

Open University of Cyprus

Faculty of Economics and Management

**Postgraduate Programme of Study *Educational Studies*
*Special Education***

Postgraduate (Master's) Dissertation



**Teaching First and Second/Foreign Language Vocabulary to
Students with Learning Disabilities: A Review of the Research**

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**Supervisor
Anastasia Liasidou**

January 2019

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fulfillment of the requirements for the postgraduate degree
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Summary

The process of language learning is a challenging process for students with Learning Disabilities. As regards second/foreign language acquisition, LD students seem to fall behind compared to their peers and usually give up or get exempted of foreign language learning classes. Nonetheless, the policy of exemption is against the inclusion philosophy as all students are entitled to have access to appropriate education that must also include foreign language learning. However, research regarding LD in foreign language learning is limited. More specifically, as regards second/foreign language vocabulary instruction to LD students, a gap exists in the literature. The goal of this study is to present published empirical research on vocabulary instruction strategies to LD students. More specifically, studies on first, second/foreign language and Computer Assisted Instruction vocabulary strategies to students with Learning Disabilities are reviewed. This study is secondary, as it is mostly based on previous reviews of the research on LD students' vocabulary instruction or on studies that were located and then were, first, presented according to the research questions of this study, and later, were reviewed according to type of instruction. Twelve instructional methods were located. Mnemonic strategy instruction, direct/explicit instruction, cognitive strategy instruction, peer-based approaches, fluency-building practice, learning strategies, activity-based instruction, and constant time delay were examined in students' first language. Regarding foreign language learning, supportive feedback strategies were only located while CAI instruction, video anchors and podcasts were identified in technology assisted vocabulary instruction. Findings and effects are discussed.

Περίληψη

Η διαδικασία εκμάθησης γλώσσας είναι μια απαιτητική διαδικασία για τους μαθητές με Μαθησιακές Δυσκολίες (ΜΔ). Όσον αφορά στην απόκτηση της δεύτερης/ξένης γλώσσας, οι μαθητές με ΜΔ φαίνεται ότι μένουν πίσω σε σχέση με τους συνομηλίκους τους και συνήθως τα παρατούν ή απαλλάσσονται από το μάθημα της δεύτερης/ξένης γλώσσας, γεγονός που είναι ενάντια στις αρχές της συμπεριληπτικής φιλοσοφίας καθώς όλοι οι μαθητές έχουν δικαίωμα πρόσβασης σε κατάλληλη εκπαίδευση που πρέπει επίσης να συμπεριλαμβάνει και την εκμάθηση μιας ξένης γλώσσας. Ωστόσο, η έρευνα που αφορά στις ΜΔ στον τομέα της ξένης γλώσσας είναι περιορισμένη. Συγκεκριμένα, παίρνοντας υπόψη την διδασκαλία του λεξιλογίου της δεύτερης/ξένης γλώσσας σε παιδιά με ΜΔ, κενό εντοπίζεται ήδη κατά την αναζήτηση της σχετικής βιβλιογραφίας. Ο σκοπός αυτής της μελέτης είναι να παρουσιάσει δημοσιευμένες εμπειρικές έρευνες στρατηγικών διδασκαλίας λεξιλογίου σε παιδιά με ΜΔ. Πιο συγκεκριμένα, εμπειρικές μελέτες στη πρώτη, στη συνέχεια στη δεύτερη/ξένη γλώσσα και τέλος με τη χρήση υπολογιστών σε μαθητές με ΜΔ εξετάζονται. Η μελέτη αυτή είναι δευτερογενής καθώς στηρίζεται σε προηγούμενες ανασκοπήσεις εμπειρικών ερευνών ή σε μελέτες που εντοπίστηκαν και παρουσιάζονται, αρχικώς, σύμφωνα με τα ερευνητικά ερωτήματα αυτής της σπουδής, και στη συνέχεια σύμφωνα με το είδος της στρατηγικής διδασκαλίας. Δώδεκα στρατηγικές διδασκαλίας εντοπίστηκαν. Η μνημονική στρατηγική, η άμεση/σαφής διδασκαλία, η γνωστική στρατηγική, προσεγγίσεις που βασίζονται σε συνομηλίκους, η πρακτική οικοδόμησης ευχέρειας, στρατηγικές μάθησης, η διδασκαλία μέσω γλωσσικών δραστηριοτήτων και μέσω σταθερής χρονικής καθυστέρησης εντοπίστηκαν στη πρώτη γλώσσα. Στη δεύτερη/ξένη γλώσσα, εντοπίστηκαν στρατηγικές υποστηρικτικής ανατροφοδότησης ενώ παράλληλα εξετάστηκαν στρατηγικές διδασκαλίας με τη χρήση υπολογιστή και βίντεο. Τα αποτελέσματα συζητούνται.

