONS 112

REFERENCES 116

APPENDIX 125

Appendix 1. Semi-Structured Interview Questions 125

Appendix 2. Materials That Had Been Used During Pre-Writing 127

Appendix 3. Rubrics for Analyzing Writings of Students 131

Appendix 4. Gönüllü Onam Formu 132

Appendix 5. Etik Kurul Formu 133

CURRICULUM VITAE 134

LIST OF TABLES

Table 1. Rubrics for analyzing paragraphs 40

Table 2. Pre-test and post-test results of the experimental group 50

Table 3. Pre-test and post-test results of control group..... 50

Table 4. Conjunctions for compare and contrast paragraph 82

LIST OF FIGURES

Figure1. Anatomy of a neuron 12

Figure 2. Functions of the Left and Right Cerebral Hemispheres 17

Figure 3. Sample of Brainstorming for Causes of Committing crimes in today's society 65

Figure 4. Sample of Brainstorming for Effects of Early Marriages 72

Figure 5. The Brainstorming chart..... 83

ABBREVIATIONS

BBL : Brain-Based Learning

L2 : Second Language

EFL : English as a Foreign Language

ELT : English Language Teaching

HOTS : Higher Order Thinking Skills

CHAPTER 1. INTRODUCTION

Language is the most significant kind of communication in people's lives. Therefore, the ability to use a language as a tool for interaction and communication is necessary for humans. Language skills such as listening, speaking, reading, and writing must be mastered to become an autonomous language user. The ability to write in English is crucial for language learners to acquire. Not only mastering the basic writing skills but also being able to produce long and meaningful paragraphs and essays that should be organized. For this reason, writing abilities are essential for learning a foreign language because they enable students to transform their ideas into meaningful text or sentences.

Writing is regarded as a productive skill and there is much evidence that writing ability is influenced by linguistic skills like grammar and vocabulary, discourse skills like cohesion and coherence, and individual characteristics like language aptitude, motivation, and anxiety (Bachman & Palmer, 1996). Writing has become more difficult to learn as a productive skill since it requires a long process and complex activity to generate ideas and engage critical thinking. (Imelda, Cahyono, & Astuti, 2019). Despite its importance, writing continues to be a challenge for a significant number of the global populace, including professionals, workers, and students (Gökalp, 2001). According to (Suparno & Yunus; Trismanto, 2008) writing or composing is one of the skills that students do not like the most. This unfavorable mindset of students regarding writing abilities might be influenced by several factors starting from family, society, and fast technological development.

Research findings indicate that students are either unable or unwilling to write as it can be the result of their insecurity, boredom, or lack of something to say (Byrne, 1988). One of the main factors contributing to students' resistance to writing is their perception of it as a burdensome task, a dreaded obligation, and as something that needs to be 'get done with'; they do not identify themselves as writers (Cohen & Cowen, 2010). Students lack awareness of the advantages of obtaining written language abilities, resulting in a widespread indifference toward studying them.

Additionally, Richards (2002) states that "Writing" is one of the most challenging abilities for second language (L2) learners to acquire. Writing requires a set of complex abilities. L2 writers must diligently focus on both high-level abilities, such as planning and organizing, and low-level skills, including spelling, grammar, and vocabulary. Nunan (2003) defined writing as a physical and mental effort that entails generating ideas and considering how to present them in a way that can be formed into sentences and paragraphs that the reader can comprehend.

As long as learning should be fun to stimulate creativity and imagination, difficulties are frequently caused by using traditional teaching strategies that don't make an impact on students' lives and experiences. By conventional methods, it is meant that the focus is mostly on writing-for-learning and teachers employ activities where students write to learn the language better. Additionally, students get lots of information about the organizational part of the essay or paragraph. For example, the teacher quickly shows what a paragraph or an essay includes, and how topic sentences or thesis statements are written with all useful linking words and phrases. After lecturing, students get the topic that sometimes might be out of interest, and they are asked to write by setting the number of words and type of writing they've just learned. As a result, students find it difficult to develop their writing skills in terms of critical thinking, developing ideas, and inability to create meaningful connections.

Students' own experiences serve as the basis for their thoughts and ideas, which are crucial components of effective writing. However, sticking to conventional approaches prevents students from improving their writing abilities.

Over the last 25 years, as our understanding of neuroscience has expanded, some scientists and educators have become more conscious of the advantages that neuroscience offers concerning how the brain functions throughout the learning process (Howard-Jones, 2008). Even if the field of neuroscience has not yet made substantial progress in its understanding of how the brain learns, still there has never been such a strong link between neuroscience and classroom instruction. Therefore, instructors may benefit from such data related to human learning and learning deficits.

Researchers have gained useful information on the cortical regions linked to speech activation by studying the anatomy and function of the human brain. All brains are similar in one essential manner, even though each brain is unique from the others: learning occurs because neuronal structures are growing and connecting, which is the physical basis and embodiment of learning. The brains of our students are designed to learn on different complex levels, from a variety of sources, and in various contexts.

Therefore, Brain-based learning (BBL) or brain-based instruction, which is "learning in accordance with the way the brain is naturally designed to learn" (Jensen, 2000, p. 6) may come forward as an alternative to the traditional drilling practices. In a brain-based classroom, students are participants in the learning relationship rather than having the instructor "provide" them with knowledge and learning (Caine & Caine, 1997b; Jensen, 1995b). As long as the brain is the powerful processor that enables all students to learn, there shouldn’t be any prohibition from fulfilling its normal processes. According to Caine & Caine (2002), brain-based learning refers to the acknowledgment of the brain's patterns for meaningful learning and adapting the teaching methods accordingly. Therefore, it is essential to carefully design and structure education in a manner that acknowledges and aligns with the brain's inherent learning mechanisms. Educators must possess a comprehensive understanding of how the brain acquires, analyses, comprehends, links, retains, and recalls information (Greenleaf, 2002).

Unfortunately, the brain's natural learning mechanisms are frequently ignored or discouraged in traditional educational environments. Three instructional techniques that are used in brain-based learning should be taken into consideration while teaching: orchestrated immersion, in which students are fully immersed in learning experiences; relaxed alertness, in which fear is eliminated in a challenging environment; and active processing, in which the student actively processes information through the acts of consolidation and internalization (Jensen, 1998a). In fact, there are a lot of ways that research in psychology and neuroscience may have an impact on our classrooms that are brain-compatible.

Caine and Caine (1991) provide a valuable collection of brain-based techniques and their implications for classrooms. Firstly, their studies indicate that the brain may instinctively

recognize familiar stimuli while actively searching for and reacting to new information. Thus it tends to reject meaningless, isolated pieces of data. That is why in a brain-based classroom, students must develop their patterns of understanding. Therefore, teachers should provide material in context, such as real-life science or thematic instruction, to help learners recognize patterns and relate to their prior experiences and see learning as a meaningful process to get insight into it.

Second of all according to Caine and Caine (1991), the educational environment should stimulate as many senses as possible to activate the complete neurological system. Content that is presented by the teachers should be full of various teaching strategies such as implementing drawing, listening to music, using visuals and videos, group interactions, discussions, debates, drama, storytelling, mind mapping, and many other activities. The brain both sees and constructs parts and wholes simultaneously. Hence, material should not be isolated when delivered, and teachers should create exercises that engage the complete capacity of the brain. It is called full brain functioning. To encourage a more balanced and holistic approach to learning, it is important to recognize the distinct characteristics of each hemisphere. The left hemisphere is often associated with logic, analysis, verbal skills, and sequential thinking, whereas the right hemisphere is linked to intuition, conceptual thinking, nonverbal abilities, and pattern recognition. A similar view was held by Sanders and Sanders (1984):

> Engaging both the right and left hemispheres in curriculum development enhances the student's comprehension by enabling them to explore a wide range of alternatives. To prevent creating a generation of individuals overly reliant on logical thinking or conforming to societal norms (“cognitive cripples”), it is necessary to use innovative techniques and strategies to foster creativity in educational settings. Students should be educated in the way to gain independent critical thinking. (p. 24)

Caine and Caine (1991) also suggested that decreased stress is an essential element in a brain-centered classroom. The brain forms the most connections when it is stimulated in a high-risk setting. However, when the human brain perceives a threat, it becomes less adaptable and resorts to basic instincts, known as the "fight or flight" reaction. Therefore,

creating an atmosphere of comfortable awareness that is low in threat and strong in challenge is the best environment for teaching. In addition, emotions and intellect are inseparable. Emotions have a vital role in the retention and retrieval of knowledge. The instructor motivates students and helps them develop a positive self-concept using powerful language, engaging content, and process-oriented evaluation. Therefore, activities, like roleplays, celebrations, discussions, diaries, tales, plays, and games, can enhance positive feelings. Teachers use a variety of tactics to engage students based on their distinct interests and to encourage the exploration and expression of their diverse intelligence.

These principles provide a general framework of what should be considered while designing and implementing brain-compatible lessons. Another research of five laws about how the brain learns is outlined by Smilkstein (2003, pp. 71–72).

The first principle is that we acquire knowledge by making connections between new information and what we already know. From this foundational knowledge, we build additional levels of understanding. The second law is that we learn by doing. To develop our skills and thorough comprehension, we must have the time to practice, creating and fixing our mistakes. Additionally, in the third principle, exciting events trigger the brain to use its natural abilities to look for patterns, figure out issues, and comprehend how the world functions and how to make it function. Concrete experiences involve more senses and numerous pathways to store information, which increases the number of ways in which it can be recalled (Wolfe, 2001).

Moreover, the brain reinforces the neuronal circuitry about a particular piece of knowledge through application and use. But if we don't use what we've learned, the neurons associated with that structure can deteriorate and eventually disintegrate (Hung, 2003). The last one states that emotions are intrinsically linked to cognition, education, and memory. Since emotions incorporate objectives, beliefs, biases, and expectancies, they engage meaning and forecast future learning. (Jensen, 1998)

The teaching of writing skills can be improved using brain-based learning, which gives teachers new tools and strategies to help students learn. This strategy aims to establish a setting that maximizes learning outcomes by matching instruction with the cognitive

functions and mechanisms of the brain. By doing this, brain-based learning hopes to surpass conventional teaching techniques' drawbacks and provide a more interesting and effective strategy for improving students' writing abilities.

In this paper, the possibility of brain-based learning will be investigated as an alternative to traditional approaches in a foreign language classroom. It will discuss how brain-based learning can improve the teaching and learning of writing skills by looking at the principles and techniques linked with it. Teachers can improve the dynamic and productive learning environment that supports students' writing skills and their general language development by having a stronger awareness of these strategies.

1.1 Statement of the Problem

This study attempts to solve the difficulties that students of foreign languages encounter in developing their writing abilities due to their unfavorable attitudes and circumstances. Students exposed to traditional teaching approaches that are removed from their daily lives frequently view writing as tedious and uninteresting. Students consequently struggle to participate in the writing process and run into obstacles when trying to improve their writing skills. Students' development in language classes is hindered by ineffective writing teaching and a failure to consider their own experiences.

The restrictions of conventional instructional techniques are another major hindrance to developing writing abilities. Meaningful and effective learning experiences are hampered by these methods' inability to engage students' cognitive processes successfully. To improve the teaching of writing skills and answer students' concerns, it is necessary to investigate alternative strategies that are consistent with brain-based learning concepts.

Therefore, the key issue that must be researched is how to implement brain-based learning concepts and approaches into language courses to overcome the negative attitudes and challenges surrounding writing skills among students of foreign languages. By addressing this issue, the study hopes to offer insights into more efficient teaching methods and practices that encourage students to have productive, meaningful, and engaging writing experiences, thereby promoting language competency and development.

1.2 Aim of the Study

The purpose of this study is to determine how brain-based learning techniques affect students' ability to write by activating the left and right hemispheres of the brain.

Also, this study's goal is to investigate the possibility of brain-based learning as an alternative to conventional approaches in foreign language classes, with a focus on the improvement of writing abilities. Moreover, the study aims to find out the impact of brain-based learning techniques on students' activating the left and right hemispheres of the brain on writing skills. It aims to identify how this approach can help students overcome obstacles, improve the learning environment, and enhance their writing skills. In this regard, the following research questions are asked:

1. How can brain-based learning be effectively implemented in foreign language classrooms to create a more dynamic and effective learning environment for developing writing skills?

2. What are the effects of brain-based learning on the overall learning outcomes of students' writing skills?

1.3 Significance of the Study

This study aims to implement brain-based techniques into writing classes and there are several reasons for doing it.

Firstly, the Brain-based learning paradigm is not widely used in language education settings in Turkey. This study aims to experiment with this technique and derive valuable insights and implications for educational contexts.

Secondly, in terms of the attitudes students have towards writing, the researcher could have just relied on their previous experiences. Therefore, the study addresses the negative attitudes and challenges that foreign language students often encounter when it comes to writing. The study emphasizes the need for alternative ways that can engage students and encourage their desire and enthusiasm for writing by examining the effects of traditional teaching methods and the lack of personal connection in writing instruction.

The study provides valuable insights into how these approaches might enhance the instruction and acquisition of writing abilities by analyzing the concepts and strategies associated with brain-based learning. Furthermore, the study highlights the utmost importance of integrating students' own experiences and issues that capture their attention in writing instruction. Teachers may enhance the quality of writing learning experiences by acknowledging and utilizing students' backgrounds, interests, and experiences.

Finally, this study might be a valuable resource for course developers and instructors looking to integrate brain-compatible techniques into their courses and training.

1.4 Assumptions

The research is centered on the assumption that brain-based learning methodologies are expected to enhance students' writing skills by more effectively activating their cognitive processes. Therefore, students are presumed to be receptive to brain-based learning techniques and capable of implementing them in their writing assignments. Additionally, it is presumed that all students encounter a classroom setting devoid of substantial external distractions to guarantee the efficacy of brain-based techniques. Moreover, the efficacy of brain-based principles is predicated on the assumption that these principles, such as the incorporation of emotions, environmental factors, and sensory engagement, correspond with students' cognitive processes and enhance their learning outcomes.

1.5 Limitations

The study aims to improve the writing skills of preparatory school learners by using a brain-based model. However, some limitations were determined.

The study concentrated on a particular group of foreign language learners or a particular educational environment, which could have limited the findings' application to other groups or environments.

The duration of the investigation can make it difficult to track the long-term impact of applying brain-based learning concepts to students' writing abilities. The implementation is conducted for three class hours each week due to the scheduling of the writing skill course in the program. Implementing an effective language learning program within a short time frame can be challenging. The program is already tight and requires a lot of

things to teach so using a variety of activities and materials to apply the principles brain-based teaching model can be time-consuming.

The research may not have taken into consideration other important variables that might have an impact on students' writing abilities, such as individual differences, prior language-learning experiences, or outside influences. Additionally, some students don't take preparatory school seriously; they merely learn grammar rules to pass exams and continue their education at their faculties. As a result, some of them won't be enthusiastic about learning English so deeply.

As long as the researcher was assigned two random writing classes, the lower level of the experimental group might not have a significant improvement in writing skills.

The reason that the researcher was the instructor of the course could have affected the reliability of the study. The researcher herself assessed and analyzed the writings of the students which can be subjective, the interpretation of writing proficiency levels may introduce potential biases or limitations in evaluating the impact of brain-based learning on writing skills.

1.6 Keywords and Identification

Brain-based teaching model: This term in this study refers to the number of techniques that are based on the principles of how the brain learns, along with lesson plans, materials, and teaching techniques (Jensen,2007).

Traditional (conventional) teaching methods: In this study, this term refers to teaching writing skills by incorporating teacher-centeredness with little attention to the students' needs lacking the opportunities to actively practice and generate the language being taught (Broughton 22).

Cognitive cripples 'somewhat mindless, passive decision maker' (Thaler and Sunstein p.36, 2009).

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

This chapter consists of the relevant literature review for the investigation. This text comprehensively explains the brain-based teaching model, including a detailed description of the brain's anatomy and functioning. The aim is to enhance the reader's comprehension of the model. Furthermore, this text elucidates the many learning and teaching methodologies and frameworks associated with the brain-based model.

Additionally, prior studies on the brain are examined to better understand the importance of this study. This study focuses on enhancing the writing abilities of EFL students. It also examines the various methods used to improve writing skills.

2.2 The Structure and Functions of the Brain

To comprehend the functioning of the human brain, it is crucial to possess knowledge of the brain's anatomy and the interconnections among its components. Jensen (2005) asserted that the brain undergoes continuous changes, with different regions of the brain working together in a very complex manner. Gaining knowledge about the structure of the brain might aid in comprehending its many activities.

2.2.1 Making connections

The human brain is a remarkable organ, with boundless potential and mysterious qualities. The mind undergoes continuous adaptation and transformation by shaping and reshaping it through experiences, while also having the ability to function independently without external influence.

The brain is composed of between 50 billion to 100 billion neurons. The size and weight of the brain exhibit variation in individuals, with the average weight being three pounds. A fully developed adult brain typically ranges from two to four pounds (D'Arcangelo, 1998). The brain functions as an intermediary for incoming inputs, categorizing, ranking, analyzing, retaining, and replicating sensory data at a subconscious level. To comprehend

the brain's functioning, it is important to acquire knowledge about the distinct cellular components that constitute it. The ability to think, feel, and remember is made possible by certain cells that generate both chemical and electrical impulses.

As for neurons, they are a fundamental component of the nervous system and are responsible for both structural support and information processing. Information, whether visual, auditory, problem-solving, or emotional, is transmitted like how information is transmitted through wires, cables, and computer chips. (Hanson, 1950).

The structure consists of three main functional regions: dendrites, axons, and synapses. Dendrites, which serve as the input apparatus of the neuron, are intricate and branching structures that receive information from neighboring neurons. The axon, which serves as the output mechanism of each neuron, is a limb-like structure that transmits information to the many dendritic branches of other neurons, which are poised to receive this information. Synapses are tiny gaps that act as the brain's channels for processing.

Every neuron functions as a channel for transmitting information. Indeed, a solitary neuron can establish connections with anywhere from 1000 to 10000 additional cells. Generally, the greater the number of connections formed by your cells, the more advantageous it is. Therefore, learning begins on a cellular level. Each neuron functions as a relay station, receiving information from other neurons, processing them, and transmitting them to other neurons through minuscule gaps known as synapses. The synapses, which are the unique connection spots on the surfaces of nerve cells, are the actual places where information is sent. This process is known as synaptic transmission. Hence, it is important to note that nerve cells do not physically make contact with each other. Instead, they interact by synaptic transmission, which involves the release of chemical substances known as neurotransmitters. (Hanson, 1950).

When an individual acquires new knowledge, the brain establishes connections. With each instance of learning or practice, neurons become more proficient, connections strengthen, and signals transmit more rapidly. Neurons possess dendrites that resemble roots, and the primary role of dendrites is to receive information from neighboring neurons. The structure of a neuron is illustrated in figure 1.

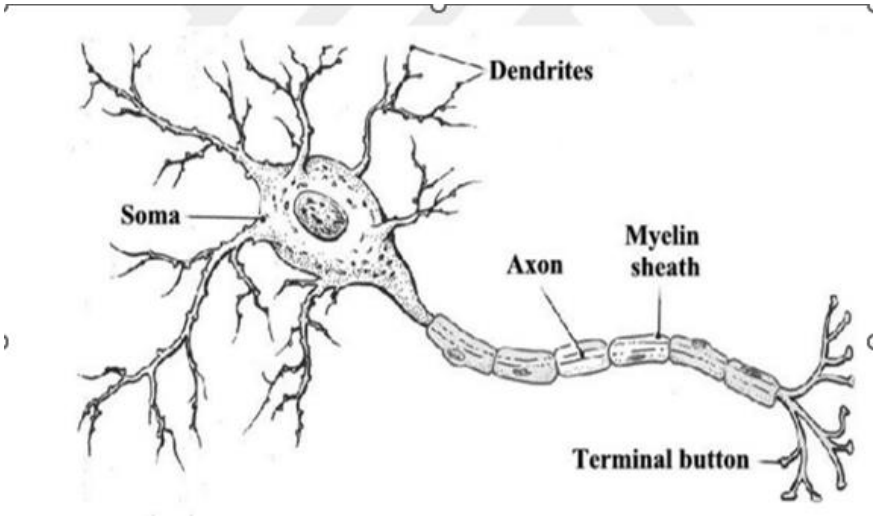


Figure1. Anatomy of a neuron (Laurenson,2009)

One view, expressed by Sprenger (1999) was that these neurotransmitters are influenced by thoughts, actions, food we eat, and drugs we take. As neurons establish connections, the brain develops dendrites and reinforces synapses (Sprenger, 1999). When an individual acquires new knowledge, the brain establishes connections. With each instance of learning or practice, neurons become increasingly efficient, interactions intensify, and communication speeds up. According to Jensen (1998a), learning is the most efficient method for the human brain to change, as it can restructure itself through exposure to new stimuli and behaviors. If a brain cell lacks adequate stimulation, it will die. However, when presented with a diet of enriched experiences, the neuronal synapses of the brain develop new branches and connections, leading to a constant restructuring of its ever-evolving wiring system.

Neurons that consistently generate electrical impulses in synchronization form connections and create a thick protective coating called myelin along the axon. If earlier learning is repeated, the neural pathways become more and more efficient due to the process of myelination, adding a fatty coating to axons (Jensen, 1998a). Thus, myelin, a neuronal protein, enhances the speed of nerve impulse transmissions, enabling them to move at a rate of 100 meters per second, comparable to driving on a superhighway. Nevertheless, according to Hannaford (1995), the process of learning something new might be compared to forging a road across unfamiliar territory, which first progresses slowly (p. 21). However, mastery of the executive functions of the brain, namely the

cerebral cortex, requires extensive practice. Additionally, the cerebral cortex is responsible for our conscious thoughts and actions.

After obtaining competency, a skill gets automated and shifts to the subcortical regions of the brain. When a procedure is stored in the lower memory, it becomes hardwired, allowing neurons that were initially used for the learning process to be available for other tasks (Ratey, 2001). As processing becomes automatic, it helps the brain function more efficiently. When working properly, the brain shifts back and forth between deliberate and automatic cognition. “This ability, which is largely taken for granted, allows us to perform many different tasks at the same time (Ratey, 2001, p. 160). The brain's capacity to continuously engage many processes suggests a substantial number of interconnections across neurons and a significant level of interaction across different regions of the brain.

2.2.1.1 Nature and nurture

There has been a continuous discussion about how the brain learns. Do we learn things that are impacted by the environment, or is knowledge inherently there? Thus, how do genes and environment impact the brain’s ability to learn?

"The brain is not a machine that just runs preset programming inherited from heredity. Furthermore, it is not a helpless gray cabbage that is dependent on its surroundings” (Ratey, 2001, p. 17). Instead, our brain's development is shaped by a combination of our genes and environmental factors, acting as two sides of the same coin.

According to Jensen (1998), the general agreement now states that 40–70% of the brain's wiring is influenced by the environment, while 30–60% is inherited. The extent of variety is dependent upon the particular trait or behavior under consideration, as well as the intricate environmental factors of circumstances, opportunities, and acquired abilities.

Experiences contribute to the development and strengthening of intricate brain connections, but these connections do not form immediately and instead require a certain amount of time to develop. The duration might vary based on an individual's inherent characteristics and ability to acquire a specific skill or knowledge, as well as their previous exposure (Armstrong, 2000). Hence, genes, environment, selection, teaching,

and learning collectively play a role in the formation of the brain and the molding of the emerging self throughout our lives.

The remarkable flexibility of the human brain allows it to constantly reorganize and acquire knowledge, not only through academic learning, but also through firsthand experience, cognitive processes, physical activity, and emotional responses. Considering the variations in how individuals learn, it is believed that both hereditary factors and the child's environment have a role in promoting learning. This includes the child's inherent abilities and the assistance they receive from their surroundings (Bransford et al., 2000). Therefore, in this context, education that acknowledges the unique characteristics of each learner, while simultaneously acknowledging the brain's ability to develop, aims to enhance a learner's experience through engaging activities that encourage the creation of brain synapses.

Thus, in an educational environment that values the variety of students and recognizes the ever-changing nature of the brain, pedagogy becomes a complex approach that aims to maximize the learning experience for every individual. The method that acknowledges the unique characteristics of each learner accepts that each learner possesses distinct talents, difficulties, and preferences in terms of learning. As a result, it gives importance to individualized teaching and customized learning tasks designed to address the varied requirements of students. Meanwhile, educators utilize their understanding of neuroplasticity to create and execute educational methods that actively include students in stimulating activities. These activities are meticulously designed to stimulate synaptic plasticity, which involves the creation of new connections between brain cells, hence improving learning and cognitive development.

2.2.1.2 Regions of the brain

Humans have extraordinary learning flexibility due to their large cortex and brains, which weigh about three pounds in an adult. The outer protective layer of the brain is known as the cerebrum, which is composed of four sets of lobes located within two convoluted hemispheres. (Van de Graaff, 1998).

