TURKISH REPUBLIC
TRAKYA UNIVERSITY
INSTITUTE OF SOCIAL SCIENCES
FOREIGN LANGUAGES TEACHING DEPARTMENT
DIVISION OF ENGLISH LANGUAGE TEACHING
A MASTER'S THESIS

AN INVESTIGATION OF WRITING SKILLS IN LEARNING ENGLISH AS A FOREIGN LANGUAGE FROM A DISTRIBUTED COGNITION PERSPECTIVE

BAHAR ARABACI

ADVISOR
Prof. Dr. MUHLİSE COŞGUN ÖGEYİK

EDİRNE 2023

Tezin Adı: Yabancı Dil olarak İngilizce Öğreniminde Yazma Becerisinin Dağıtık Biliş Perspektifinden İncelenmesi

Hazırlayan: Bahar Arabacı

ÖZET

Bu çalışma, dağıtık biliş perspektifinden yazma sürecini inceleyerek, işbirlikçi yazma görevlerine form odaklı bir yaklaşımın entegre edilmesinin İngilizce öğrenen öğrencilerin yazma performansının doğruluğu üzerindeki etkinliğini ortaya koymayı amaçlamaktadır. Bu amaç doğrultusunda, Adıyaman'daki bir Anadolu Lisesi'nin 10. sınıf öğrencilerinden 24 gönüllü katılımcı çalışmaya katılmıştır. Katılımcılar deney ve kontrol gruplarına ayrılmış olup her bir grupta 12 öğrenci bulunmaktadır. Deney grubu, İngilizcedeki basit geçmiş zaman yapısını form odaklı öğretimle öğrenmiş ve yazma görevlerinde akranlarıyla iş birliği içinde çalışmak üzere 3 gruba ayrılmıştır, kontrol grubu ise bireysel olarak çalışmıştır. Her iki gruba da basit geçmiş zaman yapısını kullanarak verilen resimler hakkında bir hikâye yazma için ön test verilmiş ve paragrafları araştırmacı tarafından yeniden düzenlenmiştir. Ayrıca, deney grubu farkındalık, uyarılmış hatırlama ve mülakat aşamalarına katılmıştır. İki hafta sonra her iki gruba da aynı yazma görevi son test olarak verilmiştir. İşbirlikçi diyalogların nitel analizi, öğrencilerin araçlardan ve öğretim uygulamalarından faydalandıklarını ve yazma performanslarını etkilediklerini göstermiştir. Ayrıca, deney grubundaki katılımcılar görüşmede işbirlikçi çalışmaya, kullanılan araçlara, farkındalık ve uyarılmış hatırlama aşamalarına yönelik olumlu görüşlerini vurgulamışlardır. Nicel veri analizi, kontrol ve deney gruplarının ön testi ile son testi arasındaki hata puanları farkının istatistiksel olarak anlamlı olduğunu göstermiştir. Bu sonuç, form odaklı öğretim ve işbirlikçi yazma görevlerinin birleştirilerek kullanılmasının yazma doğruluğunu artırmak için etkili bir yaklaşım olduğunu doğrulamaktadır.

Anahtar kelimeler: dağıtılmış biliş, dağıtılmış dil, işbirlikçi yazma görevleri, form odaklı öğretim

Title: An Investigation of Writing Skills in Learning English as a Foreign Language from a Distributed Cognition Perspective

Author: Bahar Arabacı

ABSTRACT

This study aimed to reveal the effectiveness of integrating a focus on form approach to collaborative writing tasks on the EFL learners' accuracy of the writing performance by examining the writing process from the distributed cognition perspective. In line with this purpose, 24 volunteer participants from 10th graders of an Anatolian High School in Adıyaman participated in the study. They were divided into experimental and control groups and each group had 12 students. The experimental group was exposed to focus on form instruction about simple past tense structure in English and they were divided into 3 groups to work collaboratively with their peers on their writing task while the control group worked individually. They were both given pre-test which is about writing a story about pictures by using the simple past tense structure and their paragraph was reformulated by the researcher. Additionally, the experimental group participated in noticing, stimulated recall, and interview stages. Both groups were given the same writing task as a post-test after 2 weeks. Qualitative analysis of collaborative dialogues showed that students benefited from artifacts and instructional practices, and they affected their writing performance. Furthermore, the experimental group emphasized their positive opinions towards working collaboratively, video-taped mini-lesson, noticing, and stimulated recall stages in the interview. Quantitative data analysis demonstrated that the difference in error scores between the control and experimental groups, measured from the pre-test to the post-test, was statistically significant. This result confirms that employing a combination of form-focused instruction and collaborative writing tasks is an effective approach for enhancing writing accuracy.

Keywords: distributed cognition, distributed language, collaborative writing tasks, focus on form

ACKNOWLEDGEMENTS

I would like to begin by expressing my profound gratitude to my advisor, Prof. Dr. Muhlise COŞGUN ÖGEYİK, for her invaluable contributions and unwavering support throughout the process of completing this thesis. Her continuous encouragement made me believe in myself. Without her guidance, I would not have been able to successfully finish this thesis.

I would like to extend my special appreciation to Assoc. Prof. Dr. Kutay UZUN for his invaluable contributions during the data analysis process and Assoc. Prof. Dr. Ömer Gökhan ULUM for accepting to be a member of the jury for my thesis defense.

I am grateful to my dear students who voluntarily took part in the research. Their enthusiasm for learning and dedication to do their best has been truly inspiring. Additionally, I would like to extend my thanks to my esteemed colleagues and dear friends for their unwavering support. Their constant encouragement has been instrumental in motivating me to persevere.

I am profoundly grateful to my family for their love and encouragement. I would like to express my heartfelt appreciation to my dear sister, Binnur ARABACI. Throughout challenging times, she has consistently provided me with strength and uplifted my spirits.

Lastly, this thesis is supported by the Scientific and Technological Research Council of Turkey (TÜBİTAK) within the scope of 2210-A National Scholarship Program for Master’s Students. I extend my gratitude to them for their generous support.

This study is dedicated to the memory of my colleagues, my students, and their family who lost their lives in the earthquakes centered in Kahramanmaraş on February 6, 2023.

TABLE OF CONTENTS

ÖZET i
ABSTRACT ii
ACKNOWLEDGEMENTS iii
LIST OF TABLES viii
LIST OF FIGURES viii
LIST OF APPENDICES viii
CHAPTER I 1
INTRODUCTION 1
1.1. Background of the Study 1
1.2. Statement of the Problem 5
1.3. Purpose of the Study 6
1.4. Significance of the Study 6
1.5. Limitations of the Study 7
1.6. Research Questions 7
1.7. Assumptions 7
1.8. Hypothesis 8
1.9. Abbreviations 8
CHAPTER II 9
LITERATURE REVIEW 9
2.1. Introduction 9
2.2. Distributed Cognition 9
2.2.1. Socially Distributed Cognition 11
2.2.2. Embodied Cognition 11
2.2.3. Culture and Cognition 12
2.2.4. Ethnography of Distributed Cognitive Systems 12
2.3. Studies Underlying Distributed Cognition 13
2.4. Relevant Literature on Distributed Cognition 15
2.5. SLA and Cognition 20
2.6. Distributed Language 24

2.7. Critiques of Distributed Language.....27
2.8. Form-Focused Instruction.....32
2.8.1. Focus on Form.....34
2.9. Writing as a Language Skill.....37
2.10. Collaborative Writing.....38
2.11. Integrating Focus on Form Approach into Collaborative Writing.....43
2.11.1. Dictogloss Task.....47
2.11.2. Peer Revision Task.....48
2.11.3. Reformulation Task.....49
CHAPTER III.....53
METHODOLOGY.....53
3.1.Introduction.....53
3.2.Research Method.....53
3.3. Participants.....54
3.4 Data Collection Tools and Procedure.....57
3.4.1 Data Collection Tools.....57
3.4.2. The Procedures.....58
3.5. Data Analysis.....61
3.5.1. Qualitative Data Analysis.....61
3.5.2. Quantitative Data Analysis.....62
CHAPTER IV.....64
RESULTS AND DISCUSSION.....64
4.1. Introduction.....64
4.2. Findings Related to Research Questions.....64
4.2.1. Qualitative Analysis.....64
4.2.1.1. Findings Related to First Research Question.....64
4.2.1.2. Findings Related to Second Research Question.....74
4.2.2. Quantitative Analysis.....80
4.2.2.1. Findings Related to Third Research Question.....80
4.3. Discussion.....84
CHAPTER V.....92

CONCLUSION AND SUGGESTIONS 92
5.1. Conclusion 92
5.2 Pedagogical Implications.....94
5.3 Suggestions for Further Study 96
REFERENCES 98
APPENDICES 112
Appendix 1 112
Appendix 2 113
Appendix 3 114

LIST OF TABLES

Table 1 Descriptive analysis of experimental and control group's placement test scores…….53

Table 2 Mann-Whitney U test for comparison of placement test scores……...54

Table 3 Interrater Reliability for Error Counts……. 56

Table 4 Data Collection Timetable……58

Table 5 Examples from Noticing and Stimulated Recall Stages……71

Table 6 Content Analysis of Semi-Structured Interview……73

Table 7 Descriptive Results for the Error Counts……...79

Table 8 Group Comparison for Total Number of Errors……80

Table 9 Group Comparison for Grammar……...81

Table 10 Group Comparison for Spelling Errors……....82

Table 11 Group Comparison for Sentence Structure Errors……82

LIST OF FIGURES

Figure 1 Types of Form Based Instruction (Source: Ellis et al., 2002, p.420).....33

LIST OF APPENDICES

Appendix 1 Writing Task as Pre and Post-test……110

Appendix 2 Interview Questions……. 111

Appendix 3 An example of student's paper with reformulation……...112

CHAPTER I

INTRODUCTION

This chapter begins with a brief introductory information about the study. Then, the research problem, research questions, aim, the significance of the study, assumptions and hypothesis are presented. Finally, the limitations and abbreviations of the terms used in the study are stated.

1.1. **Background of the Study**

The process of foreign language learning occurs in the cognition of an individual and it cannot be thought of the cognition without interaction with the environment. There are people and artifacts with which the individual interacts in foreign language learning settings. However, traditional cognition theories could not be sufficient to explain cognition in social settings. The traditional cognitive approach considered educational thinking and cognitive science as a symbolic processing occurring inside the brain (Simon 1979, 1982) and supposes a disembodied and disembedded view of knowledge and learning (Resnick, 1989). An alternative framework is necessary to understand the distribution of cognition in a complicated social setting like a foreign language classroom.

Edwin Hutchins, the founder of Distributed Cognition, published a book called Cognition in the Wild. He emphasized that human cognition can be understood by acknowledging the everlasting interconnectivity of functional elements inside with functional elements outside the boundary of the skin (Hutchins, 1995).

Distributed Cognition suggests focusing on comprehensive systems for the unit of analysis in which social processes are just a part of the function system. It prioritizes both the role of other human participants and the function of tools and resources in student activities.

Hutchins's work influenced Clark and Chalmers's studies stating the importance of the environment in the cognitive process and the extended mind theory stated that the cycle of human thought and reason are not totally 'in the head'. Technologies, social networks, educational practices, and policies must be considered as inseparable parts of thought (Clark, 2010).

Researchers who study language learning process, examined the cognition of language learners and they paid attention to distributed cognition theory (Ellis, 2019; Cowley, 2011). The nature of language is itself based on interaction between people and it is distributed in the environment. Ellis (2019) stated that "*Language is the quintessence of distributed cognition*". In order to understand language learning, "*the usage of language, its content, its participants, and its contexts, human social action, interaction and conversation, sociocultural and educational institutions and communities and ideological structures"* required to be investigated (p.30).

The Sociocultural Theory which is one of the bases of cognition as a distributed activity asserts that human cognition is socially mediated by cultural activities, artifacts and concepts (Vygotsky, 1980). SCT affected second language acquisition research. Usage-based approaches and SLA research emphasize the role of embodied interaction in social and cultural contexts in which setting goals are to be managed by communicating with others. Scaffolding has a role in this shared context to construct meaning. Vygotsky put forward the term scaffolding which implies the cognitive development of an individual through social interaction with a more skilled one.

Even though there are some contradictions about the distribution of cognitions in learning process, (Harris, 2004; Nardi, 2002) considerable studies showed the importance of examining the language learning from the distributed cognition perspective (Cowley, 2011; Ellis, 2019). The research on cognitive psychology and its relation to second language acquisition demonstrated that language learning is distributed across people, artifacts and settings. On the other hand, in the classroom discourse, the distributed process of foreign language learning is administrated by the teachers.

Artifacts, settings, and groups are planned before the lesson. Examination of learners' cognitive process from the perspective of distributed cognition theory can be carried out by providing tools, interaction, and tasks in the classroom. Therefore, some classroom techniques are needed to be applied to provide the distribution of language learning. In this context, collaborative tasks and focus on form approach can help language teachers. Focus on Form approach suggests drawing learners' attention to specific grammar structures by providing communicative and meaningful tasks (Long, 1991). When it is examined from the perspective of Distributed Cognition, it can be revealed that focus on form approach is affected by Interaction Hypothesis which holds that language development occurs through the interaction between learners and more proficient speakers or specific materials (Long 1988a, 1991; Long & Crookes 1992, cited in Long & Robinson 1998).

Socio-cultural and distributed cognition theories can be supported by Swain and Lapkin's (2013) emphasis on the significance of collaboration and interaction among learners to ensure the co-construction of new knowledge. All the skills of foreign language as well as writing can be improved by providing opportunities for students to interact with tools and people found in their environment. Furthermore, collaborative writing tasks can be effective in facilitating focus on form in L2 writing process, from brainstorming to drafting, revising and editing (Williams, 2012). Swain and Lapkin (2002) found that students who engage in collaborative writing tasks tend to discuss language use and form more than when they work on individual writing tasks. The researchers observed that students in collaborative writing groups discussed various aspects of language, such as grammar, vocabulary, sentence structure, and text organization. These discussions often involved negotiating meaning, clarifying misunderstandings, and providing feedback to each other.

Swain and Lapkin (2007) investigated what focus on form looked like in a distributed process of language learning. They conducted a study whose participants are grade 7 immersion students from Toronto. Neil, one of the students, was examined and his interactions with artifacts and other people in his environment were described. It was

stated that the artifacts and people with which Neil interacted are the '*sources of stimulation and guidance*' and became *'cognitive partnership*' with Neil, '*genuine parts of the learning process'*. In the study, activities included focus on form tasks such as a mini video lesson for explicit instruction of a grammar topic, the series of pictures for prompting the written story, the reformulation for providing implicit feedback, and verbalization of the differences in the noticing stage. These tasks are relevant to preemptive and reactive focus on form (Ellis et. al., 2002). The study showed that Neil learned something as he changed his mistakes in the post-test. Moreover, Swain and Lapkin (2007) demonstrated that L2 learning is distributed across Neil's interactions with artifacts in social setting. The stages examined in Swain and Lapkin's (2007) study are used in this study to demonstrate how language learners' cognition distributed across tools and their peers in the classroom.

Additionally, Storch (2011) claimed that *"while collaborative writing seems well supported theoretically, the number of empirical studies that have investigated collaborative writing in L2 classes is relatively small"* (p.277). Therefore, in this study LREs in collaborative writing process are examined and quantitative data is collected from pre-test and post-tests of both experimental and control group in the foreign language classroom. Furthermore, the grammar instruction about simple past tense provided by mini lesson planned based upon FoF approach since grammar instruction regains its importance to provide accuracy by providing meaningful tasks.

In this way, not only collaborative dialogues among learners are examined from the perspective of distributed cognition, but also the effectiveness of integrating focus on form instruction to collaborative writing tasks demonstrated.

1.2. Statement of the Problem

Distributed cognition suggests that cognitive processes are not limited to an individual's mind but can also be distributed across the environment and other individuals (Hutchins, 1995). In the context of SLA, this means that language learning is not solely a matter of individual learners acquiring linguistic knowledge and skills, but also involves the distributed cognitive resources of the social and cultural contexts in which language learning occurs. For example, in a classroom setting, the teacher, other learners, instructional materials, and the physical environment can all contribute to language learning. From this perspective, researchers investigated how the distribution of cognitive resources in different contexts affects language learning process. Stephen Cowley (2011) put forward Distributed Language theory which posits that language is not solely a product of individual cognition but is rather distributed across individuals and social and cultural contexts. This means that language is not just a cognitive ability of the individual, but is also shaped by social interactions, cultural practices, and environmental factors. Even though some theoretical studies conducted to point out distributed process of second and foreign language learning, the observation of distributed cognition process in a EFL classroom discourse is limited.

This study explores how classroom tools and techniques can be used to enhance the distribution of cognitive resources to support writing performance, for example, by facilitating communication and collaboration among learners.

The collaborative dialogue approach proposed by Swain (2002) to L2 learning aligns with the Vygotskian perspective by emphasizing the importance of social interaction and co-construction of knowledge in the learning process. Since collaborative writing tasks and focus on form approach for grammar instruction indicate the significance of interaction and negotiation of meaning (Swain & Lapkin, 2013; Long,1991) they are applied to EFL classroom to examine distributed process of improving writing skills.

1.3. Purpose of the Study

Traditionally, cognition which was associated with concepts such as thought, memory, and intelligence was situated only in individuals' minds. However, distributed cognition asserts that individuals' cognition and memory are distributed across other people and artifacts with whom the individuals are interacting, and they become genuine parts of learning. In SLA context, Distributed language theory suggests that language is not solely determined by the individual, but rather emerges through interaction and negotiation between individuals in a community (Cowley, 2011).

The aim of this study was to examine the effectiveness of collaborative writing tasks with focus on form instruction from the perspective of distributed cognition. In this context, the language learners' collaborative dialogue with their peers and teacher and interaction with artifacts, and tasks in the EFL classroom is examined. Both qualitative and quantitative data were collected to show the effectiveness of applying the distributed language theory to EFL classroom on grammatical accuracy of participants' writing performance.

1.4. Significance of the Study

The necessity for empirical research on examining the foreign language classroom discourse from perspective of distributed cognition and effects of focus on form instruction with collaborative writing has been underlined in previous studies. Even though there have been some studies conducted about distributed cognition in the education field, the studies carried out in foreign language education related to impact of distributed cognition on grammatical accuracy in writing performance are limited. Therefore, it is assumed that this study will be a basis for future research for researchers working in the field of foreign language acquisition. In addition to this, the present study will be able to present a EFL lesson design for English language teachers to use in their lessons.

1.5. Limitations of the Study

The study has a few limitations. Firstly, the number of participants was limited as only 24 students, 12 for each group, were selected among 10th grade volunteer students based on their placement test scores. Secondly, the study was conducted over a two-week period, which might have constrained the breadth and depth of the data collected. Lastly, the research took place in a different classroom setting where cameras and recorders were set up, rather than in the students' actual classroom environment, which could have affected their natural behavior.

1.6. Research Questions

This study aims to investigate and provide responses to the following research questions:

1. What is the role of integrating distributed cognition perspective to an EFL classroom on the writing performance of participants?
2. What are the participants' perspectives towards the interaction with tools and people in their writing process?
3. How does integrating focus on form instruction into collaborative writing tasks affect students' accuracy in their writing performance?

1.7. Assumptions

It was assumed that both quantitative and qualitative data will provide satisfactory answers depends on the research questions and the methods used to collect the data and participants will reflect their true opinions during interviews.

1.8. Hypothesis

The study aims to test the hypothesis that the distributed cognition theory provides insight to create meaningful EFL classroom to improve learners' writing accuracy by applying focus on form instruction to collaborative writing tasks as this approach help learners interact with peers and tools in their environment.

1.9. Abbreviations

ANCOVA: Analysis of Covariance
CW: Collaborative Writing
DC: Distributed Cognition
DLT: Distributed Language Theory
EFL: English as a Foreign Language
FFI: Form Focused Instruction
FOF: Focus on Form
FOFs: Focus on Forms
SCT: Sociocultural Theory
SLA: Second Language Acquisition
L1: First Language
L2: Second Language
LRE: Language Related Episodes
RQ: Research Question
SCT: Sociocultural Theory
TR: Task Repetition

CHAPTER II

LITERATURE REVIEW

2.1. Introduction

In this part of the study, the relevant literature on distributed cognition, focus on form and collaborative writing tasks in accordance with the purpose of the study is presented. First, distributed cognition which is theoretical framework of this study is examined and it is followed by related studies of distributed cognition. Second, cognitive approaches in SLA and distributed language theory and critiques of this theory are detailed. Then, the discussion of the benefits of applying focus on form instruction to collaborative writing to examine distribution of language learners' cognition in a classroom discourse is discussed.

2.2. Distributed Cognition

Distributed cognition is a theoretical framework evolved in the field of cognitive psychology and anthropology. The former examines the distinction between the knowledge in the mind of individual and in the world and the latter is associated with use of artifacts and tools (Wright et al. 2000). According to Edwin Hutchins who is one of the pioneers of this theory, Distributed Cognition examines how cognition of individuals is distributed across people, artifacts and environment (Hutchins, 1995).