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Contents

1	Introduction	1
1.1	This study.....	3
1.2	Hypotheses and Research Questions.....	4
2	Learning Disabilities	6
2.1	Characteristics of Students with Learning Disabilities.....	7
2.1.1	Difficulties in Perception	7
2.1.2	Difficulties in Language	8
2.1.2.1	Reading Difficulties	8
2.1.2.2	Difficulties in Written Expression	9
2.1.3	Difficulties in Attention and Concentration.....	11
2.1.4	Difficulties in Memory.....	12
3	Learning Disabilities and Second/Foreign Language	13
3.1	Native Language-Based Foreign Language Learning Disabilities.....	14
3.2	Linguistic Coding Differences Hypothesis.....	16
3.3	Continuum of Language Learning Differences.....	20
4	The importance of Vocabulary	22
4.1	Vocabulary Importance in Second/Foreign Language Learning.....	22
4.2	Vocabulary Importance in LD	23
5	Vocabulary Instruction Practices	25
5.1	Vocabulary Instruction Practices to Students with LD in the First Language.....	25
5.1.1	Mnemonic Strategy Instruction.....	25
5.1.2	Direct Instruction/Explicit Instruction.....	27
5.1.2.1	Direct Instruction.....	29
5.1.2.2	Explicit Instruction.....	29
5.1.3	Cognitive Strategy Instruction	32
5.1.4	Peer-Based Approaches	33
5.1.5	Fluency Building Vocabulary Practice.....	34
5.1.6	Learning Strategies.....	35
5.1.6.1	Word Mapping Strategy.....	35
5.1.6.2	Vocabulary LINCS Strategy.....	36
5.1.7	Activity-based Instruction.....	37
5.1.8	Constant Time Delay.....	37
5.2	Vocabulary Instruction Practices to Students with LD in Second/Foreign Language.....	37
5.3	Vocabulary Instruction Practices to Students with LD in CAI and Multimedia Instruction.....	40
5.3.1	CAI Instruction.....	40
5.3.2	Video Anchors.....	42
5.3.3	Podcasts.....	42
6	Methodology	44
6.1	Design	44
6.2	Literature Search Procedure	45
7	Findings	47
7.1	Vocabulary Instruction Practices to Students with LD in the First Language.....	48
7.1.1	Mnemonic Strategy Instruction.....	49
7.1.2	Direct Instruction.....	51
7.1.3	Cognitive Strategy Instruction	55
7.1.4	Peer-based Approaches	58
7.1.5	Fluency Building Vocabulary Practice Activities	59
7.1.6	Learning Strategies	60

7.1.7	Activity-based Instruction	62
7.1.8	Constant Time Delay	62
7.2	Vocabulary Instruction Practices to Students with LD in Second/Foreign Language.....	63
7.3	Vocabulary Instruction Practices to Students with LD in CAI and Multimedia Instruction.....	65
7.3.1	CAI Instruction.....	65
7.3.2	Video Anchors.....	66
7.3.3	Podcasts.....	67
8	Discussion.....	69
8.1	Vocabulary Instruction Practices to Students with LD in First Language.....	69
8.2	Vocabulary Instruction Practices to Students with LD in Second/Foreign Language.....	73
8.3	Vocabulary Instruction Practices to Students with LD in CAI and Multimedia Instruction.....	74
8.4	Conclusions.....	75
	Bibliography	80