The cerebral cortex, or outer covering of the brain, is crucial for the nervous system and is divided into two hemispheres, left and right. Thus, the cerebrum is composed of two

distinct hemispheres, the right and left, which are internally joined by the corpus callosum, a collection of nerve fibers that link the left and right hemispheres. (Van de Graaff, 1998). Moreover, the left and right hemispheres have distinct physical characteristics. The hemispheres consist of the cortex, which is a thin, yet resilient surface known as gray matter, and the underlying supportive tissue known as white matter. The left hemisphere has a greater amount of gray matter, whereas the right hemisphere contains a greater amount of white matter. The left hemisphere's denser group of neurons enables it to effectively process complex and detailed tasks. The white matter in the right hemisphere consists of neurons with elongated axons that can establish connections with more distant modules. The data from each hemisphere is consolidated by transmitting impulses across the corpus callosum.

The two cerebral hemispheres have distinct roles: the left hemisphere is responsible for cognitive and linguistic abilities, such as reading, writing, and mathematics, while the right hemisphere is associated with spatial and artistic forms of intelligence. However, at the operational level, to effectively carry out these many activities, the two hemispheres must work in tandem with each other instead of operating as distinct structures. (Allen,2008).

The most strongly marked feature of the right hemisphere is intuition. It primarily collects data from visual content rather than textual content and searches for recurring patterns. It also controls the left side of the body and processes input from the left visual field, overseeing functions such as creativity, contextual understanding, and the recognition of faces, locations, and objects. Additionally, it is the source of spatial and artistic kinds of intelligence. The right hemisphere is characterized by nonverbal ability, musical abilities, spatial awareness, and creativity (Springer & Deutsch, 1998). Moreover, it has specialization in processing non-verbal, concrete, and spatial information. Furthermore, it comprehensively processes information. Given that right-brain dominant students exhibited a greater inclination towards visual-spatial learning. According to Gilakjani (2011), visual-spatial learners acquire knowledge most efficiently through visual perception. They possess the capacity to comprehend the overall perspective of matters, although they may disregard the finer points (Gilakjani, 2011). Also, it interprets language through gestures, facial movements, emotions, and body

language. When it comes to writing, the right hemisphere is responsible for creative aspects of writing such as generating ideas and incorporating imagery and emotions into the written passage. It comprehends language by considering contextual cues such as body language, emotional expression, and vocal intonation, rather than relying solely on literal interpretations.

There is a view that as children progress in age, educational systems frequently prioritize the memorization of information above fostering creativity and imagination. There is a decreasing appeal to their right brains and an increasing appeal to their left brains. The right hemisphere of the brain regulates emotions, which can lead to a decrease in social harmony. Subsequently, the task of resolving difficulties comprehensively becomes increasingly challenging. The individual's creative abilities are significantly diminished. (Revell,1992).

In contrast to the right hemisphere, the left hemisphere is connected to the right side of the body. Morris (2006) stated that left-brained children possess analytical thinking skills. They generate lists and create timetables. Also, they consistently seek to understand and adhere to the regulations. They acquire information through the processes of analysis, observation, and cognitive reflection. Moreover, they possess a high level of proficiency in verbal communication. What is more, they exhibit a high level of precision while selecting their words. They possess highly developed language skills. The left hemisphere of the brain is responsible for processing the linguistic and grammatical components of writing, including syntax, grammar, and vocabulary. Additionally, they possess proficiency in symbol manipulation and mathematical computations.

The two hemispheres of the brain are interconnected by various structures known as "commissural nerve tracts", primarily the corpus callosum. Moreover, studies indicate that engaging in various writing tasks that stimulate both hemispheres of the brain might improve writing skills. For instance, participating in brainstorming exercises and freewriting can stimulate the creative faculties of the right hemisphere, while tasks such as outlining and structuring the writing can access the analytical and organizational capacities of the left hemisphere. The functions of the left and right hemispheres are displayed in figure 2.

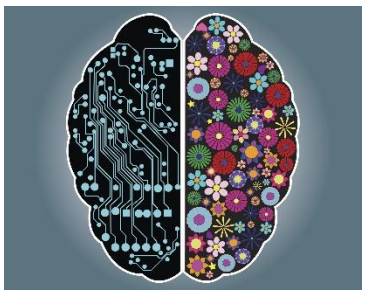
LEFT HEMISPHERE FUNCTIONS	Corpus callosum	RIGHT HEMISPHERE FUNCTIONS
Connected to the right side of the body		Connected to the left side of the body
Processes input in a sequential and analytical manner		Processes input more holistically and abstractly
Generates spoken language		Characterized by nonverbal ability, musical abilities
Cognitive and Linguistic abilities		Spatial ability
Seeks explanations for why events occur		Creativity
Logic		Intuition

Figure 2. Functions of the Left and Right Cerebral Hemispheres (Human Memory,2014)

2.3 Writing Skills and Strategies

Writing is one of the most effective tools that enables an individual to express himself and communicate most accurately and effectively. Writing is an existential reality, one of how one expresses himself, his intuition, his views, and his designs. Writing is, therefore, a personal obligation, a personal need, and a passion (Özdemir-Binyazar 2006:15).

Writing is also a process that requires cognitive thinking. Thinking is the sum of the products that arise as a result of a certain accumulation in the life of an individual and do not appear suddenly (Yılmaz 2008: 203). The ability of the students to develop their writing skills depends on their ability to speak, to think, and to use language effectively.

Widowson (1984) highlights that traditional language classes neglect the purposeful nature of the writing act, focusing solely on teaching language rules, without considering the fluency of the language, communication purposes, and students' inner motives. Thus, writing becomes a boring and monotonous activity in wild language classes. Therefore, teaching writing skills in language classes should follow a step-by-step process that

includes teaching students how to generate ideas, organize them roughly and coherently, apply rhetorical rules, review the text, and correct it.

However, traditional language classes ignore these stages and only teach the rules of language knowledge when it comes to writing. Writing in a second or foreign language presents some difficulties for students. First, foreign language students have insufficient knowledge of effective rules, which makes writing more difficult for them. Therefore, activities aimed at the acquisition and use of these rhetorical rules should assist students in language classes.

Another problem with writing skills is the lack of activities that can attract students' interests and respond to their different needs. (Brown 2001). Therefore, writing in foreign language classes is seen by students as a monotonous and boring activity. Another problem in teaching writing skills is the concern and anxiety that students hear about writing in a second language. Goleman (1995) emphasizes that when students feel threatened, the brain shuts down to learning and is negatively affected by it. Developing writing skills in foreign language classes can be done in an environment where the student feels comfortable and secure, but safe. As a result, writing skills can be improved by removing anxiety and stress from the learning environment. Many teachers complain that students are reluctant to take writing classes.

First of all, foreign language teachers need to look at how they can encourage students who dominate traditional language classes to change their negative attitudes toward writing skills and to make them love writing. For years, teachers have not adequately addressed the factors mentioned above, despite them being some of the primary problems they often encounter in the classroom. On the contrary, as noted by Harmer (2001), to this day, writing skills in foreign languages have often been tried to be developed and taught based on traditional techniques. Therefore, it is important to keep in mind that writing is an elaborate process that involves several stages and actions, ultimately leading to the creation of a written piece. (Page & Merivale, 2001, p.5). To illustrate, phases begin with prewriting, which involves preparing to write. The subsequent step is the act of writing itself when a rough or first draft is produced. Revising involves enhancing the

first version, editing includes correcting mistakes, and rewriting consists of duplicating the final document.

In the planning stage, students have to perform several sub-activities, such as narrowing the topic to the extent of the type of essay they are going to write. (Alo & Ogunsiji, 2004, p. 250). There are descriptive, argumentative, narrative, process, compare, and contrast paragraphs. The next stage is brainstorming. In its literal sense, brainstorming involves vigorously searching and exploring one's mind until new and innovative ideas emerge naturally. One must engage in deep contemplation and analysis of the selected issue, considering its many aspects and even speculating on the perspectives of others. During the process of brainstorming, you generate a multitude of ideas in a quick and spontaneous manner, without giving immediate consideration to their viability or feasibility. (Adegbija, 2004).

Subsequently, students are required to engage in reading and doing research in order to compose their written work in a proficient manner. Following the process of brainstorming, reading, and creating ideas, the subsequent step is outlining. Every form of essay has its own corresponding outline example. The outline serves as the framework or skeleton for the whole essay, ensuring that no important points are overlooked throughout the first drafting process. The first draft is composed of recording all ideas and thoughts with the assistance of notes and an outline. The subsequent and important phase is the feedback session, during which the instructor highlights errors in spelling, punctuation, or organization. Additionally, there may be recommendations for ideas. Revision is the act of making changes to enhance both the content and how an essay is expressed (McWhorter, 2003, p. 156). The final stage is the second draft and particular attention should be paid to careless mistakes in spelling, punctuation, grammar, logic, and style (Adegbija 2004, p. 269).

As noted above, teaching writing skills based on traditional techniques is usually teacher-centered. This is a traditional teacher-centered class where the subject of writing is determined by the teacher, where students are not given a choice in the choice of subject, where there is not enough time to review the text they write, and where it is important to use the grammar rules correctly rather than the creation of the text (Widdowson 1984).

Therefore, the teaching of writing skills should be based on a process through which students go through certain stages, such as pre-writing, writing, reviewing, evaluating, and producing.

2.4 Brain-Based Teaching Model

Being the epicenter of the human body, the brain controls most of our actions and has an extremely complex structure. Recent technological advancements have also begun to impact the field of education. This has begun to show itself, especially in teaching foreign languages. As a result, research on the human brain has been able to answer many important questions about teaching and learning. Education neglected the human brain, an organ of learning, thinking, and mental activity, until the 1990s. Brain-based learning emerged in the 1980s, and in the 1990s, it penetrated many subdisciplines such as biology, neuroscience, and psychology. A new theory of brain-based learning has emerged. Jensen (1997) considers this new theory of learning as a new perspective on learning, stating that teaching and learning drive us to incorporate the human brain into the decision-making process. Brain-based learning theory is inconsistent with traditional teaching techniques and practices that lower the individual's thinking skills.

The brain-based Teaching Model in this research focuses on specific techniques that are designed to enhance the cognitive abilities of learners to improve their writing skills. By cognitive processes, mean using images or storytelling to reinforce comprehension. Also, activating both hemispheres by incorporating different activities in the pre-writing stage.

What is the focus of this model? The brain is the place where the entire process starts. It not only promotes learning but also serves as the environment in which learning happens. A student's difficulties in processing information might be better comprehended by possessing a basic understanding of the system that facilitates this process, therefore explaining the obstacles these students encounter (Ergin, 2003: 46; quoted in Kirby and Williams, 2000).

The insufficient knowledge of foreign language educators regarding brain learning processes, the neglect of the brain-language relationship in teacher training, the implementation of teaching methodologies without comprehension of their foundational theories, the inability of instructors to identify students' learning mechanisms, and the

disregard for cognitive and neuroscientific progress in teacher education are contributing factors to the inefficacy of foreign language instruction (Tarhan,2009).

The processing of linguistic information and abilities occurs in specific areas of the brain, and precise conditions must be fulfilled for these processes to succeed. Otherwise, the brain will wait until the appropriate conditions are provided. These conditions constitute a framework for fulfilling requirements as the model in this research includes activities specifically designed to enhance the writing skills of the learners. Therefore, the main aim of this model is to make teachers aware of the fact that the brain is the organ responsible for learning, educators must comprehend its functioning and design their classes accordingly to enhance the learning process (Duman, 2007).

According to Sousa (2001), the brain-based learning theory aims to direct the activation and integration of the brain into the learning process. As a result of combining what is known about the human brain with standard training practices, brain-based learning offers new and different methods and techniques to create learning environments where the optimum level of learning can take place, unlike in traditional language schools and classrooms. (Jensen 1997).

Therefore, learning and teaching are essential activities in our daily lives that need an understanding of the brain's structure and functions. According to Hardiman (2003), having knowledge of the structure and functioning principles of the brain may facilitate learning and teaching in any topic, leading to a more effective education. It is important to understand that the brain's physiology undergoes changes as a result of experience (Caine & Caine, 1991). Learning and experience can alter the human brain's function and structure. Researchers (Caine & Caine, 1994) have demonstrated the plasticity of the human brain at all ages and abilities. They also found that positive, nurturing, stimulating environments promote better neural growth.

The brain-based education paradigm encompasses several aspects that refer to the knowledge of the human brain, mind, body, and emotions. These concepts are formulated by taking into account the diversity of learners and their individual demands. The brain-based teaching paradigm involves using tactics that are grounded in the knowledge of the brain's structure and functioning principles (Jensen, 2007). To develop a brain-based

teaching model, it is crucial to have a comprehensive understanding of the many components of the brain and the specific cognitive processes that occur during the learning process.

Jensen (1996) defines this learning style as a method that prioritizes the brain's most effective natural processes in order to achieve optimal attention, comprehension, significance, and retention. (p.1)

For brain-based learning, Caine and Caine (1991) proposed twelve principles. The following principles are:

1. The brain is a parallel processor; 2. Learning engages the entire physiology; 3. The search for meaning is innate; 4. The search for meaning occurs through patterning; 5. Emotions are critical to patterning; 6. The brain processes parts and wholes simultaneously; 7. Learning involves both focused attention and peripheral perception; 8. Learning always involves conscious and unconscious processes; 9. We have at least two different types of memory: A spatial memory system and a set of systems for rote learning; 10. We understand and remember best when facts and skills are embedded in natural, spatial memory; 11. Learning is enhanced by challenge and inhibited by threat; 12. Each brain is uniquely organized.

The first principle is that the brain is a parallel processor capable of doing several tasks concurrently, such as learning, maintaining social norms, and ensuring human survival. Additionally, emotions, ideas, experiences, and prior knowledge interact throughout the information processing. This has significant pedagogical implications since educational approaches should be diverse to stimulate all the potentialities of the brain, as one method alone is insufficient to promote successful learning. Caine and Caine (1990) argue that effective education should coordinate all aspects of parallel processing, drawing on ideas and [...]. Due to the complex nature of the human brain, no single approach or methodology can fully capture its variations (p. 66).

The second principle is including the full physiology in the learning process, which means taking into account the various inclinations of the brain while teaching and learning. This is because the development of the brain is influenced by different methods of studying

and learning. Therefore, the human brain interacts with the entire human body and operates following physiological principles. Learning, like other essential bodily activities such as breathing, is dependent on the brain and may be altered by several factors that impact human physiology, including diet and stress. Thus, educators should contemplate establishing a relaxed instructional and learning atmosphere that nurtures the innate cognitive growth of the brain.

It is a normal feature of the human brain to look for meaning in certain situations. The third principle of brain learning is the pursuit of meaning, where the human mind instinctively seeks to acquire known concepts while simultaneously exploring new ideas. All the while, the human brain makes use of the knowledge that is already available and looks for meaning in the new information that is being taken in. For this reason, it is essential for the learning environment to supply input that is already recognizable to the learners and to provide the new data in a manner that is relevant to them. This will make it simpler for the learners to digest the new knowledge.

The meaningful classification of information is one way to characterize the phenomenon known as patterning. It is the fourth principle of brain learning. The human brain has the ability to recognize and generate patterns, and this is because the brain learns meaningful patterns and rejects information that is isolated from patterns that are not connected to each other. When learners are engaged in the process of learning, they organize information in a manner that is meaningful to them. This is due to the fact that the brain is able to digest new information and incorporate it into its learning system. "The brain is innately motivated to search for meaning," Caine (1998) asserts, confirming this pattern that has been seen. Patterning is the vehicle through which the quest for meaning is carried out.

Emotions play a significant role in the process of learning since they have an impact on cognitive development, which is impacted by the learners' emotions and expectations. It is the fifth principle of brain-based learning. Furthermore, emotions impact memory by facilitating the storage and retrieval of information through the use of many cognitive pathways. Thus, educators ought to establish a nurturing emotional setting for students by fostering a suitable learning climate through the promotion of mutual respect and the

implementation of cooperative learning strategies. The feelings and ideas that are associated with a particular thing are also a part of the learning process for that item. As a result, the emotions that are associated with this item affect how well it is stored and recalled. The classroom should be emotionally supportive and nonthreatening.

Principle six emphasizes the significance of both whole-brain and part-brain teaching and learning since the lateralization of the brain is a widely recognized principle. As it was mentioned before, the human brain is composed of two hemispheres, the left and right brain, each responsible for distinct activities. Nevertheless, there exists a contralateral link between these hemispheres, resulting in a continuous interaction. One half of the process involves analyzing and categorizing individual components, while the other half focuses on identifying relationships between these parts and integrating them to understand the information as a whole. That is why effective teaching should encompass both the parts and the complete to facilitate meaningful learning.

The seventh principle of the brain learning technique states that the brain acquires knowledge through focused attention and unfocused perception. This means that the brain is capable of learning information that the learner actively concentrates on, as well as information that they just see without intentional emphasis. The brain can acquire knowledge from both explicit statements and subtle hints. Therefore, educators must employ a variety of teaching methods, such as utilizing charts and pictures, to expand the range of learning opportunities. Furthermore, teachers should emotionally involve learners while teaching writing to stimulate the untapped cognitive abilities of the brain for receiving diverse and comprehensive information.

The eighth principle of brain learning involves the interplay between conscious and unconscious cognitive processes. Caine (1990) affirms that the majority of learning occurs through unconscious learning, as we absorb most knowledge without conscious effort or intention, through our experiences. Furthermore, she contends that the field of education should be restructured to incorporate the use of implicit learning. Caine (1990) argues that active teaching lacks effectiveness unless it incorporates students' personal experiences and that the purpose of active learning is primarily to evaluate and regulate unconscious learning. This theory aligns with Krashen's Learning and Acquisition

Hypothesis (Randall, 2007), which posits that the majority of learning takes place through natural acquisition, and the purpose of classroom learning is to guide and regulate this process.

The ninth principle of the brain-based learning hypothesis states that teaching and learning should take into account two distinct types of memories. The spatial memory system is responsible for effortlessly and organically remembering our experiences. Conversely, the information processing memory theory suggests that there are specific mechanisms for memorizing through repetition, which states that new information must be processed before it can be retained. The function of memory is to capture and retain the specifics of our encounters, while also being responsible for preserving less significant data. When there is a lack of connection between new information and existing knowledge, the reliance on rote learning increases. Rote learning and memorizing are employed for the retention of knowledge that is kept in a state of isolation. Both sorts of memories should be utilized effectively in the process of learning. Memorization is not favored for significant presentations, as it hinders comprehension and acquisition of knowledge.

The tenth principle states that optimal information acquisition takes place when it is given naturally and learned through spatial memory. This idea is essential in the process of learning and encompasses many procedures. Teaching plans may be designed by incorporating learner experiences and culture. In creating meaningful learning, several methods such as images, everyday occurrences, real-life examples, projects, and tales can be utilized to engage all senses. All theories grounded in neuroscience concur on the significance of this concept in the process of acquiring knowledge.

The eleventh principle emphasizes the significance of positive challenges and the negative impacts of threats in the educational process. This is because the brain operates more effectively when faced with challenging tasks. However, its efficacy significantly decreases when threatened due to reduced functioning of the hippocampus. Therefore, instructors should strive to establish a stimulating and non-intimidating atmosphere in the classroom by cultivating a calm and stress-free educational environment. Therefore, the

L2 lexical item should be chosen in a manner that both challenges learners and meets their specific needs.

The uniqueness of the brain is stated in the twelfth principle. Thus, each brain has a distinct and individual organization. It means that every neurotypical human brain possesses a comparable structure and functionality. However, the arrangement of information varies across individuals, as indicated by the findings of Gardner's (2006) hypothesis on multiple intelligences and emotions. Emotions, experiences, and individual variances in learning methods alter the configuration of the brain, resulting in a distinct and personalized brain for each individual. Therefore, it is crucial to take into account the requirements and interests of each student in the learning process. Additionally, the learning process should cater to individual variations by employing a diverse range of materials and methodologies.

To summarize, Caine and Caine (1991) outlined 12 principles and their consequences for education. Caine and Caine (2000) further asserted that each brain/mind learning principle demonstrates the inherent ability of all learners to acquire and comprehend a language. For each of these capacities, the underlying concept is presented appropriately. The capacities are listed in the following way. All students can comprehend effectively, including their ability to engage with natural experiences, their need for social interactions, their interests, purposes, and ideas, and their capacity to perceive and create patterns. It also emphasizes that there is the importance of appropriate emotions, the integration of details, deepening attention, and the use of multiple layers of context to support learning. It is also highlighted that there is the significance of time for reflection and processing, the engagement of multiple ways to remember, and the consideration of individual differences in maturation, development, and prior learning. It is concluded that there is an emphasis on the need for a supportive, empowering, and intrinsically challenging environment, as well as the engagement of individual talents, abilities, and capacities. Overall, all these are important factors in enhancing students' comprehension abilities.

2.5 Brain-Based Teaching and Writing Skills

Writing is a complex process that involves several processes leading to the creation of a well-structured and technically accurate composition, such as a history term paper or a job application letter (Page & Merivale, 2001, p.5). The brain acquires the skill of writing by assimilating a blend of experiences, deliberate repetition, and exposure to linguistic and written stimuli. When people participate in writing activities, several cognitive processes and brain networks are used to learn and improve writing abilities. Long-term memory plays an important role in the writing process which encompasses both internal mental resources and external sources like books and serves as a repository of information about the subject matter and target audience. Sometimes, a single cue in the given topic might enable a writer to access a pre-existing mental framework of an issue and activate a wide range of writing strategies. (Hayes & Flower, 1981)

The primary issue with long-term memory is the retrieval of information, namely locating the cue that enables the retrieval of a network of valuable knowledge. The second challenge for a writer often involves rearranging or modifying the content to align with the requirements of the rhetorical dilemma. Therefore, the crucial act is generating ideas by retrieving key information from long-term memory. That is why the pre-writing stage must include some activities that will activate both hemispheres. (Hayes & Flower, 1981)

Starting, the process of acquiring writing skills includes the stimulation of the language-processing regions of the brain, predominantly situated in the left hemisphere. These regions are responsible for functions such as choosing vocabulary, organizing sentences, and constructing grammar. Through the act of writing, individuals enhance the brain connections related to language processing, resulting in enhanced verbal fluency and skill. (Ornstein, 2004).

In addition, the act of acquiring writing skills also stimulates the right hemisphere of the brain, which plays a role in the imaginative elements of writing. This engagement improves the capacity to produce ideas, structure thoughts, and incorporate imagery and emotion into written communication. (Hodges, 2000). By exposing oneself to a variety of writing prompts and engaging in different writing exercises, individuals can activate

the creative functions of the right hemisphere of the brain, leading to a more comprehensive and inventive approach to writing.

As individuals consistently engage in writing activities, their brain undergoes neural pruning, a process that refines and optimizes neural connections associated with language processing and writing skills. This process of pruning leads to the enhancement of pertinent brain pathways, resulting in heightened proficiency in verbal and expressive faculties.

Ultimately, the brain acquires the skill of writing through a dynamic and interactive process that necessitates the simultaneous collaboration of both hemispheres. Through participating in a variety of writing tasks and offering valuable language opportunities, individuals may maximize the brain's ability to process language and express creativity, ultimately resulting in improved writing abilities. (Damasio, 1999; Hodges 2000)

It is emphasized that there are stages to writing as a brain-based writing product and that teaching writing skills in a meaningful context is necessary to produce a related product.

The brain-based writing approach posits that lessons should connect to students' lives and provide them with a wide range of choices, as the brain strives to make sense of the data it encounters. The brain-based writing approach brings a new and different perspective on learning compared to other traditional writing approaches, as well as taking into account every detail that may be important for learning without skipping. Therefore, the brain-based writing approach offers new prospects and options for learning a second language in foreign language classes as an alternative to traditional teaching methods and techniques.

2.6 Relevant Studies on the Brain-Based Teaching Model

Previous studies on applying brain-based techniques have demonstrated positive outcomes. According to Duman (2010), Gözüyeşil and Dikici (2014), brain-based education has been shown to have a considerable positive impact on the academic accomplishments of students with diverse learning styles. To examine the impact of brain-based learning, a total of 31 research papers were discovered, which included 42 different impacts. The primary focus of the study was to determine the degree to which

brain-based learning influences students' academic achievement. Research has shown that the research undertaken in Turkey is of greater magnitude compared to those carried out in the USA.

Hoge (2002) conducted research examining the use of brain-based teaching strategies by instructors to facilitate and motivate their students in reading and writing. Empirical data, acquired independently of any formal investigation, has shown the significance of brain-based education in establishing a secure and supportive atmosphere. In addition, the use of brain-based teaching strategies by educators has fostered student engagement and enhanced their academic performance.

In 2003, Getz conducted a study to examine the impact of Brain-Based Learning on the process of acquiring the English language. Based on the acquired data, there was no noticeable difference seen between the two groups. This might be linked to the inexperience of the two educators in brain-based learning theory and the inadequate quantity of brain-based courses in the program. Furthermore, research has shown that brain-based teachings have a beneficial impact since they promote innovative thinking and captivate students' attention.