In the early classical cognitive theories, the brain was seen as a computational system and researchers developed information processing. It consisted of perception, cognition and action; and they occurred in the different stages: (a)Perception occurs in input from world to mind, (b) cognition uses this input to create a representation of things

found in the subject's environment and decides what subjects should do through reasoning and planning, (c) action is the output as a result of this cognitive process (Ellis, 2019). Scientists of mid-twentieth century cognitive psychology was studied the internal mental processes and they focused on the cognition 'in the head'.

As opposed to traditional cognitive theories, Distributed Cognition theory investigates the interdependencies of cognition with people, artifacts and technology and defends the idea of extending the mind beyond the individual to interactions with tools and environment (Hollan et al., 2000).

Distributed cognition has two principles differentiating from the traditional approach of cognitive psychology; *(1) an expansion of boundaries for the unit of analysis, and (2) the range of mechanisms assumed as part of cognitive processes* (Hollan et. al., 2000).

First principle pays attention to the boundaries of the unit of analysis for cognition. In traditional theories of cognition, the boundaries of the unit of analysis are limited to mind of individuals. Distributed cognition is based upon the functional interconnections of elements that participate together in the cognitive process. For instance, Hutchins (1995a, 1995b) considered the bridge of a ship or an airline cockpit as a unit of analysis. These systems are expected to bring subsystems together to accomplish various functions.

The second principle concerns the range of mechanisms assumed as a part of cognitive processes. Distributed cognition does not look for cognitive events consisting of representations only inside individuals surrounded by the skin or skull. Material world is used for reorganizing the distributed cognitive systems and exchanging a variety of internal and external processes. Hutchins (1995) examined the memory processes in an airline cockpit, and it demonstrates that memory includes interaction between internal processes, the use of tools and the traffic in representations among pilots.

Furthermore, Hollan, et. al. (2000) have presented four characteristics of distributed cognition: cognition is distributed socially; cognition is embodied; cognition is inseparable from culture; and cognitive ethnography is the best-suited methodology for the study of distributed cognition.

2.2.1. Socially Distributed Cognition

Hollan et. al (2000) stated that concepts, constructs, and social groups can be used to represent what is happening in a mind. He exemplified the studies of anthropologists and sociologists led to take into consideration of cognitive features in the level of society such as distributed problem solving by computer scientists; small group problem solving, organizational learning, and jury decisions by social psychologists and the relations of individual and group rationale by economists and political scientists. They emphasis the necessity of modes of transmission and transformation which are called information trajectories and the stability of it requires cognitive architecture. Transmission of information is resolved by social organization and the context of the activity through group, so social organization may be considered as a cognitive architecture (Montgomery, 2021). According to Hollan et al. (2000), since it has dynamic coordination of subsystems in order to carry out function, brain itself may be considered as a cognitive system.

2.2.2. Embodied Cognition

Holland et al. (2000) proposes second tenet of distributed cognition which is embodied cognition. In the 1990s, cognitive science focused on biologicals factors that led to comprehensive research on embodied cognition. Barsalou (2008) states that embodied states and cognition affect each other. According to Carlson and Kenny (2005), embodied experience is required to understand objects and Smith (2005) argues that opportunities for embodied action provide cognitive development.

2.2.3. Culture and Cognition

Culture and cognition are not separable from each other since individuals live in complex cultural environments (Hollan et al, 2000). Culture in the form of a history of material artifacts and social practices shapes distributed cognitive processes.

Hutchins (1995) argues that culture is an effective factor in the distributed cognition process whereas it is just a context for individual cognition in the traditional cognitive science. The process of culture collects solutions for the problems frequently encountered and provides intellectual tools to manage things that couldn't be done without them. On the other hand, it could lead people to think that somethings are impossible even though they are possible when thought in different way.

Because the features of distributed cognition such as culture, context and history cannot be applied to the traditional model, the new model of individual mind is required.

2.2.4. Ethnography of Distributed Cognitive Systems

The ethnography of distributed cognitive systems focuses on not only individual minds but also the material and social representations of the construction of action and meaning whereas earlier versions ethnographic methods focused on meaning systems; especially meaning of words (Agar, 1986; Tyler, 1969; Werner and Schoepfle, 1987) and meanings found in the contents of individual minds (Hutchins,1980). Hutchins (1995) stated:

> "*….what we learn and what we know, and what our culture knows for us in the form of the structure of artifacts and social organizations, are these hunks of mediating structure. Thinking consists of bringing these structures into coordination so that they can shape and be shaped by one another. The thinker in this world is a very special medium that can provide coordination among many*

> *structured media—some internal, some external, some embodied in artifacts, some in ideas, and some in social relationships" (p.316).*

It is argued that meaning can also be situated in silence, the absence of action in context (Hutchins and Palen, 1997). Cognitive ethnography is interested in how people use what they know to what to do as opposed to earlier versions which focus on only the knowledge of individuals (Hollan et al.,2000).

It is required detailed analysis of interviews, surveys, participant observation and video and audio recording. Analysis of video and audio recordings is vitally important as the theory especially related with activity and actions (Goodwin and Goodwin, 1996).

2.3. Studies Underlying Distributed Cognition

Hutchins (2001) has argued that the development of Distributed Cognition as a theoretical framework was influenced by the concurrent contributions of Vygotsky's Mind in Society (1980) and Minsky's Society of Mind (1988), along with the resurgence of interest in parallel distributed processing as a cognitive model in the 1980s (Montogomery, 2021).

The notion of distributed cognition is indeed not a new concept and Cole and Engestrom (1993) stated it has roots in the works of psychologists such as Wundt in 1920s and Munsterberg in 1910s, who recognized the importance of the interaction between the mind and the environment in shaping cognitive processes. These early ideas paved the way for modern conceptions of distributed cognition, which emphasize the distributed nature of cognitive processes across individuals, artifacts, and the environment.

Karasavvidis (2002) indicated that the resurgence of interest in the mind in the 1950s can also be seen as a reaction against the behaviorist focus on observable behavior alone, as well as a rejection of the mind-body dualism of Plato and Descartes. This illustrates the social evolution of human thought and the influence of the social infrastructure in shaping our understanding of cognition.

Vygotsky's (1980) sociocultural theory (SCT) emphasizes the role of social interactions and cultural tools in shaping cognitive development. He believed that cognitive development is not just a matter of individual maturation but is heavily influenced by the cultural and social contexts in which individuals live and learn. According to Vygotsky (1980) cognitive development is a socially-mediated process, meaning that individuals acquire new knowledge and skills through interactions with others who are more knowledgeable or experienced. For example, a child might learn a new word by hearing it used in conversation with an adult or by seeing it in a book. Vygotsky called this process of learning from others "scaffolding," and believed that it is a critical component of cognitive development. Furthermore, Vygotsky argued that the cultural tools and artifacts that individuals use also play a crucial role in cognitive development. These might include things like language, writing systems, and other technologies that are used to store and transmit information. Through interactions with these tools, individuals are able to internalize knowledge and develop new mental processes and strategies. Vygotsky's SCT emphasizes the idea that cognition is a distributed activity that emerges from social and cultural interactions, rather than being solely the product of individual biological processes.

The society of the mind metaphor, proposed by cognitive scientist Minsky (1988), suggests that the human mind can be seen as a complex, interconnected network of smaller "agents" or sub-minds, each with its own specialized function. These agents work together to solve problems and accomplish tasks, much like members of a society work together to achieve common goals. In this metaphor, the individual is not seen as a solitary entity with a single, unified mind, but rather as a collection of interacting agents, each with its own agenda and way of processing information. These agents can include

modules responsible for language processing, sensory perception, motor control, memory storage, and many other cognitive functions.

The society of the mind metaphor also emphasizes the importance of social factors in shaping individual cognition. Just as members of a society influence and shape one another's behavior, the different agents in the mind can influence and shape each other's processing of information. This can lead to the emergence of new ideas and solutions that would not have been possible without the interaction of different cognitive agents.

Minsky and Papert's (1988) perspective on intelligence as a systemic configuration of agencies suggests that intelligence is not a single entity but rather a complex system of interacting parts. They argued that higher-level agencies are composed of lower-level agencies and that these agencies operate together as a network of distributed computations. Hutchins extended this view of intelligence by suggesting that cognition is also distributed across neural networks within the lobes of the brain. Moreover, he proposed that each society of mind is situated in a community of other such societies and that the coordination of these internal agencies with external structure provides the organization between internal agencies required for cognitive function (Hutchins, 2001, cited in Montogomery, 2021).

2.4. Relevant Literature on Distributed Cognition

The earliest studies carried out distributed cognition research focused especially on cognitive systems in workplace such as aircraft cockpits, air traffic control, software development, and engineering (Rogers, 1997). Hutchins (1995) did extensive research on the navigation aboard US Navy ships. It examined the use of tools in detail by demonstrating how the cognitive process that is necessary to manipulate a tool is different from computations practiced by manipulating the tool. It showed the social organization of work and how learning occurred both in individual and organizational level (Hollan et. al, 2000).

Hutchins and his friends continued cognitive ethnography studies on the theory of distributed cognition with the examination of cockpit (Hutchins 1995b; Hutchins and Klausen 1996; Hutchins and Palen 1997) and air traffic control (Halverson 1995, cited in Montogomery, 2021). This study involved comprehensive cognitive ethnography of pilots based on observations of the jump seat of airliners in revenue flight, completion of training programs and work with airline training departments on the design of training programs. As these studies showed, Distributed Cognition (DC) theory, as developed in the Hutchins tradition, views cognition as a process that extends beyond an individual's brain and involves the coordination of external and internal representations within a network of technologies and actors. This perspective emphasizes the importance of understanding the relationship between an individual and their environment, and how they interact to produce cognition. However, DC theory has also been applied to individual problem-solving, where the focus is on how cognitive components of a problem are distributed between a single human problem solver and a single problem-solving artifact. In this approach, the problem solver is viewed as an active participant in a larger cognitive system that includes external tools and representations. The individual's cognitive processes are seen as distributed across this system, with different components of the problem being processed by different parts of the system (Wright et al.,2000).

Zhang and Norman (1994) applied the principles of Distributed Cognition (DC) to study individual problem-solving in a laboratory setting. Their goal is to explore the theoretical foundations of DC systems by investigating how people interact with representational artifacts in cognitive tasks.

It also has been used as a theoretical framework for human-computer interaction (Hollan et al., 2000; Moore & Rocklin, 1998; Wright et al., 2000). According to Hollan et al., (2000) distributed cognition provides a powerful and flexible theoretical framework for understanding and designing human-computer interaction. By embracing this perspective, HCI researchers and practitioners can develop more nuanced and effective digital work materials that reflect the complex and dynamic nature of human cognition and behavior.

Human-computer interaction studies lead to conduct studies which focuses on application of technology in the classroom and instructional technology became one of the studies which use the distributed cognition as a framework. According to Salomon (1993), individual students bring their own cognitive structures, knowledge, and strategies to the learning situation, which can influence how they interact with social and technological resources. Therefore, research and theories of distributed cognition in the field of educational technology must take into account both the individual and the social aspects of learning.

Koschmann's (2002) characterization of computer supported collaborative learning as a socio-cognitive function highlights the importance of understanding the distributed nature of cognition in learning with technology. By focusing on the interactions between people, tools, and artifacts, this perspective provides a valuable framework for understanding how collaborative learning can be supported and enhanced through the use of technology.

Narciss and Koerndle's (2009) paper employs the concept of distributed cognition to examine the advantages and limitations of incorporating technology in social-constructive foreign language learning settings. The objectives of this paper are as follows: (a) to illustrate how the open-ended knowledge construction and communication tools, namely TEE (The Electronic Exercise) and EF-editor (Exercise Fermat Editor), can contribute to social-constructive foreign language learning from the perspective of distributed cognition; (b) to present the utilization of TEE and EF-editor in a foreign language classroom involving 25 seventh-grade students, where they were employed to create a web-based tourist guide for London; and (c) to present the findings from an evaluative study that investigates the benefits and challenges encountered by the teacher and students in this learning scenario. Ultimately, these results are examined in terms of the heuristic value of distributed cognition in technology-enhanced social-constructive learning scenarios.

Hammond's (2010) argument about the representation of mind in theories of technologically enhanced learning is related to the idea that distributed cognition challenges traditional views of the mind as a representational entity that processes information in isolation. According to Hammond (2010), some theories of technologically enhanced learning have moved away from this representational view of the mind, and instead focus on the embodied, enactive, and extended aspects of cognition. Hammond (2010) suggests that these alternative views of cognition are becoming more accepted in the field of educational technology, and that the representational view of mind is becoming ‘unfashionable’.

Various studies have been conducted to observe classroom setting from the perspective of distributed cognition. Gomez et. al. (2010) conducted a study that examined the interactions between secondary students and pre-service teachers in an online setting. The objective was to gain insights into how their processes of creating meaning reflect distributed cognition. The researchers began by presenting a theoretical overview of how literacy learning is distributed among various elements such as learners, objects, tools, symbols, technologies, and the classroom environment in modern English language arts classrooms. They then conducted a case study to demonstrate how program values, textual resources, and cultural schema serve as distributed tools. Through an analysis of online discourse among students and pre-service teachers, the authors argue that virtual spaces have the potential to facilitate critical dialogue and serve as catalysts for embracing a distributed theory of mind.

The study by Xu and Clarke (2011) focused on the ‘public space of interaction’ in a science classroom, which refers to the interactions that take place between individuals and artifacts in a shared physical environment. They observed a grade-seven science classroom in Australia and analyzed how students interacted with each other and with the artifacts in the classroom. They found that the students' learning was influenced by a range of factors, including their interactions with each other, their interactions with the teacher, the artifacts in the environment, and the affordances of the environment itself. The study demonstrated the capacity of DC to understand the nature of learning in science

classrooms. By focusing on the public space of interaction, the study highlights the importance of considering the role of artifacts and the environment in shaping learning outcomes.

In Clayson's (2018) study the process of collaborative writing within a student advocacy nonprofit is examined. The focus is on how writers distribute their text planning across various tools, artifacts, and gestures, with a specific emphasis on the presence of embodied representations in the planning stage of writing. The study reveals that the writers create different types of representations, which vary in terms of durability, ranging from provisional to more enduring forms. The author argues that these findings provide valuable insights into the interplay between distributed cognition, materiality, embodiment, and text planning. Furthermore, the author suggests that these insights have practical implications for writing practitioners and students. The article concludes by recommending further exploration of how embodied representations of texts are generated through lived experiences with writing materials.

Montgomery (2021) addressed a gap in literature regarding cooperative learning and distributed cognition by conducting a study with 29 sixth-grade mathematics students. By observing the students, Montgomery (2021) was able to explore how cooperative learning and distributed cognition intersect in the context of mathematics education. Montgomery's (2021) study found that increased group-level cognition was promoted by decentralizing the teacher's role as the sole authority on mathematics and promoting classroom discourse. This is in line with the principles of cooperative learning, which emphasizes the importance of collaboration, communication, and interaction among students. Moreover, the study also found that the use of SDCSs (Shared Display of Cognitive Structure) helped to promote group-level cognition in problem-solving tasks. SDCS is a visual representation of the group's collective thinking process, which can help to identify areas of agreement and disagreement and promote critical thinking.

Shi and Thibault's (2022) study explores how classroom interaction occurs in literature classrooms for second language (L2) tertiary students in Hong Kong and

Taiwan, specifically focusing on how ESL/EFL students engage with and interpret literary texts through classroom discussions, as part of the process of recontextualizing the texts for educational purposes. The study proposes an approach that considers the ecological aspects of language and communication dynamics, complementing the current social semiotic approaches to multimodality. It also aims to investigate the role of embodiment in the process of meaning-making within tertiary literature classrooms. Adopting a distributed language perspective, the study demonstrates the embodied and distributed nature of classroom interaction, where pedagogic subjects interact with the affordances of their educational environment. Additionally, it provides insights into how pedagogic activities impact the multi-scalar dynamics of the meaning-making process, particularly in terms of the coordination between embodied speech and gestures. Overall, this paper highlights the importance of an ecologically embodied perspective in multimodal studies within classroom research and encourages a reconsideration of overlooked aspects of classroom interaction.

2.5. SLA and Cognition

The study of cognition, particularly in the field of second language acquisition (SLA), has evolved over the years. Previously, the focus was on knowledge acquisition rather than the processes by which knowledge is acquired. However, today there is a greater understanding that in order to understand the final state of fluent expertise, it is necessary to understand the learning processes that lead to the emergence of knowledge. Cognitive science is now more concerned with functional and neurobiological descriptions of learning processes that result in change, development, and the emergence of knowledge. A complete theory of SLA must include both a property theory of what the domain of knowledge is and how it is represented, as well as a transition theory of how learners move from one knowledge state to another (Ellis 1998; Gregg, 1993). It recognized as a subject of cognitive science *par excellence*, and significant contributions have been made to this field (Bialystok, 1978; McLaughlin 1987; Schmidt, 1990; 1992). This liaison between cognitive science and SLA has led to a greater understanding of the cognitive processes involved in language learning, including how learners acquire and

use new vocabulary and grammar, how they develop language proficiency, and how they navigate cultural and social differences in language use.

The cognitive approaches to Second Language Acquisition (SLA) emphasize the importance of functional, usage-based models of language analysis. According to this approach, language cannot be separated from its function and semantics, and language learning must take place in naturalistic, communicative situations that reflect the frequencies of the language population. The process of language learning is seen as similar to the acquisition of other complex skills, which require at least ten thousand hours of practice. Language learning is exemplar-based and involves the recognition of many thousands of structural cues to meaning, statistical frequency information, and the tuning of weights. It requires years of time-on-task and exposure to real texts, corpus and collocational-analysis resources, and materials based on the patterns of language as they are regularly used. In the initial stages of language learning, learners can benefit from explicit instruction that is based on a proper analysis of the problem space, the learner, and the stage of learning. Relevant cues can be made salient by input enhancement, and the ways in which these cues relate to meaning can be explained and made explicit (Ellis, 1999).

According to Ellis (1999), cognitive approaches to SLA involve a range of special issues that are relevant to understanding the cognitive processes involved in language learning. These include:

1. Longitudinal descriptions of the development of LI and L2 interlanguage;
2. Incremental hierarchical representations in language development;
3. The effects on learning of structural complexity of cue/function pairings;
4. The mechanisms of language transfer and the effects of language transfer;
5. The best ways of providing explicit instruction—whether to focus on forms or form, whether to build a curriculum around tasks or around structures, or whether to give learners free rein in naturalistic discourse but provide negative evidence as appropriate;
6. The highlighting of patterns while maintaining a communicative focus;

7. Learnability, teachability constraints, and the timing of focus on form;

8. The role of learner strategies.

9. The role and content of metalinguistic knowledge;

10. The role of language learner aptitude;

11. The development of automaticity and fluency;

12. The interplay of formulas and creative patterns (p.35)

Coginitive psychology studies have provided a great deal of contributions to the SLA field. The Associative-Cognitive CREED (SLA is Construction-based, Rational, Exemplar-driven, Emergent, and Dialectic) framework is concerned with the relationship between explicit and implicit learning in second language acquisition (Ellis, 1994; Krashen 1982) and the role of consciousness in cognition (Baars 1988). Consciousness plays various roles in SLA, including the learner's ability to notice negative evidence, attend to language form, perceive language through social scaffolding or explicit instruction, use pedagogical grammatical descriptions and analogical reasoning, reflect on meta-linguistic insights, and guide their practice consciously. Ultimately, these conscious efforts result in the development of unconscious, automatized skill (Ellis, 2006b). Research into the effectiveness of explicit learning and L2 instruction has demonstrated that focused L2 instruction results in significant gains, explicit types of instruction are more effective than implicit types, and the effectiveness of L2 instruction is durable (Norris &Ortega, 2000). Ellis (2005) examines a variety of psychological, educational, and neurological processes that play a role in the development of interlanguage through the interaction of explicit knowledge of form-meaning connections and implicit learning. The main process of explicit learning involves initially acquiring pattern recognizers for specific structures, which are then refined and incorporated into the overall system through implicit learning during further input processing. The prefrontal cortex's neural systems, responsible for working memory, contribute to the necessary synchronization of neurons for perceptual integration, the construction of coherent representations, selective attention, awareness, and the integration of consciousness (Ellis, 2006b).

Schmidt's (1990) concept of "noticing" refers to the learner's conscious attention to a linguistic feature or form in the input. This conscious attention is critical for solving Quine's (1960) problem of referential indeterminacy, which refers to the difficulty in determining the referent of a word or phrase in the absence of contextual clues. *Noticing* allows the learner to attend to the form-meaning relationship and make explicit connections between the two. Explicit learning, which is facilitated by noticing, results in explicit memories that are stored in the hippocampus. The hippocampus plays an important role in forming unitary episodic representations, which allow disparate cortical representations to be bound together into a single memory. These unitized memory representations are then adopted by other brain regions in the neocortex, where they are further consolidated and integrated into the learner's implicit knowledge (Gluck, Meeter, & Myers 2003). Neuroscience research has provided important insights into the neural mechanisms that underlie implicit and explicit language learning and memory (Kandel, Schwartz, & Jessell 2000, Chapter 6). Additionally, research has demonstrated that different brain regions are involved in different aspects of language processing, such as the prefrontal cortex, which is involved in working memory and attention, and the temporal cortex, which is involved in processing auditory and visual input (Gullberg & Indefrey, 2006).