Chapter 1

Introduction

All children are entitled and have the right to benefit from all kinds of educational opportunities offered almost in all educational systems around the world. However, nowadays, in our multilingual society and highly competitive globalised and technology dependent world, the need for all students to receive foreign language learning education is more than urgent. However, although for most students the procedure of foreign language learning presents a certain amount of difficulties (described in a plethora of articles), this task becomes even more demanding for students with Learning Disabilities (LD) who exist in almost every classroom. This hypothesis may result from the fact that these children face difficulties and exhibit a slower progress rate compared to their classmates in the learning or acquisition of their first language. In many cases, students with LD seem not to be able to perform equally well and keep up with peers as they face difficulties in both short and long-term language learning (Gathercole & Baddeley, 1993; as cited in Leons, Herbert & Gobbo, 2009). When these students realize that they cannot catch up with their peers pace of learning often end up giving up or get exempted from foreign language learning education. However, according to Leons et al. (2009), the policy of exemption that takes places not only for diagnosed LD students but also for the ones characterized as at-risk or low-achieving is not supported by the inclusive philosophy and the Individuals with Disabilities Education Improvement Act (IDEA, 2004), according to which all students are entitled to appropriate education that must also incorporate the learning of a foreign language (as cited in Wight, 2015).

This problem is intensified in second/foreign learning as research is extremely limited or nonexistent, although there is a significant and increasing body of research concerning LD in students' first language. This reported gap in the literature is noted by Sparks and Ganscow (as cited in Difino and Lombardino, 2004: 391) who admit that

research that addresses LD in foreign language classrooms and the adoption of alternative methodologies that cater for these students' special educational needs is extremely restricted. These scholars further maintain that an "enormous void" exists in this field and "unfortunately foreign language teachers, who often are the first instructors to observe the students' learning difficulties, have not participated in advancing our understanding of the challenges involved in the assisting students with learning disabilities who take foreign language classes." Following this reasoning, Sparks (2009) further advises language teachers and researchers to collect and explore valid data, identify at-risk students and act with the inclusion of appropriate and suitable foreign language teaching methods in a consistent manner in order for these children to be supported in inclusive classes and be successful in them. Correspondingly, Wight (2015:50) concludes that: "Existing research on students with learning disabilities studying a foreign language is lacking both in breadth and in depth" and she further supports that more research is crucial to be conducted as regards the practices, philosophy, and policies that prevent all students from foreign language learning and maintains that more research is vital on teacher and student' perceptions regarding learners' identity and the learning processes so that inclusive foreign language environments to be developed and can be easily accessible especially for students with LD. The author further notes that much of the existing research has focused on English speaking students and thus, further insights and research into the LD field is necessary to be conducted in countries and environments in which multilingualism is the norm.

Trying to limit the scope of LD research in a specific field and identify research studies focusing on vocabulary instruction to LD students, Scammacca, et al. (as cited in Kuder, 2017), in a review of evidence-based practices, indicated that five kinds of interventions have been found to improve adolescents' reading outcomes. These were comprehension strategies, word study, vocabulary, fluency, and multicomponent approaches. Out of these five interventions, vocabulary interventions yielded the largest effect size and have been found to improve students' with LD reading comprehension. Despite these findings, a small body of research was conducted aiming at examining vocabulary instruction to LD students at the time. Specifically, Bryant et al. (2003), in a review, identified six articles with eight experiments on vocabulary instruction to LD adolescents. Further, Jitendra et al. (2004) with a review of research identified nineteen

studies examining vocabulary instruction to both elementary and adolescents LD students. Additionally, Kuder (2017), in an updated review of Bryant et al. (2003) study, spotted seven studies examining vocabulary instruction practices to secondary LD students. However, researchers of all three of the above reviews came to the conclusion that their reviews were based on a relatively small body of studies and further research is necessary.