Weimer (2007) researched to examine the impact of brain-based learning on students' level of engagement in the class and the improvement of their long-term memory. Research results suggest that teaching practices based on brain science effectively address students' social and sensory demands, stimulate student interest and attention, promote students' engagement with classes, and subsequently improve their ability to remember information.

Hsueh-Yun Huang (2006) conducted research in Taiwan that explored the use of brain-based approaches for teaching English as a Foreign Language (EFL). The study discovered a direct relationship between students' impressions of these strategies and their success in learning EFL. The study further proposed that using brain-based methodologies for teaching might effectively close the disparity between the material being taught and the material being comprehended, therefore augmenting the overall learning experience.

The 2014 study conducted by Yağcıoğlu examined the advantages of implementing a brain-based teaching approach in English Language Teaching (ELT) programs. The study revealed that students engaged actively, derived enjoyment from the learning process, and made notable progress in their English language proficiency, thereby indicating the efficacy of this instructional approach.

In Bayındır's (2003) research, students' attitudes toward brain-based applications in the English Composition Skills II course were investigated. It was discovered that the brain-based teaching model is successful in instructing writing abilities and the interviews done with 10 out of the 23 participants indicated that all of the students had favorable attitudes towards the brain-based applications used in the course. Therefore, the outcomes of the interviews validated the findings of the questionnaire. Furthermore, they developed a sense of self-assurance in their writing abilities and experienced a sense of joy from being recognized and appreciated throughout the courses. All participants expressed a positive attitude towards the course, specifically highlighting their enjoyment of group work, journal writing, roleplays, portfolio development, writing skills acquisition, teacher feedback, teacher-student interaction, and the overall class atmosphere. However, one or two students had negative concerns regarding sample analyses and reviews, formal writing tasks, and the duration of the lessons. All in all, students exhibit a favorable attitude towards the use of the brain-based paradigm in English as a Foreign Language (EFL) writing lessons.

Zuhriyah and Agustina (2020) aimed to investigate the effects of Brain-based learning and high-order thinking skills on the writing abilities of the students. It was revealed that students in BBL classes were not asked to memorize, they were expected to be engaged in critical thinking. In addition, BBL encouraged students to develop curiosity, innovation, and inventiveness, since the knowledge provided acted as a mere stimulant. Furthermore, the lecturer's approach of instructing students to construct each section of the essay during discussion sessions aids in their comprehension of the overall structure of the essay. They extensively discussed every aspect of this organization and put more effort into producing well-written content. Subsequently, they used their high order thinking abilities to understand the material presented.

Maryam Haghighi's (2013) empirical investigation revealed a notable disparity between the experimental group and the control group, suggesting that the use of brain-based teaching methodologies yields advantageous outcomes in English as a Foreign Language (EFL) classrooms. Research discovered that the use of brain-based teaching methods resulted in enhanced performance and long-term retention of English language abilities.

The study conducted by Tüfekçi and Demirel (2009) utilized a pre-test and post-test experimental research methodology and included interviews to gather qualitative data on student perspectives on the learning process. The quantitative data demonstrated that the implementation of brain-based techniques had a good effect on higher-level learning and memory retention. In addition, the qualitative data revealed that there were favorable views towards the learning environment that incorporated brain-based approaches. In general, using brain-based teaching approaches in English as a Foreign Language (EFL) classrooms yields positive outcomes.

Bruer (1999) identifies many advantageous characteristics of brain-based learning. Brain-based learning educators integrate constructivist learning models, promote student engagement and active participation in their learning, prioritize teaching for meaning and comprehension rather than memorization, establish low-threat but high-challenge classroom environments, immerse students in complex learning experiences, utilize research to guide instructional practices and make informed decisions about how research should be applied in their classrooms.

The 2019 study conducted by Ahmed Khalil investigated the effect of the Program Based on Brain-Based Learning and Emotional Intelligence for Developing EFL Secondary School Students' Critical Writing Skills. The research used a quasi-experimental approach, which facilitated the comparison between an experimental group and a control group. The study revealed that the experimental group, who took part in the specialized program, achieved considerably better results than the control group in the post-assessment of the EFL critical writing exam. This suggests that the program was successful in enhancing their writing abilities. This indicates that the program not only improved their performance compared to the control group but also strengthened their skills gradually. Overall, the research determined that the specialized program had a

substantial and beneficial impact on the development of critical writing abilities in English as a Foreign Language (EFL) among secondary school students. This supports the need to include creative techniques based on brain-based learning and emotional intelligence, to foster critical writing skills among students.

In Laura Erlauer (2003) research, how knowledge gained from neuroscience might improve teaching methodologies was explored. It highlights the significance of matching educational techniques with the brain's optimal learning methods. The research provides evidence that teaching practices that are consistent with the brain greatly improve student engagement and learning results. These methods are derived from the cognitive processes of information processing and knowledge retention in the brain. Using visuals, and incorporating different activities that require movement, collaborative learning experiences foster emotional engagement. It is linked to better learning outcomes as enhancing critical thinking and problem-solving skills.

CHAPTER 3. METHODOLOGY

This section presents the research design and further details about the research questions. The setting and participants, data collection, and data analysis are also presented to better understand the purpose and implementation of this study.

3.1 Research Design

This study's goal is to investigate the possibility of brain-based learning as an alternative to conventional approaches in foreign language classes, with a focus on the improvement of writing abilities. The study also aims to find out the impact of brain-based learning techniques on activating the left and right hemispheres of the brain of students on writing skills. It aims to identify how this approach can help students overcome obstacles, improve the learning environment, and enhance their writing skills.

The study’s qualitative method of research seeks to answer the following research questions:

1. How can brain-based learning be effectively implemented in foreign language classrooms to create a more dynamic and effective learning environment for developing writing skills?

2. What are the effects of brain-based learning on the overall learning outcomes of students' writing skills?

The study consisted of two classes of students from the Preparatory School of the Foundation University located in Istanbul. One class was as a control group, the other was as an experimental group. There were 18 students in each group. The participants were between the ages of nineteen and twenty-one, with a pre-intermediate to intermediate level of English knowledge. In the study, an experimental group and a control group were formed to assess the effectiveness of the model.

Additionally, students in both groups were informed about the study and obtained consent from the university. At the start of the semester, both groups were given a pretest to assess their current proficiency in English language writing skills. Subsequently, the

experimental group underwent a 10-week English language course that was specifically tailored to adhere to the principles of the brain-based teaching model. The course incorporated techniques and activities that were in line with the model's principles.

In the experimental phase, three sessions per week, each of which is forty-five minutes, were aimed at improving students' writing skills. Students in the experimental group were immersed in the environment where the left and right hemispheres of the brain were activated. After different brain-based activities, students were asked to use their ideas in the paragraph and essay they will write in the classroom under the supervision of the researcher. These paragraphs and essays had been analyzed by the researcher to determine whether brain-based activities helped each student to generate their ideas and how they reflected them in the text. A decision will be made based on both the experimental group, individually and throughout the group as to whether the technique is learned and applied or not learned and not applied.

In contrast, the control group was taught an English language writing course conventionally, without any emphasis on the brain's functioning and its principles of learning. After 10 weeks of teaching, both groups had a post-test to assess the improvement made by the experimental group. The pre-test and post-test findings of both groups were analyzed comparatively to see if there were any significant differences.

The study also aimed to ascertain the opinions of students on the brain-based teaching approach. To do this, interview questions designed by the researcher were administered to the experimental group. In addition, interviews were conducted with 10 students from the experimental group to get their perspectives and opinions about the use of the model. The interviews were done orally at the end of the experiment. Each participant responded to eight interview questions, with each interview lasting around eight minutes. The student’s answers to the interview questions were captured on tape and then transcribed. The interview was not administered to the control group, since they were not exposed to brain-based training.

3.2 Setting and Participants

The study sampled two groups of students enrolled in the Preparatory School of a Foundation University located in Istanbul. Each group consisted of 18 students. The participants were between the ages of nineteen and twenty-one, with a pre-intermediate to intermediate level of English knowledge. Both Turkish and students of other different nationalities participated in the study. The rationale for selecting a sample of students from these two specific groups is that they are currently under their instruction. There's a clear purpose in choosing these groups, and that's to work on writing with them.

The reason is that the researcher was assigned as a writing teacher of these groups, and they were also chosen by the manager of the preparatory school. Participants were not randomly selected from a larger population; instead, the researcher taught them alongside within the educational context.

Participants didn't have the same level; the control group had a higher level than the experimental group. The reason was that two groups were chosen randomly by the manager, and they were assigned to the researcher. That is why there were several extra factors influencing the research findings. However, the students in these groups are presumed to possess analogous academic backgrounds and follow the same academic curriculum. Therefore, it was not anticipated that there would be significant disparities in the level of language instruction or language exposure between these two groups.

The experimental group had 9 female students and 9 male students, 18 students were attending the course. The control group consisted of 11 female and 7 male participants enrolled in the course. Due to its diverse cultural atmosphere and focus on language teaching, the school provided an optimal environment for studying the impact of Brain-Based Learning (BBL) methodologies on language performance abilities. The study took place in two language classrooms that were specially created for teaching English.

3.4.1 Data collection tools

This study was designed as a qualitative research study so qualitative data collection tools were used for the collection of necessary data. Pre-test, Post-test, and open-ended

interviews with students were used in this study. Also, students' writings as paragraphs and essays were used to be analyzed.

3.4.1.1 Pre-test and post-test.

Pre-test was administered to the experimental and controlled groups in the very first writing class of the course. The aim was to test the writing skills of the learners before giving any input to them. The topic was "Who is your best friend and why?". One lesson, namely 45 minutes, was allocated for this task. There wasn't any limit to the number of words. One more objective was to see if learners could activate both hemispheres to perform the task. As it was stated before, the left hemisphere is responsible for logical thinking, language skills, and analysis. On the other hand, the right hemisphere is focused on intuition, also it is responsible for imagination, musicality, and spatial orientation. Additionally, it creates emotions and conveys non-verbal information. It was expected to see any of these skills in the writing passages of the students.

Furthermore, after the experiment was done, a post-test was assigned to both controlled and experimental groups. The topic was the same. They were supposed to write an essay about their best friend. The limit for the number of words wasn't given to them. The main aim was to see if students reflected all their knowledge in their papers. The researcher mainly concentrated on organization, number of words, and activation of the whole brain.

3.4.1.2 Student interviews

Interviews are frequently used as a qualitative data collection tool; it is a comfortable data collection tool for both participants and the researcher (Dörnyei, 2007). Interviews are important in reflecting the participants' feelings and thoughts in their own words. In this study, to find out students' views on brain-based teaching models a standardized open-ended interview was administered. 9 students were interviewed about their opinions on the English writing course. The interview questions were created by the researcher. The interview questions were about their experiences and feelings about the course, their likes and dislikes about the course, the benefits, and their recommendations for the course. Students' responses were tape-recorded and noted down. Each student answered 8 questions and each of them was interviewed for about 8 minutes in the classroom as a private meeting with the teacher.

3.5 Data Collection Procedure

The main objective of the study is to investigate the possibility of brain-based learning as an alternative to conventional approaches in EFL learners' preparatory class with a focus on the improvement of writing abilities. Also, the study aims to investigate the impact of brain-based learning techniques aimed at activating the left and right hemispheres on students' writing skills. For this reason, the study was designed as a qualitative study.

The study was conducted using a qualitative method. The study was conducted as an experimental group study, with a duration of 10 weeks. To determine the effectiveness of the brain-based teaching model on the writing abilities of English as a Foreign Language (EFL) learners, the experimental group was provided with 10 weeks of English language instruction that was constructed based on the principles of the brain-based teaching model. The writing abilities of both groups were assessed at the beginning and end of the module to measure the progress achieved and determine the impact of the strategy on this improvement.

During the first week of the study, a pre-test was conducted in both groups and the findings were analyzed and compared. Starting with the second week, the experimental group in the writing course was instructed using brain-based teaching methodologies. The design of the materials was modified. The classroom environment, curriculum, lesson plans, assessment procedures, methods, and activities were all intentionally planned. The emphasis was on engaging with every learner and stimulating all of their senses. A diverse range of materials and activities were employed, including graphics, audio materials, group activities, storytelling, information gap activities, problem-solving exercises, and real-life connections.

Additionally, homework assignments were given to encourage creative application of the taught concepts. However, in the control group, the booklet was utilized without any modifications or additional contents and exercises.

In the 10th week of the experiment, a post-test was performed during the class hour for both groups. The findings of the post-test were compared to the results of the pre-test to determine any improvements achieved in both groups. Writings after implementing each

activity of brain-based learning were collected and analyzed by rubrics that were created by the researcher to detect progress.

An interview was conducted in the 11th week among students in the experimental group to get their perspectives on the brain-based teaching methodology. A total of 9 students from the experimental group actively engaged in the interview, expressing their views and emotions on the course through verbal communication. The students' responses to the interview questions were both captured on audio and transcribed in writing form. The survey data was written in a descriptive way to answer research questions.

3.6 Data Analysis Procedure

In this study, the collected data were analyzed qualitatively. Firstly, the pre-test results of the participants in the experimental group and in the control group were analyzed based on the rubrics separately. The pre-test results were comparatively analyzed to determine the writing skills of participants in both groups.

To answer the research question about the efficiency of the brain-based teaching model in writing skills, the post-test results of the participants in both groups were analyzed. Post-test results were comparatively analyzed and the differences between the experimental group and the control group were found by analyzing in detail.

Finally, to find out whether the use of a brain-based teaching model made any difference in the writing skills of the experimental group participants, the difference between the pre-test and post-test results of both groups were analyzed. Eight writing paragraphs of the participants were analyzed by the rubrics created by the researcher to determine how many skills were applied. Rubrics included eight items: creativity/imagination/inventing, analyzing, organizing the paragraph describing (spatial orientation), exemplifying categorization, critical thinking, and expressing feelings and emotions. Additionally, each part of the interview was categorized, and it was separately analyzed; each question was answered descriptively.

CHAPTER 4. FINDINGS AND DISCUSSION

This chapter presents the findings of qualitative data. Analysis of pre-test and post-test results is given comparatively and in detail and descriptions of qualitative data with examples from the writings of students are presented in this chapter. The results of students' interviews are given in this chapter.

4.1 The findings of Qualitative Data

Pre-test and post-test results of the experimental group and control group were analyzed according to the rubric to find out any significant differences between the groups. Pre-test results were analyzed to determine the success level of the groups before the brain-based instruction and post-test results were analyzed to find out any significant difference between the groups after the instruction.

4.1.1 The findings of the Pre-Test

Pre-test results were analyzed in detail to get information about the skills of the participants at the beginning of the study. Pre-test results were analyzed descriptively to provide general information about students' writing paragraphs in terms of some skills fostered by using Brain-based Techniques. The aim was to detect if students could reflect these skills in their writing before the project started.

The researcher was assigned two writing courses with students whose levels were different. It was deliberately decided that the class with the lower level be chosen as an experimental group to see the improvement within the classroom. In both classrooms, on the first day of the course, when students didn't start getting input, the researcher distributed blank papers and asked them to write a paragraph about "Who is your best friend and why?". No limitation of words was given, just a limitation of time as 45 minutes was determined.

Pre-test	Descriptive	Narrative	Cause 1	Effect 1	Effect 2	Compare contrast 1	Compare contrast 2	Superhero	Post-test
creativity **imagination** **inventing**	spatial orientation	organization	exemplifying	critical thinking	categorization	analyzing similarities and differences	judging opinion	creativity imagination	**creativity** **imagination** **inventing**
analyzing	opinion	emotions	categorization	opinion	describing				**analyzing**
organizing the paragraph			judging						**organizing the paragraph**
describing (spatial orientation)									**describing (spatial orientation)**
exemplifying									**exemplifying**
categorization									**categorization**
critical thinking									**critical thinking**
expressing feelings and emotions									**expressing feelings and emotions**

Table 1. Rubrics for analyzing paragraphs

Creativity/ imagination, organizing a paragraph, categorization, spatial orientation, exemplifying, critical thinking, and analyzing (expressing feelings and opinions) were skills that the researcher was looking for in the writings of the students of the experimental and controlled groups.

Creativity and imagination were not detected in any pre-test writings. A researcher was expecting that students would create a scenario or a story of how they met their best friend.

11 students attempted to organize their paragraphs by starting with the name of their best friend and using linking words that show sequencing**.** All grammatical and spelling errors in the students' writing paragraphs have been kept in their original form."

"Firstly, I want to start to talk about our first meeting with her". "After the summer holiday, I went to school, and in the first lesson I met her." (S2)

"My best friend's name is Nehir Tokcan. We met 7 years ago." (S3)

"My best friend's name is Bilge. We met in high school." (S4)

*"My best friend's name is Elif." (*S7)

"My best friend is my mom." (S8)

"His name is Alp. His my best friend." (S9)

"My best friends name is Yaren. She is my neighbor. We are child friend."(S10)

"My best friends and me are neighbors. We met when we were five years old."(S11)

"My favorite best friend name is Enes and he is 18 years old. We met in 3 years old so I don't remember how we met." (S12)

"My best friend is Kerem. He is 18 years old. He is a software engineer." (S13)

"I met with my best friend in village. He was my cousin friend." (S15)

Spatial orientation is used to organize ideas while describing places or people. There are many ways of organizing a description as right to left, left to right, top to bottom, bottom to top, from outer to inner, from inner to outer, etc.

In spatial orientation, the researcher was looking for sentences that describe a person from bottom to top, from top to bottom, describing appearance first and then inner world or vice versa. Fifteen students described their friends by using these techniques, most probably unconsciously.

From outer to inner: ten students started describing their friends by describing physical appearance first and then personality traits.

"She has curly hair and her color is dark black. I love her style. She is very helpful and advises me every time." (S2)

"She is tall, brown hair, black eyes. She is calm, positive, and ambitious." (S4)

"She have a short hair and blond. She is very intelligent and gorgeous." (S5)

"She very nice, kind and funny. She have very big brown eyes and nice black hair. She very tall." (S6)

"She is very beautiful. She was a green eye. My mom very friendly. His like a red and yellow. She is love a hamburger and pizza." (S8)

"He have a black hair and long. He is not smart. He is sometimes being shy." (S9)

"She has brown hair and brown eyes. She is so honest, funny and kind."(S10)

He isn't tall but also he isn't short. He has black eyes and hair. He is handsome and smart." (S13)

"He is short and fit. He is funniest and clever." (S15)

"Sude is tall and skinny and long hair. Sude enjoyed read books and liked to swim." (S18)

From inner to outer: four students started describing their friends by describing personality traits first and then physical appearance.

"She is very funny, cute, kind". "She is blonde and beautiful."(S3)

"She is helpful and friendly. She is green eyes, and short and blond hair. She is successful and smart." (S7)

"Nisan is very funny. She is blonde and hair is short. She cooking delicious pasta." (S11)

"My best friend is so nice, kind, lovely and funny. She has brown hair and eyes. Usually she wearing colorful dress." (S16)

One student described just appearance.

He looks tall, little bit black. His hair is curly and he is using glasses like me". One student described just personality." (S14)

"Burak is hard worker and smart. He is a good person but very jealous." (S17)

As an exemplifying skill, students were supposed to support their ideas by bringing some examples connected with their best friends. 1 student used this technique in a very good way.

"We love listening to rap music, we went to Khontkor's concert five years ago. We love Trabzonspor team and we went to match last summer." (S12)

Being able to analyze their paragraph by using their critical thinking to express their opinion, judging and describing their feelings towards their best friend was analyzed in each writing. 4 students managed to do it by expressing their opinions at the end of the writing.

"Words are not enough to describe him." (S1)

"She is the best friend for me." (S2)

"I am happy to have this friendship." (S3)

"I am scared because she have a 48 weight." (S5)

The findings of pre-test had been assessed and it was found out that students don't know how to use skills to make their writings organized, analyzed, and exemplified. Some of them had an attempt to write their paragraphs in the way that rubrics suggest.

4.1.2. The findings of Post-Test

The teacher distributed papers to students and asked them to start writing about the first topic that was given to them before the process started. The topic was: "Why my best friend is my best friend". They were given 45 minutes as it was in the beginning, it was forbidden to use dictionaries.

Post-test writings were analyzed comparatively to find any significant difference between the pre-test and post-test paragraphs. The researcher was looking for the same skills that were determined at the beginning of the project. These are the skills that were taught to the students during 8 weeks. They are: 1. Creativity/ imagination, 2. organizing a

paragraph, 3. categorization, 4. spatial orientation, 5. exemplifying, 6. critical thinking, and 7. analyzing (expressing feelings and opinions).

During this period, students learned how to differentiate types of paragraphs, and which words and structures to use if they want to write a particular kind of writing. When they were given the topic of their post-test, students automatically understood that it should be a cause paragraph. They organized their paragraphs in a specific way of categorizing causes, writing introductions and thesis statements, exemplifying each cause, and writing conclusions by expressing their own opinion. Therefore, all 18 students organized their paragraphs in the way that the cause paragraph requires. They wrote at least 3 causes and described them by supporting ideas so they managed to categorize reasons. Students' paragraph organization is displayed in the way they categorized the causes.

"Honesty, understanding and helpfulness." (S1)

"Trust, personality, and support." (S2)

"My friend is kind, thoughtful and smart." (S3)

"Being nice,ambitious and her character." (S4)

"Development,finance,mentality." (S5)

"Her personality, her being social and friendly." (S6)

"Making happy and motivating." (S8)

"Sociable, polite and she has a good sense of humor." (S9)

"My friend is supportive, sensitive and honest." (S10)

"Enjoyable, having a great time together and trustworthy." (S11)

"Having many things in common, getting along with each other and support." (S12)

"Having perfect communication, understanding me very clearly and being

in the same situation." (S13)

"Sense of humor, memories and hard times." (S14)

"Her personality, our communication and our similarities." (S16)

"Same sense of humor, same memories and good communication." (S17)

"Always supporting each other,having fun and being at the same frequency." (S18)

The way causes were described:

> Honesty makes you believe him and friendship turns into brotherhood." We can understand each other through simple movements and we have the same accent. Revealing something happened to me, he listens and helps me.(S1)

> Trust is the most important thing in friendship for me that is why we trust each Other and whenever we have a problem, we always talk and share. My friend has a perfect personality and I learn only good things from her. We support each other and it makes me comfortable to be around her. (S2)

"I have never seen a friendship like this until I met my friend. She is so smart that her advice always works for me." (S3)

"Being friendly and giving only positive vibes. She is hardworking and best in the class. Her character is so good,she always makes me happy." (S4)

> My best friend is obsessed with learning something new every day. She listens to podcasts, reads many books or researches. She affects me in a positive way so I am improving with her and learning new things every day. She affected me in the way that we always support each other, especially financially. She understands everything quickly and she fixes my mentality by listening to my problems.(S5)

> Her personality is great, when there is a problem she always talks to me to find out the reason. We apologize and forgive each other. She has been to many countries and she is always motivating me to travel and hang out. She always encourages me,she is with me on my bad or good days.(S6)

She stands by me in life's difficulties and makes me strong. This support reduces our stress and makes us feel happy. She gives a great motivation to me and it influences me only in positive ways. She supports me to achieve goals. She says words that give me strength in my difficult days. (S8)

"She is very sociable and we have a good match. She is very respectful and polite to everyone. She has a nice sense of humor and always makes me smile." (S9)

"*She strives for my own good, if I make a mistake,she will guide me. She is able to feel and understand me easily if I don't talk or express my feelings. She always says the truth without hurting my feelings."* (S10)

"Everything seems funny when I am with her and I laugh so much. She immediately understands the things I am upset about and supports me. When I tell her a secret, I am sure she will keep it." (S11)

Loving the same food, traveling, playing computer games and going shopping together. If we argue about one topic, we can solve the problem just by talking. We can overcome every difficult time together and we were there for each other when we were kids and still nothing has changed. (S12)

"*We have a perfect relationship; we can talk for hours about everything. I can put myself in his shoes, when I am depressed, he doesn't complain and listens to me carefully. Our behavior, way of thinking and decisions are similar."* (S13)

"Joking without stopping and never getting bored of it, sometimes puts us into trouble. Supporting in the hardest times is the best thing a true friend can do." (S14)

She gets along with everyone easily. She talks politely even to people she doesn't like. I'm never bored around her. We have been friends for 10 years and we almost never argue. Our character and the things that we like are the same. (S16)

"We laugh at the same things and situations. Since we grew up together, we have the same memories. We always know what to talk about and he has a good vocabulary level in English, my knowledge also improves with him." (S17)

> She is such a valuable friend who I do not understand how time passes when we are together. She advises me like my mother, listens to my problems and she is one of the few people I feel at peace with. She is a balanced person full of love for life.(S18)

Fourteen out of eighteen students extended their ideas by exemplifying them.