Embodiment, environmental embeddedness, enaction, social enculturation, situatedness, and distributed cognition are key concepts that pervade usage-based approaches to language acquisition. These approaches focus on how individuals learn language through engaging in communication, which involves interpersonal communicative and cognitive processes that shape language use and development (Slobin, 1997). Usage-based theories of language acquisition hold that an individual's linguistic competence emerges from the collaboration of the memories of all the meaningful interactions in their entire history of language usage (Behrens, 2009; Bybee, 2010; N. Ellis, 2015; N. Ellis et al., 2013; Robinson & N. Ellis, 2008). This means that our linguistic abilities are not just the result of innate cognitive abilities or explicit instruction but are instead shaped by the language we encounter and use in real-life situations.

Understanding how usage affects an individual learner's language development is a complex task that requires the use of various methods and techniques. Longitudinal corpora of learner language must be recorded and transcribed, and then analyzed using corpus, conversation analysis, and computational techniques, which have been specially designed for learner language. Researchers also need to investigate the learner's language processing from a psycholinguistic perspective. This involves examining how processes of implicit, explicit, and statistical learning, as well as categorization and analogy, proceduralization, and schematization, impact the development of individual learners' linguistic systems. Moreover, attention is a critical factor in learning, cognition, and instruction. Attention can be motivated by personal, environmental, social, and cultural factors, and it influences how learners process language input and form representations in their minds. Finally, to understand how explicit and implicit learning support language acquisition, researchers need to explore the nature of their interface (Ellis, 2019).

Both explicit and implicit learning mechanisms are necessary for language acquisition, and they interact with each other in complex ways. Understanding the nature of this interaction is essential for designing effective language instruction and intervention programs. Focus on grammar results in grammatical competence, but sometimes accompanied by low fluency. In contrast, a focus on meaning can result in communicative competence and fluency, but sometimes accompanied by low accuracy. This understanding has implications for language instruction and the development of language programs, as different language learners may require different approaches to achieve their desired level of proficiency in a language (Ellis, 2019).

2.6. Distributed Language

The distributed perspective on language challenges two dominant orthodoxies in linguistics. The first orthodoxy is the belief that language is essentially symbolic, meaning that words are arbitrary signs that refer to something in the world through convention. The distributed perspective denies this, arguing that language is not simply a system of symbols but a complex and dynamic process of coordination between individuals. The

second orthodoxy is the idea that verbal patterns are represented inside minds or brains. The distributed perspective challenges this by emphasizing the social and interactive nature of language use. According to this perspective, language is not just a product of individual cognition but is distributed across individuals and the social and cultural contexts in which they interact. From this perspective, language is seen as both collective and individual, and it is constitutive of the feeling of thinking. Language is not just a tool for communication, but it shapes the way we think and feel about the world around us (Cowley, 2011).

Stephen Cowley founded and coordinated Distributed Language Group who seeks to develop new approaches to study language and dialogue that take into account the social, cultural, and technological contexts in which they occur. According to Cowley and his friends (Steffensen, Thibault and Cowley, 2010), language is a "social meshwork" that is constantly evolving and adapting to different social and cultural contexts.

The dynamics of language use and meaning are shaped by a variety of factors, including historical and cultural traditions, social norms and expectations, and individual experiences and perspectives. These factors interact with one another in complex ways, creating a rich and diverse tapestry of linguistic practices and meanings. Cowley (2011) expressed this distributed nature of language:

> *Linguistic experience alters who we become as we orient to others (who orient to us). Just as I coordinate with my imagined reader, you draw on your expectations, scan what is before your eyes, evoke memories and, perhaps, see future prospects. Even in reading, language activity connects eye and head movements with inscriptions and wordings. For those concerned with the results, we can ask what happens as we create and construe language and, generally, manage human action. Language links the here-and-now with what has been and, crucially, what is to come. It is thus beyond dispute that, in this sense, language is a distributed phenomenon (p.1,2).*

In contrast to Saussure's (1983, as cited in Cowley, 2011) view of language as a system of signs that is imposed on us, distributed language theorists see language as a dynamic and emergent phenomenon that arises from the interactions between people and their environment. This means that language is not a fixed or predetermined system but is instead constantly evolving and adapting in response to changing circumstances.

Cowley (2011), in the book Distributed Language, described language as *ecological*, *dialogical* and *non-local*.

The distributed perspective of language views it as an integral part of the ecology, arising from social events that link bodies, physical environments, and cultural traditions. According to this ecological perspective, language is an activity that involves wordings, and it is through bodily coordination and social interactions that we acquire the necessary skills to use language. The use of language deeply affects the lives of ourselves and others, and it is through linguistic resources that we communicate and make sense of the world around us.

This perspective allows us to connect different concepts related to language, including "languaging," (Kravchenko, 2006, p. 22),"utterance-activity," (Thibault, 2011, p. 218) "first-order language," (Love, 2004, p. 530) "dialogue," (Linell, 2009, p. 422), and "embodied, embedded language use" (Fowler, 2010, p. 286).

Language is also *dialogical* that highlights the idea that language is not just a means of communication, but a crucial aspect of our sense of self and our experiences with others. The "digital" or verbal aspects of language shape how we understand ourselves and others, and the meanings of words are shaped by the dialogical interactions between people (Cowley, 2011). Bakhtin (1981) and Mead (1932) supported this view, arguing that our experiences of sense-making involve not just individual cognition, but also the social and linguistic contexts in which we operate.

Furthermore, the study of language requires a non-local ontology, (Steffensen and Cowley, 2010) meaning that we need to consider how language operates across different time-scales and historical contexts. In simpler terms, the idea of real-time language cannot be fully explained without considering non-local factors, such as the historical and cultural context of language use, as well as the physical structures and biological processes involved in language production. Language is both a dynamic, measurable activity and a symbolic system that is shaped by tradition and history. The debate over the role of virtual structures (Cowley, 2007) versus physical constraints in language production (Carr, 2007) continues, but the important point is that language serves as a means of communication that links people across space and time. While language occurs in real-time, it is also influenced by patterns and structures that have developed over time through evolutionary processes, including natural selection. Therefore, language is both a product of biology and a construct of human experience (Cowley, 2011).

Overall, it is suggested that the study of language requires a nuanced and holistic approach that takes into account historical patterns, social dynamics, and non-local factors. By embracing this complexity, we can gain a deeper understanding of how language operates and how it shapes our experiences of the world.

2.7. Critiques of Distributed Language

Distributed Language (DL) is a theory that suggests that language is not just located in a particular area of the brain, but rather is distributed throughout the brain. While DL has gained some support in the field of linguistics and cognitive science, there are also critiques of the theory and several divergent or disputable opinions among contributors. Each contributor brings their unique perspective and understanding of the theory, which leads to different interpretations and opinions.

The central figure of integrational linguistics, Roy Harris, has been an exception to the enthusiasm that has attended the prospect of incorporating insights from distributed cognition into integrational linguistics. Harris (2004) argues that the proposition "the mind is distributed" is a category mistake, in the sense used by Ryle in his attack on Descartes' classical view of mind, a view which the distributors themselves seek to demolish. Harris (2004) questions why the distributors would set up another category mistake in place of the one they have already gotten rid of.

Harris (2004) invokes a number of examples to highlight what he sees as the oddness or absurdity of the distributors' position. For instance, he asks whether a rock could be said to have a distributed mind because it is involved in the process of erosion or whether a book could be said to have a distributed mind because it contains information. He argues that the distributors' position is incoherent and that it is not supported by any evidence.

> *When, for instance, I use a pocket calculator I feel no temptation to say 'Ah! The machine is doing my thinking for me'. Or: 'Part of my mind is now in the machine'. Because it patently isn't the case. How do I know? Because whatever is going on inside the machine, it is not part of me. […] I am no more convinced that using my pocket calculator is an extended form of thinking than that riding a bicycle is an extended form of walking or driving a motor car an extended form of riding on horseback. Thinking by proxy makes no more sense than being happy or sad by proxy. The black tie I wear at the funeral isn't doing my grieving for me. Nor is it a bit of grief that somehow escaped from inside me and got distributed (Harris, 2004, pp. 728–729).*

For Harris, the mind is not the kind of thing that can be distributed or extended. He argues that mental activity is *sui generis* and cannot be treated as synonymous with physical objects that can be distributed or extended. Harris equates the term "distributed mind" with "extended mind" as used by Clark and others, although it should be noted that "distributed mind" is not a term commonly used by proponents of socially distributed cognition.

While it is unclear whether Harris coined the term "distributed mind" himself, it has become widely associated with Clark in particular. Harris's rejection of the notion of distributed or extended mind represents a significant challenge to the proponents of this approach and has slowed its integration into certain fields, such as integrational linguistics (Orman, 2016).

Clark and Chalmer (1998) in their famous case of Otto trying to find his way to museum argue that it is not just that Otto uses his notebook as an external aid to help him remember where the museum is, but rather that his notebook is actually a part of his cognitive process, functioning as an extension of his memory and beliefs. It is “part of the extended mind of a person who uses it” and that “the iPhone in some sense is incorporated into my mind, just as the notebook is incorporated into Otto’s mind” (Clark, 2010). These claims, which Harris finds absurd and problematic, are central to the extended mind thesis and demonstrate the extent to which it challenges traditional notions of the mind as an individual, internal phenomenon. While some proponents of the theory may reject the more extreme claims made by Clark and Chalmers, the fact remains that the notion of distributed or extended cognition represents a significant departure from traditional conceptions of the mind and mental activity.

Harris's objection to the notion of distributed/extended mind is not that it is false, but rather that it is nonsensical. He argues that the terms "distributed mind" and "distributed cognition" lack a clear meaning, and that it is not possible to talk in such terms. This is similar to the Ordinary Language argument, which holds that certain philosophical problems arise from misunderstandings of language (Orman, 2016). Harris's position is also similar to that of Bennett and Hacker (2003), who criticize the practice of ascribing psychological attributes to the brain rather than to the whole person. For Bennett and Hacker, such attributions commit the mereological fallacy and do not make sense.

Harris did not address the socially distributed cognitive system perspective, which is understandable given the state of the field at the time of his article. At that time,

what was to become the distributed language view drew heavily on Clark's individual-centered account of cognition. However, following the formation of the Distributed Language Group in 2005, the influence of Clark appears to have waned considerably due to his problematic views on language and continuing adherence to a 'naive realist' position. In fact, Harris had already identified Clark as a "reocentric surrogationist," a representationist or code-based view of language that is condemned by integrationists.

The current distributed language movement challenges appeal to an individual language faculty and instead promotes a social, collective view of language and human interactivity. This perspective owes far more to Hutchins' concept of socially distributed cognition, in which individual beings and actions are not the primary units of analysis. Thus, the distributed language view is aligned with the socially distributed cognitive system perspective, which emphasizes the importance of social and cultural factors in shaping cognitive processes.

Harris' main objection to the notion of distributed or extended mind is that it conflicts with a "vulgar concept of mind" (Hampshire, 1971) that is underwritten by everyday language or "vulgar mind speak" (Harris, 2008). This language serves common-sense or folk-psychological intuitions about the mind and mental activities, comprising the everyday use of verbs such as think, intend, believe, imagine, remember, and nouns such as idea, belief, memory, etc. Harris argues that vulgar mindspeak "allows one to talk, in short, as if there were no doubt whatever those human beings had minds, and that minds were where most of human thinking was done" (2008, p.2).

Nardi’s (2002) criticism is similar to Harris’ in that they both argue that distributed cognition involves a category mistake by extending the notion of cognition to non-human elements and artifacts. However, Nardi’s objection is more specifically focused on the attribution of awareness and judgment to non-human elements, which she argues is a key element of human cognition that cannot be shared by non-human agents. She suggests that this reduces the scope of cognition to the point of changing the meaning

of the word itself, rendering it unrecognizable and useless for understanding human cognitive processes (Orman, 2015).

There are significant theoretical differences between integrationism and distributed cognition. While there may be some overlap and shared insights between the two approaches, each has its own unique focus and theoretical commitments. Integrationism is primarily concerned with the role of language in human cognition and the need for a unified account of language and thought. Distributed cognition, on the other hand, is focused on how cognition is distributed across individuals, artifacts, and environments in the course of practical activities. While there may be some potential for dialogue and collaboration between the two approaches, it is unlikely that they can be fully integrated without significant theoretical compromises on both sides. Ultimately, the choice between integrationism and distributed cognition will depend on the specific research questions and goals of individual researchers and the practical constraints of their research contexts (Orman, 2016).

On the other hand, Linell (2013) stated that DLT is a complex and multifaceted theory that encompasses various perspectives and viewpoints. He put forward some areas of potential disagreement and debate among contributors to DLT:

- *There must be a language system (Raczaszek-Leonardi, 178), vs. language is not a system (Steffensen, 185).*
- *Direct interaction and reading a book are radically different (Kravchenko, 38) vs. similar processes (Järvilehto, 28).*
- *How much significance should be attributed to the ''language stance'' (Cowley, 2011) and its effects? A language is a second- order construct (Love, 2004; Steffensen, 192): it provides stabilised patterns of languaging in social context (Steffensen, 194), but also (sometimes false) beliefs about them (cf. Linell, 2012).*
- *What are the implications of talk about ''the feeling of thinking'' (Cowley, 5)? That ''thinking'' is ''just'' a sensation, of no particular importance?*

- *What is the point of seeing language as ''irreducibly bound up with metabolic activity'' (Steffensen, 185). (p.172).*

In summary, DLT is a complex theory with many different interpretations and opinions. The diverse perspectives within the field contribute to a richer understanding of language and its relationship with the environment and human cognition.

Indeed, while cognitive approaches to SLA have made significant progress in recent years, there is still much work to be done in terms of translating theory into effective classroom practice. In order for cognitive approaches to SLA to truly have an impact on language instruction, they must be tested and evaluated in real-world classroom settings, where learners have different needs, motivations, and learning styles.

In order to bridge the gap between distributed language theory and practice in foreign language classroom, form-focused instruction may be an effective approach to be used. In a language classroom, the use of focus on form instruction can support distributed cognition by providing students with explicit instruction and guidance on how to use language forms and structures in different contexts. For example, a teacher may use focus on form instruction to teach students about the past tense in English. The teacher can provide explicit instruction on how to form the past tense and how to use it in different contexts. By doing so, the teacher is providing students with a cognitive tool that they can use in their language learning process.

2.8. Form-Focused Instruction

According to Long (1991), two types of form-focused instruction can be distinguished: focus-on-forms and focus-on-form. Figure 1 illustrates basic approaches to handle form-focused instruction. Focus-on-forms involves the predetermined selection of specific language features based on a linguistic syllabus, with these features being intensively and systematically taught. In this type of instruction, the main focus is on the

targeted form. A good example of focus-on-forms instruction is a lesson using the 'PPP' approach, which includes three stages: presentation of a grammatical structure, practice through controlled exercises, and opportunities for free production. In contrast, focus-on-form instruction primarily emphasizes meaning. The attention to form arises naturally from meaning-centered activities that stem from performing communicative tasks (Ellis et al., 2002).

Figure 1 Types of Form Based Instruction (Source: Ellis et al., 2002, p.420)

Type	**Syllabus**	**Primary Focus**	**Distribution**
Focus on Forms	Structural	Form	Intensive
Planned focus-on-form	Task-based	Meaning	Intensive
Incidental focus-on-form	Task-based	Meaning	Extensive

There are two types of focus-on-form instruction: planned focus-on-form and incidental focus-on-form. Planned focus-on-form involves using specific tasks designed to encourage the use of a particular language structure within meaningful language activities. In this case, the focus on the form is predetermined. For instance, a task like comparing pictures to determine if they are the same or different could be used to prompt learners to use the target forms 'at' and 'in'. This type of instruction is similar to focus-on-forms instruction in that a specific form is selected for teaching. However, it differs in two main ways. First, the attention to form occurs within interactive communication where the main focus is on meaning. Second, learners are not explicitly informed that a specific form is being targeted, so they are expected to primarily function as language users rather than learners when performing the task (Ellis et al., 2002).

Incidental focus-on-form involves the utilization of unfocused tasks, which are communicative tasks designed to elicit general language usage rather than specific forms. These tasks can be performed without any deliberate attention to form. However, it is also possible for students and teachers to incidentally address various forms while engaging

in the task. In such cases, attention to form is comprehensive rather than intensive, meaning that multiple different forms are briefly addressed instead of focusing extensively on a single form (Ellis et al., 2002).

It is important to note that whether focus on form is planned or incidental depends more on the teacher's approach to the task rather than the nature of the task itself. Both types of focus on form involve the use of communicative tasks. In planned focus-on-form, the teacher intentionally selects a task to target a specific linguistic feature, and this decision influences how the task is carried out in the classroom. On the other hand, in incidental focus on form, the forms that receive attention are not predetermined but naturally emerge during the task performance. Even when the focus on form is planned, there can still be incidental attention given to a variety of forms in addition to the targeted one (Ellis et al., 2002).

2.8.1. Focus on Form

While learners have the ability to acquire language forms without explicit instruction, they often do not reach advanced levels of linguistic proficiency solely through meaning-centered instruction. For instance, students in immersion programs in Canada may struggle to acquire certain features like verb tense markings even after many years of study (Ellis et al., 2002). This observation has prompted researchers in second language acquisition, such as Swain (1995), to suggest that learners need more than just engaging in communicative language use; they also need to pay attention to the form of the language.

The question then arises about the most effective way to encourage learners' attention to form. While there is substantial evidence indicating that focus-on-forms instruction leads to learning, as measured by discrete-point language tests such as grammar tests in the TOEFL, there is limited evidence demonstrating its effectiveness in enabling learners to use the targeted form spontaneously in free oral production, such as during communicative tasks. Norris and Ortega (2000) conducted a review of 49 studies,

primarily focused on focus-on-forms instruction, and found that the instructional effectiveness was significantly reduced when it came to spontaneous use of the targeted form in communication. As a result, some researchers (such as Long, 1991; Doughty, 2001) have proposed that an approach based on focus-on-form may be more effective in addressing this issue. Various techniques are employed to address learners' communication breakdowns or non-target-like utterances. One approach is to provide corrective feedback or reactive focus-on-form using techniques like recasting, as suggested by Lyster (1998, 2001). Another approach involves drawing attention to language even when there is no specific error present. This type of focus on form, which can be initiated by either the teacher or the learners themselves, is referred to as preemptive FoF (Ellis et al., 2002).

Researchers have found both types of focus-on-form instruction to be effective. Planned focus-on-form instruction is effective because it repeatedly directs learners' attention to the same form while they are engaged in communication. There is evidence demonstrating that it promotes language acquisition, even in terms of spontaneous oral production. For instance, Doughty and Varela (1998) conducted a study where reactive focus-on-form was used to target past tense verbs during students' production of oral and written science reports. The reactive focus-on-form involved “corrective recast” that the teacher first repeating a learner's utterance containing a past tense error, emphasizing the error, and then, if the learner did not self-correct, the teacher recast the utterance using the correct verb form. The students showed improvement in their written and oral science report tasks in posttests, and these gains were largely maintained over time.

However, it is important to note that planned focus-on-form instruction, as illustrated in the study by Doughty and Varela, can be time-consuming. It requires dedicating whole lessons, or even series of lessons, to focus on a single form. In this aspect, it shares similarities with focus-on-forms instruction (Ellis et al., 2002).

In contrast, incidental focus-on-form allows for the attention to be directed towards a wide range of forms within a single lesson, providing broad coverage of

language features. However, a concern is that each form is only briefly attended to, which may not be sufficient for ensuring acquisition. The acquisitional outcomes of incidental focus-on-form are not well-understood at present. Nevertheless, a recent study by Loewen (2002) suggests that learners can benefit from incidental focus-on-form. Loewen identified various instances in communicative lessons where the participants naturally paid attention to language forms. He then designed customized post-tests to determine whether individual students who engaged in these episodes had benefited from them. In tests conducted one to three days after the lessons, the students were able to recognize or produce the correct form, either fully or partially, 62.4% of the time. In tests administered two weeks later, they achieved a score of 55.6% for correct or partially correct responses. Loewen's study is significant because it demonstrates that, in certain communicative classes, incidental focus-on-form is common and that it is followed by subsequent accurate use of the forms that received attention.

In conclusion, underlying theories of focus on form approach such as Long's (1996) interaction hypothesis, Swain's (1995) pushed output hypothesis, and Schmidt's (1990) noticing hypothesis have common ideas with Distributed Language theory. Therefore, focus on form could be applicable approach to distribute foreign language learning across the people and artifacts in the classroom environment. When learners are encouraged to pay attention to the forms of language in use, they are not just using their own internal cognitive resources but are also drawing on the resources of the teacher, the materials, and the context in which the language is being used. This can help to create a more collaborative and socially distributed approach to language learning, which can be more effective than a purely individualistic approach. Such approach may be used for all language skills development as well as writing skill. Learners in foreign language writing classrooms can benefit from FoF, which offers an opportunity to enhance their language proficiency as they engage in the writing process. By incorporating FoF into foreign language writing instruction, teachers can assist learners in strengthening their language abilities by concentrating on specific language forms that are applicable to the given writing task.