1.1 This Study

The aim of this work is to review studies that examine vocabulary instruction strategies in LD students which is a limited researched field of study as already stated above. More specifically, this dissertation aims at investigating vocabulary instruction strategies in second/foreign language leaning in students with LD and thereon report on findings in a collective manner. A study of this type would be necessary for a number of purposes and for different audience:

- a) It would serve as an initial reconnaissance in the field for both researchers and foreign language teachers
- b) It would list, if possible, a number of successfully empirically or experimentally tested strategies
- c) It would trigger a discussion on the topic which is of vital importance for the educational and professional development of LD children

Ganschow, Sparks, and Javorsky (1998) cite a number of scholars who hypothesized that foreign language learning difficulties in children with LD were also related to native language learning difficulties (e.g. Cohen, 1983; Lefebvre, 1984; Levine, 1987; Pompian, 1986) and Sparks et al. (1989) under the Linguistic Coding Difference Hypothesis domain in which it was argued that difficulties on a specific language skill are likely to have a negative impact on both language systems- the native and the foreign (Ganschow & Sparks, 1995, 1996; Ganschow et al., 1994; Ganschow et al. 1991; Sparks & Ganschow, 1993a, 1993b, 1993c, 1996; Sparks, Ganschow, Javorsky, Pohlman, & Patton, 1992a, 1992b; as cited in Ganschow et al., 1998).

In this light, it was decided to begin from and also examine the mirror field, i.e. that of vocabulary instruction to students with learning difficulties in the first language.

1.2 Hypotheses and Research Questions

Following the above argument, this study attempts to extend the LD students' vocabulary instruction research to the field of second/foreign language vocabulary learning and present findings from a review of practices and research in the field. As stated above, a huge registered gap exists in the research literature of this specific field (e.g. Wight, 2015), and a study of this type would seem necessary as a starting point in the field. A discussion attempting to register the published studies that examine the different types of vocabulary instruction strategies of LD students and their effectiveness is presented in chapter five. By that respect the study unfolds by identifying research papers that address students in their first language, studies which address the second/foreign language and studies that are related to Computer Assisted Language Learning (CALL). Studies are categorized according to the type of strategy/intervention. The basic research questions are formulated as follows and aim at identifying:

- a) Vocabulary instruction strategies to students with Learning Disabilities in their first language
- b) Vocabulary instruction strategies to students with Learning Disabilities in their second/foreign language
- c) Vocabulary instruction strategies to students with Learning Disabilities through CALL environments

This dissertation is structured as follows: In the first five chapters a literature review is presented. More specifically, the second chapter is dedicated to considering the issue of Learning Disabilities while the third chapter focuses on the case of second/foreign language learning in the LD field. In chapter four, research of the importance of vocabulary instruction is discussed, first in the second/foreign language learning, and second, as regards the LD field. In chapter five, a review of all the empirically examined vocabulary instruction strategies to LD students are presented, as examined through a review of several studies in first, second/foreign language, and finally in CALL, CAI or

multimedia environments. As this work holds the format of an empirical review study, where the subjects are the reviewed studies themselves, the methodology of data collection is presented in chapter six. Findings of this study are presented according to the three research questions stated, in first language, second/foreign language and then in CAI or multimedia environments in chapter seven and finally, in the last chapter findings are summarized and discussed.

Chapter 2

Learning Disabilities

Samuel Kirk in 1962 (as cited in Heward, 2011) was the first to use the term Learning Disabilities, and although throughout the development of the specific field many definitions have been proposed, one that had the greater impact is the one suggested by the National Joint Committee on Learning Disabilities-NJCLD which was adopted in 1990. According to NJCLD, the definition below on Learning Disabilities was adopted in 1990 and later updated in 2016:

Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. Problems in self-regulatory behaviors, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability. Although learning disabilities may occur concomitantly with other disabilities (for example, sensory impairment, intellectual disabilities, emotional disturbance), or with extrinsic influences (such as cultural or linguistic differences, insufficient or inappropriate instruction), they are not the result of those conditions or influences. (NJCLD, 2016)

Heward (2011) cites that three criteria have to be met in order for this definition to be functional and to be able to trace and diagnose a child with Learning Disabilities:

- a) A serious discrepancy between a child's academic performance and mental ability. Children with LD show an unexpected discrepancy between their mental abilities and performance, which is unpredictable (Kavale & Forness, 2000).
- b) An exclusion criterion: the difficulties the child experiences must not be the result or consequence of another condition or lack of educational opportunities that could cause Learning Disabilities.