"For example, I can trust him because he has the same attitude as me, if something isn't good, he tries and tells me about it." (S1)

"For example, if your friend has a bad personality, you will learn only bad things from them." (S2)

"For example, when I make a mistake, she always fixes them." (S3)

"Features of character are really important because best friends do positive things, and it makes us feel privileged and happy." (S4)

"We help each other financially. For instance, if she has problems with money, I pay her food bills." (S5)

"She is a very kind person. For example, if you apologize, she always forgives you." (S6)

"She is sensitive because she can empathize with people and animals." (S11)

"We like playing computer games. For example, today after school, we will go to the shopping mall together." (S12)

"For instance, when we want to decide on something, always our decisions are similar." (S13)

"Escaping from the dormitory at midnight, fighting with someone, tasting something for the first time are some good memories that connect us." (S14)

Creativity was missing but the reason is that the topic of the paragraph doesn't require any imagination because students were describing their real friends. Only 2 students attempted to start their paragraphs creatively.

"Trust is the most important thing in this life." (S2)

"Friendship is the most important thing in this life." (S13)

All eighteen students analyzed and expressed their opinions in the last sentence of the paragraph.

"All the reasons worked for me and now he is like my brother, he is my kanka." (S1)

"I'm a very lucky person because my best friend has these three things and she is one of the most important people in my life." (S2)

"I love her and I am very lucky to have her." (S3)

"It is better to have two real friends rather than many fake ones." (S4)

"Best friend means support and understanding your emotions even without talking." (S5)

"I have never met people like her before and I hope she will stay in my life forever." (S6)

"The positive effects are evident in every aspect of our lives." (S8)

"She is always good for me, I enjoy hanging out with her." (S9)

"Everybody needs a best friend, I feel lucky and hope we will be together for long years." (S10)

"Friend in need is a friend indeed." (S11)

"Everyone needs a friend like Enes." (S12)

"We are best friends because we understand each other and we complete each other as puzzles".(S13)

"I cannot imagine my life without my best friend." (S14)

"Our friendship is a friendship that will last forever." (S16)

"If you have a good relationship with your friend, you are the luckiest person in the world." (S17)

"It is very important to have close friends and not to lose them." (S18)

4.1.3 The Comparison of Pre-Test and Post-Test results

There is a significant difference between the pre-test and post-test results of the participants in the experimental group. Pre-test results showed that before the experiment students had no idea concerning the organizational part of the paragraph. Based on the pre-writing, 11 students attempted to organize their paragraphs. In post-test results, it was detected that all 18 students organized their paragraphs in the way that is required by starting with a hook sentence that follows general statements and thesis statements where students explained 3 reasons why they love their friends. Each cause is supported with examples and memories from real life that are connected with conjunctions. In the conclusion part, their opinion is expressed. Based on the model, creativity, imagination, and inventing are the parts that only 2 students attempted to fulfill. All 18 students succeeded in organizing (sequencing /categorization) part. All 18 students used spatial orientation to describe their friends but this time, no one mentioned the physical appearance of the friend, all of them wrote about character and personality. 14 out of 18 students gave examples to support their ideas. Finally, all 18 students expressed their feelings in the body part and opinions at the end of the paragraph.

As a result, the use of conjunctions has increased even in terms of difficulty. To illustrate, before the experiment, students used to use "and", "but", "or", and "because". However, in the process they have learned and started actively using "therefore", "consequently", "besides", "owing to", "additionally", "moreover", "due to", "on the one hand", "on the other hand". Descriptive adjectives from "beautiful", "nice", "good", "kind", and "happy" have changed to "intimate", "thoughtful", "smart", "supportive", "helpful", "impressive", "optimistic", "ambitious", "important", "positive", "determined", "privileged", and "obsessed". It is concluded that the Brain-based model positively impacted the performance of students in their writing skills. To illustrate the difference in the use of skills, researchers compared the pre-test and post-test results of students. The table 2 shows the number of skills participants were able to produce before the implementation of the brain-based model and after it.

Table 2. Pre-test and post-test results of the experimental group

List of students	Pre-test results	Post-test results
S1	1	5
S2	3	6
S3	3	5
S4	2	5
S5	2	5
S6	1	5
S7	2	-
S8	2	4
S9	2	4
S10	2	4
S11	2	5
S12	2	5
S13	2	6
S14	1	5
S15	2	-
S16	1	4
S17	1	4
S18	1	4

Table 3. Pre-test and post-test results of control group

List of students	Pre-test results	Post-test results
S1	4	4
S2	3	5
S3	5	5
S4	4	5
S5	3	4
S6	3	4
S7	3	3
S8	4	4
S9	2	3
S10	4	5
S11	4	3
S12	4	3
S13	2	4

S14	4	5
S15	4	5
S16	5	4
S17	3	4
S18	2	4

The table 3 shows the pre-test and post-test results of the control group. The group was strong from the beginning, showing good results even in the pre-test. There were some improvements even if writing lessons were taught traditionally because students got their detailed feedback based on each writing every week.

4.1.4 The findings of students' writings

This study lasted 10 weeks, and 8 weeks were devoted to the experiment. There were four stages: brain activation, writing the first draft, revision and writing the main paragraph, and assessment and feedback**.** Students were exposed to different activities that activated their whole brains in the brain activation stage. For example, the left hemisphere is responsible for analytical tasks, and the right hemisphere of the brain is responsible for creative tasks. Therefore, activities that require both hemispheres were incorporated. Afterward, students brainstormed ideas on the given topic, discussed them with partners, and started writing their first drafts. After the assessment, the teacher gave their paragraphs back with written and oral feedback, and students wrote their main writings by working on their mistakes. Then students got their final feedback.

1. Descriptive paragraph

Brain activation (pre-writing stage)

A melody of the busy town was being played by the instructor. Each student was provided with a piece of paper, and T was instructing them to use colored pencils. The teacher was currently reading a work in which she tried to incorporate all five senses and, as she was reading, she invited the children to draw. Several prepositions of location, including to the left, to the right, and in front of, were used throughout the text. Additionally, the text made use of descriptive words; some examples were colorful, fresh, yummy, and delicious. The reader was able to feel, taste, see, smell, and hear what was being described using descriptive paragraphs. Based on the model, the fifth component, which is referred

to as enrichment, was applied to appeal to the five senses to stimulate the complete neurological system of the students and to provide them with different sources of knowledge.

The instructor examined the students' drawings when they had completed it. Students also compared their drawings to one another. Students created a variety of drawings, which is a fascinating aspect of the activity. Even if the script was the same, students used their creativity and imagination to add details that belonged to them. To give an example, a student sketched a kebab instead of fresh fruit, and he said that he sensed the smell of meat. To carry out this exercise, positive emotions, attentiveness, and music were applied successfully. In addition to providing comments on the usage of prepositions, the teacher also checked to see if the students had drawn the items in the appropriate locations. Following the feedback, the instructor distributed pictures of the room that had a variety of things and then asked the students to work in pairs and describe the pictures to one another. When one of the students was describing, their partner sketched, and then they switched roles. Students were able to include grammatical structures such as "there is, there are, colors, descriptive adjectives, prepositions of places, and the names of objects in their writing by participating in this exercise. Students had a great time, and their attention spans remained stable throughout the activity".

The text that was used in the experiment. (It was generated by AI)

In the busy town, there are lots of things to explore. If you look to the left, you'll see colorful shops with signs. To the right, there's a noisy street market where people sell fresh fruits and vegetables. In front of it, the main road is full of cars and people talking, making the town lively. As you walk, you will smell yummy food on the left and delicious coffee on the right. The air is full of different smells, making you want to try the local treats. While you're walking down the street, you might feel a breeze from the left and experience some bumps as you move through the busy market. The town is full of things to touch and discover.

Writing the first draft is the second stage.

Requesting students to compose their paragraphs was the next stage in the process. Before each writing, students were supposed to do brainstorming and complete outline parts. The topic that was asked to be written about was, "What is your favorite room?" Through the application of their cognitive abilities, each student was able to complete the assignment successfully. This included remembering where they tried to recall their room and what was in their room. By activating the left hemisphere, which is responsible for memorizing, and the right hemisphere, which is responsible for spatial orientations, the brain was able to better process information. It is also the right hemisphere of the brain that is responsible for the capacity to draw pictures. Additionally, 5 senses were activated.

Revision and writing the main paragraph stages

The teacher corrected papers by putting symbols concerning the organizational part, also grammar points. Students got their papers back and they were supposed to revise and correct their mistakes. They rewrote their paragraphs as the second draft.

Assessment and feedback stages

The teacher assessed the final draft by giving points based on rubrics that were created to test if brain-based instruction worked and students reflected it in their writings.

In the Descriptive paragraph, these aspects were supposed to be found in spatial orientation (the use of prepositions). To illustrate, some samples were taken from the students' writings.

Four students used a clockwise spatial order, which means that they described their rooms by picturing them and following from the left to right order.

"I have a desk, to the right of the door, and a two-layer shelf above it. There are two small rugs on the floor in the middle of the room." (S3)

"There is one bed to the left of the door and one nightstand next to the bed." (S4)

"When you enter the door, there is a painting on the wall to the right. There is a window behind the bed." (S9)

"To the left of my room,there is a bookcase with shelves. There is a desk next to it." (S10)

"*When you enter the door, there is long mirror on right side. I have a bed next to my drawers so drawers are between my desk and my bed."* (S12)

"When you enter the door on the left side of the room, there is my bed. There is a nightstand next to my bed. I have personal care products on the nightstand and my socks." (S13)

"On the right, there is my bed. On the opposite side of the room, there is a window and a radiator, radiator is in the bottom of the window." (S15)

"My wardrobe is located to the left of the door. On my walls, there are many framed memories." (S17)

Right to the left:

"On the right, there is a cupboard and the clock on the wall. On the left, there is a table and 6 chairs next to the freezer." (S6)

"On the right, there is a large wardrobe with three shelves. On the left, there is a large wood bookshelf." (S7)

From the opposite to the right:

"There is a window opposite the door. There is a bed right next to the window." (S8)

From the middle:

"There is a big bed in the middle of the room. There is a big wardrobe in front of the Bed." (S5)

From top to bottom:

"The ceiling is high and the walls are light grey. My bed is next to the wall. There is a bookshelf next to my bed." (S11)

Outside to inside:

> Enter through the outer door. Then turn left, the second door is my room's door. There is a huge closet on the left side. There is a chest of drawers next to the closet and there is my useful desk in front of it. (S18)

Expressing feelings was the second component that the researcher was looking for in the paragraphs of students. Using descriptive words to write about their feelings:(creating a sensory image in the reader's mind)

"Having a big window makes me happy because the view from my room is so beautiful". My big bed is an advantage. I am lucky to have a room like this." (S3)

"I don't like a big room, it gets dirty quickly." (S4)

"I want a toilet and bath inside my room, it is important for privacy". My walls are blue because blue is so relaxing." (S5)

"I like sitting on the balcony, I love it." (S6)

"My life is in my room." (S7)

"I love my room, I am happy to be in my room." (S8)

"This is my room, my favorite room!" (S9)

"My room may be small but even so it is my private place and I love spending time in my room." (S10)

"I love spending time in my room because it belongs to me." (S11)

"I really like my bedroom because I am very comfortable there and it is very modern." (S12)

" My favorite room in the home is my room." (S13)

"My best room isn't huge but it is tidy and useful so I like it." (S15)

"I enjoy/love spending time in my room." (S17)

"I love my room and it is more than enough for me." (S18)

Examining the sentences from the students' paragraphs revealed that all 18 students successfully applied the skills they had learned from a brain-based model. Students who were absent during the session received a remedial lesson in the writing club, which a researcher was responsible for.

Furthermore, they learned how to organize and write a descriptive paragraph. Whenever they were given a task to write a descriptive essay, they kept in mind that they should visualize the space or the person they were going to write about. Secondly, they should employ descriptive adjectives that can captivate and stimulate the reader's visual senses. Lastly, prepositions of place and the ability to think critically to express an opinion, either negative or positive, are crucial aspects of this type of writing.

2. Narrative paragraph.

Brain activation (pre-writing stage)

The teacher entered the classroom, and it was very noisy, students kept talking. Suddenly the teacher started telling a story that caught the attention of students immediately. This is the text. (it was written by the researcher)

Today's morning was a disaster for me. I overslept and woke up to the sound of my alarm. In a panic, I quickly got ready and rushed to school. When I arrived, I was already 10 minutes late for my first lesson. After that I realized I forgot to make prints for my lesson and prepare materials for my students. When I entered my classroom, I found that the interactive whiteboard wasn't working. It was just a black screen and the projector was not working. The students were surprised that their punctual teacher was late, they were waiting for some action from me. I felt so disappointed, took a deep breath and decided to make the best of the situation. Instead of relying on the board, I engaged the students in a lively discussion. We shared ideas, asked questions and I asked them to create materials. Despite the chaos, the class turned out to be surprisingly enjoyable. Students were surprised at how I reacted to unexpected challenges. By the end of the day, the students left the classroom with smiles on their faces, having experienced an unforgettable, chaotic day of learning. Even bad days may end in a good way.

Students believed that this situation had happened to their teacher. They were so involved in giving advice and their eyes were full of sympathy. The first mission to catch their attention was completed.

The second step was to make students listen to another story. T started reading a text with intonation and she wanted them to understand the type of paragraph that they were going to cover that day. Students didn't know the word narrative, but they said it is a story. The next step was to distribute the same text to students so that after listening they could see the text and structures. T asked the class to listen to her carefully and asked them to try to notice the language or useful structures that are used in the text.

After some time, students compared their highlighted words with their partners. T asked some questions to check their understanding.

A scary pool (this text was generated by AI)

Timmy, a shy boy, used to be scared of swimming. When he thought about the pool, it seemed big and uncertain. While other kids were playing, Timmy stayed by the edge, watching and feeling a bit scared. One sunny day, his friends told him to try. Firstly, he put his toes in the water. His heart raced, but he took another step. Then, the water reached his knees, making him a bit anxious. Still, Timmy kept going, wanting to face his fear. After some help from a swimming teacher, Timmy learned to trust the water. Firstly, floating on his back was a small triumph. Then, kicking his legs felt like a victorious dance. Each lesson had a new challenge, but Timmy didn't give up. Before he knew it, Timmy felt confident. The once-scary pool became a fun place. His laughter echoed as he splashed and swam. Fear turned into a love for the water. Timmy didn't only face his fear but also found joy and excitement in the pool.

T elicited this information:

The story is told in a sequence of events that is narrated by using narrative tenses.

Gives background information such as where and when the story takes place in the opening sentence or sentences.

Has a clear beginning, a middle, and an end.

Entertains and informs.

Uses descriptive words to paint a picture so realistic that the reader can almost feel the experience of witnessing the event themselves.
Reflects the feelings of the writer at the time of the event.

After a short discussion, students got another text, and this time the task was to find the Topic sentence (Background of the story), the Beginning of the story, the Middle of the story, and The End of the Story (Concluding Sentence).

(this text was taken from the writing booklet that is used for teaching writing at the place where the experiment was conducted).

Fear of public speaking

[Background of the story (Topic Sentence)] I never thought I could do it, but I finally conquered my fear of public speaking. [Beginning of the story] At the beginning of the semester, my English teacher assigned us the difficult task of speaking in front of the class for three minutes, and I worried about it for the next two months. I have always been afraid of making a speech in public. I wrote all my ideas on note cards. I practiced my speech with my notes in front of a mirror, in front of my cat, and in front of my husband. Would I be able to make my speech in front of my class? [Middle of the story] When the day of my speech came, I was ready. As I reached the podium, I looked at my audience and smiled. Then I looked down at my note cards. At that moment, I realized that I had the wrong information. These were the notes for my biology test, not the information about my speech! I closed my eyes and took a deep breath. Without further hesitation, I began the speech. [End of the story (Concluding Sentence)] To my surprise, the words flowed from my mouth. Three minutes later, it was over. Everyone applauded my speech that day, and I left that room feeling like a winner.

Students read the text, completed the task, compared their answers with their partners, and discussed each part with a teacher.

Students constructed the meaning that the first sentence in the paragraph –the topic sentence- gives background information about the story. The main character must be

introduced and the writer herself- and prepares her readers for the action that will come later in the story. The reader can guess from this first sentence that the story will probably be about what the writer did or what happened that made her less afraid of public speaking.

After that student figured out that the topic sentence is the beginning of the paragraph, but it is not usually the beginning of the story. The main action begins after the topic sentence. Not all narratives contain action. They may be about a problem or a conflict.

After the beginning part, the students found the middle part of the story. The middle part is where the main action or problem occurs. Lastly, the end of the story gives the final action or result. It also concludes the story. If there is a problem or conflict in the story, the solution is presented here.

Writing the first draft is the second stage.

After the explanation, the researcher asked students to write about the most memorable\happiest moment in their lives taking into consideration everything that was discussed in the session.

The sixth component of the model is multiple memory pathways such as incorporating real-world context with its many associations and hands-on exercises. Additionally, the seventh component of the model is the construction of meaning. This principle focuses on the fact that every individual creatively constructs his meaning out of the material at hand by activating his prior knowledge, making personal and real-life connections, and actively interacting with others. Consequently, the product for each person is something unique and personal.

To analyze the narrative paragraph writings, the researcher activated the organizational skills and emotions of their learners, who are located in different hemispheres of the brain. Thus, organization which is the left-brain hemisphere responsible for is one of the aspects that was detected in the writings of the students. Additionally, it is a fact that the right hemisphere is responsible for emotions. Therefore, the ability to reflect the feelings of the writer at the time of the event was an important skill that the researcher was searching for in the paragraphs of the students.

<u>Organization of the paragraph was detected in the paragraphs in this way.</u>

Background of the story (Topic Sentence)]:

"The happiest moment in my life was in Barcelona." (S1)

"That day I felt very bad because I didn't get any answers from universities." (S2)

"18th birthday is special for everyone." (S3)

"My first adventure started when I left my hometown." (S5)

"I will never forget the time I visited my hometown." (S6)

"Football match 2 weeks ago made me happy and excited." (S7)

"The happiest moment in my life is when I drove a long distance car." (S9)

"My happiest memories in my life were at middle school." (S10)

"I think everyone's 18th birthday is very special." (S11)

"The happiest moment in my life was 3 weeks ago." (S12)

"The happiest moment in my life happened a few months ago with my friends at the seaside." (S13)

"My happiest moment in my life is my first driving experience." (S14)

"Actually, everything started with a two week holiday because corona disease spread everywhere." (S15)

"The most beautiful experience in my life happened one year before." (S16)

"The happiest moment for me was when I went to a Formula 1 race." (S17)

Beginning of the story:

"In 2019 when I was 15,I traveled to Barcelona with my friends." (S1)

"11th of July I woke up very early and I saw a lot of notifications on my phone." (S2)

"My 18th birthday was last week and it was so much fun." (S3)

"I had to get a higher mark in the LGS exam." (S5)

"That day I went to hang out with my cousins." (S6)

"My friends said Manchester United would win Galatasaray." (S7)

"I was only 16,it wasn't legal but my father was with me." (S9)

"I came across a great class." (S10)

"First of all, we ate at a nice and expensive restaurant." (S11)

" *I went to Kocaeli, we met at the seaside."* (S12)

"Firstly, I woke up early because my university exam finished a few weeks ago." (S13)

"I sat on the driver's couch,took out the steering wheel and pulled the hand brake." (S14)

"*When I studied at school, teachers came to our class and said hello,school is closed for two weeks."* (S15)

"Me and my friend decided to go to the concert." (S16)

"The weather was cold and rainy, the race began late." (S17)

[Middle of the story]:

"When we arrived at the hotel I realized I had forgotten my passport." (S1)

"After some time, I went to say to my family and they felt very happy also it made me more happy." (S2)

"It was the time to open gifts." (S3)

"I got my first money and got 93 on the exam at the same time." (S5)

"I am very tiny but I tried to use a motorcycle." (S6)

"I turned on Tv and we started watching the game." (S7)

"While we were on the road,he pulled the car over and said I should get in the driver's seat." (S9)

"We were going to a food shop with the remaining friends." (S10)

"As the hours got later, my friends came to my house for a sleepover." (S11)

"When the match started, I felt very excited." (S12)

"After walking around the court,we decided to ride a bike." (S13)

"I rode 5 or 10 min and after that I turned on the music." (S14)

"After this holiday, students understood that schools can't open again." (S15)

"The singer tried to talk with the audience." (S16)

"The race lasted 57 laps and Max Verstappen won." (S17)

[End of the story (Concluding Sentence)]:

"Actually, we visited a lot of places but I want to stop at that." (S1)

"That is why this day is my best day." (S2)

"*It was an amazing 18th party." (S3)*

"This experience makes me happy and proud of myself." (S5)

"I will never forget these days." (S6)

"We were so happy that we won the match." (S7)

"I returned the car after driving 100km." (S9)

"That is the reason I love these memories." (S10)

"This memory is very special for me." (S11)

"*I had a very fun day." (S12)*

"Finally, we went home in a very good mood." (S13)

"This was the first driving experience in my life." (S14)

"It was the best period for me." (S15)

"It was my favorite concert." (S16)

"It was the best experience for me." (S17)

Statements that express feelings and emotions were found in the writings of students.

"*Unfortunately, lunch wasn't delicious. "It was one of the most beautiful moments of my life, it is impossible to forget it." (S1)*

"*We need to believe in ourselves. We should do our best. We should be patient, if we want, we can do everything. Memories are the most important thing in our life."* (S2)

"*I love talking with them."* (S3)

"*I want an academic career and I work for an academic career. I work and earn my own money,it makes me feel free."* (S5)

"*I miss them very much,I was happy. I hope we will meet again someday."* (S6)

"*My friend was disappointed, this broke his heart."* (S7)

"It was a great experience for me." (S9)

"*We felt like a family."* (S10)

"*It was very special and enjoyable. I was very happy and emotional. I felt so happy and special."* (S11)

"I was so happy and extremely excited." (S12)

"My happiest moment was with my friends."* (S13)

"I was so excited. I felt happy."* (S14)

"I felt very happy and peaceful." (S15)

"This was my favorite moment and it was incredible. This one made me love concerts so much."* (S16)

"These memories I mentioned were some of the happiest moments I have experienced in my life. The food I ate was truly amazing." (S17)

Through the examination of the sentences that were included in the paragraphs of the students, it was discovered that all 15 students were able to successfully use the abilities that had been taught using a brain-based model. Additionally, they have acquired the knowledge to organize and compose a paragraph that is narrative. They made sure to keep in mind that in their further tasks to write a narrative paragraph, they should have a clear point in their mind as topic sentence, beginning, middle part and ending. In the second place, they should use descriptive words to paint a picture so realistic that the reader can almost feel the experience of witnessing the event themselves. In conclusion, the capacity to think critically and express one's viewpoint, whether it be favorable or negative, is an essential component of the narrative type of writing.

3. Cause paragraph

Brain activation (pre-writing stage)

T prepared a presentation about famous criminals and the reasons why they committed crimes. T asked the class if they knew any famous criminals. The first criminal that students named was Pablo Escobar.

T showed the photo of the first criminal, who, by chance, was Pablo Escobar. The teacher began listing the crimes he had committed, and the question was: Why did he commit them?

The answers provided by the students included poverty, jealousy, and bipolar disorder. T demonstrated all the criminals by eliciting their reasons for committing crimes and at the end. The instructor also presented two terminologies, such as blue-collar and white-collar criminality. Since it was all new information to them, students were particularly attentive. The instructor requested that the students provide cases of both white-collar and blue-collar crimes from their own countries.

T showed three reasons and asked students to categorize them. There was poverty, schizophrenia, and a lack of education. Some students said no money, no health, and no education.

Afterward, T taught the students that it is better to categorize the reasons in the following way:physical,psychological,social,educational,financial,individual,environmental.
Additionally, T showed a brainstorming technique that is a very good way to organize the writing and generate ideas.

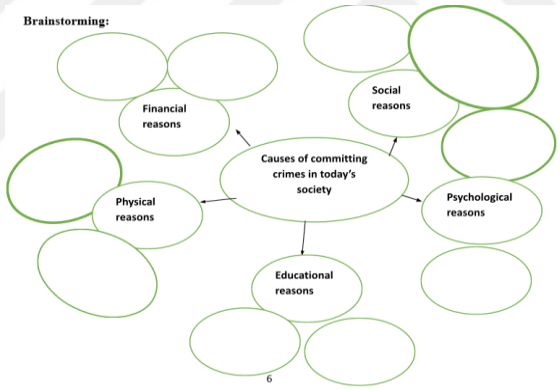


Figure 3. Sample of Brainstorming for Causes of Committing crimes in today's society

(adapted from the writing booklet of the institution)
The topic that was given after a brain-activation stage was: "Causes of committing crime in today's society."
T asked students to brainstorm ideas and categorize the reasons. After brainstorming, students started writing. Additionally, new conjunctions to express the reasons instead of because as owing to, due to were presented with examples.
Visuals aimed to evoke students' interest. Multiple intelligence, attention, and emotions were involved because students were involved in the discussions by their own choice.

These all are the jobs of the right hemisphere. As for the left hemisphere, students' analytical thinking and reasoning were activated since they were evaluating and criticizing some criminals, they were expressing their points of view. Skills such as categorizing each case by exemplifying them and the feelings of students as judging or expressing their opinion were searched for in their pieces of writing.

The way students categorized causes by exemplifying them.

Samples from students' writings about causes of committing crime in today's society.