2.9. Writing as a Language Skill

Writing is one of the four primary language skills, along with listening, speaking, and reading, and is an essential aspect of language learning. It involves the use of written symbols, such as letters and punctuation marks, to represent the sounds, syllables, or words of a language and allows individuals to express their thoughts and ideas in a permanent and tangible form, which can be shared and understood by others.

The ability to write well is an essential skill that is valued in many fields, including academia, business, and communication (Ungan, 2007).

Over the years, different approaches and methods have been used to teach writing skills in a second or foreign language, each with its own benefits and shortcomings.

The product approach and *the process approach* are two common approaches to writing. *The product approach* focuses on the final written product, such as grammar, syntax, spelling, and punctuation. It emphasizes correctness and accuracy, and typically involves teaching students how to write by following specific rules and guidelines. In contrast, *Process approach* is a pedagogical approach that emphasizes the writing process itself, rather than just the final product. It is designed to help learners become better writers by guiding them through a series of stages that include brainstorming, planning, drafting, revising, and editing. The approach is based on the premise that writing is a complex and recursive process that requires multiple drafts and revisions to achieve a successful final product (Harmer, 1992).

The process approach has been favored over the product approach in writing instruction by many educators (Harmer, 1992). Research has shown that focusing on the writing process rather than the final product can lead to better writing outcomes, as students are more engaged in the writing process and more likely to develop their own

unique voice and style. Additionally, the process approach can help students develop critical thinking and problem-solving skills, as they are required to think deeply about the content and structure of their writing.

In recent years, there has been a growing interest among researchers in exploring the potential of writing as a tool for foreign language learning (Manchón, 2011). Rather than viewing writing simply as a means to practice language skills, this new perspective suggests that writing can actually facilitate cognitive processes that enhance FL learning.

According to Ortega (2007), cognitive-interactionist researchers in the field of second language acquisition (SLA) have primarily emphasized oral interaction. However, Ortega suggests that this kind of interaction can also take place in other forms, such as writing. Writing provides learners with extra time to focus on language use, which may not be as available during oral-only tasks (Storch, 2016). Additionally, writing allows learners to access resources for deeper language processing (Manchón, 2011) and to apply learned language rules. As a result, written tasks often elicit more attention to form and more complex language structures than oral-only tasks, leading to greater accuracy and a focus on lexical and grammatical forms. In this regard, collaborative writing may encourage students to pay attention to form and to co-construct novel knowledge.

2.10. Collaborative Writing

Storch (2011) defines collaborative L2 writing as *"the production of a text by two or more writers"* and noted that the primary characteristic of collaborative writing is the shared responsibility and ownership of the resulting document. Therefore, collaborative writing stands apart from activities such as group planning or peer feedback, which are commonly seen in the process-oriented approach to teaching writing.

From a socio-cultural perspective (Vygotsky, 1978), knowledge is socially constructed, and collaboration among learners is a valuable process that allows for co-

construction of new knowledge (Swain & Lapkin, 2013). Collaborative writing tasks allow learners to scaffold their discourse and create a Zone of Proximal Development (ZPD). This is a space between the learner's current level of ability and their potential level, which can be reached with the assistance of a teacher or peer with higher skills.

Swain and Watanabe (2013) suggest that learners can effectively improve their language proficiency by working together and engaging in collaborative dialogues or LREs. Through these dialogues, learners share ideas and pool their knowledge, which enables them to reflect on language use and solve language-related problems. This process of using language as a cognitive tool to reflect on language and facilitate problem-solving is called "languaging". 'Languaging' is defined as *"the process of making meaning and shaping knowledge and experience through language*" (Swain, 2006, p. 98, as cited in Swain & Watanabe, 2013) and Swain and Lapkin (1998, p. 326) define LREs as "any part of a dialogue where the students talk about the language they are producing, question their language use, correct themselves and others".

LREs can be categorized into different types, including form-focused, lexical-based, and mechanics, depending on the type of language problem being addressed (Swain & Lapkin, 1998). By engaging in LREs, learners can reflect on their language use and develop their metalinguistic awareness, which can help them identify and correct language errors more effectively. Collaborative writing is one such activity that can facilitate LREs. During the writing process, various language problems may arise, such as form-focused issues like morphology and syntax, lexical-based issues like word meaning and word choices, and mechanics issues like punctuation, spelling, and pronunciation. By working collaboratively to solve these problems, learners can improve their language proficiency and develop their ability to use language effectively.

Furthermore, the Interaction Hypothesis (Long, 1996) and Output Hypothesis (Swain, 1985) highlight the importance of interaction and language production in language acquisition. During collaborative work, learners may engage in meta-talk or LREs, which are highly beneficial for L2 acquisition (Swain & Lapkin, 1998).

Collaborative tasks offer opportunities for meaningful language use, provide contexts for learners to communicate in the TL, and may lead to learners noticing gaps in their interlanguage and modifying their contributions to a conversation to make themselves better understood. Therefore, collaborative work is considered crucial for L2 learning. (Hidalgo & Mayo, 2021).

Overall, collaborative writing tasks have been found to offer great benefits for FL learning, as they trigger more negotiation between learners and provide opportunities for further L2 learning (Nassaji & Tian, 2010; Teng, 2017) through the discussion and resolution of language-related issues (Storch, 2013).

Storch (2011) reviewed some studies conducted in order to show the effectiveness and benefits of collaborative writing in L2 learning.

For example, Leeser's (2004) study investigated the impact of proficiency pairing on attention to language use by analyzing the talk of 10 Spanish L2 learners who completed a dictogloss task in pairs of similar proficiency. The study found that L2 proficiency had an impact on the number and focus of LREs produced, with the high-high pairs producing the greatest number of LREs and focusing mainly on grammatical forms, while the low-low pairs mainly focused on lexis. The study also found that the highest proportion of unresolved LREs was found in the data of the low-low pairs, suggesting that languaging may not be as successful among low-proficiency pairs. Overall, Leeser's study highlights the importance of considering proficiency pairing when designing tasks that involve attention to language use.

De la Colina and Garc´ıa Mayo's (2007) study investigated the effectiveness of three collaborative writing tasks (jigsaw, text reconstruction, and dictogloss) in drawing low-proficiency L2 learners' attention to language in an EFL setting. The study found that all three tasks were effective in eliciting LREs, but text reconstruction resulted in more LREs than the other two tasks. However, the researchers noted that many of these LREs

were resolved incorrectly, indicating that these tasks may not be suitable for low-proficiency L2 learners.

Storch and Wigglesworth's (2007) study investigated the effects of two meaning-focused writing tasks on the attention to language of advanced ESL learners. The first task required the participants to write a data commentary report of about 150-200 words based on a graphic prompt, while the second task required them to write an argumentative essay of about 250-300 words. The participants were given more time to complete the essay than the data commentary report, as it was a longer text requirement. The study found that both tasks elicited more attention to lexical choices than to accuracy. This means that the participants were more concerned with using appropriate and effective vocabulary and expressions than with using correct grammar and syntax. Storch and Wigglesworth suggested that this greater attention to lexis could be due to the fact that the participants were fairly advanced L2 learners and had less need to deliberate about grammatical accuracy.

The study by Watanabe and Swain (2007) aimed to investigate whether the occurrence of LREs differed when English L2 learners interacted with interlocutors of different proficiency levels. The study involved four L2 learners who engaged in a multistage task of writing and responding to feedback. The researchers found that the learners produced more LREs when they interacted with a higher-level interlocutor. This suggests that learners were more likely to notice and attend to language form when working with someone who had a higher proficiency level.

The study conducted by Kim and McDonough (2008) aimed to investigate the effect of peer proficiency level on L2 learners' production of language-related episodes (LREs) during a dictogloss task. The study design involved pairing eight intermediate Korean L2 learners with fellow intermediate interlocutors and then with advanced interlocutors. The results of the study showed that learners produced more LREs, particularly lexical errors, when interacting with an advanced peer than with an

intermediate peer. Additionally, learners had more unresolved or incorrectly resolved LREs when working with intermediate peers compared to advanced peers.

Aldosari's (2008) doctoral research highlights the significance of the relationships learners form when engaging in collaborative writing tasks. The study found that the quality and quantity of language-related episodes (LREs) that occurred during these tasks were influenced by task type, proficiency grouping, and the relationships formed between the learners. The study used three types of collaborative writing tasks: jigsaw, composition, and editing, and involved 18 EFL students in Saudi Arabia, forming six pairs each of high-high, high-low, and low-low pairs based on their instructor's assessment of their proficiency. The findings showed that the task type played a significant role in determining the type of LREs that emerged during the tasks. The jigsaw and composition tasks elicited more attention to lexis, while the editing task generated more grammar-related LREs. Furthermore, the study demonstrated that proficiency grouping did not have a significant impact on the quantity and quality of LREs, and that the relationships formed between the learners were more important. The study highlights the importance of task design and the establishment of a positive learning environment in promoting effective collaborative writing tasks.

Collaborative writing has been an area of growing interest in second language learning research in recent years. While there is some evidence to suggest that collaborative writing tasks can be beneficial for L2 learning, more research is needed to provide stronger evidence for this claim. Storch (2011) claims that "*to date, the number of studies on the outcomes of collaborative writing, particularly studies showing evidence of L2 learning, are few in number and small scale"* (p.282).

The abovementioned studies have shown that collaborative writing tasks can help learners develop a range of skills, including improved writing fluency, accuracy, and complexity, as well as increased knowledge of grammar, vocabulary, and discourse structures. Collaborative writing tasks can also provide opportunities for learners to engage in negotiation of meaning, to receive feedback on their writing from peers, and to

develop social and interpersonal skills that can support language learning. However, it is important to note that the effectiveness of collaborative writing tasks may depend on a range of factors, including the learners' proficiency level, their motivation and engagement in the task, the task design and structure, and the type and quality of feedback provided by peers.

Focus on form instruction could be applied to collaborative writing tasks to improve the students' grammatical accuracy on their writing performance.

2.11. Integrating Focus on Form Approach into Collaborative Writing

In the 1960s and 1970s, grammar instruction was a prominent feature of L2 writing courses (Frodesen & Holten, 2003). However, the efficacy of this approach was later questioned, particularly in the communicative language teaching era of the 1980s. Research in both L1 (Hartwell, 1985) and SLA suggested that explicit grammar knowledge did not always lead to improved writing ability or communicative competence. Additionally, studies of the composing process in L1 (Flower & Hayes, 1981), and L2 writing (Zamel, 1983), revealed that successful writers prioritized idea generation, arrangement, and drafting over attention to grammar rules and language form.

As a result, L2 writing pedagogy has shifted away from a focus on grammar instruction and toward an emphasis on the composing process, idea development, and the production of authentic texts. While grammar instruction is still considered important, it is often incorporated as a secondary aspect of the writing process, with greater attention given to the development of writing skills through practice, feedback, and revision.

On the other hand, these results of studies led to new SLA research, and they have shown a positive role for grammar instruction in L2 learning (Ferris & Hedgcock, 2005) while some earlier research suggested that grammar instruction was not necessary or even detrimental to SLA.

For example, a meta-analysis of 49 studies by Norris and Ortega (2000) found that explicit grammar instruction led to more substantial improvements in L2 acquisition compared to implicit instruction. The results of studies suggested that “L2 writing instructors have a role to play in making writers aware of language form” (Frodesen & Holten, 2003, p. 144).

As a result of research which has demonstrated positive role of grammar instruction in L2 writing, SLA researchers has started to admit positive role of L2 writing in L2 acquisition (Williams, 2012, p. 321). In the past, L2 writing was primarily viewed as a way for learners to demonstrate their level of L2 proficiency rather than as a means to facilitate L2 acquisition. However, recent research has challenged this perception and has shown that writing in a second language can have a positive impact on L2 acquisition. By engaging in writing tasks, learners have an opportunity to practice their language skills and receive feedback that can help them improve their language proficiency. Additionally, writing tasks can be designed to promote deeper processing of the language and enhance learners' acquisition of new vocabulary and grammatical structures.

L2 writing classroom can be a rich environment for form-focused instruction, as learners engage in the writing process and work to improve their language knowledge and skills (Williams, 2012).

The critical role of form-focused instruction in L2 acquisition is well-established in the field of second language acquisition and applied linguistics. Similarly, L2 output, including L2 writing, is widely recognized as an important aspect of L2 acquisition, as it provides learners with opportunities to use and practice their language skills.

To facilitate the development of L2 writers' language resources, L2 writing instructors can integrate form-focused instruction and L2 writing through focus-on-form. FoF is an instructional approach that involves drawing learners' attention to specific language forms, such as grammar or vocabulary, within the context of a communicative task. FoF is based on the premise that learners will acquire language forms more

effectively when they are provided with opportunities to use them in meaningful contexts. By integrating FoF into L2 writing instruction, instructors can help learners develop their language resources by focusing on specific language forms that are relevant to the writing task at hand (Goins, 2021).

The application of FoF in the L2 writing classroom is an ongoing area of research and exploration (Goins, 2021). Collaborative prewriting activities, such as group brainstorming and discussion, can provide opportunities for students to negotiate meaning and engage in language-related episodes (LREs) that can deepen their awareness of language forms.

LREs can occur when students talk about or question their own or others' language use while carrying out a given task in the L2. By engaging in LREs, students can focus their attention on language forms in the context of their own writing, making the learning more relevant and meaningful (Leeser, 2004).

Swain and Lapkin's (1998) research demonstrated that collaborative writing tasks can stimulate LREs, as students engage in discussions about language use and form. This type of collaborative writing activity can be especially effective in facilitating the integration of FoF in the L2 writing classroom.

Williams (2012) argues that LREs rather than written production itself, may provide a better way to observe how focus on form is accomplished in writing and through writing instruction. By observing and analyzing LREs, L2 writing instructors can gain insights into how to effectively integrate FoF into their writing instruction, helping students develop their language resources and become more proficient writers in the L2.

In conclusion, LREs provide a valuable context for L2 writing instructors to provide FoF in the L2 writing classroom, as they focus students' attention on language form within the context of their own writing. Collaborative writing tasks and activities can stimulate LREs and provide opportunities for students to engage in meaningful

discussions about language use and form. The research showed the effectiveness of focus on form instruction to increase attention on grammatical forms on the writing performance.

For example, Shabani and Hosseinzadeh's (2019) study aimed to compare the impact of two methods of focusing on grammatical accuracy, known as teacher-initiated planned preemptive and reactive focus on form (FonF), on the correct usage of the English third person singular -s in second language (L2) learners' narrative writing. A total of 32 English learners were chosen from a pool of 70 participants based on the Quick Oxford Placement Test. These learners were randomly divided into two groups: one experimental group and one comparison group. Each group received a different instruction approach for FonF during narrative tasks. The analysis of the groups' performance on the pretest, immediate posttest, and delayed posttest indicated that both techniques were equally effective in directing the learners' attention to the targeted grammatical form. Therefore, it can be suggested that teachers should carefully consider the timing of focusing learners' attention on specific linguistic forms.

In Calzoda and Mayo's (2021) study, the oral production of 31 pairs of 11- to 12-year-old Spanish-speaking English as a Foreign Language (EFL) learners was examined while they engaged in a collaborative dictogloss task. The targeted linguistic feature in the task was the 3rd person singular morpheme -s. Language-related episodes (LREs) were identified based on instances where the learners deliberated about language, categorized by their focus and resolution. The study also quantified the incorporation of resolved deliberations into the collaborative written output. The findings reveal that the learners exhibited a significant focus on form rather than meaning, but interestingly, they concentrated more on other grammatical forms rather than the targeted -s. In terms of resolution, a higher number of LREs were correctly resolved compared to those that were resolved incorrectly or remained unresolved. Furthermore, the resolved LREs were predominantly incorporated into the written output, regardless of their focus.

According to Hidalgo and Mayo (2021) despite the growing body of research on young learners' second language acquisition, few studies have investigated the impact of repeating collaborative writing tasks on the output of this specific population. Their study aims to address this gap by examining the effect of task repetition on the attention to form among young learners (aged 11-12), operationalized as language-related episodes (LREs). The study involved forty beginner learners of English as a foreign language (EFL), who engaged in two types of TR: exact TR, where participants repeated the same task verbatim, and procedural TR, where participants repeated the task type but with different content. In contrast to most previous research, a majority of the LREs in both groups were focused on form and resolved in a target-like manner. Additionally, the ETR group showed a statistically significant decrease in the number of LREs at the third time point, while the LREs in the PTR group remained stable.

Goins (2021) stated that the inclusion of grammar instruction in second-language writing instruction has been a topic of discussion for many years. Researchers have debated its necessity, different approaches to teaching grammar, and its effectiveness in developing second-language writing skills. Despite evidence suggesting the benefits of grammar instruction for second-language learning and writing development, the practical application of grammar instruction in second-language writing remains limited in the discourse surrounding second-language learning. His article utilizes theories, research, and practices from the fields of Second Language Acquisition and Applied Linguistics to propose three collaborative writing tasks that specifically address grammar and language form in the context of second-language writing. In the next section, three different tasks that facilitate FoF in the context of writing tasks that Goins (2021) suggested will be discussed: a dictogloss task, a reformulation task, and a peer revision task.

2.11.1. Dictogloss Task

A dictogloss task involves the teacher or a student reading a short text aloud while students take notes. Afterwards, students work together in small groups to reconstruct the text based on their notes. This task provides opportunities for students to

negotiate meaning and engage in LREs as they discuss the content of the text and the language forms used. Teachers can also provide feedback and guidance on language forms as needed.

A dictogloss task can be used to facilitate both reactive and preemptive FoF. In reactive FoF, the instructor should let the task and the communicative needs of the students dictate which language forms and constructions become the targets of explicit language instruction. The instructor should be attentive to student conversations and offer just-in-time and responsive instruction on emerging areas of difficulty. In preemptive FoF, the instructor can introduce a mini-lesson before the dictogloss task to prepare students for upcoming language forms and constructions. In either case, the dictogloss task engages students in a task where the communication of meaning is primary, but attention is also paid to language form (Goins, 2021).

2.11.2. Peer Revision Task

Peer revision tasks are an effective way to facilitate FoF, as they provide an opportunity for students to engage in meaningful conversations about the content and meaning of their writing while focusing on the language forms used to convey it. During peer revision tasks, students may exchange correct and incorrect information, make good and bad decisions, but at all times, they are co-constructing their own system of meaning in a second language from a sociocultural perspective.

This approach to peer revision tasks recognizes the importance of social and cultural factors in language learning, emphasizing the role of interaction and negotiation of meaning between peers. By engaging in peer revision, students not only improve their writing skills, but they also develop their abilities to communicate effectively in a second language, negotiate meaning, and interpret and respond to feedback. Moreover, through peer revision tasks, students are exposed to a variety of language forms and styles, which can help them expand their linguistic repertoires and become more proficient in the second language.

Preemptive FoF is indeed well-suited for peer revision tasks, as it allows instructors to reinforce and build upon previously covered linguistic and rhetorical topics. By focusing on specific language constructions, instructors can guide students' attention towards key features of effective writing and facilitate meaningful discussions that support language learning. The use of a peer review guide can help scaffold students' understanding and use of these language constructions, while also promoting interaction and collaboration amongst peers. Reactive FonF can be appropriate for advanced L2 writers during the final stages of the writing process. In this case, the instructor would observe students as they participate in the peer revision task and provide feedback and guidance based on their individual needs. This approach allows students to choose the linguistic items they wish to focus on and engage in LREs that are relevant to their writing.

However, there are some drawbacks to this approach. Students may not have clear guidance on what to discuss or focus on, which could lead to less productive discussions. Additionally, the lack of structure may make it difficult for instructors to reinforce previously covered course content.

As such, it is recommended that instructors use reactive FoF in conjunction with preemptive FoF. Instructors can use peer revision tasks preemptively to reinforce learning in the beginning stages of a paper, providing guidance on specific linguistic and rhetorical features. Later on, instructors can use reactive FoF to allow students to focus on language items of their choosing (Goins, 2021).

2.11.3. Reformulation Task

Cohen (1983) defined reformulation as "*having a native writer of the target language rewrite the learner's essay, preserving all the writer's ideas, making it sound as nativelike as possible*" (p. 4). Reformulation is not just about correcting errors, but also about improving overall language use. By providing learners with a model of nativelike

language use, reformulation can help them improve their vocabulary, sentence structure, coherence, and other aspects of their writing or speaking.

However, as Cohen noted, learners may need assistance in comparing their original version with the reformulated one. This is because the differences between the two versions may not always be immediately apparent, especially for learners who are still developing their language proficiency.

One way to facilitate this process is to engage learners in a collaborative discussion about the differences between the two versions. This can help learners to identify specific areas where they need to improve and to develop a deeper understanding of the target language. In addition, instructors can use the comparison process to highlight specific language forms and functions that learners may need to focus on in order to improve their overall language proficiency (Goins, 2020).