- c) A need for receiving Special Education services. Children with Learning Disabilities show specific and serious problems in spite of the educational programs they are included in, and consequently are in need of an educational intervention program which can meet their unique educational needs.

2.1 Characteristics of Students with Learning Disabilities

Learning Disabilities are associated with problems in perception and cognitive processes and more specifically, in perception, reasoning, memory, attention and concentration in specific stimuli and finally in the visual and auditory information processing. These difficulties are believed to be the main causes of the problems children with Learning Disabilities experience, firstly, in language and more specifically in reading ability and in written expression. Second, problems in Maths, behavior and low self-esteem feeling as a consequence from the above, and in attention span such as attention deficit and hyperactivity (Heward, 2011). Panteliadou and Botsas (2007) argue that these problems extend to metacognition, motivation, self-regulation, social development and relations and finally emotional development. It becomes obvious that it would be difficult for one study to discuss all the above areas and thus this endeavour, concentrates only on the characteristics regarding the areas of perception, language, memory and attention. These, will be discussed below.

2.1.1 Difficulties in Perception

According to Smith (as cited in Panteliadou and Botsas, 2007), children with Learning Disabilities experience perception deficits. Despite the fact that they do not face vision or hearing problems, they usually differ from their typical peers in visual and auditory processing. These problems have an impact on school performance and particularly on the process of reading. However, visual and auditory processing are not considered to be the main characteristics of Learning Disabilities as other factors (e.g. phonological processing) have a greater impact on the reading process.

2.1.2 Difficulties in Language

According to Bender and Larkin (as cited in Panteliadou & Botsas, 2007), students with LD face a serious difficulty in segmenting sentences into words, words into syllables, and syllables into phonemes. Although, difficulties and deficits do not exhibit the same way in every student, they mainly affect the manipulation of the written language, and more specifically the reading and writing process. In this unit, the main difficulties in reading and writing experienced by LD students are presented.

2.1.2.1 Reading difficulties

Kavale and Forness (as cited in Heward, 2011), argue that reading difficulty is the commonest characteristic of children with LD. They argue that in 90% of all the LD children, reading difficulty is the principle reason why this group needs Special Education services as according to Lyon (as cited in Heward, 2011) this is a persistent deficit a child faces and not just a developmental delay in reading skills. According to APA (as cited in Germano, Gagliano & Curatolo, 2010), *“Reading Disability (RD) commonly referred to as dyslexia, is defined as an unexpected, specific and persistent failure to acquire efficient reading skills despite conventional instruction, adequate intelligence and sociocultural opportunity”* and it is estimated to be around 4-10% of school population at schools in the USA (Tannock, 2005a; as cited in Konstantinou & Kosmidou, 2011). More specifically, reading difficulties are particularly located in reading decoding, in reading fluency and in reading comprehension and are discussed below in detail.

Reading decoding is defined as the procedure of recognizing and manipulating the alphabet code. Children with LD experience a deficit in the phonological process that makes it difficult for them to acquire the alphabetical order and consolidate the decoding process during the first school years (Kotoulas, 2003; as cited in Panteliadou & Botsas, 2007). Later, the children’s decoding skills still remain poor and have a negative impact on reading fluency and reading comprehension. According to research, students with LD decode about one third compared to their typically developing peers (Smith, 2004; as cited in Panteliadou & Botsas, 2007). Notice that, reading fluency is an

important characteristic of the reading process as it helps reading comprehension and it is considered to be a first indicator of reading difficulties (Speece & Ritchey, 2005; as cited in Panteliadou & Botsas, 2007). Fluency is the ability for a student to be able to read the words with accuracy, expression and prosody (Archer & Felton, 1999; as cited in Panteliadou & Botsas, 2007) and also to automatically read a text effortlessly with speed, and paying little attention to decoding (Meyer & Felton, 1999; as cited in Panteliadou & Botsas, 2007). Students with LD, exhibit a difficulty in executing these processes: a) they read slowly while they often pause in order to spell the words, and b) they often repeat parts of the text in order to be able to understand it (Archer et al., 2003; as cited in Panteliadou & Botsas, 2007). Summarising, it should be pointed out that reading comprehension is an important skill and a process during which the reader attempts to form a representation of the text, by combining his own knowledge with the notion the writer of the text tries to present (Grigorenko & Stenberg, 2005; as cited in Panteliadou & Botsas, 2007). Children with LD face limitations in the above skills, in attention skills, in memory, in reading decoding and fluency. Therefore, their negatively affected reading comprehension skills combined with their limited vocabulary and background knowledge have a greater negative impact on them (Archer et al, 2003; as cited in Panteliadou & Botsas, 2007).