> Greed and selfishness/psychopathic people/living in an uncared environment. Some countries decided to bring them together and give them Palestine. They are killing Palestinian civilians under the pretext that they are terrorists the land doesn't belong to Palestinians.(S1)

> People start having problems because of economic problems, such as taking debt and cannot pay this money. Relations between friends and people, schizophrenic problems so people can't think normally, and that makes them dangerous. (S2)

> Financial causes are the poverty rate, people prefer to steal and hunt people instead of making money, they owe money to others and make decisions that will have bad results. Psychological reasons are being a freak, crazy, or trauma. Ignorance and inhibition of achievement are examples of educational causes. Body shaming and alcoholic or drug addiction are physical causes. Social reasons are peer pressure and family problems. (S3)

> Psychological reasons: sick thoughts. Physical reasons: desire to make other people's likes worse because they don't like themselves. As an example, Jeffrey Dahmer is given. Social reasons are family problems: Ted Bundy, Jeffrey Dahmar, and Richard Ramirez. (S4)

> Psychological reasons: sick thoughts. Physical reasons: desire to make other people's likes worse because they don't like themselves. As an example, Jeffrey Dahmer is given. Social reasons are family problems: Ted Bundy, Jeffrey Dahmar, and Richard Ramirez. (S4)

Psychological reasons: breakdown of morals, childhood trauma,death of family members (Jed Bundy,serial killer of women who broke up with his girlfriend and started killing women who look like his first girlfriend). Physical reasons: adrenaline rush and boredom, there is a chromosome that makes them prone to crime. (Albert De Salvo, he raped women and on the top of that he did torture them. Another example is Can Goktug who had been killing because of boredom. Educational reason is not knowing law, not finding economic power for education. Also poor role models, not seeing an ideal person in the family, government or country. (S5)

Social reason is exclusion, loneliness. Educational causes are ignorance or the devil. The Devil asks them to kill people. Financial reason is debt, there are many people who ask to kill people for money. Psychological reasons are traumatic childhood and mental illness. Example is Arthur Smith who had a multiple personality disorder (24 personalities). The reason is that his father died and his stepdad treated him in a bad way. (S6)

Economic inequalities and poverty can push people who are struggling to make ends education, discrimination and social exclusion can create an environment in which individuals are marginalized and turn to crime. Psychological reasons are traumas, abuse or mental health problems and these people may be more open to engaging in criminal behavior as a way of coping with their emotional pain or distress. (S7)

Financial: people steal because they run out of money, social reason: being jealous and thinking badly of us. Psychological reasons are diseases, mental illnesses. Bipolar person can be both murderer and compassionate. (S8)

Not having many opportunities for school or work,not having another choice, drugs and alcohol use messes with their thinking and it can make them do bad stuff. A good family helps you do good things.(S9)

Broken family structure, family members not respecting each other, not having an environment of love and trust, it reduces a person’s confidence and

connection, as a result of it they become inclined to commit crimes. Losing consciousness and acting with impulses because of drug use and drunkenness. Social problems are a desire for revenge. Financial reasons are decreasing job opportunities and salaries which leads to poverty, and the desire to make easy money is increasing.(S10)

Ambition to make money leads to theft and corruption. Poverty can make people do things they don't want to do to steal to fill their stomachs. Psychological disorders to revenge when they grow up. People may be influenced by the movies they watch, the news they read on social media. (S11)

Having debt leads to robbing. Not going to school and becoming antisocial, not having enough friends. Psychological reason, as an example there is Richard Romirez, he was bullied by his family and he was exposed to a lot of violence.(S12)

Poverty, having to pay bills or loan, it is a pressure to steal money. Social reason is the environment, not being able to communicate clearly, the role model is wrong. Educational reason is not getting moral lessons, not having information about life. Psychological reason is schizophrenia. (S13)

Some people don't want to work so they are stealing. People are freaks or having problems from childhood, parents are drug or alcohol addicted. Criminals in the family. Psychopaths. Not getting enough education, becoming an ignorant person, ignorant people don't care about rules. (S14)

Poor families seeing other people's lives, being jealous, they can't go to school and they can't learn how to be polite. Physical reason is comparing yourself to other people and behaving rudely. Psychological reasons include genetic disease, schizophrenia,autism. Not controlling their brains. (S15)

Robbery because of lack of money or debts. Mental issues so they can't control their actions, also not feeling good about themselves. If someone thinks they are not important. Social factors are not having a good job or education. Peer pressure, when families don't provide enough support. (S16)

Insufficient knowledge about rules and law because of lack of education. Not being able to complete their basic needs and jealousy caused by poverty is a financial reason. Psychological cause is lack of love from family during childhood. (S17)

Social pressure the society exerts on people and desire to take revenge on society. Psychological disorders have a traumatic past before that. For example, Carol Wuarnos was traumatized at a young age, she was abandoned by his parents when she was young and grew up with grandparents but they raised her poorly,abused and harassed her and didn't allow her to play. She started to have sudden anger problems,she started hating men and she became a serial killer.(S18)

Students expressed their opinion and some of them judged the criminals. The following sentences are samples from the students' paragraphs.

"Self-defense isn't a form of committing crime because if you don't defend yourself, the game is over." (S1)

"The 21st century is the most dangerous time because of these crimes." (S2)

"It is very easy to become a criminal in today's society but if you continue despite the difficulties, you can be sure that a much better future is waiting for you." (S3)

"How important it is to have a good family and childhood. Serial killers don't suddenly become this way." (S4)

"Everyone must know law and take education for a life." (S5)

"The most important reason is psychological. A person with a good psychology knows that crime isn't a solution." (S6)

"Social support programmes and mental health initiatives can play an important role in crime rates and creating a safer more inclusive society." (S7)

"People prone to crime need to receive psychological treatment."(S8)

"To stop people from doing something, we need to make sure everyone has good chances, enough money and support." (S9)

"I hope no one will face this situation." (S10)

"The biggest cause is psychological." (S11)

"Psychological reasons are the most important ones." (S12)

"If someone has bad habits. this person will be a criminal." (S13)

"LIFE can make people criminals." (S14)

"Most crimes are committed due to psychological reasons." (S16)

"It is more crucial to understand why criminals commit crimes rather than just punishing them." (S17)

"People are inherently evil!" (S18)

Through the examination of the sentences that were included in the paragraphs of the students, it was discovered that all 18 students were able to successfully use the abilities that had been taught using a brain-based model.

Additionally, they have acquired the knowledge to organize and compose a paragraph that is cause. They made sure to keep in mind that in their further tasks to write a cause paragraph, they should brainstorm their ideas by drawing a chart with categories and subcategories.

Secondly, when they write a cause or reason paragraph, they keep in mind that they should give reasons to explain and support the topic sentence and use examples to give additional information about each reason. Additionally, different linking words to show reason must be used. In conclusion, the capacity to think critically, analyze, and express one's viewpoint, whether it be favorable or negative, is an essential component of this sort of writing.

4. Effect Paragraph.

Brain activation (pre-writing stage)

T entered the classroom and asked two of the students to come to the board. It was a girl and a boy who were 19 years old. T started asking questions to them and the class.

1. What do you think is the ideal age to get married?

2. Are you thinking about marriage now?

3. Would you like to get married at a young age?

There was a huge discussion about this topic. Some boys who have girlfriends supported this idea that even now they are ready to get married, but they don't have financial stability. The girls were against this idea because they were mentioning personal growth and psychological problems. After the discussion, the teacher presented a presentation about some possible effects of early marriages. The teacher gave some categories and students tried to categorize the effects.

There are physical (Overburdened with domestic work\ Lack of health\ Unwanted pregnancies\domestic violence), intellectual (dropping out of school), psychological (the lack of opportunity to develop a full sense of selfhood, depression), emotional impacts (lack of emotional well-being\isolation). Some of the students mentioned only negative effects and some of them wrote both about negative and positive effects.

Writing the first draft is the second stage.

Teacher asked students to work in pairs and brainstorm their ideas. They chose three effects and started writing.

The real-world context and its numerous associations were incorporated to involve students emotionally. Peer discussions and internet research were initiated, which foster critical and analytical thinking, to stimulate left brain functioning. The right hemisphere's function was used to appeal to the students' senses via the use of images, statistics, and presentation.

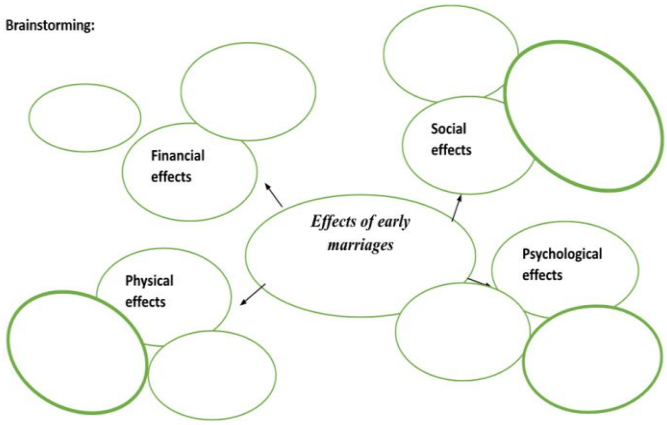


Figure 4. Sample of Brainstorming for Effects of Early Marriages

The way students used their critical and analytical thinking to describe each effect and their personal opinions were the aspects the researcher was looking for in their writings.

Samples from students' writings.

> When teenagers get married, they will see many problems as they are not ready to be father or mother and they need a good job to earn money. You will work more to get enough money and you will have headaches and exhaustion. If you get married early, your social relationships become more formal and you will lose your friends, you will see them as stupid relationships. Psychological effects are depression and confusion. (S1)

> Financial effect is if you're poor, you should find work and make more money by yourself. The social effect is if you are 18 or 19, a boy or a girl should finish their social life. They don't have any opinion about this situation. If they don't want this marriage they will destroy each other's dreams. (S2)

> Financial difficulties occur during and after marriage and this creates major problems between spouses. Every time there is an argument between spouses, the psychological effects become greater and our mental health is endangered. It is very likely that not getting enough education is the result in business life. Taking responsibility in marriage is of great importance for both parties. Big

problems will arise in relationships if parties don't take responsibility. Important things that need to be done in marriage must be fulfilled. (S3)

"Financial effect will end in debts and frugality. They have to mature early and they might become asocial. They might have wrong emotions and depression." (S4)

They marry early and they don't have sufficient education to raise children. They can't teach their own kids the right time and right things. No one wants to give a job to young relatives thus they will have a hard time. After all, they are still teenagers and they want to behave like this. They want chatting and hang out with friends. They will not take responsibility because they are still teenagers.(S5)

When they get married at a young age, they cannot continue their education and it affects their social life because people look down on them because they haven't finished their education and don't want to communicate with them. When they get married, they usually borrow money and pay the debt for a very long time, so they cannot meet their own needs very well because they don't have any savings. They have a lot of responsibilities at a time and that means a lot of stress, they may gain and lose weight or lose their hair. They are too young to know themselves, there can be a lot of fights because they don't know what they want so they are always restless, stressed and unhappy. Marriage is like hell. (S6)

Young girls are often forced to drop out of school and take on domestic responsibilities. Poverty limits their potential for personal and professional growth. Young girls are not physically or emotionally ready for the responsibilities of marriage and childbearing. They may experience higher levels of domestic violence and mental health issues due to the stress and pressure of early marriage. Early marriages can perpetuate gender inequality and limit the overall development of society. (S7)

Job-finding processes may not be completed, which may lead to financial difficulties. They may give up personal development opportunities such as

career and education. Getting married at a young age may be a decision taken under social or family pressure. Couples may be bad at articulating and understanding issues clearly. Lack of maturity and differences in experience can increase the risk of divorce. (S8)

People who get married during school term, they mostly choose to drop out of school. They forget their own future life, career and needs. They will have difficulties in joining a new environment. These people may have psychological disorders because of personal and environmental problems such as depression. People look for solutions to get rid of their troubles and numb themselves, solutions. Are alcohol, drugs and gambling. Early marriage causes premature birth in women. Transmission of genetic diseases to future generations as colorblindness, muscular dystrophy and hemophilia. (S10)

Young people may encounter financial challenges due to a lack of job opportunities. Children of young couples may grow up in an unhealthy environment due to inexperience. Taking too much responsibility at a young age can hinder a person's personal growth and self-discovery. Couples who marry early may not have time to socialize due to responsibilities. The stress and challenges associated with early marriage can have negative effects on mental health leading to anxiety and depression. (S11)

You can be more social, you can go out and socialize with your partner. In early marriages you will learn how to think maturely because now you're married and you have responsibilities to your spouse other than yourself. You may be more tired than you were in the past but it is a good tiredness, since you are both young, you can relieve your tiredness by going to fitness together. You learn how to save and share money together. (S12)

Families will take out a loan from the bank and they will have low quality of life. Early marriages affect women more than men due to the fact that she has a lot of responsibilities. She can feel lonely and man can feel pressure due to the fact that he should earn money for his wife and family. They will fight because

they are still children and they can't realize reality. They might have psychological problems such as depression and stress. (S13)

Young girls may get difficulties being pregnant because their babies won't grow enough. Both girls and boys often have to stop going to school and that limits their chances for good jobs and a good future. Early marriage can also make it harder for couples to have enough money to take care of themselves and their children without their family support. Also, early marriage can help old traditions get alive where girls have less say in decisions and may even experience fights at home. (S14)

Individuals keep themselves away from many educational chances to complete household chores. Also, they might feel various necessary and unnecessary responsibilities towards their surroundings and family leading to genuinely adverse psychological consequences. They haven't completed their careers and they don't have financial independence and this enters into substantial debt for marriage. (S17)

Early marriages lead to poor health, they may get HIV infection, hepatitis B and C. The Child is trapped in a marriage before she has an opportunity to discover herself or even discover life. They may have difficulties with the needs of the household because they don't know the importance of and responsibilities that come with it. Ignorance due to lack of education and unwanted pregnancies. (S18)

The way students expressed their opinions on early marriages.

"Early marriage isn't good at this time, it isn't like it was in the past because you need more information to be a real father." (S1)

"Early marriages can destroy both of their psychological health, that is why it isn't true to marry before 24 but it depends on your lifestyle."(S2)

"We shouldn't decide on this issue without thinking carefully." (S3)

"No matter how bad we think it is, it can occur in exceptional circumstances. For example, a happy ending!" (S4)

"For me, no matter how dynamic young parents are, it is more important that they have sufficient knowledge and experience." (S5)

"From my point of view, early marriage is not good, there is time for everything, people shouldn't get married before they reach the necessary maturity otherwise it is inevitable to be unhappy." (S6)

"There should something be done to provide support for young girls to pursue education and personal development." (S7)

"No matter how much couples love each other, they should think carefully before getting married." (S8)

"For a healthier life and relationship, marriage should be done at a mature and appropriate age." (S10)

"All the effects may have sad consequences for both sides, for these reasons, early marriages may sometimes be regrettable." (S11)

"It is nice to get married at an early age if you are both really confident and have money to do it." (S12)

"Early marriages really damage couples and their family." (S13)

"Stopping early marriage is very important for a better and wealthier future for young people. Early marriage can change everything for their life and they need help." (S14)

"I believe these consequences are the most significant outcomes of early marriages for individuals." (S17)

"In order to prevent this, people should be aware, and children should be encouraged to learn and read." (S18)

5. Effect Paragraph

T entered the classroom, she asked Ss to watch a video and answer the question: What happens to our body when we feel stressed? Answers were variable: sleep problems, feeling moody, forgetting little things, feeling overwhelmed and isolated. After a short discussion, T asked students to work in pairs and discuss the following questions: What is stress? Do you often feel stressed? What causes stress for you? How do you handle stressful situations? Is stress a common problem for people in your country? What are some physical signs of stress? Do you think exercise helps reduce stress? T and Ss had a whole class discussion. The next step was to ask students to brainstorm ideas. Students took this sentence into a circle: “What were some effects of stress for me”? After they finished drawing their chart, T asked some of the volunteers to go to the board and share their ideas.

Writing the first draft is the second stage.

The third component of multiple intelligences such as interacting with each other is very crucial in the classroom because learning is a social process.

The seventh component of the model is the construction of meaning. This principle focuses on the fact that every individual creatively constructs his own meaning out of the material at hand by activating his prior knowledge, making personal and real-life connections, and actively interacting with others. The left hemisphere functioned by connecting cause-and-effect relationships. The methods used to capture students' interest and stimulate their right hemisphere were sound and visuals.

Students were given the topic “Effects of stress on our body”. Their chart where they brainstormed their ideas was very helpful in outlining their writings.

The aspect that the researcher was looking for was the way students categorized and described the effects.

Revision and second draft stages

The teacher corrected papers by putting symbols concerning the organizational part, also grammar points. Students got their papers back and they were supposed to revise and correct their mistakes. They rewrite their paragraphs as the second draft.

Assessment and feedback stages

The teacher assesses the final draft by giving points based on rubrics that were created by her to test if brain-based instruction worked and students reflected it in their writings.

The way students categorized and described the effects.

Samples from students' writings related to the effects of stress on our body.

> You have an exam, you have to study for it and something happened to your relative, what would you do in this situation? You will be confused. When you think about something too much, you will have a headache. If you have confusion and headache, you will feel depressed and after that, you will waste your time and you will be angry. (S1)

> Stress causes lots of problems for our health: heart and pressure problems. Effects on our psychological health are anxiety disorder, depression, and schizophrenia. One of the physical effects is obesity. (S2)

> An anxious individual feels scared and worried rejected in their behavior. They become lonely. Family members, friends, and even co-workers are affected. If the loneliness caused by anxiety progresses, it may even drive you to suicide, they may not be able to find a solution. A lot of thoughts tire your mind. Your body is negatively affected by the stress it is exposed to. You can see the effect on your skin and stomach. Acne may appear on your face. You either start eating too much or not eating at all, both negatively affect your body health. (S5)

> People get angry more easily when they are stressed so they argue a lot. They break the hearts of their loved ones, they cannot control things and they make mistakes. Many diseases are caused by stress, hair may fall out, you may gain and lose weight, you may get sores on different parts of your body and your self-confidence may decrease. There can be a lot of internal diseases without any symptoms. Stress can take over your body, it can make you depressed, you can have advanced levels of anxiety, you always have bad thoughts. (S6)

When a person is stressed, their body releases hormones such as cortisol and adrenaline which can lead to increased heart rate, elevated blood pressure, and a weakened immune system. Chronic stress can lead to feelings of anxiety, depression, and irritability. It can also affect a person's ability to concentrate and make decisions which can impact on a person's work and personal life. (S7)

A person experiencing stress may get a headache from thinking too much. Someone who is stressed feels bad and anxious, and this turns into depression over time. They think too much and can't sleep, they feel tired and unhappy during the day. (S8)

On a mental level, stress often brings about heightened feelings of anxiety, nervousness, restlessness and sense of being overwhelmed. It can also make it difficult to concentrate on tasks and decisions. (S9)

Stress affects your body in the form of aches and health problems. For example, muscle and joint pains-spasms, destruction of working tempo of the heart and lungs, skin and hair problems, intestinal problems. Due to stress, your body becomes under pressure and overstimulation. It causes tiredness, lability of mood, sudden anger and sleeplessness. Stress has psychological effects such as forgetfulness, depression, alcohol and drug addiction. People don't have the energy to socialize because stress induces exhaustion and weakness. Their perspective on life changes negatively, they become pessimistic. (S10)

Anxiety is a stress disorder. Stress causes skin problems such as stains, acne, eczema or skin diseases due to the hormones secreted. Sleep problems are called insomnia and require treatment. People may be irritable, angry or tense and they may reflect this in their daily lives. Stress can cause emotional breakdowns in people who cannot cope with it. Depression may occur, headaches and digestive issues. (S11)

"It is impossible to sleep or eat when you're stressed. You don't want to meet any people." (S12)

If you're face to face with stress,for this reason you will lose your job. Losing and gaining weight, acne and stains on your body are effects that affect your quality of life. People feel lonely and pressured by everyone. They can't communicate clearly with family and friends. Stressed person can't control his own self, he is in depression and worrying all the time. He will be either aggressive or quiet. (S13)

"Worrying and being nervous, forgetful, having headaches and troubles to fall asleep. Stressed people might avoid being around people, not spending time with family and friends." (S14)

"Losing hair,appetite and weight. Getting depressed, not thinking logically, not being able to work or meet friends." (S16)

"Trouble sleeping, stomach and brain problems. Having bad thoughts that affect motivation. Feeling stressed about exams or homework may get you low grades." (S17)

People will experience panic attacks due to anxiety and stress, it can last from 10 to 40 minutes. If a person is confronted with a negative event during the day, they may have sleep problems. People isolate themselves and stay in their comfort zone. (S18)

Through the examination of the sentences that were included in the paragraphs of the students, it was discovered that all 18 students were able to successfully use the abilities that had been taught using a brain-based model.

Additionally, they have acquired the knowledge to organize and compose a paragraph that is effect. They made sure to keep in mind that in their further tasks to write an effect paragraph, if they run out of ideas and if the topic is closely connected with real-life situations, students can simply think of the effects they have when they are in this situation. Making real-life connections, discussing and negotiating with peers, and turning abstract ideas into concrete cases are good techniques for writing an effect paragraph.

6. Compare and Contrast paragraph.

Brain activation (pre-writing stage)

The teacher prepared a presentation full of pictures and a traditional melody. Students were listening very carefully because the teacher was describing Kazakh culture. T talked about traditional cuisine\clothes\celebrations\games\musical instruments. In the background, students could hear a traditional Kazakh instrument with a nice melody to involve them in the process more and keep their attention. After that, the teacher distributed a text where she compared two cultures such as Azeri and Kazakh cultures.

The teacher asked students to highlight all useful linking words, topic sentences, conclusion sentences, and grammar structures that show that it is a compare and contrast paragraph.

Kazakh and Azerbaijani cultures

(text was generated by AI with some corrections from the researcher)

Every culture is unique, and it has its characteristics. Kazakh and Azerbaijani cultures, both rich and diverse, share similarities while maintaining distinctive characteristics. Similarly, both societies place a strong emphasis on hospitality, where guests are warmly welcomed and treated with utmost respect. Likewise, their traditional cuisines reflect a love for hearty and flavorful dishes, showcasing a common appreciation for food as a central element of social gatherings. On the other hand, the architectural influences in Kazakh culture, rooted in nomadic traditions, differ markedly from the Azerbaijani emphasis on intricate designs and oriental patterns seen in their historical buildings. While Kazakh culture reflects its nomadic past through yurts and expansive landscapes, Azerbaijan's architecture is characterized by palaces and mosques adorned with intricate tilework. Moreover, the musical traditions of both cultures demonstrate unique qualities. Kazakh music often features the dombra, a traditional string instrument, while Azerbaijani music incorporates the tar and saz. However, both traditions convey a deep connection to their respective histories through melodic storytelling. In conclusion, Kazakh and Azerbaijani cultures share common threads of hospitality and culinary appreciation yet diverge in architectural styles and musical traditions. However, these

distinctions contribute to the rich tapestry of the broader Central Asian and Caucasus regions. I think that each culture is amazing, and it should be appreciated.

Students highlighted all the necessary structures for compare and contrast paragraphs as defining two similarities and one difference or vice versa in the topic sentence. Also, the use of linking words to show comparison and contrast is very important. The teacher gave them the list and asked them to make some sentences and write them on the board.

Table 4. Conjunctions for compare and contrast paragraph

Similarities	**Differences**
is similar to	On the other hand
both … and …	however /nevertheless / nonetheless
also	but
too	in contrast to
as well	differs from
not only …but also …	while / whereas
like, just like	unlike
Likewise / Similarly	Although / though/ even though
The same	Despite / in spite of
The same as…	Despite the fact that / in spite of the fact that
	… is different from … in terms of…
	Comparatives and superlatives

(taken from the writing booklet of the institution)

After some discussion, the teacher asked students to brainstorm ideas about two cultures they wanted to write about.

The left hemisphere's duties such as analyzing two cultures, and remembering the features of each culture were involved in this activity. Thinking creatively to choose two cultures is the work of the right hemisphere. Also, putting something abstract into a concrete idea, peer discussion, and internet research to choose the features of two cultures.

This brainstorming chart was used to find similarities and differences.

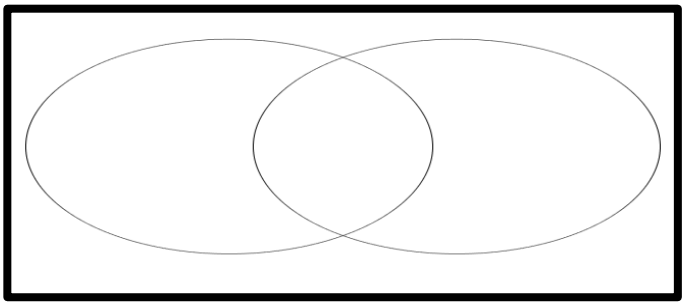


Figure 5. The Brainstorming chart

The outline was introduced by the researcher to make students outline and organize their thoughts.