The study conducted by Swain and Lapkin (2002) aimed to investigate the potential of reformulation as an instrument for facilitating language-related episodes (LREs) and second language (L2) learning. The participants in the study were two English-speaking students who were enrolled in a French immersion program in Canada. Both students were 12 years old and in seventh grade, and they had a high-intermediate to an advanced level of proficiency in French prior to the study. It involved several stages. First, the two students were asked to write a story together based on a series of pictures. Next, a native French speaker reformulated their story, highlighting the differences between the original text and the reformulation. The students were then asked to notice and comment on the differences they observed. In the next stage, the students were shown a videotape of themselves, where they were asked to notice and comment further on the differences between the original text and its reformulation. They were also asked to share their thoughts on what they were thinking about as they compared the two texts. In the final stage, the researchers gave the students back their original text and asked them to make any changes they wanted individually. Afterward, the students were interviewed about all stages of the process. The study found that reformulation was a valuable

instrument for facilitating LREs and L2 learning. The process of noticing and commenting on differences between the original text and its reformulation helped the students become more aware of their language use and expand their linguistic knowledge. Additionally, the students reported feeling more confident in their language abilities after the process.

The purpose of reformulation is to help language learners become more aware of their language choices, identify areas for improvement, and develop strategies for self-editing (Ferris & Hedgcock, 2005).

Engaging in reformulation exercises within a second language (L2) writing class requires a significant investment of time and effort, mainly due to the instructor's responsibility to reformulate the texts of multiple students or pairs of students. One possible approach is for students to collaborate in pairs to compose a text either in a single class session or as homework. Subsequently, the teacher can reformulate these texts and instruct the students to compare their original versions with the reformulations during the next class period. This reformulation activity can be designed to specifically highlight certain language forms, thereby ensuring that the majority of students engage in discussions that revolve around similar form-function relationships within their group. Consequently, this approach offers the instructor an opportunity to deliver targeted instruction that benefits the entire class (Goins, 2021).

These three collaborative writing tasks have an overarching goal of prompting students to think about and discuss language forms necessary for expressing a wide range of meanings and ideas. This includes basic elements like sequencing words and transition phrases, as well as more advanced language constructs for contrast, condition, comparison, agreement, disagreement, and more (Goins, 2021). These tasks are particularly beneficial because they foster active and student-centered discussions about language, allowing L2 writing instructors to incorporate grammar instruction into meaningful writing activities. Additionally, these tasks can seamlessly integrate with existing classroom practices of L2 writing instructors. Another advantage is that they

enable instructors to initiate (preemptive FoF) or respond to (reactive FoF) language discussions and offer explicit language instruction (Goins, 2021). When deciding whether to employ preemptive or reactive FoF, instructors should consider multiple factors. FoF instructional methods should align with students' communicative needs. Instructors must attentively observe students' linguistic output during tasks to identify their specific requirements and make informed decisions about which language aspects to address and to what extent.

Lastly, the effectiveness of collaborative writing activities in supporting L2 learning depends largely on the specific characteristics of the task (Swain, 1998, p. 79). It should be noted that a task which prompts language-related episodes (LREs) in one group of students may not have the same effect in another group due to factors such as the familiarity of the task topic, the proficiency level of the learners, their age, and other related variables (p. 79). Therefore, instructors should aim to design tasks that encourage output and discussion aligned with students' background knowledge and interests, while also considering their zones of proximal development to facilitate learning. Additionally, student preparedness for task performance plays a crucial role in generating LREs. Prior to any task, instructors should ensure that students have a clear understanding of their responsibilities. This can be achieved through teacher modeling and role-playing conducted by teachers before the actual task takes place (p. 80).

CHAPTER III

METHODOLOGY

3.1. Introduction

This chapter provides a comprehensive explanation of the processes involved in collecting and analyzing data. It begins with a discussion of the research model and then goes on to describe the participants and research tools. The following section outlines the data collection procedures, including clear justifications for their role in obtaining results. Finally, the chapter concludes with an analysis of the collected data.

3.2. Research Method

To conduct this study, the preferred research design is a mixed-methods approach that involves using both quantitative and qualitative methods within a single study. Mixed-methods research refers to the utilization of both quantitative and qualitative methodologies within a single study. Advocates of this approach believe that employing both methods offers a more comprehensive understanding of research issues compared to relying on solely either approach (Fraenkel & Wallen, 2009).

This research is based on the theory of distributed cognition, which is a branch of cognitive anthropology. In order to answer the first research question, the study employs qualitative methods that are consistent with previous distributed cognition research. Previous investigations in this field have mostly used ethnographic methods (Hutchins, 1995, 2014) and could be characterized as micro-ethnographic case studies (Hall, 2007). These studies involve collecting a large amount of audio/video data in the

field over a relatively short period of time. In the present study, audio and video recordings were collected during focus on form instruction, collaborative writing, noticing, and stimulated recall sessions in which participants were engaged.

As for the second research question, participants interviewed to provide better understanding of the distributed process they are engaged in. Semi-structured questions were used to interview participants of experimental group in order to find out their opinions about the effectiveness of the tasks and stages they participated in.

The third research question was addressed through an experimental study involving two participant groups. The experimental group received focus on form instruction and participated in collaborative writing tasks, noticing, and stimulated recall sessions. Meanwhile, the control group received traditional instruction and had their pre-test reformulated. The study collected quantitative data through pre-tests and post-tests, which aimed to measure the improvement in writing accuracy achieved by distributing the learning through mini lesson, collaborative writing task, noticing, and stimulated recall session.

3.3. Participants

The Participants were 10th-grade students from low-income families of a public Anatolian high school in Adıyaman. Students are accepted to this school based on their year-end grades of secondary school. They are not accepted based on the result of entrance exam, so their level of academic achievement is low. In the study, convenient sampling was used as the researcher is also an English teacher at the same school. 10th graders are taught A2 level of English according to MONE curriculum. On the other hand, the English level of students varies, the classes are not homogeneous. Therefore, a placement test was applied to see the levels of the students who were volunteer to join in the research and the students who are A2 level of proficiency were determined.

The volunteer participants were chosen from three different classroom as the high school has three 10th graders. The number of females who were volunteer were more than males and as a result of placement test, only 8 boys left to join in the research. It was aimed to distribute the participants equally according to their gender and level of proficiency. Therefore, 12 students for the experimental group and 12 students for the control group were selected according to their genders and proficiency levels to create equality. In this way each group included 4 males and 8 females.

The placement test scores of participants were analyzed by Mann-Whitney U-test. The Mann-Whitney U test is a non-parametric statistical method that allows researchers to investigate the distinctions between groups. One significant benefit of this test is its applicability to small sample sizes, typically ranging from five to twenty participants (Nachar, 2008). The descriptive analysis of experimental and control group's placement test scores are presented below:

Table 1 Descriptive analysis of experimental and control group's placement test scores

Value	**Group**	**M**	**SD**	**Mdn**	**Min**	**Max**
Placement Score	Experimental	43.830	11.424	43	30	70
	Control	39.170	6.847	38	30	52
	Total	41.500	9.514	39	30	70

According to the results, the experimental group scored 6.66 points higher than the control group on average. The minimum score for both groups was 30. The maximum score in the experiment group was 70 while the same value was 52 in the control group. The scores are compared below by means of a Mann-Whitney U test.

Table 2 Mann-Whitney U test results for comparison of placement test scores

Group	**N**	**MR**	**SR**	**U**	**Z**	**P**	**R**
Experiment	12	13.92	167	55.000	-0.985	0.325	0.201
Control	12	11.08	133				

The results of the test showed that the placement score difference between the experimental and control groups was not statistically significant ($Z = -0.98$, $p > .05$, $r = 0.20$).

Additionally, before starting the collaborative writing task, the experimental group divided into 3 groups to work collaboratively on the writing task.

3.4 Data Collection Tools and Procedure

3.4.1 Data Collection Tools

The research involved using both quantitative and qualitative data collection methods. Quantitative data were collected through pre and post-tests, while qualitative data were collected through semi-structured interviews, video, and audio recordings.

In the beginning, the experimental group had a mini lesson and the dialogues with the teacher and peers in their groups were recorded by using 3 audio recorders and 1 video recorder in the classroom. An audio recorder was set up for each group and a video recorder was set up in the corner of classroom. Moreover, the noticing and stimulated recall sessions were video recorded.

Secondly, the participants in both experimental and control groups were given a pre-test **(See Appendix 1).** The experimental group discussed about the pictures on the pre-test with their group before they started writing. The same test was later administered to all participants in both groups as a post-test. It was aimed to assess the accuracy of grammar on the writing task, so the mistakes of the participants were grouped as grammar, spelling, and sentence structure. To ensure accuracy and consistency, the mistakes made by the participants were evaluated by two different raters; a researcher and a colleague from the same school. In order to determine if the data from the different raters agreed, interrater reliability was computed as Cronbach's Alpha in all measurements (Larsen-Hall, 2016). The results are presented below:

Table 3 Interrater Reliability Results for Error Counts

Measurement	**Alpha**
Grammatical $\text{Errors}_{\text{Pretest}}$	.988
Spelling $\text{Errors}_{\text{Pretest}}$	.992
Sentence Structure $\text{Errors}_{\text{Pretest}}$	.993
Total Number of $\text{Errors}_{\text{Pretest}}$	.995
Grammatical $\text{Errors}_{\text{Posttest}}$	1.000
Spelling $\text{Errors}_{\text{Posttest}}$	1.000
Sentence Structure $\text{Errors}_{\text{Posttest}}$	1.000
Total Number of $\text{Errors}_{\text{Posttest}}$	1.000

As seen in the table, all measurements produced excellent reliability with reliability coefficients above .99.

Finally, the participants in the experimental group were interviewed using semi-structured questions **(See Appendix 2)** to gather more detailed data about their opinions on the entire process.

3.4.2. The Procedures

The study was held in a classroom in which a camera and voice recorders was set up. The volunteer students who were from 3 different classrooms came the classroom to have instruction and complete the tasks.

The data collection process was replicated from Swain and Lapkin's study, *The Distributed Nature of Second Language Learning: From Neil's Perspective*. The aim of this study was to show how Neil's second language learning is distributed across the tools

and people around him in the writing activity. For this sample study, 7 students from the 12th-grade immersion French class were selected. In the study, the data on writing activity was collected from a student called Neil. The data were collected in two weeks by following five stages. The first week was scheduled as on Monday, the first stage started with a mini video lesson and writing as a pretest for 30 minutes, on Wednesday, the second stage is noticing for 10 minutes, and on Friday third stage is stimulated recall session for 40 minutes; the second week started on Tuesday with the fourth stage which includes post-test for 15 minutes and on Wednesday stage five was scheduled as an interview for 15-20 minutes.

In this study, the data were collected in 2 weeks and consists of 5 steps as shown in the table 1. In the first step, students were instructed with a mini video lesson about simple past tense structure in English. This video started with a conversation among people who talk about their last weekend. Simple past tense structures were highlighted to make them salient for the students. After that, students were asked for their understandings of highlighted structure. They tried to explain reasons to use the highlighted structure. Then, they were given explicit instruction of simple past tense. They were also demonstrated a sample writing activity and some mistakes about usage of simple past tense were done intentionally to encourage the students to find the mistakes. After watching the video, students were given pictures depicting a story and vocabulary cards. They were expected to talk about the pictures with peers in their group. Then everyone wrote their own story individually. Their writing is collected as a pre-test. The control group, on the other hand, did the same writing exercise after the grammar lesson taught with the traditional method and their writing is used as a pre-test. In this stage, the stories written by the students are reformulated by the teacher.

Table 4 Data Collection Timetable

Week 1			**Week 2**	
Monday	**Wednesday**	**Friday**	**Tuesday**	**Wednesday**
Stage 1	Stage 2	Stage 3	Stage 4	Stage 5
Collaborative Writing (pre-test)	Noticing	Stimulated Recall	Post-tests	Interview
80 min	10 min	60 min	20 min	60 min

In the second stage, the students compared their own writing with the reformulated text, and they tried to notice their mistakes and highlighted the differences. They also used the thinking-aloud technique to talk about the mistakes they notice, and it was recorded on video. The mistakes in the writing texts of the control group students were corrected and given back to the students. No time is given to notice their mistakes.

In the third stage, the students watched the videos of the noticing stage and talked about the changes they noticed and the reasons for their mistakes. In this process, the teacher encouraged students to understand the source of their mistakes by asking questions. The control group did not take this treatment.

The second week started with the fourth stage which included the post-test. The students who discovered their mistakes were asked to rewrite the same story. Both the experimental and control group rewrote the same story.

Finally, with the interview method, which is the fifth stage, semi-structured questions were asked to the participants to learn their perspectives on the distributed

process they are engaged in.

3.5. Data Analysis

3.5.1. Qualitative Data Analysis

To analyze interactions in the classroom setting, audio and video recordings were analyzed in detail through conversation analysis. Conversation analysis aims to '*characterize the organization of interaction by abstracting from exemplars of specimens of interaction and to uncover the emic logic underlying the organization'* (Seedhouse, 2004: 13). Firstly, the recordings were transcribed by the researcher. LREs (language-related episodes) were used as a unit of analysis to operationalize the construct of collaborative dialogue. According to Swain and Lapkin (1998), LREs refer to any part of a conversation where students discuss the language they are using, question their language skills, or correct themselves or others. LREs were encoded into three types following Yang's (2016) typology:

(1) Episodes focused on morphology or syntax, known as Grammar-based (G-WL), highlight the use of articles, tenses, and voices. For example:
A: Blood type O group face fewer risks or faces? I'm not sure.
B: Group is plural. The face is correct.

(2) Episodes that focus on word choice, meaning, or equivalence are called Lexis-based (L-WL). For example:
A: People with Blood type O, or Blood O type?
B: Blood O type sounds better. But I am not sure!

(3) Discourse-based (D-WL) episodes concentrate on discourse markers like collocations, references, and conjunctions. For example:
A: We used but for اما (= amma). However is correct, too! What do you think?
B: Ah, I think we should change it to however (Cited in Kazeml &Pourdana&Khalılı& Nour, 2022).

Using conversation analysis provided a detailed account of social interactions in the classroom, complementing the theoretical framework of Distributed Cognition.

Rogers (1997) suggests that several methods can be used to analyze distributed cognition, including detailed analysis of video recordings of real-life events, neural network simulations, and laboratory experiments. The methodology used depends on the unit of analysis and the level of cognitive system being explained. To understand cognitive systems at the work setting level, it is essential to be familiar with work practices and conduct comprehensive fieldwork, including observing work, taking field notes, recording events, and transcribing and encoding them. An important part of this kind of ethnographic analysis is describing the data collected at different levels of abstraction and detail and analyzing changes in the representational state of the cognitive system.

A semi-structured interview was used as another method to collect qualitative data, where participants were asked a set of predetermined questions. The responses were analyzed through content analysis. Initially, significant themes were identified through open coding. These selected themes were further expanded and organized using focused coding (**see Table 6**). Moreover, some of the students' answers presented as direct quotes to provide additional depth and detail to the collaborative dialogues.

3.5.2. Quantitative Data Analysis

For the research question three, an ANCOVA model was needed to compare the posttest scores of the experiment and control groups while controlling for their pretest scores. However, since all models related to the third research question violated the assumptions of ANCOVA, all analyses were performed using non-parametric Quade's tests. Among these dependent variables, the total number of errors, spelling errors and grammar errors were seen to violate both variance homogeneity and homoscedasticity assumptions of ANCOVA ($p < .05$) and sentence structure errors violated only the variance homogeneity assumption of the analysis ($p < .01$).

Since placement test results also produced a skewness of 1.248 (SE = 0.472) and a kurtosis of 2.015 (SE = 0.918), indicating deviation normality, a Mann Whitney U test was run for their comparison.

CHAPTER IV

RESULTS AND DISCUSSION

4.1. Introduction

This chapter aims to share the results of the data gathering process, which involved collecting video and audio recordings, conducting semi-structured interviews, and administering pre- and post-test scores. The data were collected from students who voluntarily participated in the study. Both quantitative and qualitative data were collected, and the results are compared to relevant literature. The first part of the chapter examines the findings related to the three research questions, followed by an interpretation of the analysis. Finally, the chapter concludes by discussing how the findings of this study are relevant to the current literature.

4.2. Findings Related to Research Questions

4.2.1. Qualitative Analysis

4.2.1.1. Findings Related to First Research Question

In this section examples of the participants' language use interacting with their groups, along with the protocols of the noticing and stimulated recall sessions are presented to answer the first research question (*RQ 1: What is the role of integrating distributed cognition perspective to EFL classroom on the writing performance of*

participants?). The instances demonstrate their interactions with many of the mediating tools available to them. While engaging in the multitask activity, participants were surrounded by multiple resources, such as mini-lesson on the English simple past tense, the researcher, the peers, the pictures they were given, the story they wrote, the reformulation of their story, the video of the noticing session, and their own selves. As they faced and resolved the language difficulties that arose during the multitask activity, they made use of these cognitive resources.

Mini-Lesson

The research started with a mini lesson based on the focus on form approach. It began with the video of story which includes subtitles with highlighted simple past tense structures. After students watched the story, the teacher interrogated their noticing of the new structure (turn 1).

1. *Teacher: Did you realize the red bold verbs? Did you see them?*
2. *Students: Yes*
3. *Teacher: Ok. Let's talk about these verbs.*

In the video, the sentences with simple past tense structure from the story were demonstrated. Explicit instruction of past tense structure was given and the situations in which past tense was used were explained. Then, the students were encouraged to talk about the pictures that the teacher showed on the smart board (turn 4). They were expected to use the language in a meaningful context.

4. *T: Look at the pictures now. Let's try to tell a story about these pictures. What do you see in these pictures. By using these words, can you make sentences? Who wants to make a sentence?*
5. *E: <u>She's asleep</u>.*
6. *T: <u>Louisa was asleep</u> and what happened here? (in the picture)*
7. *N: alarm*

8. *T: Yes, the alarm rang but Louisa was asleep. What about the second Picture?*

The teacher began by presenting pictures and asking the students to observe and create sentences based on what they see (turn 4). One student, E, responds with the sentence “She's asleep” (turn 5), which teacher used recast type of corrective feedback to make students discover the correct form (turn 6).

Another student, N, then responds with the word "alarm" (turn 7), which the teacher affirms and adds additional information by stating that the alarm rang while Louisa was asleep. The teacher then prompted the students to create sentences about the second picture.

After the students talked about the pictures, the teacher showed them a sample paragraph which included mistakes. The teacher wanted them to find the mistakes (turn 37). In this way, she tried to make them discover the correct usage of new structure they have just learnt.

37. T: OK here I've written a story. Look at my paragraph. I think I did some mistakes. Let's find the mistakes. Can you see the mistakes. Which words are wrong in my paragraph?
Silence. Students whisper.
38. T: Ok. So, look at here. Louisa were... Is were correct here?
39. Students: was
40. T: her alarm ringed
41. Students: rang not ringed
42. T: yes, because it is ….
43. Students: irregular verb.
44. T: With irregular verbs we use ….
45. Students: second form

The teacher began by presenting the paragraph and asking the students to find the mistakes (turn 37). When the students did not respond, there was a moment of silence followed by whispering among the students. The teacher then took a turn and asked specifically about the use of the word "were" in the sentence "Louisa were..." (turn 38). The students corrected the mistake and suggested that the correct form should be “was” (turn 39).

The teacher then moved on to another mistake, the use of "ringed" instead of "rang" in the sentence "her alarm ringed" (turn 40). The students corrected the mistake and identified that "rang" is the correct form of the irregular verb "ring"(turn 41).

Finally, the teacher encouraged the students to identify the rule for using irregular verbs. The students responded by saying that the second form of the verb is used with irregular verbs.

47. Teacher: She didn’t heard it. Is it true?

48. Students: No

49. Teacher: What is the mistake here?

50. N: hocam Türkçe söyleyebilir miyim? Çünkü did olduğu zaman fiillerin 2. Hali kullanılmaz.

51. Teacher: if my sentence is negative i don’t say the second form of the verb after didn’t. So, i should say, she didn’t ….

52. Students: hear

In this conversation (turn 47-52), the unit of analysis is the teacher's attempt to correct a mistake in their use of English grammar. The conversation involves a series of turns where the teacher makes a statement with a mistake, and the students are prompted to identify the mistake and provide a correction.

The teacher began by making a statement, "She didn't heard it" and asked if it is true (turn 47). The students responded with "No" (turn 48), indicating that the statement was incorrect. The teacher then prompted the students to identify the mistake (turn 49), and one student asked if they could say it in Turkish (turn 50). The teacher responded by explaining that when a sentence is negative, the second form of the verb should not be used after "didn't" (turn 51).

The teacher then modeled the correct form by saying "She didn't ..." and prompted the students to provide the correct verb form. The students responded with "hear" (turn 52), indicating that the correct form should be "She didn't hear it".

Collaborative Writing Task

The participants were given a collaborative writing task after they had focus on form instruction about the usage of simple past tense. Firstly, they talked about the pictures given by the teacher. Then, they started to write a story in accordance with pictures.