2.1.2.2 Difficulties in Written Expression

Many children with LD face difficulties in written expression and this is estimated to affect about 10% of the student population (Fletcher et al., 2007; as cited in Tsotsi and Kosmidou, 2011:43). This percentage can reach the level of 34% if deficits in writing are also included in the estimation and may increase even more, if deficits in spelling are added as well (Maridaki-Kassiotaki, 2005; as cited in Tsotsi and Kosmidou, 2011). Heward (2011) cites Graham and Harris (2003) and Newcomer and Barenbaum, (1991), according to whom, students with LD score significantly lower compared to typically developing students in all tasks of written expression particularly in spelling, vocabulary, punctuation, grammar and organization or structure of written expression. Some of these students are competent readers but they exhibit a slow progress in the written language. These difficulties are presented below in more detail.

First, difficulties are located in the graphomotor skills. LD children exhibit a difficulty when trying to form the letters and words and stick to the lines in the notebook. They have a difficulty in coordinating their motor skills and their handwriting is usually bad. Further, they find it difficult to apply punctuation rules and marks correctly and/or use small and capital letters appropriately. As regards orthography/spelling, they often make reversal errors, replacements and omissions at the level of letters, syllables and words. They also make errors regarding spelling rules and further generalizing these rules to all the words (Panteliadou and Botsas, 2007).

Second, regarding the structure and organization of written expression, students with LD face the difficulty in putting words in the correct order or follow the correct time or logical sequence. They also find it hard in sentence completion and paragraph structuring (Panteliadou and Botsas, 2007).

As far as vocabulary is concerned, students cannot recall and use the appropriate nouns, verbs and adjectives and often use them incorrectly in sentences. Further, they tend to repeat the same words as their vocabulary is poor. As regards content, students find it hard to formulate and develop ideas relevant to the topic and use their imagination while writing. They often omit words while their writing is limited in words and sentences exhibiting also cohesion and coherence problems. Further, they have a difficulty in finding the main ideas and develop supportive arguments so that they can express themselves clearly through writing (Panteliadou and Botsas, 2007).

Lastly, they do not have the skills to associate their ideas with their writing, that is, to turn their ideas into language and transcript them into writing (Berninger & Swanson, 1994). Their writing usually contains inadequate and useless information as they have a difficulty in retaining in memory related to the subject information they need to develop. Further, it is difficult for them to assess the erroneous associations between the subject they were first asked to write about and the final product they produce. Their metacognitive skills are restricted, and they cannot easily choose and apply the appropriate strategies in order to produce a text. What is more, they fail to set a goal

before they begin writing, to control the procedure they are going to follow, to check on their writing and finally assess their final performance in writing. As a result, they are unable to get effective feedback in order to improve their written expression and their poor skills (as cited in Panteliadou and Botsas, 2007).

2.1.3 Difficulties in Attention and Concentration

According to Heward (2011) some children with Learning Disabilities demonstrate high levels of hyperactivity and /or have a difficulty in concentrating their attention on a task. Hence, at school they usually get characterized as getting distracted easily. Children demonstrating these problems permanently may get a diagnosis for the Attention Deficit/ Hyperactivity Disorder (AD/HD). According to the American Psychiatric Association (APA) (2000), "*AD/HD is one of the most prevalent developmental disorders, characterized by excessive activity, short-attention span and impulsivity*" (as cited in Germano et al., 2010: 481). As reported in Malegiannaki (2012) and the citation within, it is estimated that about 7% of school aged children is diagnosed with AD/HD in the USA and this percentage is estimated to be at about 10% in the children population in Greece. Nevertheless, a comorbidity between two conditions is often recorded. According to Willcut & Pennington (2000a, 2000b; as cited in Germano et al, 2010), over 80% of children who are diagnosed with AD/HD and 60% of children with a diagnosis with a reading disability (RD) are eligible for getting a diagnosis for another disorder. As regards school, typically developing students are concentrating on the learning task for 60-80% of the class time while students with AD/HD stay concentrated for 30-60%. Further, research at school aged children indicated that the difference between LD students and their typical peers is considered to be about 2-3 school years time and that difference deteriorates after the age of 12- 13 (Masters, Mori & Mori, 1993; as cited in Panteliadou & Botsas, 2007).