Outline (taken from the writing booklet of the institution)

Topic sentence:_____

1:Similarity_____

Details _____

2:Similarity_____

Details _____

3:Difference_____

Details _____

Concluding sentence:_____

Analyzing aspects was taken into account as how students explored the relationships between two cultures and how they compared and contrasted them.

Writing the first draft is the second stage.

The teacher corrected papers by putting symbols concerning the organizational part, as well as grammar points. Students got their papers back and they were supposed to revise and correct their mistakes. They rewrite their paragraphs as the second draft.

Assessment and feedback stages

The teacher assesses the final draft by giving points based on rubrics that were created by her to test if brain-based instruction worked and students reflected it in their writings.

Samples from students' writings of comparing and contrasting two cultures.

Palestinian and Turkish cultures

Similarities: Being friendly, having strong family connections,tasty food that represent their culture are similarities". Differences: "Their history shaped their cultures. Palestinian history is marked by struggles for self-determination and preservation of their cultural heritage. Turkey, with its historical ottoman past, has a distinct historical journey that has influenced its cultural fabric. (S1)

Georgian and Azerbaijani cultures

Similarities: Shared history, two countries were a part of the USSR. Some old people speak both languages very easily. Same stories, as Ali from Azerbaijan and Nino from Georgia. Similar food (xangal and some soups)". Differences: "Religion and holidays."(S2)

Australia and Canada

Similarities: Caring about values as justice, equality,inclusion and social justice. In terms of communication, they are a very friendly, helpful, and hospitable society. They have adapted a cosmopolitan social structure, they are very constructive and optimistic toward strangers. Differences: "Australia's unemployment rate is 0.7% less. Canada's population is 23,47% higher. Australia has 46%more agricultural land. Music and cuisine demonstrate unique qualities. Australia's music is "didgeridoo", while Canada's music incorporates the "tautirut. (S3)

South Korea and Turkiye

Similarities: You should be more careful and respectful towards elders,being constructive and realistic as a society. Differences: “Ways of eating, alcohol drinking,forms of religious beliefs and order they expect from life. South Korea is more developed than Turkiye. (S4)

South Korea and Turkiye

Similarities: Both traditions have religious and cultural ceremonies such as chuseok in Korea and Ramadan month in Turkiye. They are very friendly,they have special rituals to welcome guests, they serve treats. They remove shoes before entering houses symbolizing cleanliness and respect. In both societies, there is respect for elders. They both have traditional street games.” Differences: “Turkish culinary culture is full of meat, vegetables, yogurt. Korean cuisine is rice, fish,tofu, kimchi,bibimbap. Turkey is a Muslim country while Buddhism and Christianity are common in Korea. Drinking tea has a central role in Turkish culture. Although, in Korea tea is often drunk after meals or during tea ceremonies. (S5)

Spain and Mexico cultures.

Similarities: Spanish is used as the official language in both Spain and Mexico. They both have religious festivals such as the Day of the Dead festival”. Differences: “Mexican cuisine mostly consists of corn and spicy peppers. Spanish cuisine consists of seafood and rice dishes. Traditional clothing styles differ. Spanish flamenco and colorful patterned clothing is preferred in Mexico. (S6)

Spain and Turkey

Similarities: Diverse and flavorful cuisine, the importance of family, a strong tradition of hospitality and warmth towards visitors, a rich history”. Differences: “Languages, while Turkish is a language with no relation to the indo-European language family, Spanish is indo-European language. (S7)

Turkey and Greece

Similarities: A long history that shaped them, olive oil". Differences: "Turkish culture is a mix of East and West, influenced by its history,especially the Ottoman Empire. Greece has a deep-rooted culture from ancient times contributing to philosophy,art and democracy. Greek culture is known for its myths. (S9)

Spanish and Turkish cultures.

Similarities: Cuisine consists of olive oil dishes, flour and sea products. Many types of cheese. People's friendliness,helpfulness and socializing". Differences: "Spanish music culture and instruments. In Turkish culture baglama, drums and flute are used. Spanish uses guitar and piano. In Spain, festivals such as bull, formula, bicycle and tennis, siesta are celebrated. Different wedding traditions in terms of the color of the bridal gown. (S10)

Turkiye and Japanese culture.

Similarities: Hospitality, it is important to take off slippers and offer tea to guests when they come home. Both cultures have manti. There are chestnut sellers on the streets in both countries. Meals were eaten on the floor table". Differences: "Frequent use of rice and fish in Japanese culture (sushi, onigiri, sashimi) and meat(kebab,doner,karniyarik, sarma) in Turkish culture. Traditional clothes are called kimono in Japan, Turkish clothing is salvar, kaftan, bindal, entari. (S11)

Turkish and Montenegro cultures.

Similarities: Hospitality, sense of entertainment. People are friendly, they offer delight or coffee. In both cultures, during celebrations, traditional clothes are worn and traditional games are played". Differences: "Food culture and lifestyle. (S12)

Turkey and Russia cultures.

Similarities: Loving drinking tea. Hospitality, they really care about guest. Differences: Turkish people usually eat middle eastern food such as baklava,kebab but Russian people prefer eating European and Slavic traditional

food like borscht,pelmens and blini. Their religion is different, Turkish people are muslims but Russian people believe in Orthodox Christianity.(S13)

Turkey and Greece.

Similarities: Food is similar to baklava and baklavaki, also kokorec and kokoretsi. Differences: History and dances. Turkey has a bloody culture because they had lots of wars. Greek has peaceful music, Turkish music is noisy. (S14)

Turkey and Finland.

Similarities: “Social norms and hospitality”. Differences: Food in Finland are rye bread, karelian pie, sauteed reindeer. Turkey's special food is doner, manti,lahmacun. Finland’s people have sauna traditions because they are helping their minds. Turkish people go to “turkish hamam” to clean themselves and be relaxed. (S16)

Turkish and Greek cultures.

Similarities: Society’s character and family order are similar. They have high feelings like getting angry or being happy. Seasides and holiday vacations are almost the same. The climate is the same. Differences: Different language and alphabet. In Greek culture, cuisine consists of oil and vegetables,as for Turkish, there is meat and spices. Turkish belief is Islam, Greek’s is Christianity. (S17)

Turkish and German cultures

Similarities: Importance placed on family. Differences: Language differences, German is a West Germanic language. Communication style and expressions are different. Cultural norms and etiquette. In Turkiye, it is common to greet each other with a kiss on the cheek. In Germany, a firm handshake is enough.' (S18)

Through the examination of the sentences that were included in the paragraphs of the students, it was discovered that all 18 students were able to successfully use the abilities that had been taught using a brain-based model. They explored the relationships and analyzed two cultures. Moreover, they put information apart as music, traditions, food,

history and chose the ones that may show differences and similarities between two cultures.

It was an interesting topic for them. Some of them compared Turkish culture with Japanese\Greece\American\Arab cultures. They were supposed to write 2 differences and 1 similarity or vice versa. It was easy for them to find differences but it took some time to find similarities.

Additionally, they have acquired the knowledge to organize and compose a paragraph that is compare and contrast. They made sure to keep in mind that in their further tasks to write a compare and contrast paragraph, they should brainstorm their ideas with a different chart, also they can use an outlining technique. Additionally, different linking words to show comparison and contrast must be used otherwise they won't be able to show differences or similarities.

7. Compare and Contrast Paragraph

The teacher divided students into two teams and assigned each group a task. The first group was responsible for listing the roles women performed in the past, and the second team was responsible for listing their roles today. After 20 min of talk, students were ready to express their points of view. They were debating and negotiating about the position of women in the past and present. One side was trying to convince another that women still have inferior roles compared to men. On the other hand, the second team was persuading them that the position of women in society had improved. After all arguments, contra arguments, and refutations, students chose two similarities and one difference or two differences and one similarity between the roles of women today and in the past. They brainstormed their ideas again and started writing.

Based on the Brain-based model, critical and analytical thinking were involved. Enrichment of the brain with different points of view was reached. Additionally, each brain is unique, some students are strong at writing, some of them are good at speaking and they feel more confident while doing it. Therefore, having discussion before writing provided extraverted students to show their strengths by speaking and debating over a controversial topic. Students analyzed, took information apart and explored the

relationship between past and present. Moreover, they organized their thoughts by comparing and contrasting. Debating promotes emotions as a sense of competition and the wish to win, also it is an engaging activity to process time not to force the limits of attention span. The left part of the brain is to logically analyze information, recalling the past to remember some events about the roles of the women. Right hemisphere is also working owing to debates that created emotion and sustained attention.

The way they analyzed the past and compared it with the present were examined. Additionally, their feelings, opinion or judgmental ideas had been traced while analyzing their paragraphs.

Samples from students' writings on the roles of women in the past and present.

> Past: Women were studying at home, they were learning simple things such as taking care of family and cooking. Some professions were forbidden in the past. No freedom and rights. Similarities: Housewifing. Present: Nowadays, they can attend schools and universities. Also, women can work everywhere like the government as presidents. More freedom and more rights. (S1)

> Past: They used to be only housewives and they were just taking care of children,cooking, cleaning. Their rights were limited and restricted. The number of women who had the right to receive education freely was very low. Job opportunities were limited. Similarities: Housewifing. Present: They have the right to vote and be elected. (S4)

> Past: Being a housewife,not having much of a social life. They couldn't even choose their own husband. Similarity: Women are still building the blocks of the house. They still have responsibilities of housework and childcare". Present: "They started getting involved in business life. They have the right to study at university and have a career. They play musical instruments and participate in art activities. Right to vote and be elected. (S5)

> Past: Women were mostly focused on housework and raising children. Women weren't given much space in the workforce. They didn't have the opportunity for education. They didn't have the right to vote and they were trapped in a

patriarchal system. They couldn't freely express their thoughts and wishes. Similarity: Still doing housework and raising children. There is still prejudice against women. Present: They are actively participating in the workforce. (S6)

Past: Managing households and caring for family members. Contributing to communities as organizing social gatherings, providing support to neighbors and participating in religious ceremonies. Similarity: Women still often shoulder the bulk of household responsibilities. Today, women continue to contribute to their communities through volunteering and participating in local organizations. Present: A significant increase in women joining the workforce pursuing careers across diverse fields as education, healthcare, technology and business. (S7)

Past: Housework, household chores. Similarity: Gender equality has not yet been fully achieved in many societies and women will face challenges. Gender discrimination at workplace and society. Present: Holding political positions and participating in decision-making processes in many countries. (S8)

Past: Women's political, societal and educational presence was limited. Similarity: Responsibility for household chores. Present: Women's presence in politics, assuming leadership positions in many countries. There is increasing awareness and activism on women's rights and gender equality issues. Equal access to education and the business world. (S10)

Past: "Generally, they were working in factories, most of them were illiterate". Similarity: "Housewifing". Present: "Voting rights and job opportunities." (S14)

Past: Women were often excluded from certain areas of society particularly in politics and education. Similarity: Responsible for household chores, childcare and maintaining family relationships. Present: Increasingly joining the workforce and pursuing successful careers in various professions. (S16)

Past: Fewer job opportunities. Similarity: Ongoing and unchanging struggle for equality and fighting for rights. Present: Women have the right to vote and be elected. Taking a more active role in business life and also contributing to the world of science by conducting research in many fields. (S17)

The way students expressed their opinions/feelings/judging concerning this topic.

"Women should have their own full rights for life, and they also help the world a lot in some important points." (S1)

"Women should have more rights and power." (S4)

"Women are in a position to keep life alive, they deserve respect and love". (S5)

"I believe that women deserve to live more freely and I hope one day they will get what they deserve". (S6)

"Providing women with equal opportunities and allowing them to fully utilize their potential is not only essential for a just society but also for the overall well-being of society." (S8)

"As women continue their struggle, it will be women themselves, not men who determine the role of women in the world." (S10)

"I hope everyone will be equal and we won't focus on these issues again". (S14)

"There is still progress needed in achieving gender equality". (S16)

"Women have come a long way in this regard and that is why we should protect this and not allow anyone to take these rights away from us". (S17)

Through the examination of the sentences that were included in the paragraphs of the students, it was discovered that all 18 students were able to successfully use the abilities that had been taught using a brain-based model. Students were already familiar with the organizational part of the paragraph. The aim was to make them correlate past and present roles of women by making them debate over a controversial topic.

They negotiated over the topic a lot, they presented their arguments and the opposite team tried to beat those arguments with their counterarguments. They took notes of each other's ideas so they could use them later in their writings. They turned an abstract idea into something concrete. Also, students used brainstorming and outlining techniques to plan their writing.

In conclusion, the capacity to think critically, analyze and express one's viewpoint, whether it be favorable or negative, is an essential component of this sort of writing.

8. If I were a superhero, what three things would I do?

Pre-writing stage (brain activation)

The teacher showed the pictures of the famous superheroes and asked them to name their power. After some discussion, they matched superheroes and their power. Students shared their opinions about their favorite heroes and why they like them.

The second task was the teacher to ask them to work in groups and draw their own superhero, name them, and choose three superpowers for them. They presented their incredible ideas one by one as a group.

Writing the first draft is the second stage.

The last writing that was assigned to invoke their creativity and imagination was "If they were a superhero, what power would they have and what three things would they change about the world?" Students started brainstorming and writing.

Drawing which requires creativity and imagination is a functioning of the right hemisphere of the brain. The left hemisphere controls speech so when students presented their projects, their left hemisphere was activated.

The aspect which is creativity had been looked for in the writings of the students.

Samples from students' writings on creative topics.

> With invisibility, I can prevent injustice in the country and even in the world. I can prevent theft or helpless people who are stuck in a bad situation. Mind reading will be useful in learning the truth, especially from criminals. By controlling time, I will solve most problems such as epidemics or economic conditions. (S2)

Wishing to have the ability to talk to animals to be their voice. By this power, all animals will be saved. Teleportation will help with saving time. Reading people's minds may help to understand people's momentary feelings. (S4)

"Changing the world order, everything is based on money. Also, criminals will be punished accordingly. Whoever commits a crime of whatever severity should receive a response of that severity." (S5)

Mind control will help to use people in higher positions to end wars for the world, I would ensure that criminals receive adequate punishment. I could create a fertile soil, fruit and vegetables would grow there. People who are in need would get rid of hunger and thirst. (S6)

I would assist in situations where some need urgent help but may not have immediate access to it. For example, I could sneak into dangerous areas to rescue people or animals, or I could prevent crimes by discreetly intervening when necessary. I could gather important information without being noticed. With telekinesis, I could extinguish fires by manipulating water hoses from a safe distance or lift heavy objects to rescue people trapped under debris. I could create barriers to protect communities from natural disasters like floods or landslides. With the ability to read minds, I could identify individuals in distress who may be struggling silently allowing me to offer them comfort. (S7)

I would stop forest fires, I would protect trees from cutting and I would prevent creatures living in the forests from being hunted and provide them with a natural environment. I would find children who were married off early, children who were forced to work, children who were not sent to school, children who were hungry and thirsty somewhere healing their wounds. (S8)

Addressing wars as rescuing the innocent in places where wars are claiming the lives of unjustly targeted people. I would address issues such as colonial nations, unequal income distribution, children on the brink of starvation and countries denied the opportunity to prosper aiming to resolve these problems and ensure equal income for every nation. I would eliminate corruption. (S9)

Abilities of Athena from Greek Mythology and her magical spear. With a magical spear, I would bring to people's minds information that they didn't know or couldn't think of at the moment. At the same time, I would empathize and think about other possibilities so they don't act foolishly while communicating. I would spread information because knowledge changes the world or rather the hearts and consciences of knowledgeable people. I would prevent money laundering, no one would be able to earn more money than they deserved. There would be fair income, everyone would have enough money for themselves. I wouldn't allow governments to deforestation for their own benefit and I would punish them with the help of a magic spear. Every country would use high levels of renewable energy and practice the 3R (reduce-reuse-recycle) rule. (S10)

I would teleport to the countries where the war continues and deliver them food, weapons and the materials they need. I would find people who have bad thoughts and prevent them from doing bad actions. With the ability of stopping time, I would go back in time and find girls who have not studied and provide them with education opportunities. Or I would go forward in time, I would prevent criminals from committing crimes. (S11)

I would like to save people from dangerous conditions or help communities affected by natural disasters because it is a big problem in Turkiye and I would like to provide emergency assistance. I would use my power to mediate conflicts, to prevent violence and to promote empathy and cooperation. I would like to find a cure for diseases and help people and children who are suffering from disease. (S12)

With night vision, I would save the lives of victims, especially girls who are in dangerous situations at night. With the ability to dive deeply, I would save the last turtles' lives and put them into a special area. With the ability to fly, I would start all potential meteorites that are aimed to destroy the world. (S13)

I would definitely change politicians and government. The world order is really in darkness and their aim is to become rich, they do not care about people. I would change money problems, money is only an ambassador but people are just

focusing on their own money. I would make opportunities equal for everyone. (S14)

I would use my power to stop cutting, clean dirty water and encourage using clean energy like wind and solar power. I would make sure everyone has the same chances in life. No one should be treated differently because of their skin color, gender, or how much money they have. I would stop wars and fights and bring peace to the world. (S16)

I would strive to eliminate injustice in the world. I would protect natural resources because as humans, we think that they are infinite. However, this thought is leading us to a dead end. I would change the inequality of opportunities. I don't think we need to be superheroes to solve problems, I believe that if we as humans strive, we can change the world.(S17)

I would stop global warming because it is a major environmental problem that is causing temperature increases and climate changes around the world. I would like to solve the political polarization. It can divide societies and weaken democratic processes. I would like to stop global poverty. I would provide them with nutrition, healthcare, and education. (S18)

Through the examination of the sentences that were included in the paragraphs of the students, it was discovered that all 18 students were able to successfully use the abilities that had been taught using a brain-based model. The aim was to make students use their creativity and imagination to create a superhero that has the power to change three things in the world. It also made them notice and analyze some problems in the world that people face every day and unfortunately, they cannot change them. Therefore, students described natural problems,disasters,global warming,poverty,killing animals, war and many other things connected with the government and their countries. They felt some power even if not in the real world but just in their writings they believed they could change the world. Teaching is not only about making students learn the rules or grammar but also making them critically analyze situations in the world and express their opinions.

4.1.5 Findings of Student Interviews

There were 8 questions in the interview (see Appendix for the interview questions). The first four questions “How did the process affect you?” included four subquestions: “ If positively, why?”, “What was particularly interesting that encouraged you to generate more ideas for writing?”, “If it didn’t have a positive effect on you, what are the reasons??”, “Did the experiment change your attitude and general perspective on writing? If so, can you explain how?”

Attitudes Toward Brain-Based Learning

The first question: “How did the process affect you?” and the subquestion “If positively, why? " were analyzed.

All 9 participants who had been interviewed confirmed that the process positively affected them and that support from the instructor had influenced their improvement. Their grammar improved, their vocabulary level increased and they started making fewer mistakes and constructing longer sentences. Some of them couldn’t even write in Turkish but now they have confidence when they write in English. Also, they learned how to organize their paragraphs. To support and illustrate, the answers of students that were taken from their interviews.

“I think the process has significantly affected my development since the day I arrived, and because of this process, I feel more comfortable and better about myself as there hasn't been anything bad.” (S2)

“My vocabulary improved, my grammar got better, and my rate of making mistakes decreased. I started to form longer sentences.” (S3)

> Initially, I used to spend about half an hour just thinking about how to start writing. Now the process moves faster, and my decision-making, organizing, and writing have also accelerated. I used to think I couldn't even write in Turkish, but I have now left those thoughts behind. I think I have improved. Additionally, since we progressed with the rules of grammar, I can construct longer sentences and use different words. (S5)

> Certainly, there were challenges along the way. Honestly, I think I've developed significantly. Initially, my short sentences began to lengthen over time, along with acquiring other knowledge. I learned how to write a paragraph, how to express what I want to convey accurately and fluently. (S10)

"Initially, my English wasn't very good. Especially, I had no experience in writing. However, I believe I've progressed significantly with your teaching style and help." (S11)

> The impact of the process on me has been really positive. Initially, I didn't have much of an idea about writing and struggled to believe in my abilities. However, the activities we did in classes and the support from the instructor have positively influenced me. Seeing the strategies we learned and other topics within the class has been beneficial. (S13)

"I can clearly see a difference between my first writing class and my last writing class. When I first wrote, I couldn't connect sentences well, but now I think I can write quite good sentences." (S14)

> The process has affected me quite positively. In our first lesson, we had to write a sample essay. You asked us to introduce our friends. I could only write about three or four lines, and they were all incorrect. They were full of grammar mistakes. There was no structure to what I was talking about. In our latest writing assignment, I managed to write about 1.5 pages about a friend. And there was so much to say. In fact, I managed to organize it in a more structured way. I learned to organize my writing. And I've added a lot to myself. (S17)

> In terms of thinking in English, initially I used to think in Turkish while writing, but later I realized I needed to think in English. It also allows me to talk to myself. I couldn't openly converse with people outside because I lacked confidence. However, I try talking to myself now. It works out fine. (S18)

All in all, 9 students who were interviewed had positive feelings about the process that was based on brain-based techniques they had been exposed to during the writing course.

The second question: What was particularly interesting that encouraged you to generate more ideas for writing? Activities that the teacher gave before each writing like visuals, handouts, presentations. Also, the teacher's feedback was very valuable. Concretization abstracts things by talking to each other, debating and negotiating. Increase of motivation and self-esteem.

"Especially in the beginning, the activities our teacher gave us were very helpful because initially my writing wasn't good. For instance, she taught us with visuals and handouts, and she conducted presentations. She explained unclear points in an illustrative manner". (S3)

"I think the most impressive thing was the debates we did. Because by exchanging ideas together, I not only developed my own thoughts but also contributed to my friends' thoughts". (S5)

"With the activities we did in class and also doing this process together in class, interacting made it much easier. Additionally, we can generate ideas from talking to each other, negotiating, debating, and become more creative when we discuss together". (S10)

> As I saw myself improving more, I actually became more motivated. As motivation increased, ideas started coming to mind for new topics. For example, initially, if I had a few ideas when generating ideas, now more ideas start to come. Because we are using our brains more to generate ideas. As I develop, my skills also improve. There are also activities we do before writing and visuals. (S11)

"The activities that encourage idea generation have been particularly useful. These activities have broadened my horizons for generating ideas. Things we see on the board and conversations we have in class have really helped me generate ideas". (S13)

"Especially when I reviewed our first writings with the feedback you gave us, I looked at my first writings again. It was very amateurish. Our last writing was better. At least I've learned my writing style." (S14)

> The particularly interesting thing was, for example, we wrote an English essay where we used categorization for the first time in our lives. Before that, we discussed examples for about one or two lessons. You told us what we could write. So, we were dealing with very abstract things. The ideas were very abstract, but because you constantly concretized them, we learned how to categorize them even without any initial examples. Now, even if you don't mention the topic, I've reached a point where I can go home and write about it all. I've gotten used to it because you've concretized it. I've learned how ideas come to mind and what I think about. (S17)

"I was interested in the topics. I was researching and learning." (S18)

The next question was: "Did the experiment change your attitude and general perspective on writing? 3 of the students had a positive attitude about writing in their own language. 5 of them claimed that they had a negative attitude concerning writing in English, but it has changed within the process. 1 student revealed that he always loved writing in English.

"I had some experience before because I was unprepared, but I completely quit writing because I didn't work for a year. Starting again was very good for me; I developed myself and learned many things." (S2)

> I tended to write in Turkish, and I had no problem with that. However, when writing in English, I realized that I use conjunctions less frequently than in Turkish, so I started with simpler sentences and words. Later on, we moved on to words at the B1- B2 level that we learned in classes, and now I can say I can do much better. (S3)

"I wasn't someone who loved writing. Now, however, I have a more positive attitude about it, and I'm not prejudiced." (S5)

> I generally enjoyed writing. However, writing in a newly learned language was initially a challenging and biased topic for me. It wasn't an area where I felt confident or trusted myself much. But after starting to write, with your help,

> support, and practice, writing in English now gives me pleasure, and I'm no longer biased, not at all. It comes easily, I enjoy it. (S10)
>
> Initially I was worried about English writing because I had no experience. How can I succeed? However, as motivation increased through doing it, and seeing improvement, my perspective changed. Initially perhaps as one of the most feared courses, now it is like I can handle the writing part in exams easily. (S11)
>
> I used to be somewhat anxious about writing. I didn't believe I could do it very well. However, after starting to write and especially after reading and participating in class activities, I realized that writing can be enjoyable. Although it was tedious to write 150 words initially, setting goals like writing 250 words became more enjoyable over time. (S13)

"I didn't like writing before. I do all my assignments on time now. I used to do it late before. I don't need to use translation anymore." (S14)

> I used to find it very difficult. I was thinking about how to place it in a narrative structure and how to do it in English, a foreign language. But it's actually very simple. What we were talking about was actually very simple. It was abstract, but we concretized it in class. Thinking about how to categorize, like introduction, body parts, development, conclusion, was very difficult, but now it's becoming very easy for me. (S17)
>
> I already liked writing in Turkish, but I struggled a bit with English at first. I was nervous, but now there is no such thing, I'm very comfortable. I do all my research in English. I don't translate from Turkish to English directly. (S18)

Success During The Process

The next question concerning the achievements of students during the process was asked this way: "Did the experiment help you generate ideas more easily for the topic you will write about in your paragraph? (e.g., longer sentences, use of conjunctions, increased variety of words). Expansion of vocabulary and learning how to use conjunctions, there is progress in making longer sentences. The need to translate words decreased, students

had learned where to place nouns, conjunctions, prepositions, and adverbs in the sentence. Concretizing abstract things before writing, with visual, video, sound, or picture materials. Their way of thinking changed a lot with these materials.