1. *M: Lucy and Suzy bought a t-shirt.*
2. *K: Tişört almamışlar ball almışlar.*
3. *N: Luzy and Suzy …*
4. *İ: Lucy and Suzy bought ball and sunglasses.*
5. *İ: Sonra*
6. *M: After that*
7. *İ: after then*
8. *M: After that*
9. *İ: After that*

This conversation (1-9) was coded as discourse-based episode. It started with a statement made by (M) that Lucy and Suzy bought a t-shirt. (K) responded by stating that they did not buy a t-shirt but instead bought a ball. (N) began to speak but did not complete their sentence. (İ) intervened and corrected the previous statement by saying that Lucy and Suzy bought a ball and sunglasses. (İ) then added "Sonra" which means "then" in English. (M) responded by using the phrase "After that" and (İ) repeated the phrase "After that" to emphasize the sequence of events. The conversation seemed to be focused on recounting a sequence of events and clarifying details about what was bought. It can be seen how Speaker (İ) changed the linker (after that) with the help of her peer in turn 9.

10. *M: salesperson neydi*
11. *N: satıcı*
12. *M: Salesperson*
13. *M: Salesperson içeriye gitti ve aldı.*
14. *İ: Suzy talked salesperson. Konuştu.*
15. *M: veya satıcıya gözlük var mı diye sordular.*
16. *N: evet o daha iyi*
17. *N: Suzy salesperson ıımm*
18. *N: sormak neydi*
19. *İ: ask*
20. N: evet asked

In turn 10-20, lexis-based episode is demonstrated. The conversation started with (M) asking about the salesperson, to which (N) responded with the word "satıcı" (salesperson). Then, (M) repeated the word "salesperson" in English, which might indicate a language switch.

In turn 13, (M) continued his narrative by saying that the salesperson went inside and brought something. (İ) added some information by saying that Suzy talked to the salesperson. (M) then provided further information about the conversation between Suzy and the salesperson, saying that they asked if the salesperson had glasses. In turn 16, (N) responded positively to the question. In line 17, (N) continued by saying "Suzy salesperson," which states miscommunication or an attempt to clarify who talked to the salesperson.

(N) then asked for clarification by saying "sormak neydi" (what was the asking), and (İ) responded by giving the translation of "ask." Finally, N confirmed that Suzy asked the question by saying "evet asked" (yes, asked).

37. *N: play beach*
38. *İ: played olacak çünkü geçmiş zaman. Played beach o zaman*
39. *M: They went to beach played ball*
40. *M: And bağlacı da gelecek araya*

The conversation above, which is coded as grammar-based episode, began with (N) saying "play beach", which could be interpreted as a request for correction or confirmation. (İ) responded by correcting the verb tense, stating that "played" should be used instead of "play" because it's in the past tense. (M) then confirmed (İ)'s correction and used the corrected phrase "played beach" to form a complete sentence.

(M) then added more information to the sentence by stating that "They went to the beach played ball". The addition of the subject "they" and the verb "went" clarifies the context of the sentence and provided a more complete picture of what happened. (M) then further elaborates on the activity by specifying that they played ball on the beach.

Finally, (M) acknowledged the use of the conjunction "and" as a way of linking the two ideas in the sentence. This demonstrates an awareness of the importance of conjunctions in forming coherent sentences and shows a conscious effort to apply this knowledge in their writing.

45. İ: the weather is sunny mi dicez, is mi kullancaz weather ile sunny arasına

46. M: geçmiş zaman yapıyoruz is olmaz.

47. M: hava güneşliydi ama birden değişti ve rüzgar çıktı dememiz lazım ama birden ne demekti he surprised olabilir bak onun yerine

48. İ: the weather is… is yok ya. The weather sunny

49. M: hayır hayır. Bu güneşli oluyor hava güneşliydi değil

50. İ: the weather sunnied mi olacak

51. İ: hocaya soralım. Hocam biz hava güneşliydi dicez ama the weather sunny mi olacak

52. T: the weather sunny burda ne eksik

53. M: geçmiş zaman

54. T: hangi fiil eksik araya ne koymamız gerek. Eğer bir fiil yoksa cümlede bir fiil yardımcı oluyordu neydi o

55. M: were was

56. T: o zaman nasıl olacak

58. N: The weather was sunny

In this excerpt above, the students were discussing how to correctly express the weather condition in the past tense in their collaborative writing task. They were trying to determine the appropriate verb tense to use in their sentence. (İ) suggested using "the weather is sunny," but M corrected them by saying they need to use the past tense. (M) also suggested adding more detail to the sentence, such as saying the weather was sunny, but suddenly changed and became windy. (İ) suggested using "the weather sunnied," but

the group decided to ask the teacher for clarification. The teacher (T) prompted the students to identify the missing verb in their sentence and reminded them of the auxiliary verbs "were" and "was" to express past tense. Finally, (N) suggested the correct sentence structure, "The weather was sunny." This excerpt illustrates how the students collaboratively work to identify and correct their grammatical errors with the help of their peers and teacher.

Noticing and Stimulated Recall Stages

In the noticing stage, students talked about the differences they notice between their text and the reformulated text. Then, in the stimulated recall session, the researcher questioned the students' mistakes to help them reflect on their language use. Some examples were given in the table below.

Table 5 Examples from Noticing and Stimulated recall stages

Noticing	**Stimulated Recall**
Z: ... Fly.. flew away 2. Halini kullanacaktım.	*Z: ...the ball fly away demişim ama geçmiş zamanda yazdığım için flew away demem lazım.*
İ: ..they go beach yazmışım they went to beach olmalıydı.	*İ: go yu geniş zamanda kullanmışım ama went olmalıydı çünkü geçmiş zamanda cümle kurduk.*
E: They haven't demişim ama didn't have olmalıymış	*T: they haven't ball and sunglasses, düzenlenmiş haliyle arasındaki fark ne?* *E: : they didn't have sunglasses and ball demişsiniz.* *T: neden didn't dedim* *E: geçmiş zamanda olumsuz cümle yaptığım için.*

In the noticing session, student (Z) noticed that reformulator had changed the verb fly to flew. She said that "… fly.. flew away.. I should have written second form of the verb". It is clear that (Z) used the reformulation to mediate a cognitive act of comparison. In the stimulated recall session, (Z) was reflecting on what he had noticed earlier. She stated that "*I said the ball 'fly away', but since I wrote it in the past tense, I have to say 'flew away'.*"

In the noticing session of the second example, (İ) noticed a mistake in their writing and corrected it. They had originally written "they go beach" but realized it should be "they went to beach". This shows the process of error correction and self-monitoring in language production.

In the stimulated recall session, (İ) reflected on their language use and specifically on the use of the verb "go" in the present tense when they should have used "went" in the past tense. This indicates a reflection on language form and use, and the awareness of how to correctly use tenses in different contexts.

The third example is closely related to previous examples. Student E also made a grammar mistake on the use of simple past tense. In the noticing session, he expressed the difference between what he wrote and reformulation version, "I wrote they go beach, but it should have been they went to beach". In the stimulated recall session, the teacher (T) and the student (E) were discussing the difference between two sentences. The original sentence is "they haven't ball and sunglasses", while the reformulated sentence is "they didn't have sunglasses and ball". The teacher asked what the difference was between the two, and the student explained that they used the past tense and negation in their sentence. The teacher then asked why they used "didn't" instead of "haven't", and the student explains that they used the past tense because they were making a negative sentence in the past tense.

The experimental group was participated in the tasks and stages and interacted with their peers. The video and audio recording were examined in detail and the data were

presented. On the other hand, the control group did not take any treatment except of reformulation. The researcher took field notes while observing the control group in the writing process. It was observed that students needed scaffolding. They wanted to ask questions to their peers and teacher such as: *"Satın almak ne?; Sahil kelimesi nasıl yazılıyor?; Hava ne demekti?"*. (*What is the word buy?; How is the word beach written?; What is the weather mean?).*

4.2.1.2. Findings Related to Second Research Question

The semi-structured interview was analyzed using the content analysis method to answer second research question (*RQ:2. What are the participants' perspectives towards the interaction with tools and people in their writing process?)*

The first step was to select key themes from the initial themes identified through open coding. These key themes were then developed and arranged through focused coding. Finally, the final themes were determined. The themes and codes demonstrated on the table 3.

Table 6 Content Analysis of Semi-Structured Interview

Themes	**Codes**
Collaborative Writing	benefits of group work self-confidence peer feedback positive contribution collaborative learning
Video-taped mini lesson	instructive effective tool preparing before starting
Noticing	thinking aloud reformulation discover
Stimulated Recall	self-awareness understanding the causes of misakes realization

Theme 1: Collaborative Writing

All students emphasized the benefits of working in a group. They mentioned that they were able to avoid mistakes, improve their sentence structure, and correct each other's sentences. They appreciated the opportunity to discuss ideas with their group members and get feedback from them.

"Group work was very helpful because, for example, if I were alone, I would have a high probability of making mistakes, how to construct sentences and so on. But for example, we talked about these topics and words by discussing with friends in my group, which was very helpful."

The students highlighted that working in a group helped them avoid mistakes. They mentioned that if they were working alone, they would have made more mistakes in their writing. They appreciated that their group members were able to point out their mistakes and help them correct them.

"We corrected each other's sentences. If we overlooked what kind of words needed to be used or what kind of action was, we would talk to each other and correct it. We were making sentences and helping each other by showing or telling each other what we did wrong or missed in those sentences."

Moreover, the students mentioned that they learned from each other during the group work. They compared their knowledge and shared ideas. They appreciated the opportunity to learn from their peers and improve their writing skills.

"What helped me a lot was group work. I think that everyone's different opinions and the ideas my friends give me are a good contribution to me".

"I would have made more mistakes if I had written by myself".

The students emphasized that the different perspectives and ideas of their group members contributed positively to their writing. They appreciated the feedback and suggestions provided by their group members.

"We compared what my friends knew with what I knew. It was easier to write like this. I would have made more mistakes if it was individual".

Theme 2: Videotaped mini-lesson

The feedback provided by the students suggests that they found the videotaped mini lesson to be effective in helping them to understand the subject matter and to improve their writing skills.

All students mentioned that watching the video was an effective tool to learn new concepts and to understand the subject matter. They appreciated the pause and reflection time provided during the video, which helped them to process the information presented.

"If there wasn't the first video we watched, I might have mixed up a few sentences already. The video and the information you gave about the sentences were very helpful for us".

One of the students mentioned that watching the video before starting helped them to get an idea about the subject and to know what to do. They appreciated the opportunity to try to answer the questions presented in the video, which helped them to check their understanding of the concepts presented.

"It was good to watch a video before starting. I got an idea on the subject. When I watched it, I had an idea about what to do. When you paused the video, I tried to answer it myself. I make sure I'm telling the truth. I learned a little before I started. I'm checking whether the answer I gave inside is correct or not".

Another student specifically mentioned that the video was effective in helping them to learn how to use words and tenses correctly in their writing.

"The most effective tool was video watching. Because we learned how to use words and tenses there".

The analysis suggests that using a videotaped mini lesson provided benefits for the students to understand the subject matter and improve their writing skills. The pause and reflection time provided during the video, along with the opportunity to try to answer questions presented, can help students to process the information presented and check their understanding of the concepts.

Theme 3: Noticing

The data provided in this section pertains to the process of noticing, which is a critical aspect of language learning that involves becoming aware of one's errors or inconsistencies in using language. The students in this section are discussing how they became aware of their mistakes and the strategies they used to correct them.

Students reported that they saw and discovered their mistakes in the reformulated text, demostrating that they were able to compare their original writing with the corrected version.

"*I saw and discovered the mistakes I made in the reformulated text".*

One of the students mentioned that she noticed her mistake of using -ed instead of the 2nd form of verbs in the reformulated text provided by the teacher. This suggests that comparing one's original work with the corrected version is a helpful strategy for noticing errors.

"I put -ed at the end of some verbs, but I needed to use the 2nd form. I noticed this in the reformulated text you wrote".

Moreover, they stated that they perceived their mistakes better by thinking aloud, specifes that verbalizing their thoughts and language use helped them become more aware of their errors.

"I perceived my mistakes better in thinking aloud".

Students mentioned that they asked themselves what mistakes they made and corrected their sentences aloud, demonstrating the use of self-talk and self-correction as a strategy for noticing errors.

"I asked myself what mistakes I made. For example, after I said how I did it, I said how I thought at that moment. Then I corrected my sentences aloud and, for example, I learned the auxiliary verbs that I put wrong and the places of the auxiliary verbs that I did not put. Me and my inner self as a group as two people and I reviewed the mistakes I made".

In conclusion, the students in this section demonstrate different strategies for noticing errors in language use, including comparing original work with corrected versions, thinking aloud, and self-talk.

Theme 4: Stimulated Recall

The answers of students suggest that they benefited from stimulated recall for reflecting on and improving performance, particularly when used in conjunction with prompts or cues to guide the recall process.

Students appeared to have reflected on their mistakes and gained confidence in avoiding them in the future. This suggests that stimulated recall helped them identify their errors and develop a plan to improve their performance.

"I realized my mistakes that I had not noticed before. I was confident enough not to make my mistakes again, I learned".

They also benefited from stimulated recall by gaining a better understanding of grammatical rules related to verbs.

"It was good to realize that the mistakes I made were right or wrong. I learned the second form of verbs and that I shouldn't add another verb after the verb be".

Additionally, they used stimulated recall to analyze the causes of errors, which can be an important step in improving performance. By identifying the root causes of errors, individuals can develop strategies to avoid making the same mistakes in the future.

" *I understood the causes of errors with the questions asked in Stimulated Recall".*

4.2.2. Quantitative Analysis

4.2.2.1. Findings Related to Third Research Question

To address research question three (*RQ:3 How does integrating focus on form instruction into collaborative writing tasks affect students' accuracy in their writing performance)*, an ANCOVA model was initially employed to compare the posttest scores of both the experiment and control groups, while also accounting for their pretest scores. However, the ANCOVA assumptions were violated by all models related to the third research question. Consequently, non-parametric Quade's tests were used for all analyses instead. Specifically, among the dependent variables, the total number of errors, spelling errors, and grammar errors violated both the assumptions of variance homogeneity and homoscedasticity for ANCOVA ($p < .05$), while sentence structure errors only violated the assumption of variance homogeneity ($p < .01$).

As for the placement test results, they exhibited a skewness of 1.248 (SE = 0.472) and a kurtosis of 2.015 (SE = 0.918), indicating a departure from normality. Consequently, a Mann-Whitney U test was conducted to compare these results.

The descriptive findings related to the errors are shown below.

Table 7 Descriptive Results for the Error Counts

Variable	Group	*M*	*SD*	*Mdn*	*Min*	*Max*
Number of $Words_{Pretest}$	Experiment	59.330	17.437	52	43	104
	Control	45.580	13.118	45	31	77
	Total	52.460	16.645	50.50	31	104
Grammatical $Errors_{Pretest}$	Experiment	3.830	1.899	4	1	8
	Control	4.670	2.425	4	1	9
	Total	4.250	2.172	4	1	9
Spelling $Errors_{Pretest}$	Experiment	0.420	0.669	0	0	2
	Control	1.670	1.231	2	0	4
	Total	1.040	1.160	1	0	4

Sentence Structure Errors$_{Pretest}$	Experiment	4.420	2.392	4.50	1	10
	Control	6.420	3.605	6	0	13
	Total	5.420	3.161	5	0	13
Total Number of Errors$_{Pretest}$	Experiment	8.670	3.846	8	5	19
	Control	12.750	4.434	12	8	22
	Total	10.710	4.563	9	5	22
Number of Words$_{Posttest}$	Experiment	55.920	12.169	52.50	40	80
	Control	45.330	11.804	46	22	71
	Total	50.630	12.910	48.50	22	80
Grammatical Errors$_{Posttest}$	Experiment	1.830	1.528	1.50	0	5
	Control	4.500	3.261	5.50	0	11
	Total	3.170	2.839	2	0	11
Spelling Errors$_{Posttest}$	Experiment	0.500	0.905	0	0	3
	Control	2.750	2.667	2	0	9
	Total	1.620	2.261	1	0	9
Sentence Structure Errors$_{Posttest}$	Experiment	0.330	0.651	0	0	2
	Control	5.080	3.554	6	0	10
	Total	2.710	3.483	1	0	10
Total Number of Errors$_{Posttest}$	Experiment	2.670	1.614	2.50	0	5
	Control	12.330	5.805	10.50	5	23
	Total	7.500	6.461	5	0	23

In the pretest, the experiment group had a higher mean number of words (*M* = 59.33, *SD* = 17.437) compared to the control group (*M* = 45.58, *SD* = 13.118). Additionally, the experiment group had a lower mean number of grammar mistakes (*M* = 3.83, *SD* = 1.899) than the control group (*M* = 4.67, *SD* = 2.425). However, regarding spelling mistakes, the control group had a higher mean (*M* = 1.67, *SD* = 1.231) than the experiment group (*M* = 0.42, *SD* = 0.669). Furthermore, the control group demonstrated higher mean scores in sentence structure mistakes (*M* = 6.42, *SD* = 3.605) compared to the experiment group (*M* = 4.42, *SD* = 2.392). The the total number of errors was lower in the experiment group (*M* = 8.67, *SD* = 3.846) compared to the control group (*M* = 12.75, *SD* = 4.434). Overall, the pretest results indicate initial differences between the experiment and control groups in terms of the number of words, grammatical errors, spelling errors, and sentence structure errors.

In the posttest, the experiment group still had a higher mean (*M* = 55.92, *SD* = 12.169) compared to the control group (*M* = 45.33, *SD* = 11.804) in terms of the mean number of words. In terms of grammar errors, the experiment group had a lower mean (*M* = 1.83, *SD* = 1.528) compared to the control group (*M* = 4.5, *SD* = 3.261). Similarly, the experiment group had fewer spelling mistakes (*M* = 0.50, *SD* = 0.905) on average compared to the control group (*M* = 2.75, *SD* = 2.667). In contrast, the control group exhibited higher mean scores in sentence structure mistakes (*M* = 5.08, *SD* = 3.554) than the experiment group (*M* = 0.33, *SD* = 0.651). The experiment group continued to demonstrate a lower mean number of total errors (*M* = 2.67, *SD* = 1.614) compared to the control group (*M* = 12.33, *SD* = 5.805).

To compare the aforementioned differences, multiple Quade's tests were run on the data. The comparison of the total number of errors are tabulated below.

Table 8 Group Comparison for Total Number of Errors

Source	***SS***	***Df***	***MS***	***F***	***P***	η_p^2
Corrected Model	269.353	1	269.353	16.935	**< .001**	0.435
Intercept	0	1	0.000	0.000	1.000	0.000
Group	269.353	1	269.353	16.935	**< .001**	0.435
Error	349.906	22	15.905			
Total	619.259	24				
Corrected Total	619.259	23				
R-Squared = .435 (Adjusted R-Squared = .409)						

According to the descriptive results of the posttest, the mean total error count of the control group was 9.66 higher than that of the experiment group. Quade's test showed that the difference was statistically significant with a very large effect, explaining 40.90% of the variance after controlling for the pretest results ($F(1, 22) = 16.94$, $p < .001$, $\eta_p^2 = 0.44$).

The comparison of the grammar errors in the posttest are shown below.

Table 9 Group Comparison for Grammar Errors

Source	***SS***	***Df***	***MS***	***F***	***P***	η_p^2
Corrected Model	189.826	1	189.826	4.555	**.044**	0.172
Intercept	0.000	1	0.000	0.000	1.000	0.000
Group	189.826	1	189.826	4.555	**.044**	0.172
Error	916.752	22	41.671			
Total	1106.578	24				
Corrected Total	1106.578	23				
R Squared = .172 (Adjusted R Squared = .134)						

The descriptive results showed that the mean grammar error count of the control group was 2.67 higher than that of the experiment group. The difference was found to be statistically significant with a large effect, explaining 13.40% of the variance after controlling for the pretest results ($F_{(1, 22)} = 4.56$, $p < .05$, $\eta_p^2 = 0.17$). Group comparisons for the spelling errors are given below.

Table 10 Group Comparison for Spelling Errors

Source	***SS***	***Df***	***MS***	***F***	***p***	η_p^2
Corrected Model	114.081	1	114.081	3.226	.086	0.128
Intercept	0.000	1	0.000	0.000	1.000	0.000
Group	114.081	1	114.081	3.226	.086	0.128
Error	778.085	22	35.367			
Total	892.166	24				
Corrected Total	892.166	23				
R Squared = .128 (Adjusted R Squared = .088)						

According to the descriptive results, there was a difference of 2.250 in the mean spelling error counts of the groups. However, Quade's test showed that the difference was not statistically significant ($F_{(1, 22)} = 3.23$, $p > .05$, $\eta_p^2 = 0.13$).Group comparisons for sentence structure errors are tabulated below.

Table 11 Group Comparison for Sentence Structure Errors

Source	***SS***	***df***	***MS***	***F***	***P***	η_p^2
Corrected Model	298.421	1	298.421	12.478	.002	0.362
Intercept	0.000	1	0.000	0.000	1.000	0.000
Group	298.421	1	298.421	12.478	.002	0.362
Error	526.163	22	23.917			
Total	824.584	24				
Corrected Total	824.584	23				
R Squared = .362 (Adjusted R Squared = .333)						

The descriptive results showed that there was a difference of 4.75 in the mean sentence structure errors counts of the groups. According to the results of the Quade's test, the difference was statistically significant with a very large effect, explaining 33.30% of the variance after controlling for the pretest scores ($F_{(1, 22)} = 12.478$, $p < .01$, $\eta_p^2 = 0.36$)

4.3. Discussion

The present study investigated how students' writing performance was distributed across people and artifacts in the EFL classroom, students' perceptions about collaborative writing task and the tools they used and the stages they participated in the distributed process and the effects of integrating focus on form instruction to collaborative writing tasks in this process. The discussion of the findings was presented by focusing on the research questions.