Difficulties in language abilities are among the most frequent problems children with AD/HD face. In particular, according to Malegiannaki (2012:216) and the citation therein, language deficits regard difficulties in reading, in spelling, in writing, in grammar, in pragmatics, in fluency and in the ability to narrate. Furthermore, students

demonstrate delayed speech development, poor organizational skills and expression of ideas and lastly delayed development of the “internal” speech.

2.1.4 Difficulties in Memory

According to Swanson, Cooney, and McNamara (as cited in Panteliadou and Botsas, 2007) memory is a person’s ability to encode, process and recall information at which they were exposed to at some time in the past. Children with LD face difficulties in memory and these difficulties are significant (in combination with these of phonological awareness) as they relate to reading, spelling (orthography), and language problems and they extend to the whole mnemonic mechanism (cited in Panteliadou and Botsas, 2007).

More specifically, as far as short-term memory is concerned, research has showed that LD students’ performance is poor in tasks that require language processing and particularly when the period of time between the presented stimuli and the recall is long (long-term memory). Hence, the limited short-term memory, the ineffective use of phonological code, and the poor application of the internal strategies of organization and revision are the basis for problems spotted in the long-term memory (Swanson, Cooney & McNamara, 2004; as cited in Panteliadou and Botsas, 2007). In addition, Panteliadou and Botsas (2007) cite that LD children do not exhibit distinctive functional difficulties in long-term memory (Sousa, 2001; Swanson, 1994) and although it is limitless in capacity, lack of employment of effective organizational strategies and the superficial processing of semantic representations result in its restriction (Wong, 1982).

Chapter 3

Learning Disabilities and Second/Foreign Language

Foreign language learning is a must for our multilingual and technology dependent world and is a fundamental part of every educational system around the globe. The phenomenon that many students exhibit an inability to perform equally when compared to their peer has been greatly researched over the years and many explanations and possible reasons have been proposed. Most of these explanations included mostly personality variables such as poor attitude, lack of foreign language aptitude, low motivation and high anxiety levels, not using correctly learning strategies and learning styles difference between teachers and learners. Although some correlations between the previous affective factors and successful learning of a foreign language have been found to be strong, no specific variable or group of variables has been proved to explain successful or not successful foreign language learning. No specific and clear pattern has been found by foreign language researchers to clearly identify any relationship between foreign language success and cognitive, personality and attitudinal factors (Brown, 2000; Ellis, 1994; Lundberg, 2002; Sparks, 1995, 1996; as cited in Nijakowska, 2010).

As already mentioned, research regarding LD and second/foreign language learning is limited and a registered gap exist in the field. In the chapter that follows, a review of the research that examines foreign language learning in the LD field that has been identified in the related literature is presented. It is worth mentioning that the scope that the research has mostly focused on is the causes of foreign language difficulties. Specifically, the chapter below is organized around the most examined scopes found in literature. More specifically, in the support of native language serving as the basis of foreign language learning disabilities, in Linguistic Coding Differences Hypothesis which relate

foreign language to native language capacity, and finally in the Continuum Notion of Language Learning Differences that supports that language learning ability exists on a continuum from mild to severe and one may find that there is no a distinct Foreign Language Learning Disability (FLLD).