> I used to keep words in my mind before, but I had some difficulties in putting them into sentences. Later, I learned to edit them and think better about sentence structures. Also, understanding the differences between speaking and writing has been an important improvement. (S2)

> My vocabulary has expanded because we learn different words in every class, and there are many words in English. Especially in exams, new words in writing sections have influenced my exam grades, so my vocabulary has developed more. As I use lots of conjunctions when writing in Turkish, I started with simpler sentences in English, but now with the grammar and tenses we learned, I can write better and use conjunctions. (S3)

> Yes, the process helped me a lot. Especially in terms of progress in making longer sentences, using conjunctions, and increasing word diversity. Although I still have difficulty with some conjunctions, I can now use conjunctions that are more commonly used, such as more easily. Being able to translate long sentences I use in Turkish into English also happened thanks to my grammar and my need for Google Translate decreased. (S5)

> Yes, I am writing longer sentences. We learned more conjunctions, adverbs, and even prepositions. We learned where to place these in a paragraph, we learned their correct usage. When we write these in an essay or paragraph, it becomes easier. (S10)

"I started to make much longer sentences. While initially using simple and short sentences, now longer sentences and my vocabulary have increased. At the same time, I started using conjunctions, so I think I have progressed further." (S11)

"My vocabulary diversity and ability to form sentences have improved. The activities in class and writing practice have enhanced my vocabulary and ability to generate ideas." (S13)

> Before I translated everything from Turkish. I was thinking in Turkish and I thought it was like that, but I noticed that it was not like that. Some word groups when I translate them directly from Turkish have different meanings in English. I learned to use them to write sentences. (S14)

> Absolutely. For example, the biggest thing that helped me generate ideas more easily was, as I mentioned, concretizing abstract things before writing, with visual, video, sound, or picture materials. Our way of thinking changed a lot with these materials. Even when I write longer sentences now, I don't start with one thing and end with another. I've learned these things very well. Using conjunctions and learning to structure longer sentences with conjunctions has also helped me. My vocabulary has definitely increased because in each class, instead of sticking to one thing, we talk about many different things, so I have the chance to use a word I didn't know in writing, thanks to what I've heard from you. (S17)

> I'm trying to use longer sentences, conjunctions, and a variety of vocabulary. I have a vocabulary notebook. I write down rich words I've learned in classes and words I found during this process, and I revise them later. (S18)

What other skills did you develop during the process of experiencing brain-based techniques? Analytical and critical thinking, imagination, and creativity have been enhanced. Also, new techniques such as brainstorming and outlining have been learned. Moreover, the ability to draw a picture in mind and actually draw a picture, trying to visualize, had become a common habit before writing. Additionally, the ability to organize any type of paragraph with topic sentences, introduction, body parts, and conclusion. Furthermore, the skill to express a point of view concerning lots of controversial topics that were included in the process. Looking at the topic from a wide angle, starting from general to specific is one of the aspects that had been taught during the process. Categorizing, grouping, and exemplifying things are abilities that have been acquired. Other skills such as speaking and reading have been influenced by the knowledge of the organization of writing paragraphs.

There has been a significant change in my analytical skills. When you think about a subject, you have to consider other perspectives, which has improved my analytical skills. I also noticed that my writing skills have improved from a literary standpoint. Particularly, I learned to write in English in my personal writings. (S2)

Critical thinking, analyzing, grouping and organizing into one category skills have improved. Especially since we started writing compositions continuously in classes, we have a brainstorming section first. The small sentences and keywords I write in that section make it easier for us to write compositions. I still continue to use these techniques, making my writing easier. (S3)

I've improved, especially in terms of analysis and grouping. I used to have difficulty with paragraph organization, but now I've made progress in that area too. My creativity has also increased, and I've started to think and deal more quickly. (S5)

I think it also enhanced our ability to use grammar. We learn grammar, but if we don't use it in speaking and writing, we may forget the information or some things we memorized. However, in writing, writing frequently improved my grammar knowledge and expanded my usage area. Mind mapping, brainstorming. Normally, we don't think much about things before writing. But since we learned to brainstorm and actually do this before writing, the stage of finding ideas has become much easier. So brainstorming has had a big impact on me. (S10)

I think I have developed in terms of creativity. Because we start to produce more ideas as we write about a new topic every week. Analytically, I think I have a general perspective, going from general to specific, using conjunctions more. I think it allows me to summarize a topic in my mind. (S11)

Skills like critical thinking, analysis, and imagination have really developed. Especially during brainstorming sessions, ideas that I previously considered

have now become part of my daily life. I think more before doing something, and this has positively influenced my decision-making process. (S13)

I have learned how to organize writing, and how to do some research, I slowly started to develop. When I look at the situation as an analysis, I start from a wider angle. I prefer to start with a general and then choose a funny trick. It could be myself, I don't know if this is a project that took part in, but it could be my own. When I start, I look from a general perspective, I analyze it first. When I think more about specific issues in the critique, I try to do them myself, but of course, I have learned a lot from the course. (S14)

For example, this experience developed skills like critical thinking or creativity, imagination, analyzing. I especially use critical thinking in reading. Because in a paragraph, I introduce a topic, then talk about the event, and finally the author or book talks about their own idea and data. This allows me to answer questions given to me more effectively. I can better find a common point when listing things. (S17)

"As I said before, thinking and talking to myself are something I've seen as a common factor. Also creativity. People gain different perspectives because they can look at one subject in different ways." (S18)

Personal Feelings Toward The Writing Process

7. How did the experiment affect you emotionally? (anxious, uncomfortable?) (If yes, what specifically made you feel tense and anxious?)

Most of the students said that they felt anxious in the beginning but then they found writing as a relaxing activity. With the help and support of the teacher, they got confidence and motivation, they started believing in themselves. T showed everything step by step so with each lesson, it became a simpler activity.

No, I felt quite relaxed during classes. I used to enjoy sitting alone and listening to music during classes, but now I prefer to write during class, which relaxes me more. Since I already enjoy writing, I feel good in the classroom as well. (S2)

> I was a little anxious at first, and I occasionally had concerns that I wouldn't be able to finish on time. But now, I can comfortably write between 250-280 words in 45 minutes due to continuous practice, making me more comfortable in writing classes. (S3)

"I used to feel anxious before the experiment and counted how many words I had during the exam. Now, however, I don't care about such details." (S5)

> For me, writing is a relaxing activity. Therefore, having an area where we can write and express our ideas, conduct research, and learn new things have positively affected me emotionally. I was a bit intimidated at first because we hadn't written English essays or paragraphs, so I had concerns about how to use grammar correctly and how to write accurately. But this began to decrease after about 2-3 months because we started to practice more, started to write a lot, and also got used to the process. So, even though I was anxious at first, it eventually turned into an activity that actually relaxed me. (S10)

"I felt anxious at first. In the early lessons since we started new. However, it started to get easier later on. As we progressed, that's how it happened." (S11)

"Initially, I was worried about classes, but as the process continued, my anxiety levels decreased, and my self-confidence increased. With the improvement in my writing skills, my self-confidence has also grown." (S13)

"At first, I felt a bit anxious but then I started feeling comfortable. My teacher showed that she believes in me. I started trusting myself." (S14)

> Because we didn't know anything and it was very difficult, but now if it were another teacher, would I understand so easily if we worked differently, I'm not sure. Now, actually, to show how simple everything is step by step, I started to find it very simple. I feel more comfortable now. (S17)

"I didn't feel uncomfortable because I'm already a relaxed person." (S18)

Participants' Views And Suggestions On Strategies

8. Do you have any suggestions to add to the writing lesson in the study?

All of the participants who had been interviewed shared that they had nothing to add to the course, everything was fine, especially with the help and the feedback of the teacher.

"No, I don't think there's anything I'd like to add right now. Everything seems to be going quite well already. I think that's enough." (S2)

"Everything seems quite sufficient for now. If I don't understand something, I consult with teacher, and there isn't any problem." (S3)

Frankly, teacher, you're already doing everything you can. I don't have any suggestions on this, but discussions and applications like pictures seemed very interesting to me. Thank you." (S5)

"I think we are spending our time as efficiently as possible. I don't have a different suggestion; nothing else comes to mind." (S10)

"Nothing comes to mind. I think it's going well. Okay. Thank you very much." (S11)

"The classes are going very well, and I believe their impact has been positive. There's nothing else I would like to add; everything is going smoothly." (S13)

"No, everything was fine." (S14)

> Teacher, I think it's quite good because, as I said, writing is an abstract thing, an idea. Because we made it concrete at first, it started to be very easy for us to write. Teacher, as I said, making it concrete has been very helpful to me. Thank you. (S17)

"Everything was nice." (S18)

4.2 Discussion of Major Findings

This chapter discusses the study's results concerning the research questions and other studies that have been done that are comparable to it. The study's conclusions revealed that the use of brain-based teaching techniques in the EFL classroom significantly improved students' writing abilities as well as their vocabulary, grammar, and the use of

conjunctions. They have developed some other skills such as analyzing, exemplifying, categorization, critical thinking, and the ability to express their opinion. Moreover, their imagination and creativity have improved a lot. Additionally, the results of the qualitative data revealed that students were happy with their experience learning English in this course and that they generally had good opinions about the use of brain-based teaching methodologies in EFL classrooms.

First of all, the result of the study will be discussed according to the 1st research question and the 1st research question:

1.How can brain-based learning be effectively implemented in foreign language classrooms to create a more dynamic and effective learning environment for developing writing skills?

The results of the pre-test showed that students weren't familiar with the types of paragraphs, the organizational part of them, and the skills that must be used while creating a piece of writing. However, after 10 weeks of brain-based instruction in the experimental group, the post-test was implemented and the results suggested that there is a significant difference between pre-test and post-test results.

Students' interviews revealed that the activities that the teacher applied before writing helped them to immerse themselves in the process. In particular, visuals, sounds, presentations, and drawings that can appeal to all senses of the learner were favorable among the students. Eriyanti (2020) also shows that multimodal instruction improves students' productive and receptive abilities. Demircan (2005) claims that the use of visual aids in language learning is crucial because it enables students to create connections in their minds between words and real-life items. Owing to the reason that visualization may help students "recall words" when they speak or write, its value in the classroom should not be understated.

Furthermore, BBL students stated that negotiating, debating and storytelling were very helpful to turn abstract things into concrete ideas. Meaningful discussions, researching information, and sharing ideas with peers made the process emotionally engaging. These claims align with those made by Jensen (2008) and Willis (2006) in their publications,

which declare that encouraging active learning and offering interesting materials increases student motivation, engagement, and language proficiency. Additionally, participants stated that the activities that the teacher presented mostly in an illustrative way were helpful during this period. Also, they revealed that the support from the instructor had positively influenced them, especially in feedback sessions. The results are in line with the study of Bayındır (2003) in which all participants expressed a positive attitude towards the course, specifically highlighting their enjoyment of group work, journal writing, roleplays, portfolio development, writing skills acquisition teacher-student interaction, and the overall class atmosphere. They stated their favorable opinion toward drawing, audio-visual support, questioning, and presentation. Also, detailed, and personal feedback contributed a lot to the development of writing skills because they could correct their mistakes accordingly. Moreover, based on the students' interview answers they shared that the process positively affected them because there is an area where they can write and express their ideas, conduct research, and learn new things. So, even though they expressed they were anxious at first, it eventually turned into an activity that relaxed them. Similarly, the study of Akhmed Khalil (2019) investigated the effect of the Program Based on Brain-Based Learning and Emotional Intelligence for Developing EFL Secondary School Students' Critical Writing Skills. The results are in line with this study as the participants' engagement with one another in a pleasant atmosphere and a comfortable setting fostered favorable sentiments towards critical writing participation. Facilitating students' free expression of opinions, valuing their perspectives, embracing all sincerely presented beliefs, establishing, and sustaining a nurturing and supportive atmosphere where students honor each other's responses and experiences, and offering constructive feedback aimed at enhancing discussions and exchanging viewpoints significantly enhanced their critical writing skills; all these actions fostered a critical s among the students.

The second research question was:

2.What are the effects of brain-based learning on the overall learning outcomes of students' writing skills?

According to the participants' answers, the most important effect of brain-based learning is their attitude toward writing. Most of them were very biased and negative when they started the writing course, but after some time, with the help of the teacher, writing became a relaxing activity for them. This result also lines with the findings of Tüfekçi (2005), Avcı (2007), Çelebi (2008), Bayındır (2003), İnci (2010), Baştuğ (2010) who maintained that brain-based learning has a significant influence on improving students' attitudes. On the other hand, Getz (2003) and Aydın (2008) hold that the approach neither has an influence on students' attitudes towards courses nor leads to changes in their attitudes.

Moreover, the results of the interviews suggest that the use of brain-based teaching strategies in EFL writing classes made significant differences in the participants' writing skills. Additionally, some skills such as grammar use, vocabulary enrichment, making longer sentences, and using conjunctions have improved, along with the ability to generate more ideas. Demircan (2005), Duman (2010), and Gözüyeşil (2012) who conducted research on a related topic in different settings and participants, also line with the findings of the study as they state that BBL increases overall academic achievement scores of the learners compared to the traditional education. Also, the results of this research are consistent with those of Odabaşı (2010), who asserts that studies with a BBL focus significantly raise students' academic performance.

It was observed that the brain-based learning activities were significantly effective in increasing the student's motivation. Similarly, Salmiza (2011) reported that the brain-based learning approach is an effective instrument for increasing students' motivation. Similarly, Yıldırım (2010) observed that the students in the experimental group, who were taught in accordance with brain-based teaching, were more motivated than the ones in the control group.

Bayındır (2003) showed that the use of a brain-based teaching model in teaching writing skills was helpful for students in developing patterns, making meaningful inferences, and acquiring the expected skills as the physical and emotional environment was proper to use the full potential of the brain. Based on the findings, participants noted that writing became a relaxing activity for them and owing to the positive atmosphere that had been

created by the teacher, their anxiety level decreased. Their anxiety at first occasionally created some concerns that they wouldn't be able to finish their writing on time. But in the process, they could comfortably write between 250-280 words in 45 minutes due to continuous practice and it made them comfortable in writing classes.

Furthermore, the findings of written paragraphs suggested that students learned how to apply higher-order thinking skills within the context of writing. Skills like classifying, describing, sketching, comparing contrasting, differentiating, judging, and creating were detected in the writings of students. The results of similar previous studies of Zuhriyah suggested that in exploring concepts, participants were afforded the freedom to fully use their imagination to develop a new idea. They successfully classified and identified the structures of essay writing from the sample provided by their professor.

They discussed each aspect of the organization in greater detail and engaged more in the writing process, stimulating their intellect to produce quality material.

The highest average writing score achieved by students with high Higher Order Thinking Skills (HOTS) in the experimental class was mostly attributable to the instructional model employed in that class. Brain-based learning introduced significant variations in teaching and learning methodologies, particularly with assisted writing. Brain-based learning (BBL) engages students in active cognitive processes. Students were not required to memorize in BBL class; rather, they were expected to engage in critical thinking. Furthermore, BBL encouraged students to cultivate curiosity, innovation, and inventiveness, as the knowledge provided acted just as a stimulus. The teacher didn’t provide much explanation of the content, expecting that the students would find the objectives of the writing instruction and learning process. They employed their brains to comprehend the lecturer's meaning and intentions about the provision of writing supplies. This allowed them to feel relaxed while articulating their ideas without any force.

According to the findings that had been derived from the interviews it was found out that brainstorming sessions helped a lot in generating ideas and it became part of students’ daily life. They started thinking more before doing something, and this has positively influenced their decision-making process. They learned how to organize writing, and how to do some research before diving into writing. Additionally, they developed their

strategies. One of the participants noted that he started looking at the situation from a wider angle, analyzing from a general perspective to a specific one.

CHAPTER 5. CONCLUSION AND SUGGESTIONS

The purpose of this study was to determine how brain-based learning techniques affected students' ability to write by activating their left and right hemispheres of the brain. The research also aimed to investigate the possibility of brain-based learning as an alternative to conventional approaches in foreign language classes, with a focus on the improvement of writing abilities. It was carried out to identify how this approach can help students overcome obstacles, improve the learning environment, and enhance their writing skills. A qualitative research method was used. To collect the data, semi-structured interviews, pre-test, and post-test were employed. Additionally, students' writings were analyzed based on the rubrics. To address the research questions, the data saved from the open-ended questions was analyzed. The results were presented descriptively by categorizing them into themes and using the sentences of students from their writings and their interviews.

Following the results obtained from the data, it can be finalized that the experimental group, which received training through the brain-based model, demonstrated significant improvement in several aspects of writing during the ten-week intervention period. The program was designed to engage both the left and right hemispheres of the brain through preliminary tasks, providing a comprehensive learning strategy focused on writing competency and overall cognitive and emotional development.

The experimental group demonstrated significant enhancements in several critical aspects of writing. A notable gain occurred in grammar and vocabulary use. Numerous students said that in the beginning, they encountered difficulties in structuring words into sentences. Initially, they were using simple and short sentences. By the end of the course, they could construct longer, more complex sentences with increased proficiency. This was especially apparent in their abilities to use conjunctions like "therefore," "furthermore," and "consequently," as well as in their capacity to formulate sentences that were both grammatically accurate and lexically diverse. They also learned the placement and right usage of adjectives, adverbs, and prepositions within a paragraph. Moreover, the enhancement of vocabulary constituted another significant field of

development. Students recognized that exposure to diverse language in each subject and engagement in writing and classroom activities had expanded their lexicon. Furthermore, students saw a reduced reliance on translation programs such as Google Translate compared to prior usage. Before using brain-based model techniques, most of the students faced difficulties depending significantly on translation from their native language. By the end of the program, students were capable of thinking in English generating ideas, and expressing those ideas with greater fluency and coherence. Their capacity to conceptualize in English instead of translating directly from Turkish signified a notable cognitive transformation, which enhanced their overall proficiency.

The development of grammar was closely linked to the students' increased confidence in their writing. Participants expressed that although they had previously acquired grammatical principles, they had not properly integrated the rules into their writing and speech. Nevertheless, via regular practice and implementation in classroom activities, students gained increased proficiency in using language within practical situations. This transition is noteworthy as it highlights the need to employ language in authentic communication contexts, rather than merely learning rules in isolation.

A significant emotional transformation seen was the decrease in writing-related anxiety and the enhancement of students' self-esteem. Initially, several students exhibited anxiety about writing and showed a deficiency in confidence concerning their capacity to fulfill writing assignments. As they engaged in additional brain-based activities that fostered both creativity and organization, they started to approach writing with less stress and anxiety. At first, composing 150 words appeared to be a frightening challenge for some; but, by the end of the process, students began to establish more ambitious objectives, such as writing 250 words, and derived pleasure from the experience.

The change was especially evident in their attitude towards writing itself as a skill. A task that once appeared tiresome or challenging transformed into a more accomplishable and even pleasurable one. This emotional transition directly influenced their academic achievement, as they started to submit assignments punctually and without the tension that had previously impeded their advancement.

Brain-based concepts promoted autonomous learning, empowering students to assume responsibility for their educational journey. Students from the experimental group began formulating individualized ways to enhance their writing skills. For example, several maintained vocabulary notebooks that consistently recorded new terms they learned in class or throughout their study. This active engagement with vocabulary enabled students to review and refine terms, thus strengthening their comprehension and application in writing.

The shift from dependence on translation and external instruments to the internalization of the language was a notable accomplishment. Students discovered that cognitive processing in English facilitated the production of more fluid and natural phrases. The transition from a straight translation approach to a more instinctive use of English enhanced both the quality of their work and their confidence as autonomous authors. Students started developing their strategies by starting from a wide angle or general idea and moving to specific ones. Furthermore, they began brainstorming and outlining parts before each writing, and because it became a habitual activity, they found it easy to plan their paragraphs without depending on time limits, exams, or homework.

Students not only enhanced their writing abilities but also cultivated important cognitive skills vital for language acquisition and overall academic achievement. The brain-based activities prompted students to participate in analytical thinking, enabling them to break down the information they were presented into parts. This ability was especially beneficial in categorizing paragraphs by kind, enabling students to organize their work more coherently and efficiently.

The enhancement of creativity was another significant result of the study. Students acquired the ability to synthesize various components of the material provided to generate novel concepts, hence exhibiting improved originality in their writing. This capacity to synthesize and generate new material corresponds with higher-order cognitive skills, where students not only assimilate knowledge but also evaluate or judge its significance and applicability in their work. The abilities to describe, compare, contrast, group, and categorize were essential components of their writing process, allowing them to tackle assignments with a more structured and analytical perspective.

The activities that stimulated idea creation were crucial in developing these cognitive skills. By activating both the left and right hemispheres, students might investigate novel views and expand their horizons, leading to a more thorough and contemplative writing style. This cognitive involvement enhanced the students' capacity to assess the quality of their thoughts, guaranteeing that their writing was both grammatically correct and intellectually coherent.

All in all, the present study has shown that brain-based strategies may substantially enhance students' writing abilities, encompassing vocabulary development, sentence construction, and grammatical accuracy. The enhancements were coupled with less anxiety, elevated self-esteem, and the cultivation of autonomous learning mechanisms. Moreover, students demonstrated improved cognitive skills, including analysis, organization, and synthesis of knowledge, generating ideas that facilitated their overall academic achievement. Furthermore, their attitudes towards writing significantly shifted towards positivity.

For future research, the integration of neurocognitive approaches with technology might be done. As digital learning expands, investigating the adaptation of brain-based activities for virtual classrooms may provide new chances for a broader spectrum of students to benefit from these methodologies. Also, different activities that can activate both hemispheres of the brain or appeal to more senses to make more connections can be integrated by employing AI tools.

Furthermore, as this model was developed and executed for enhancing writing abilities, subsequent research might apply this model to teach other language skills, following appropriate modifications to its linguistic attributes.

In addition, this study was conducted with students from different departments that are mostly related to engineering. Future research might employ the research with participants from ESL departments who will be more interested in learning the language.

REFERENCES

Adegbija, E. (Ed.). (2004). *Language, communication and study skills*. Ota, Ogun State, Nigeria: Covenant University Press.

Allen, R. (2008). Making lasting memories: A conversation with Marilee Sprenger. *Education Update, May,* 4–5.

Alo, M., & Ogunsiji, A. (Eds.). (2004). *English language communication skills for academic purposes*. Ibadan, Nigeria: Louds Books Publishers.

Armstrong, T. (2000). *Multiple intelligences in the classroom* (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.

Aydın, S. (2008). *Beyin temelli öğrenme kuramına dayalı biyoloji eğitiminin akademik başarı ve tutum üzerine etkisi* (Yayın no. 219028) [Unpublished master's thesis, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara, Turkey]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Bachman, L. F., & Palmer, A. S. (1996). *Language testing in practice: Designing and developing useful language tests*. Oxford, England: Oxford University Press.

Baştuğ, M. (2007). *Beyin temelli öğrenme kuramının ilköğretim 5. sınıf sosyal bilgiler öğretiminde kullanılması* [Unpublished master's thesis, Selçuk Üniversitesi Sosyal Bilimler Enstitüsü, Konya, Turkey]. https://tez.yok.gov.tr/UlusalTezMerkezi/tezSorguSonucYeni.jsp

Bayındır, H. (2003). *An investigation of students' attitudes towards brain-based applications in English composition skills II course: A case study*. Graduate School of Social Sciences, [Master's Thesis, Middle East Technical University, Ankara, Turkey]. Retrieved from 15.05.2024 http://etd.lib.metu.edu.tr/upload/12604909/index.pdf

Bransford, J. D., Brown, A. L., & Cocking, R. (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.

Broughton, G., Brumfit, C., Flavell, R., Hill, P., & Pincas, A. (1994). *Teaching English as a foreign language* (2nd ed.). London, England: Routledge.

Brown, H. D. (2001). *Teaching by principles: An interactive approach to language pedagogy*. New York, NY: Pearson Education.

Bruer, J. T. (1999). In search of brain-based education. *Phi Delta Kappan, 80*(9), 648-657.

Byrne, D. (1988). *Teaching writing skills* (New ed.). London, England: Longman.

Caine, G., & Caine, R. N. (1998). Building a bridge between the neurosciences and education: Cautions and possibilities. *National Association of Secondary School Principals Bulletin, 82*(1), 1–8.

Caine, R. N., & Caine, G. (1990). Understanding a brain-based approach to learning and teaching. *Educational Leadership, 48*(2), 66–70.

Caine, R. N., & Caine, G. (1994). *Making connections: Teaching and the human brain*. Menlo Park, CA: Addison-Wesley.