The first research question of this study was related to observe how distributed cognition perspective provides insight into the appearance of development in writing performance in the EFL classroom. Our investigation involved considering the potential of utilizing Distributed Cognition theory to conduct an empirical research study on the process of student learning in an EFL writing classroom. By broadening the scope of the analysis to include not only individuals but also the artifacts, social dynamics, and learning environment, it was able to identify significant factors that contribute to students' writing performance. This paper specifically concentrated on how students used artifacts and how instructional practices, such as focus on form instruction, collaborative writing tasks, noticing, and stimulated recall sessions, affected their writing performance.

The data showed that the students' writing performance was influenced by their physical and social surroundings. In other words, the results demonstrated that the mental processes involved in writing process are "situated and distributed" (Salomon 1993: XIV): they are located in the specific activity being performed and spread out across the cognitive resources available in that environment. Distribution of learning across the artifacts and people in the social environment and supporting importance of interaction are consistent with relevant literature carried out in second language classroom and education field. (Swain & Lapkin, 2007; Montogomery 2021; Xu and Clarke, 2012; Gomez &Schieble & Curwood & Hasset, 2010; Narciss & Koerndle, 2008).

Additionally, the findings of qualitative data demonstrated that mediation tools and activities as well as interaction and peer and teacher feedback contributed to writing performance of the students. The LREs of each stage presented in the findings showed the development in students' comprehension.

Firstly, the mini lesson was an example of planned focus on form instruction. The teacher drew the students' attention to simple past tense structure by highlighting the structure in the story and encouraged them to notice the new structure and talk about it.

During the tasks given by the teacher, the students were scaffolded by their teacher and were given recast type of feedback as they were supposed to discover the structure. Lyster's (1998) study focuses on the use of recasts in the classroom and argues that such feedback is most effective when it is collaborative and involves negotiation between learners and teachers.

Moreover, the students needed teacher initiation to talk about the mistakes in the given writing task. They kept silent when the teacher wanted them to find mistakes in the paragraph. Ellis (2012) states that the teacher uses techniques such as demonstrating, asking for repetition, posing leading questions, and prompting solutions to support learning. These methods were identified by Vygotsky (1978), who is considered the founder of SCT. In the example, the teacher posed leading questions and initiated the sentences to encourage the students. The LREs taken from the end of lesson shows the effectiveness of the story and explicit instruction that they watched as they said correct form of the verbs and metalinguistic explanation.

The students sometimes wanted to use L1 to talk about the language itself. L1 may be seen as another cognitive tool to solve language problems. Appropriate use of L1 can help learners to notice and comprehend aspects of the L2 that might otherwise be confusing or difficult to understand. However, they also should be caution that the use of L1 should be balanced with opportunities for learners to practice using the target language in meaningful contexts, as excessive reliance on L1 can impede progress in L2 development. The LREs show that students' EFL learning distributed across the video, tasks, teacher and feedback during the grammar instruction.

In the mini lesson, mostly teacher-initiated exchanges were observed. However, "*task-based teaching affords opportunities for student-initiated discourse" (Ellis 2012).*

In the collaborative writing task, pictures and interaction with peers became parts of their language learning. The LREs in collaborative writing process demonstrate how the students collaboratively constructed a sentence using their knowledge of the past

tense, and how they built on each other's contributions to create a coherent and complete sentence. The use of correction, clarification, and elaboration strategies highlights the importance of collaboration and peer feedback in language learning (Storch, 2013; Swain,1985). The acknowledgement of the use of conjunctions also shows an awareness of the importance of grammar and syntax in forming meaningful sentences.

The LREs during collaborative task illustrate that students collaboratively work to identify and correct their grammatical errors with the help of their peers and teacher.

Furthermore, the noticing and stimulated recall sessions highlight the importance of discovering mistakes and talking about them. The teacher's questioning helped the student to reflect on their language use and to explain their choices. It also shows the benefit of reformulating student work, as it allows them to compare their original sentence with a corrected version and to identify and understand their mistakes.

The second research question was about the perceptions of students towards the integrating focus on form instruction to collaborative writing tasks and the whole process that they participated in.

Firstly, the findings from semi-structured interview clearly indicate that working in a group has numerous benefits for students, particularly when it comes to improving their writing skills. The participants in the research consistently emphasized these advantages, highlighting how group work helped them avoid mistakes, enhance their sentence structure, and correct errors in their writing. By engaging in discussions and exchanging ideas with their group members, they were able to compare their own knowledge and benefit from the insights and perspectives of others. This collaborative learning environment fostered an atmosphere of growth, enabling the students to improve their writing skills through the collective knowledge of the group. Students’ opinions towards collaborative writing task are in line with studies conducted on this topic. According to Swain (2006), learners can enhance their language skills by working together and participating in collaborative dialogues or language-related activities. These

dialogues allow learners to exchange ideas and combine their knowledge, enabling them to reflect on language usage and resolve language-related issues. Collaborative writing tasks also promote meaningful interaction in the second language (L2), as highlighted by Villarreal and Gil-Sarratea (2019), and learners typically have a favorable attitude towards such tasks.

Secondly, the findings from the answers provided by the students strongly indicate that the utilization of videotaped mini lesson may be a valuable and effective tool for enhancing students' understanding of subject matter and improving their writing skills. All the students expressed their appreciation for the video lesson, highlighting its efficacy in facilitating the acquisition of new concepts and comprehending the subject matter. The incorporation of pause and reflection time, along with the opportunity for active engagement through question prompts, aids in processing information, checking comprehension, and reinforcing key concepts. By integrating these elements, educators can leverage the power of technological tools as an engaging and instructive medium to support students' learning journey and foster their development in EFL writing performance.

Furthermore, the students' answers provide valuable insights into the process of noticing errors in language use. The strategies employed by the students, such as comparing original work with corrected versions, thinking aloud, and utilizing self-talk, highlight their active engagement in identifying and correcting errors.

The students expressed that stimulated recall, in conjunction with prompts or cues, can be an effective method for reflecting on and improving language performance. The students' reflective practices fostered a better understanding of their mistakes, enhanced their confidence, and facilitated the development of strategies to avoid similar errors in the future.

The answers of the students to the semi-structured interview questions in this study are consistent with Neil’s answers in Swain and Lapkin’s (2007) study. Neil

expressed that his understanding of verbs and related topics expanded significantly through two distinct experiences. Firstly, he observed a written reformulation of his own writing, which provided valuable insights. Secondly, during the stimulated recall session, he witnessed revisiting and explaining the concept once more. Additionally, Neil emphasized that he gained knowledge about the specific concept of "verbe réfléchi" during the initial mini-lesson. Consequently, Neil perceived his learning process as a distributed effort, drawing from various resources available in his immediate surroundings (Swain & Lapkin, 2007). Similar to Neil's perspective, students in this study also highlighted the effectiveness of artifacts in their environment and working collaboratively on their writing performance.

The third research question of the study aimed to specify the effects of integrating focus on form instruction to collaborative writing task on the students' accuracy in their writing performance. In order to demonstrate the effect, pre and post-test results were compared using Quade's tests. As a result, the number of errors of the experimental group including grammar, spelling and sentence structure decreased from the pre-test to the post-test. Based on the findings from the posttest analysis, the control group's mean score of errors was 9.66 higher than the experimental group. The statistical analysis using Quade's test showed that this difference was highly significant, with a substantial effect size, explaining 40.90% of the observed variance when accounting for the pretest results ($p < .001$). Therefore, the findings indicate that collaborative writing tasks with focus on form instruction developed students' writing accuracy. Relevant literature also supported the effectiveness of collaborative writing tasks to develop participants' writing performance. However, Storch and Wigglesworth's study (2007) examined accuracy in writing performance, and they found that participants paid more attention to select appropriate words than accuracy. Moreover, in Leeser's (2004) study high level pairs focused on grammatical forms while the low-level pairs focused on lexis.

Aldosari's (2008) doctoral research stated that the task design affects the focus of the LREs. The jigsaw and composition tasks resulted in increased focus on vocabulary, whereas the editing task led to the emergence of more grammar-related LREs.

In the light of studies suggesting that *"L2 writing instructors have a role to play in making writers aware of language form"* (Frodesen & Holten, 2003, p. 144), the present study integrated focus on form instruction to collaborative writing task and aimed to see the participants' accuracy level. Since students used brainstorming for vocabulary that they can use for their story with their peer and teacher, they did not have to focus more on lexis. The researcher wanted them to focus on grammatical form as they got focus on form instruction about the simple past tense. According to Goins (2020), integrating Focus on Form into second language writing instruction allows instructors to assist learners in enhancing their language abilities by concentrating on specific language forms that are pertinent to the writing task being addressed. The implementation of FoF in the L2 writing classroom is continuously being studied and explored. Collaborative prewriting activities, like group brainstorming and discussions, offer students chances to negotiate meaning and participate in language-related episodes (LREs), which can further develop their understanding of language structures.

The findings also supported the effectiveness of focus on form instruction on writing accuracy. The experimental group had FoF instruction before they started their writing task as opposed to control group having traditional grammar instruction. Therefore, the pre-test results showed that the accuracy of experimental group is higher than the control group. Even though the placement test score difference between control and experimental group was not statistically significant ($Z = -0.98$, $p > .05$, $r = 0.20$), The total number of errors including grammatical, spelling and sentence structure was lower in the experimental group ($M = 8.67$, $SD = 3.846$) in comparison to the control group ($M = 12.75$, $SD = 4.434$) in the pre-test.

To sum up, using collaborative writing tasks facilitate focus on form instruction in EFL classroom and increase the level of accuracy in the writing performance.

CHAPTER V

CONCLUSION AND SUGGESTIONS

5.1. Conclusion

The present study aimed to investigate the effectiveness of integrating focus on form instruction into collaborative writing tasks on the accuracy of participants in their writing performance from the distributed cognition perspective. Furthermore, the opinions of participants about the distributed process of their writing process were interrogated.

Twenty-four students at an Anatolian High School in Adıyaman participated in this study. The students were studying in three different classes of 10th grade. They all underwent the EFL lesson from the same English language teacher from 9th grade to 10th grade. Since the classes are not homogenous, placement test was applied, and the same level of students were divided into two groups as an experimental group and a control group. The experimental group was given focus on form instruction on simple past tense structure in English and they divided to three different groups before they participated in collaborative writing tasks. Their writing task was writing a story about the pictures given on the pre-test paper. After they completed writing their paragraphs, they were reformulated by the researcher, and they participated in noticing, stimulated recall and interview stages respectively. On the other hand, the control group wrote their paragraph individually and their paragraphs were reformulated. They didn't join in the stages and use any technological tools or scaffolded during the writing process. Both of the groups were given the same writing task as a post-test after 2 weeks.

Firstly, to investigate the role of distributed cognition perspective on the participants' writing process in the EFL classroom setting, conversation analysis was used to analyze the audio and video recordings in detail. Then, the perceptions of students analyzed through content analysis method. Lastly, in order to measure the effectiveness of integrating focus on form instruction to collaborative writing tasks, pre-test and post-test scores of both groups were statistically compared.

The results of qualitative data answered the first research question which is about the examining the writing performance of the participants from the perspective of distributed cognition. It was concluded that students utilized artifacts and instructional practices, such as FonF instruction, collaborative writing tasks, noticing, and stimulated recall sessions and they impacted participants' writing performance. The findings demonstrate that students' writing abilities are influenced by their physical and social contexts. In other words, the cognitive processes involved in the writing process are situated within the specific activity being performed and distributed across the cognitive resources available in that particular environment. This distribution of learning across artifacts and individuals in the social environment and the emphasis on interaction were supported in previous research conducted in the field of education second language classroom (Swain & Lapkin, 2007; Montogomery, 2021; Xu & Clarke, 2012; Gomez, Schieble, Curwood & Hasset, 2010; Narciss & Koerndle, 2008).

The second research question answered with semi-structured interview which seeks to participants' perceptions towards their whole writing process. All the students emphasized the benefits of working in a group, videotaped mini lesson, noticing and stimulated recall stages. Their answers to the questions also highlighted that the improvement of writing performance distributed across tools and interaction with people in their classroom.

As a result of the quantitative data analysis, it was found that control groups' total number of errors were higher than the experimental group in both pre-test and post-test. The change in the scores of errors from pre-test to post-test were statistically

significant between the control and experimental groups. This finding supported the effectiveness of using focus on form instruction with collaborative writing tasks to improve accuracy in the writing performance.

In conclusion, applying distributed cognition theory to EFL classroom suggests new perspective to understand the benefits of using different tools and interaction among peers to improve the writing performance. Examining the LREs of participants on the video and audio recordings and statistical analysis of pre and post-test demonstrated the effectiveness of working collaboratively and the importance of focus on form instruction to improve participants' accuracy in the writing performance.

5.2 Pedagogical Implications

The present study demonstrated that considering distributed language theory to design tasks for writing skills in EFL classroom is effective to improve foreign language learners' writing performance. Taking distributed cognition perspective into account provides insight of EFL learners' cognitive process during language learning to EFL teachers and they can apply this perspective to all language skills as well as writing skills.

Firstly, Distributed language theory emphasizes the importance of social engagement in language learning. Through collaborative writing, teachers can encourage their students to engage in meaningful interactions that allow for negotiation of meaning and exposure to different perspectives, leading to a richer understanding and internalization of language forms. In addition, distributed language theory emphasizes the role of environmental and contextual factors in language learning. By integrating authentic contexts, such as real-world writing tasks or simulations, students have the opportunity to encounter the target language forms in meaningful and purposeful ways, enhancing their learning and transferability.

The LREs in this study indicated facilitating from group discussions that explicitly focus on language forms during the collaborative writing process. EFL teachers should allocate time for learners to reflect on and discuss grammar, vocabulary, sentence structure, or any other form-related aspects they encounter and encourage them to share their insights, ask questions, and provide explanations to their peers. This reflection promotes metacognitive awareness of language forms and encourages learners to make informed choices.

Moreover, utilizing multimodal resources during the collaborative writing task enhances students' engagement and comprehension of language forms. Students in this study emphasized that they benefited from video story. Incorporating multimedia materials, technology tools, or real-life artifacts provide a rich and varied learning environment.

Distributed language theory recognizes that learning is an ongoing process that can be shaped through feedback and guidance. Dynamic assessment involves providing formative feedback and scaffolding during the writing task, allowing students to actively participate in their own language development. Providing appropriate scaffolding techniques supports learners' understanding and use of language forms. EFL teachers can also offer prompts or guiding questions that prompt learners to consider specific language features, structures, or vocabulary choices. This helps to direct their attention to the relevant form-related aspects while writing collaboratively.

Furthermore, EFL teachers may encourage learners to collectively analyze and discuss language errors or areas of improvement in their collaborative writing. This can involve identifying recurring mistakes, discussing alternative ways to express ideas, or exploring grammatical or vocabulary issues. In order to be more controlled and find certain results, noticing and analyzing errors were discussed in the noticing and stimulated recall stages of this study individually. However, engaging in error analysis as a group promotes metacognition and fosters a deeper understanding of language forms. Swain and Lapkin (2007) proposed a lesson design for teachers who has big classrooms: "*If the*

teachers wanted to adapt the activity, students could work in small groups to construct a jointly written text. The teacher then reformulates the groups' texts, and the following day, the groups would reconvene to compare their text with the reformulated version. This noticing activity would resemble what Neil did, and since it is impossible to incorporate stimulated recalls for multiple groups, the students could then talk through the language problems that they identified in the noticing activity in their groups. Each group might then present the teacher with one or two salient language problems they had encountered, and the collected language problems might inform one or more language lessons in whole-class time".

Lastly, as Swain and Lapkin (2007) mentioned the role of teacher should be organizing the learning environment to facilitate language learning according to students' needs. In this way, learning can occur without teaching. Teacher should create a classroom environment where expertise is distributed among learners and not solely reliant on the teacher.

5.3 Suggestions for Further Study

The current research was constrained to 24 students enrolled in the 10th grade at an Anatolian high school in Adıyaman. Therefore, the findings of the study cannot be generalized to all high schools in Turkey. However, these findings can serve as a starting point for further investigations in similar areas with a larger number of participants.

Additionally, it is important to note that the data for this study were collected within a short period of time. Therefore, future research could conduct studies carried out in a longer period.

Moreover, the research carried out in a different classroom which had video and audio recordings. The students did not participate in research in their own classroom with many students. Further research can conduct studies in the real classroom environment.

Finally, the present study investigated the effects of integrating focus on form instruction into collaborative writing tasks on the writing performance. Future research could investigate convenience of focus on form instruction to other foreign language skills.

REFERENCES

Agar, M. (1986). Speaking of Ethnography. *Sage Publications,* Inc., Thousand Oaks, CA.

Aldosari, A. (2008*). The influence of proficiency levels, task type and social relationships on pair interaction:* An EFL context (Unpublished doctoral dissertation). University of Melbourne, Australia.

Baars, B.J. 1988. *A Cognitive Theory of Consciousness*. Cambridge: CUP.

Bakhtin, M. M. (1986) *Speech genres and other late essays* (Trans.V.W. McGee & C. Emerson, M. Holquist (eds.). Austin: University of texas Press.

Barselou, L. (2008). Grounded cognition. *Annual Review of Psychology* 59: 617–45.

Behrens, H. (2009). Usage-based and emergentist approaches to language acquisition. *Linguistics*, 47, 383–411.

Bennett, M. & Hacker, P. (2003). *Philosophical foundations of neuroscience.* Oxford: Blackwell.

Bialystok, E. (1978). A theoretical model of second language learning. *Language Learning*. 28.69-84.

Bybee, J. (2010). *Language, usage, and cognition*. Cambridge: Cambridge University Press.

Calzada, A., & García Mayo, M. P. (2021). Child learners' reflections about EFL grammar in a collaborative writing task: when form is not at odds with communication. *Language Awareness*, 30(1), 1-16.

Carlson, L. and R. Kenny. (2005). ‘Constraints on spatial language comprehension: function and geometry’ in Pecher D. and R. Zwaan (eds): *Grounding Cognition*. CambridgeUniversity Press.

Cohen, A. (1983). Reformulating second-language compositions: A potential source of input for the learner. *Paper presented at the annual convention of Teachers of English to Speakers of Other Languages*, Toronto, ON (ERIC Document Reproduction Service No. ED 228 866).

Cole, M., & Engestrom, Y. (1993). A cultural-historical approach to distributed cognition. In G. Salomon (Ed.). *Distributed cognitions: Psychological and educational considerations* (pp. 1-46). New York: Cambridge University Press.

Cowley, S.J. (2007). Cognitive dynamics and distributed language. *Language Sciences*, 29/5: 575-583.

Cowley, Stephen J. (2011). Distributed Language. *John Benjamins*. ISBN 978-90-272-8415-0.

Clark, A. (2010). Supersizing the mind: Embodiment, action, and cognitive extension. *Oxford: Oxford University Press.*

Clark, A., & Chalmers, D. J. (1998). The extended mind. *Analysis*, 58, 7–19.

Clayson, A. (2018). Distributed Cognition and Embodiment in Text Planning: A Situated Study of Collaborative Writing in the Workplace. *Written Communication Quarterly*, 35(2), 155-181. DOI: 10.1177/0741088317753348. Retrieved from journals.sagepub.com/home/wcx

De la Colina, A. A.,&Garc´ıa Mayo,M. P. (2007).Attention to form across collaborative tasks by low-proficiency learners in an EFL setting. In M. P. Garc´ıa Mayo (Ed.), *Investigating tasks in formal language learning* (pp. 91–116). London, UK: Multilingual Matters.

Doughty, C. (2001). Cognitive underpinnings of focus on form. In: Robinson, P. (Ed.), *Cognition and Second Language Instruction.* Cambridge University Press, Cambridge, pp. 206–257.

Doughty, C., & Varela, E. (1998). Communicative focus on form. *In C. Doughty, & J. Williams (Eds.), Focus on form in classroom second language acquisition* (pp. 114-138). Cambridge: Cambridge University Press.

Doughty, C. and Williams, J. (eds). (1998). *Focus on Form in Classroom Second Language Acquisition*. New York NY: CUP.

Ellis, N. C. (Ed.). (1994). *Implicit and explicit learning of languages*. San Diego, CA: Academic Press.

Ellis, N. C. (1998). Emergentism, connectionism and language learning. *Language Learning*, 48, 631–664.

Ellis, N. C. (1999). Cognitive approaches to SLA. *Annual Review of Applied Linguistics*, 19, 22–42.

Ellis, N.C. (2005). At the interface: Dynamic interactions of explicit and implicit language knowledge. *Studies in Second Language Acquisition* 27: 305–352.

Ellis, N. C. (2006b). Cognitive perspectives on SLA: The Associative Cognitive CREED. *AILA Review*, 19, 100–121.

Ellis, N. C., O'Donnell, M. B., & Römer, U. (2013). Usage-based language: Investigating the latent structures that underpin acquisition. *Currents in Language Learning,* 1, 25–51.

Ellis, N. C. (2015). Cognitive and social aspects of learning from usage. In T. Cadierno & S. W. Eskildsen (Eds.*), Usage-based perspectives on second language learning* (pp. 49–73). Berlin: de Gruyter Mouton.

Ellis, N. C. (2019). Essentials of a Theory of Language Cognition. *The Modern Language Journal*, 103, 39–60.

Ellis, R. (1994) *The study of second language acquisition.* Oxford: Oxford University Press.

Ellis, R., Basturkmen, H., Loewen, S. (2002). Doing Focus-on-form. *System 30*, 419–432

Ellis, R. (2012). *Language Teaching Research and Language Pedagogy.* 2012 JohnWiley & Sons, Inc.

Ferris, D., & Hedgcock, J. (2005). *Teaching ESL composition: Purpose, process, and practice*. Mahwah, NJ: Lawrence Erlbaum.

Field, A. (2018). Discovering statistics using IBM SPSS statistics. Sage Publications.

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication,* 32(4), 365-387.

Fraenkel, J. R., & Wallen, N. E. (2009*). How to Design and Evaluate Research in Education*. McGraw-Hill Education.

Fowler, C. (2010). Embodied, embedded language use. *Ecological Psychology*, 22; 286- 303.

Frodesen, J. & Holten, C. (2003). Grammar in the ESL writing class. In B. Kroll (Ed.), *Exploring the Dynamics of Second Language Writing* (pp. 141-161). New York: Cambridge University Press.

Goins, M. (2021). Output as a Source of Input: Collaborative Writing Tasks for Developing the Grammar and Linguistic Resources of L2 Writers. *The CATESOL Journal*, 32(1), 81-90.

Goodwin, C. and Goodwin, M. H. (1996). Formulating planes: Seeing as situated activity. *In Cognition and Communication at Work,* Y. Engeström and D. Middleton, Eds. Cambridge University Press, New York, NY.

Gomez, M. L., Schieble, M., Curwood, J. S., & Hassett, D. (2010). Technology, learning and instruction: Distributed cognition in the secondary English classroom. *Literacy, UKLA*, 44(1), 20-27.

Gregg, K. (1993). Taking explanations seriously; or, let a couple of flowers bloom. *Applied Linguistics.* 14.276-294.

Gluck, M.A., Meeter, M. and Myers, C.E. (2003). Computational models of the hippocampal region: Linking incremental learning and episodic memory. *Trends in Cognitive Science* 7: 269–276.

Gullberg, M. and Indefrey, P. (eds). (2006). *The Cognitive Neuroscience of Second Language Acquisition.* Oxford: Blackwell.

Hall, R. (2007). Distributed cognition: A framework for understanding collective practice. In A. L. Swan & R. A. Sandieson (Eds.), *The 11th International Conference on Human-Computer Interaction* (pp. 88-97). Springer.

Hampshire, S. (1971). *Critical review of 'The Concept of Mind'*. In O. P. Wood & G. Pitcher (Eds.), Ryle (pp. 17 – 44). London: Macmillan.

Hammond, M. (2010). What is an affordance, and can it help us understand the use of ICT in education?. *Education & Information Technologies* 15(3): 205–217.

Harmer, J. (1992). *The Practice of English Language Teaching*. London: Longman.

Harris, R. (2004). Integrationism, language, mind and world. *Language Sciences*, 26, 727 – 739.

Harris, R. (2008). *Mindboggling: preliminaries to a science of the mind*. Luton: Pantaneto Press.

Hartwell, P. (1985). Grammar, grammars, and the teaching of grammar. *College English* 47(2), 105-127.

Hidalgo, M. Á., & García Mayo, M. P. (2021). The influence of task repetition type on young EFL learners' attention to form. *Language Teaching Research,* 25(4), 565-586. DOI: 10.1177/1362168819865559

Hollan, J., Hutchins, E., & Kirsh, D. (2000). Distributed Cognition: Toward a New Foundation for Human-Computer Interaction Research. *ACM Transactions on Computer-Human Interaction,* 7(2), 174-196.

Hutchins, E. L. (1995). How a cockpit remembers its speed. *Cogn. Sci*. 19, 265–288.

Hutchins, E. L. (1995). *Cognition in the wild*. MIT Press.

Hutchins, E. L. and Klausen, T. (1996). Distributed cognition in an airline cockpit. *In Cognition and Communication at Work,* Y. Engeström and D. Middleton, Eds. Cambridge University Press, New York, NY, 15–34.

Hutchins, E. L. and P, L. (1997). Constructing meaning from space, gesture, and speech. *In Tools, and Reasoning: Essays in Situated Cognition,* L. B. Resneck, R. Saljo, C. Pontecorvo, and B. Burge, Eds. Springer-Verlag, Vienna, Austria.

Hutchins, E. (2014). The cultural ecosystem of human cognition. *Philosophical Psychology*, 27(1), 34-49.

Jennings, R.E. & Thompson, J. J. (2012). The biology of language and the epigenesis of recursive embedding. *Interaction Studies*.

Kandel, E.R., Schwartz, J.H. and Jessell, T.M. (2000). *Principles of Neural Science*, 4th ed. New York NY: McGraw-Hill.

Karasavvidis, I. (2002). Distributed cognition and educational practice. *Journal of Interactive Learning Research*, 13(112), 11-29.

Kim, Y., & McDonough, K. (2008). The effect of interlocutor proficiency on the collaborative dialogue between Korean as a second language learners. *Language Teaching Research*, 12, 211–234.

Koschmann, T. (2002). Dewey's contribution to the foundations of CSCL research. *In Proceedings of Conzputer Supported Collaborative Learning 2002* (pp. 12-22), Boulder, CO.

Krashen, S. D. (1982). *Principles and practice in second language acquisition*. Oxford, UK: Pergamon.

Kravchenko, A. (2007). Essential properties of language: why language is not a digital code. *Language Sciences*, 29 (5): 650-621.

Larson-Hall, J. (2016). *A guide to doing research in second language acquisition with SPSS and R.* New York, NY: Routledge.

Leeser,M. J. (2004). Learner proficiency and focus on form during collaborative dialogue. *Language Teaching Research*, 8, 55–81.

Linell, P. (2013). Distributed language theory, with or without dialogue. *Language Sciences* ,40, 168 – 173.

Loewen, S. (2002). *The Occurrence and Effectiveness of Incidental Focus on Form in Meaning-focused ESL Lessons*. PhD thesis submitted to the University of Auckland, Auckland, New Zealand.

Long, M.H. (1991). Focus on form: a design feature in language teaching methodology. In: de Bot, K., Ginsberg, R.B., Kramsch, C. (Eds.), *Foreign Language Research in Cross-cultural Perspective. John Benjamins*, Amsterdam, pp. 39e52.

Long, M.H. & Crookes, G. (1992). Three approaches to task-based syllabus design. *TESOL Quarterly*, 26(1), 27-56.

Long, M.H. (1996). The role of the linguistic environment in second language acquisition. In: Ritchie, W.C., Bhatia, T.K. (Eds.), *Handbook of Second Language Acquisition*. Academic Press, San Diego, CA, pp. 413e468.

Lyster, R. (1998). Recasts, repetition, and ambiguity in L2 classroom discourse. *Studies in Second Language Acquisition*, 20, 51-81

Lyster, R. (2001). Negotiation of form, recasts, and explicit correction in relation to error types and learner repair in immersion classrooms. *Language Learning*, 51(1), 265-301.

Manchón, R. M. (2011). Writing to learn the language: Issues in theory and research. *Learning-to-write and writing-to-learn in an additional language*, 61-82.

McLaughlin, B., (1987). *Theories of second language acquisition.* London: Edward Arnold.

Mead, G. H. (1932). *The Philosophy of the Present*. Chicago: Open Court.

Montgomery, K. E. (2021*). The Emergence of Socially Distributed Cognition From Classroom Discourse of Accelerated Sixth-Grade Mathematics* (unpublished dissertation). Graduate Faculty of The University of Georgia, Athens, Goergia.

Moore, J. L., & Rocklin, T. R. (1998). The distribution of distributed cognition: *Multiple interpretations and uses*. Educational Psychology Review, 10(1), 97-113.

Minsky, M. L. (1988). *Society of mind*. Simon & Schuster.

Minsky, M. L., & Papert, S. (1988). *Perceptrons, expanded edition: An introduction to computational geometry*. MIT Press.

Munsterberg, H. (1914). *Psychology: General and applied*. New York: Appleton.

Nachar, N. (2008). The Mann-Whitney U: A Test for Assessing Whether Two Independent Samples Come from the Same Distribution. *Tutorials in Quantitative Methods for Psychology*, 4(1), 13-20.

Narciss, S., & Koerndle, H. (2009). Benefits and Constraints of Distributed Cognition in Foreign Language Learning: Creating a Web-based Tourist Guide for London. *Journal of Research on Technology in Education*, 40(3), 281-307.

Nardi, B. A. (2002). Coda and response to Christine Halverson. *Computer Supported Cooperative Work*, 11, 269 – 275.

Narciss, S., & Koerndle, H. (2009). Benefits and Constraints of Distributed Cognition in Foreign Language Learning: Creating a Web-based Tourist Guide for London. *Journal of Research on Technology in Education*, 40(3), 281-307.

Norris, J., & Ortega, L. (2000). Effectiveness of L2 instruction: A research synthesis and quantitative meta-analysis. *Language Learning*, 50, 417–528.

Orman, J. (2016). Distributing mind, cognition and language: exploring the (un)common ground with integrational linguistics. *Language and Cognition*, 8, 142–166. https://doi.org/10.1017/langcog.2014.47

Ortega, L. (2007). Meaning L2 practice in foreign language classrooms: A cognitive interactionist SLA perspective. In R. M. DeKeyser (Ed.), *Practice in a second language: Perspectives from applied linguistics and cognitive psychology* (pp. 180–207). New York, NY: Cambridge University Press.

Quine,W. V. O. (1960).*Word and object*. Cambridge,MA: The MIT Press.

Resnick, L. B. (1989). *Learning in school and out*. Educational Researcher, 18(9), 15-21.

Robinson, P. & Ellis, N. C. (Eds.). (2008). *Handbook of cognitive linguistics and second language acquisition.* London: Routledge.

Rogers, Y. (1997). *A brief introduction to Distributed Cognition.*

Salomon, Gavriel. (1993). No distribution without individuals' cognition: A dynamic interactional view. *In Distributed cognitions: Psychological and educational considerations*, ed. Gavriel Salomon, 111–138. New York: Cambridge University Press.

Schmidt, R. (1990). The role of consciousness in second language learning. *Applied Linguistics*. 11.129-156.

Schmidt R. (1992). Psychological mechanisms underlying second language fluency. *Studies in Second Language Acquisition.* 14.357-385.

Seedhouse, P. 2004. *The Interactional Architecture of the Language Classroom: A Conversation Analysis Perspective*. Malden, MA: Blackwell.

Shabani, K., & Hosseinzadeh, S. (2019). A comparative study of the effects of teacher-initiated planned preemptive and reactive focus on form on L2 learners' accuracy in narrative writing. *Innovation in Language Learning and Teaching*, 13(1), 76-92. https://doi.org/10.1080/17501229.2017.1361959

Shi, D. & Thibault, P. (2022). Languaging dynamics of classroom interactivity: a distributed view of the pedagogic recontextualization in L2 tertiary settings. *Semiotica*, 2022(245), 125-155. https://doi.org/10.1515/sem-2020-0096

Simon, H. A. (1979). *Models of thought*. New Haven: Yale University Press.

Simon, H. A. (1982). *Models of bounded rationality*. Cambridge: MIT.

Slobin, D. I. (1997). The origins of grammaticizable notions: Beyond the individual mind. In D. I. Slobin (Ed.*), The crosslinguistic study of language acquisition* (Vol. 5, pp. 265–323). Mahwah, NJ: Lawrence Erlbaum.

Steffensen, S. & Cowley, S.J. (2010). Signifying bodies, health and non-locality: the aftermath. In Cowley, S.J., Steffensen, S. & J.C. Major (eds.), *Signifying Bodies: Biosemiosis, Interaction and Health.* Braga: Portuguese Catholic University Press, 331-355.

Storch, N., & Wigglesworth, G. (2007). Writing tasks: Comparing individual and collaborative writing. In M. P. Garc´ıa Mayo (Ed.), *Investigating tasks in formal language learning* (pp.157–177). London, UK: Multilingual Matters.

Storch, N. (2011). Collaborative Writing in L2 Contexts: Processes, Outcomes, and Future Directions. *Annual Review of Applied Linguistics*, 31, 275-288. doi: 10.1017/S0267190511000079.

Storch, N. (2013). *Collaborative writing in L2 classrooms*. Multilingual Matters.

Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235-253). New York: Newbury House.

Swain, M. (1995). Three functions of output in second language learning. In: Cook, G., Seidhofer, B. (Eds.), For H. G. Widdowson: *Principles and Practice in the Study of Language*. Oxford University Press, Oxford, pp. 125–144.

Swain, M., & Lapkin, S. (1998). Interaction and second language learning: Two adolescent French immersion students working together. *The Modern Language Journal*, 82(3), 320–337

Swain, M. (2006). Languaging agency and collaboration in advanced language proficiency. In H. Byrnes (Ed.), *Advanced language learning: The contribution of Halliday and Vygotsky*. London: Continuum.

Swain, M., & Lapkin, S. (2007). "The distributed nature of second language learning: Neil's perspective". *Form-focused Instruction and Teacher Education. Studies in honor of Rod Ellis* (pp.73-85). Oxford University Press.

Swain, M., & Watanabe, Y. (2013). Languaging: Collaborative dialogue as a source of second language learning. *In The Encyclopedia of Applied Linguistics (pp. 1-7).* Wiley Blackwell. DOI: 10.1002/9781405198431.wbeal0664

Thibault, P.J. (2011) First-order languaging dynamics and second-order language: the distributed language view. To appear, *Ecological Psychology*.

Ungan, S. (2007). Yazma Becerisinin Geliştirilmesi ve Önemi. *Erciyes Üniversitesi Sosyal Bilimler Enstitüsü Dergisi,* 23(2), 461-472.

Villarreal, I., & Gil-Sarratea, N. (2020). The effect of collaborative writing in an EFL secondary setting. *Language Teaching Research,* 24(6), 874–897. https://doi.org/10.1177/1362168819829017

Vygotsky, L. S. (1980). *Mind in society: The development of higher mental processes.* Boston: Harvard University Press.

Watanabe, Y., & Swain, M. (2007). Effects of proficiency differences and patterns of pair interaction on second language learning: *Collaborative dialogue between adult ESL learners. Language Teaching Research*, 11, 121–142.

Werner, O. & Schoepfle, M. (1987). Systematic Fieldwork. *Sage Publications*, Inc., Thousand Oaks, CA.

Williams, J. (2012). The potential role(s) of writing in second language development. *Journal of Second Language Writing*, 21(4), 321–331.

Wright, P. C., Fields, R. E., & Harrison, M. D. (2000). Analyzing Human-Computer Interaction as Distributed Cognition: The Resources Model. *Human-Computer Interaction*, *15*(1), 1-41.

Wundt, W (1921). Elements of folk psychology. London: Allen & Unwin. Yuen, A., & Ma, W (2002). Gender differences in teacher computer acceptance. *Journal ofTechnology and Teacher Education*, 10, 365-382.

Xu, L., & Clarke, D. (2011). What Does Distributed Cognition Tell Us about Student Learning of Science*? Research in Science Education*, 42(3), 491-510. DOI: 10.1007/s11165-011-9207-8

Yang, L. (2016). Languaging in story rewriting tasks by Chinese EFL students. *Language Awareness*, 25(3), 241–255. https:// doi. org/ 10. 1080/ 09658 416. 2016. 11972 30

Zamel, V. (1983). The composing processes of advanced ESL students: Six case studies. *TESOL Quarterly*, 17(2), 165-187.

Zhang, J., & Norman, D. A. (1994). Representations in distributed cognitive tasks. *Cognitive Science*, 18(1), 87–122. https://doi.org/10.1207/s15516709cog1801_3

APPENDICES

Appendix 1
Writing Task as Pre and Post-test

Look at the three pictures.
Write the story shown in the pictures.
Write **35 words** or more.

Write the story on your answer sheet.

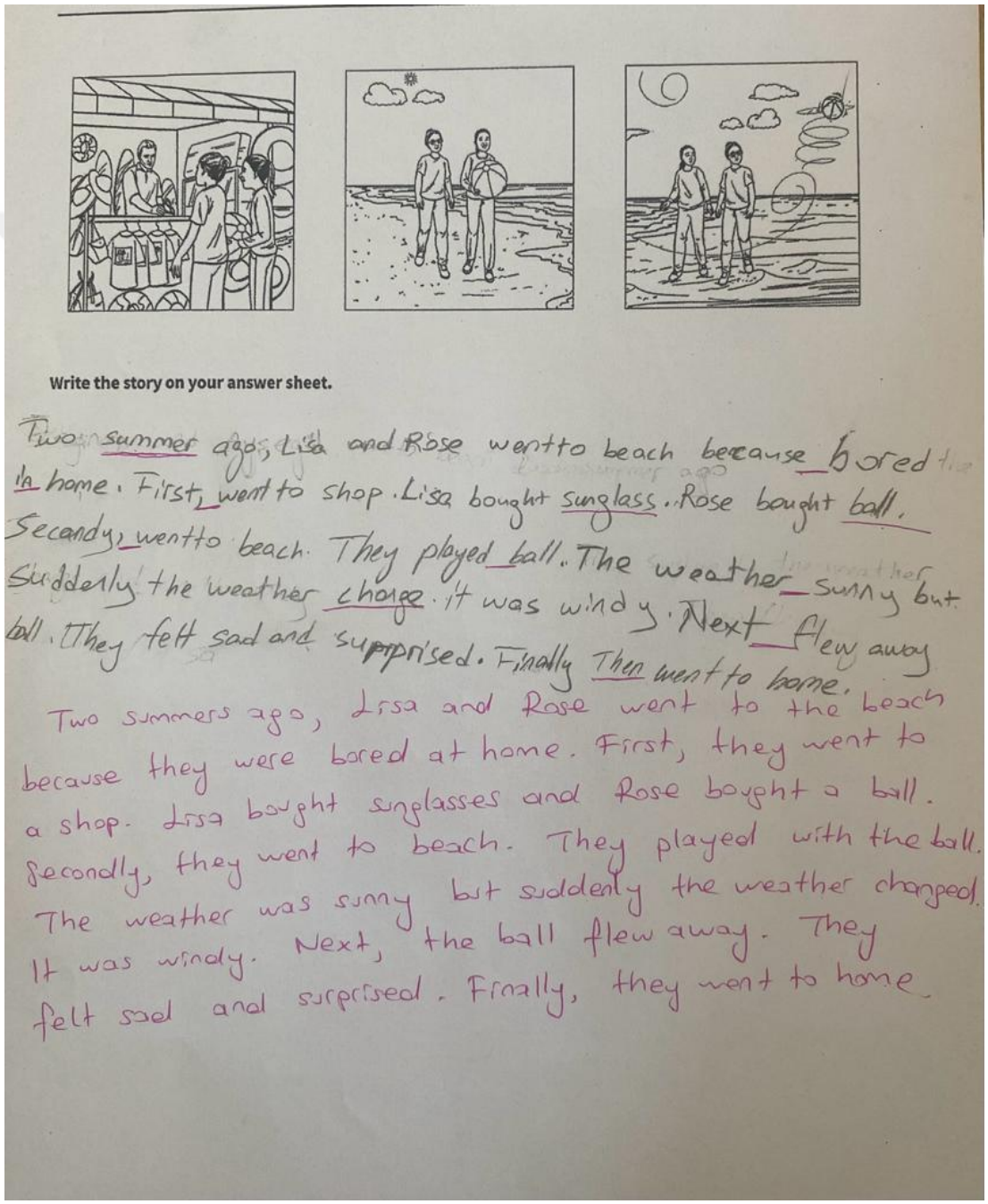
Appendix 2

Interview Questions

1. Could you share your opinions about the activities you participated in and the tools you used during your English writing process?
2. How did the discussion you had about the pictures related to the topic you would write about before starting the writing assignment affect your writing process?
3. Were you able to discover the differences between your own writing and the reformulated version in the noticing stage?
4. Could you share your experiences on the stimulated recall stage that was caried out with the research assistant after the noticing stage?
5. Are there any additional tools or activities that you would like to add or remove from these activities?

Appendix 3

A student's Paper with Reformulation



Write the story on your answer sheet.

Two summer ago, Lisa and Rose wentto beach because bored in home. First, went to shop. Lisa bought sunglass. Rose bought ball. Secondly, wentto beach. They played ball. The weather sunny but Suddenly the weather change. it was windy. Next flew away ball. They felt sad and suprised. Finally Then went to home.

Two summers ago, Lisa and Rose went to the beach because they were bored at home. First, they went to a shop. Lisa bought sunglasses and Rose bought a ball. Secondly, they went to beach. They played with the ball. The weather was sunny but suddenly the weather changed. It was windy. Next, the ball flew away. They felt sad and surprised. Finally, they went to home.