Caine, R. N., & Caine, G. (1997b). *Unleashing the power of perceptual change: The potential of brain-based teaching*. Alexandria, VA: Association for Supervision and Curriculum Development.

Caine, R. N., & Caine, G. (2000). *12 brain/mind natural learning principles*. Retrieved from 15.05.2024 http://www.cainelearning.com/wp-content/uploads/2014/04/12-Brainmindprinciples-expanded.pdf

Caine, R., & Caine, G. (1991). Understanding a brain-based approach to learning and teaching. *Educational Leadership,* 48(2), 66-70.

Caine, R. N., & Caine, G. (2002). *Beyin temelli öğrenme* (G. Ülgen, Trans.). Ankara: Nobel Yayın Dağıtım.

Çelebi, K., & Afyon, A. (2011). The effect of brain-based learning on students' achievement in elementary science teaching. *Ahmet Keleşoğlu Eğitim Fakültesi Dergisi, 31,* 169-182.

Cohen, V. L., & Cowen, J. E. (2010). *Literacy for children in an informational age: Teaching reading, writing, and thinking*. Belmont, CA: Thomson.

D'Arcangelo, M. (1998). The brains behind the brain. *Educational Leadership, 56*, 21–25.

Damasio, A. (1994). *Descartes' error: Emotion, reason, and the human brain.* New York, NY: Putnam & Sons.

Demircan, Ö. (2005). *Yabancı dil öğretim yöntemleri*. İstanbul: Der Yayınevi.

Dikici, A. (2014). The effect of brain-based learning on academic achievement: A meta-analytical study. *Educational Sciences: Theory & Practice, 14*(2), 642–648.

Dörnyei, Z. (2007). *Research methods in applied linguistics: Quantitative, qualitative, and mixed methodologies*. New York, NY: Oxford University Press.

Duman, B. (2007). *Neden beyin temelli öğrenme?* Ankara: Pegema Yayınları.

Ergin, T. (2003). *İletişim becerileri eğitim programı'nın okul öncesi dönem çocuklarının iletişim beceri düzeylerine etkisi* (Doctoral dissertation, İstanbul University, Institute of Social Sciences, Department of Educational Sciences, İstanbul, Turkey).

Eriyanti, R. W. (2020). Effectiveness of integrative learning model to develop student's language receptive skills. *The Asian EFL Journal, 27*(1), 196-209.

Erlauer, L. (2004). *The brain-compatible classroom: Using what we know about learning to improve teaching*. Alexandria, VA: ASCD.

Gardner, H. (2006). *Multiple intelligences*. New York, NY: Basic Books.

Getz, C. M. (2003). *Application of brain-based learning theory for community college developmental English students: A case study* [Doctoral dissertation. Colorado State University. ProQuest Dissertations and Theses]. Retrieved from 15.05.2024 https://www.proquest.com/openview/b67b5b597ffdef16ce1a037e31733aad/1?pq-origsite=gscholar&cbl=18750&diss=y

Gilakjani, A. P. (2011). Visual, auditory, kinaesthetic learning styles and their impacts on English language teaching. *Journal of Studies in Education, 2*(1), 104-113. https://doi.org/10.5296/jse.v2i1.1007

Goleman, D. (1995). *Emotional intelligence*. New York, NY: Bantam Books.

Gökalp, G. (2001). Literary education from the classroom to daily life. *Türkbilig 2000/I Turkish Studies Research*, 185-202.

Gözüyeşil, E. (2012). *Beyin temelli öğrenmenin akademik başarıya etkisi: Bir meta analiz çalışması*. The effect of brain-based learning on academic success: A meta-analysis study. [Unpublished master's thesis, Niğde University]. Retrieved from 15.05.2024 https://acikbilim.yok.gov.tr/handle/20.500.12812/669387

Greenleaf, R. K. (2002). The adolescent brain: Still ready to learn. *Principal Leadership, 2*(8), 24-28.

Haghighi, M. (2013). The effect of brain-based learning on Iranian EFL achievement and retention. *Procedia - Social and Behavioral Sciences, 70*, 508–516.

Hannaford, C. (1995). *Smart moves: Why learning is not all in your head*. Arlington, VA: Great Ocean Publishers, Inc.

Hanson, A. (1950). *Brain-friendly strategies for developing students' writing skills* (2nd ed.). Thousand Oaks, California: Corwin.

Hardiman, M. H. (2003). *Connecting brain research with effective teaching: The brain-targeted teaching model*. Lanham, MD: The Scarecrow Press.

Harmer, J. (2001). *The practice of English language teaching*. Malaysia: Pearson Education Limited.

Harmer, J. (2014). *How to teach writing*. Harlow, England: Longman, Pearson Education.

Hayes, J., & Flower, L. (1981). Identifying the organization of writing processes. In L. Gregg & E. Steinberg (Eds.), *Cognitive processes in writing* (pp. 3-30). Hillsdale, NJ: Lawrence Erlbaum.

Hodges, D. A. (2000, September). Implications of music and brain research. *Music Educators Journal, 87*(2), 12-22.

Hoge, P. T. (2002). *The integration of brain-based learning and literacy acquisition* [Doctoral dissertation, Georgia State University]. Retrieved from 15.05.2024 https://www.gsu.edu/

Howard-Jones, P. (2008a). Philosophical challenges for researchers at the interface between neuroscience and education. *Journal of Philosophy of Education, 42*(3–4), 361–380. https://doi.org/10.1111/j.1467-9752.2008.00640.x

Huang, H. (2006). *Brain-based teaching strategies used to teach English as a foreign language (EFL) in Taiwan high schools, colleges, and universities* [Unpublished doctoral dissertation, Spalding University]. Retrieved from 15.10.2024 https://spalding.edu/

Human Memory. (2024). Left and right hemisphere of the brain. *Human Memory*. Retrieved from 15.10.2024 https://human-memory.net/left-and-right-hemisphere-of-the-brain/

Hung, D. (2003). Supporting current pedagogical approaches with neuroscience research. *Journal of Interactive Learning Research, 14*(2), 1–27. [Electronic version].

Imelda, I., Cahyono, B. Y., & Astuti, U. P. (2019). Effect of process writing approach combined with video-based mobile learning on Indonesian EFL learners' writing skill across creativity levels. *International Journal of Instruction, 12*(3), 325-340.

İnci, N., & Erten, H. (2011). The effect of brain-based learning on academic success, attitude, and retrieval of information in science and technology classes. In *Proceedings of the ESERA Conference* (pp. xx-xx). Lyon, France.

Jensen, E. (1995b). *Super teaching*. San Diego, CA: The Brain Store.

Jensen, E. (1996). *Brain-based learning*. Del Mar, CA: Turning Point Publishing.

Jensen, E. (1997). *Brain-compatible strategies*. San Diego, CA: The Brain Store, Inc.

Jensen, E. (1998). *Teaching with the brain in mind*. Alexandria, VA: Association for Supervision and Curriculum Development.

Jensen, E. (1998a). *Teaching with the brain in mind*. Alexandria, VA: Association for Supervision and Curriculum Development.

Jensen, E. (2000). *Brain-based learning* (Rev. ed.). San Diego, CA: The Brain Store Publishing.

Jensen, E. (2005). *Teaching with the brain in mind* (2nd ed.). Alexandria, VA: ASCD.

Jensen, E. (2007). *Introduction to brain-compatible learning* (2nd ed.). Thousand Oaks, CA: Corwin Press.

Khalil, A. H. S. A. (2019). A program based on brain-based learning and emotional intelligence for developing EFL secondary school students' critical writing skills. *Journal of Faculty of Education, Benha University, 30*(1), 1–25. https://doi.org/10.21608/JFEB.2019.61281

Laurenson, E. (2009). *The brain desynchronized* (Curriculum Unit 09.06.07). In Fellows of the National Initiative (Ed.), *Curriculum units by fellows of the National Initiative: The brain in health and disease* (Vol. VI). Yale National Initiative. Retrieved from 20.10.2024 https://teachers.yale.edu/curriculum/units/2009/6/7

McWhorter, K. T. (2003). *Successful college writing: Skills, strategies, learning styles*. USA: R.R. Donnelley & Sons Company.

Morris, M. (2006). *The SPD companion: Right brain vs. left brain learning styles* (p. 10). Retrieved from 15.10.2024 https://www.sensory-processing-disorder.com/SPD_Companion-right-and-left-brain-learning-styles.html#google_vignette.

Nunan, D. (2003). The impact of English as a global language on educational policies and practices in the Asia-Pacific region. *TESOL Quarterly, 37*(4), 589–613. https://doi.org/10.2307/3588214

Odabaşı, B. (2010). Beyin temelli öğrenme yaklaşımının 12. sınıf öğrenci başarısı üzerindeki etkisi [Doctoral dissertation, Gaziantep University] Retrieved from 15.10.2024.https://acikbilim.yok.gov.tr/bitstream/handle/20.500.12812/422144/yokAcikBilim_389116.pdf?sequence=-1&isAllowed=y

Ornstein, R., & Sobel, D. (1987). *The healing brain: Breakthrough discoveries about how the brain keeps us healthy*. New York, NY: Simon & Schuster.

Özdemir, E., & Binyazar, A. (2006). *Yazma öğretimi / yazma sanatı* (3rd ed.). İstanbul, Turkey: Papirüs Yayınları.

Page, G., & Merivale, P. (2001). *Effective writing skills: General and specific strategies*. Retrieved from 15.10.2024 https://kwasuspace.kwasu.edu.ng/handle/123456789/3985

Randall, M. (2007). *Memory, psychology and second language learning*. Amsterdam: John Benjamins Publishing Company.

Ratey, J. (2001). *A user's guide to the brain: Perception, attention, and the four theaters of the brain*. New York, NY: Pantheon Books.

Revell, J. (1992). Left, right and VAK. *Practical English Teaching*.

Richards, J. C. (2002). Teaching vocabulary. In J. C. Richards & A. W. Renandya (Eds.), *Methodology in language teaching: An anthology of current practice* (Section 11, pp. 255-257). Cambridge, England: Cambridge University Press. https://doi.org/10.1017/cbo9780511667190.013

Salmiza, S. (2011). The effectiveness of the brain-based teaching approach in generating students' learning motivation towards the subject of physics: A qualitative approach. *US-China Education Review* A, 1(1), 63–72.

Sanders, D. A., & Sanders, J. A. (1984). *Teaching creativity through metaphor: An integrated brain approach*. New York, NY: Longman, Inc.

Smilkstein, R. (2003). *We're born to learn: Using the brain's natural learning process to create today's curriculum*. Thousand Oaks, CA: Corwin Press, Inc.

Sousa, D. A. (2001). *How the brain learns: A classroom teacher's guide* (2nd ed.). Thousand Oaks, CA: Corwin Press, Inc.

Sprenger, M. (1999). *Learning and memory: The brain in action*. Alexandria, VA: Association for Supervision and Curriculum Development.

Springer, S. P., & Deutsch, G. (1998). *Left brain, right brain* (5th ed.). New York, NY: W. H. Freeman and Company, pp. 158–162.

Suparno, & Yunus, M. (2008). *Basic writing skills*. Jakarta, Indonesia: Universitas Terbuka.

Tarhan, B. (2009). *Yabancı dil olarak İngilizce öğreticilerinin beyin uyumlu öğrenme ilkeleri hakkındaki bilgilerinin ve tutumlarının ölçülmesi*. [Doctoral dissertation, İstanbul University, Institute of Social Sciences, Department of Foreign Language Education, English Language Teaching Program, İstanbul, Turkey]. Retrieved from 15.10.2024 https://nek.istanbul.edu.tr/ekos/TEZ/44563.pdf

Thaler, R., & Sunstein, C. (2009). *Nudge* (1st ed.). New York: Penguin Books.

Trismanto. (2017). Writing skills and their problems. *Bangun Rekaprima, 03*(9), 62–67.

Tüfekçi, S., & Demirel, M. (2009). The effect of brain-based learning on achievement, retention, attitude, and learning process. *Procedia-Social and Behavioral Sciences, 1*, 1782–1791.

Van de Graaff, K. M. (1998). *Human anatomy* (5th ed.). Boston, MA: McGraw-Hill.

Weimer, C. (2007). *Engaged learning through the use of brain-based teaching: A case study of eight middle school classrooms* (Doctoral dissertation). Northern Illinois University. Retrieved from 15.10.2024 https://www.researchgate.net/publication/35145425_Engaged_learning_through_the_use_of_brainbased_teaching_a_case_study_of_eight_middle_school_

Widdowson, H. G. (1984). *Explorations in applied linguistics*. Oxford, England: Oxford University Press.

Widdowson, H. G. (1984). *Explorations in applied linguistics*. Oxford: Oxford University Press.

Willis, G. B., & Jensen, E. (2006). *Enriching the brain: How to maximize every learner's potential*. San Francisco, CA: Jossey-Bass.

Wolfe, P. (2001). *Brain matters: Translating the research to classroom practice*. Alexandria, VA: ASCD.

Yıldırım, R. (2004). Öğrenmeyi öğrenmek. İstanbul, Turkey: Sistem Yayıncılık.

Yılmaz, Y. (2008). Yazma öğretimi. In C. Yıldız (Ed.), *Kuramdan uygulamaya Türkçe öğretimi* (2nd ed.). Ankara, Turkey: Pegem Akademi Yayınları.

Zuhriyah, M., & Agustina, R. K. (2020). Brain-based learning and high order thinking skills effect on students' writing ability. *Journal of English Education and Society, 5*(2). https://doi.org/10.21070/jees.v5i2.778

APPENDIX

Appendix 1. Semi-Structured Interview Questions

ATTITUDES TOWARD BRAIN-BASED LEARNING

1. How did the process affect you?

2. If positively, why? What was particularly interesting that encouraged you to generate more ideas for writing?

3. If not, why?

4. Did the experiment change your attitude and general perspective on writing? If so, can you explain how?

SUCCESSES DURING THE PROCESS

5. Did the experiment help you generate ideas more easily for the topic you will write about in your paragraph? (e.g., longer sentences, use of conjunctions, increased variety of words).

6. What other skills did you develop during the process of experiencing brain-based techniques?

PERSONAL FEELINGS TOWARD THE WRITING PROCESS

7. How did the experiment affect you emotionally? (anxious, uncomfortable?) (If yes, what specifically made you feel tense and anxious?)

PARTICIPANTS' VIEWS AND SUGGESTIONS ON STRATEGIES

8. Do you have any suggestions to add to the writing lesson in the study?

Yarı yapılandırılmış bireysel görüşme soruları

BEYİN TEMELLİ ÖĞRENMEYE YÖNELİK TUTUMLAR

1. Süreç sizi nasıl etkiledi?

2.Evet ise, neden? Sizi yazmak için daha fazla fikir üretmeye teşvik eden özellikle ilginç olan şey neydi?

3. Değilse, neden?

4. Deney yazmaya yaklaşımınız veya genel olarak yazmaya bakış açınızı değiştirdi mi? Eğer öyleyse açıklayabilir misiniz?

SÜREÇ BOYUNCA BAŞARILAR

5. Deney sizin paragraf yazacağınız konuda fikirlerinizi daha kolayca üretmenize yardımcı oldu mu? (daha uzun cümleler, bağlaç kullanmanız, kelime çeşitliği artması).

6.Beyin temelli teknikleri deneyimleme sürecinde başka hangi becerilerinizi geliştirdi?

YAZMA SÜRECİNE YÖNELİK KİŞİSEL DUYGULAR

7. Gerçekleştirilen deney sizi duygusal anlamında nasıl etkiledi?

(kaygılı mı, rahatsız mi?) (Evet ise, sizi özellikle gergin ve kaygılı hissettiren şey neydi?)

KATILIMCILARIN STRATEJİLERE İLİŞKİN GÖRÜŞLERİ VE ÖNERİLERİ

8. Çalışmadaki yazma dersine eklemek istediğiniz bir öneri var mı?

Appendix 2. Materials That Had Been Used During Pre-Writing

Writing 1 (Descriptive paragraph):

In the busy town, there are lots of things to explore. If you look **to the left,** you'll see **colorful** shops with signs. **To the right,** there's a **noisy** street market where people sell **fresh fruits and vegetables. In front of it**, the main road is full of cars and people talking, making the town **lively.** As you walk, you will **smell yummy food** *on the left and delicious coffee on the right.* The air is full of different smells, making you want to try the local treats. While you're walking **down the street**, you might feel a breeze from the left and experience some bumps as you move through the busy market. The town is full of things **to touch** and discover.

Writing 2 (Narrative paragraph):

Teacher's story (it was written by the researcher)

Today's morning was a disaster for me. I overslept and woke up to the sound of my alarm. In a panic, I quickly got ready and rushed to school. When I arrived, I was already 10 minutes late for my first lesson. After that, I realized I forgot to make prints for my lesson and prepare materials for my students. When I entered my classroom, I found that the interactive whiteboard wasn't working. It was just a black screen, and the projector was not working. The students were surprised that their punctual teacher was late, they were waiting for some action from me. I felt so disappointed, took a deep breath, and decided to make the best of the situation. Instead of relying on the board, I engaged the students in a lively discussion. We shared ideas, asked questions and I asked them to create materials. Despite the chaos, the class turned out to be surprisingly enjoyable. Students were surprised at how I reacted to unexpected challenges. By the end of the day, the students left the classroom with smiles on their faces, having experienced an unforgettable, chaotic day of learning. Even bad days may end in a good way.

A scary pool (this text was generated by AI)

Timmy, a shy boy, used to fear swimming. When he thought about the pool, it seemed big and uncertain. While other kids were playing, Timmy stayed by the edge, watching, and feeling a bit scared. One sunny day, his friends told him to try. Firstly, he put his toes

in the water. His heart raced, but he took another step. Then, the water reached his knees, making him a bit anxious. Still, Timmy kept going, wanting to face his fear. After some help from a swimming teacher, Timmy learned to trust the water. Firstly, floating on his back was a small triumph. Then, kicking his legs felt like a victorious dance. Each lesson had a new challenge, but Timmy didn't give up. Before he knew it, Timmy felt confident. The once-scary pool became a fun place. His laughter echoed as he splashed and swam. Fear turned into a love for the water. Timmy not only faced his fear but also found joy and excitement in the pool.

Fear of public speaking

[Background of the story (Topic Sentence)] I never thought I could do it, but I finally conquered my fear of public speaking. **[Beginning of the story]** At the beginning of the semester, my English teacher assigned us the difficult task of speaking in front of the class for three minutes, and I worried about it for the next two months. I have always been afraid of making a speech in public. I wrote all my ideas on note cards. I practiced my speech with my notes in front of a mirror, in front of my cat, and in front of my husband. Would I be able to make my speech in front of my class? **[Middle of the story]** When the day of my speech came, I was ready. As I reached the podium, I looked at my audience and smiled. Then I looked down at my note cards. At that moment, I realized that I had the wrong information. These were the notes for my biology test, not the information about my speech! I closed my eyes and took a deep breath. Without further hesitation, I began the speech. **[End of the story (Concluding Sentence)]** To my surprise, the words flowed from my mouth. Three minutes later, it was over. Everyone applauded my speech that day, and I left that room feeling like a winner.

Writing 3 (Cause paragraph)



Writing 4 (Effect paragraph).



Writing 6 (Compare and Contrast Paragraph)

Kazakh and Azerbaijani cultures

(text was generated by AI with some corrections from the researcher)

Every culture is unique and it has its own characteristics. Kazakh and Azerbaijani cultures, **both** rich and diverse, share s**imilarities while maintaining distinctive characteristics. Similarly, both s**ocieties place a strong emphasis on hospitality, where guests are warmly welcomed and treated with utmost respect. **Likewise,** their traditional cuisines reflect a love for hearty and flavorful dishes, showcasing a common appreciation for food as a central element of social gatherings. **On the other hand,** the architectural influences in Kazakh culture, rooted in nomadic traditions, differ markedly from the Azerbaijani emphasis on intricate designs and oriental patterns seen in their historical buildings. **While** Kazakh culture reflects its nomadic past through yurts and expansive landscapes, Azerbaijan's architecture is characterized by palaces and mosques adorned

with intricate tilework. **Moreover,** the musical traditions of both cultures demonstrate unique qualities. Kazakh music often features the dombra, a traditional string instrument, while Azerbaijani music incorporates the tar and saz. However, both traditions convey a deep connection to their respective histories through melodic storytelling. In conclusion, Kazakh and Azerbaijani cultures share common threads of hospitality and culinary appreciation, yet diverge in architectural styles and musical traditions. **However,** these distinctions contribute to the rich tapestry of the broader Central Asian and Caucasus regions. I think that each culture is amazing and it should be appreciated.



Appendix 3. Rubrics for Analyzing Writings of Students

pre-test	**descriptive**	**narrative**	**cause 1**	**effect 1**	**effect 2**	**compare 1**	**compare 2**	**superhero**	**post-test**
creativity/imagination/inventing	spatial orientation	organization	exemplifying	critical thinking	categorization	analyzing similarities and differences	judge/opinion	creativity/imagination	creativity/imagination/inventing
analyzing	opinion	emotions	categorization	opinion	describing				analyzing
organizing the paragraph			judging						organizing the paragraph
describing (spatial orientation)									describing (spatial orientation)
exemplifying									exemplifying
categorization									categorization
critical thinking									critical thinking
expressing feeling and emotions									expressing feeling and emotions
Judge/opinion									Judge/opinion

Appendix 4. Gönüllü Onam Formu

Sizi danışmanlığını Dr. Öğr. Üyesi Hakan DİLMAN danışmanlığında yürütülen "Enhancing Writing skills in Foreign Language Teaching through Brain-based Learning Techniques" başlıklı Yüksek Lisans Tezinin araştırmasına davet ediyoruz. Çalışma, beyin temelli öğrenme tekniklerinin yabancı dil öğretiminde yazma becerilerinin gelişimi üzerindeki etkisini incelemektedir. Araştırma, yazma becerilerindeki ilerlemeyi izlemek amacıyla öğrencilerin beyninin sol ve sağ yarım kürelerini uyarmak için çeşitli etkinliklerin kullanılmasının etkisini belirlemeyi amaçlamaktadır. Araştırmada sizden tahminen 1 saat kadar süre ayırmanız istenmektedir. Bu çalışmaya katılmak tamamen **gönüllülük** esasına dayanmaktadır. Çalışmanın amacına ulaşması için sizden beklenen, bütün soruları eksiksiz, kimsenin baskısı veya telkini altında olmadan, size en uygun gelen cevapları içtenlikle vermenizdir. Bu formu okuyup onaylamanız, araştırmaya katılmayı kabul ettiğiniz anlamına gelecektir. Ancak, çalışmaya katılmama veya katıldıktan sonra herhangi bir anda çalışmayı bırakma hakkına da sahipsiniz. Bu çalışmadan elde edilecek bilgiler tamamen araştırma amacı ile kullanılacak olup kişisel bilgileriniz **gizli tutulacaktır**; ancak verileriniz kimliğiniz gizli kalmak şartıyla yayın amacı ile kullanılabilir. Araştırma konusuyla ilgili yeni bilgiler elde edildiğinde araştırmacılar tarafından zamanında bilgilendirileceksiniz. Eğer araştırmanın amacı ile ilgili verilen bu bilgiler dışında şimdi veya sonra daha fazla bilgiye ihtiyaç duyarsanız araştırmacıya şimdi sorabilir veya e-posta adresinden ulaşabilirsiniz. Araştırma tamamlandığında size özel sonuçların sizinle paylaşılmasını istiyorsanız lütfen araştırmacıya iletiniz.

Bilgilendirilmiş gönüllü onam formundaki tüm açıklamaları okudum. Bana yukarıda konusu ve amacı belirtilen araştırma ile ilgili yazılı ve sözlü açıklama aşağıda adı belirtilen araştırmacı tarafından yapıldı. Araştırmaya gönüllü olarak katıldığımı, istediğim zaman gerekçeli veya gerekçesiz olarak araştırmadan ayrılabileceğimi biliyorum. Söz konusu araştırmaya, hiçbir baskı ve zorlama olmaksızın kendi rızamla katılmayı kabul ediyorum.

Araştırmacının	Katılımcının
Adı-Soyadı: Sabina GUSSEINOV	Adı Soyadı:.....
İmzası:	İmzası:
Tarih: .2024	

Tarih:

Appendix 5. Etik Kurul Formu

Bu belge, Yükseköğretim Kurulu tarafından 19.01.2021 tarihli “Lisansüstü Tezlerin Elektronik Ortamda Toplanması, Düzenlenmesi ve Erişime Açılmasına İlişkin Yönerge” ile bildirilen 6689 Sayılı Kişisel Verilerin Korunması Kanunu kapsamında gizlenmiştir.”

CURRICULUM VITAE

Sabina GUSSEINOV

Education

Degree	*Year*	*University, Institute, Department*
MA	2024	Maltepe University, Graduate School Department of Foreign Language Education
BA	2017	Suleyman Demirel University, Faculty of English Language Teaching Education

Work/Employment

Year	*Job*
2022 -	English as a Foreign Language Instructor at Uskudar University, English Preparatory School