3.1 Research on Native Language –based Foreign Language Learning Disabilities

DiFino and Lombardino (2004:392) cite that the first study associating learning disabilities with foreign language difficulties was conducted by a Harvard psychologist named Dinklage (1971), who noticed that students dropped out of their degree courses as they could not meet the demands of Harvard’s foreign languages requirement. He attempted to explain the difficulties they were facing in three different groups. The first group exhibited difficulties in the written language, in their reading aloud, spelling and sound pronunciation. The second group faced difficulties in auditory discrimination, while the third one faced auditory discrimination problems, as found in the previous one, but also exhibited problems in verbal memory as they could not retain and express the information they had heard although they were able to remember the information they had seen in written. Overall, as cited in DiFino & Lombardino (2004), Dinklage’s observations are supported today. For example, studies (e.g. Sparks et al., 1989; Sparks & Ganschow, 1991; as cited in Ganschow, Sparks, & Javorsky, 1998) support the observations registered by Dnklage and argue that students having a difficulty in foreign language learning demonstrate processing difficulties in syntax, phonology and/or semantics in their first language. Further, Carroll (as cited in Ganschow, et al, 1998:249) supported that language aptitude is a “*residue*” of skills in the native language.

Nijaroskwa (2010) cites the researchers (e.g. Cohen, 1983; Lefebvre, 1984; Levine, 1987; Pompian, 1986) who in the 1980’s began bringing forward the association between student’s native language and foreign language learning difficulties. More specifically, Ganschow and Sparks (as cited in Ganschow, et al., 1998) in four case studies of university attending students who had difficulties in foreign language learning argued that these were probably associated with their native language learning difficulties.

Further, Nijaroskwa (2010) reports Ganschow and Myers (1988) who argued that the best predictor of foreign language learning in the second year of study in grade ten was an auditory task for syllable discrimination that predicted foreign language learning in the French, German and Spanish language. They further related phonology difficulties to problems when learning a foreign language adding, thus, to the auditory syllable discrimination theory.

Since 1980s Sparks and his colleagues started conducting a pioneering body of research concerning relation between foreign language learning difficulties and native language ones. More specifically, Ganschow et al. (1998) cite Sparks *et al.* (1989) who suggested the Linguistic Coding Deficits Hypothesis (LCDH). It is a model that is based on research in the native language and more specifically on Vellutino and Scanlon's work who showed that poor readers faced difficulties mainly with the structural (phonological/orthographic and syntactic) aspects of language and not with meaning (semantic). They started portraying the difficulties which students with LD have, to discover that a lot of non LD students also had FL leaning difficulties and thus their initial term *deficits* changed to *differences* (Linguistic Coding Differences Hypothesis)(Ganschow & Sparks, 1995, 1996; Ganschow et al., 1994; Ganschow et al. 1991; Sparks & Ganschow, 1993a, 1993b, 1993c, 1996; Sparks, Ganschow, Javorsky, Pohlman, & Patton, 1992a, 1992b; as cited in Ganschow et al., 1998). In this model they argued that the phonological/orthographic, semantic and syntactic language skills are the basis in learning a foreign language (a rather structural approach). They hypothesized that native language and foreign language learning are dependent on fundamental language mechanisms and that difficulties with a specific language skill is likely to have a negative impact on both language systems- the native and the foreign one. More specifically, they argued that phonological awareness measurements, seem to significantly predict the differences between children with and without reading impairing (Sparks, 1995; as cited in Ganschow et al., 1998).

Further, Nijakowska (2010) cited Sparks et al. (1989) who argued that students who face problems in the phonological aspect in their native language are prone to deal with immediate difficulties in learning a foreign language and Sparks et al. (1995b) who

argued that earlier problems in the phonological/orthographic processing in the native language affect foreign language learning at secondary and post-secondary foreign language students. It was further speculated that although these students might be able to balance their phonological/ orthographic difficulties and take average and above average marks in other school subjects, the problems at the phonological/orthographic processing emerged again as a new sound-symbol system had to be learnt.

3.2 Linguistic Coding Differences Hypothesis

In this chapter, related research will be reviewed in support of LCDH, further highlighting the suggestion that native language skills structure the foundation for foreign language learning. The limited review that follows includes research relating to affective, cognitive and linguistic factors in native and foreign language learning. Specifically, comparison, perception and anxiety, prediction, and proficiency studies are reviewed. Finally, studies on English as a foreign language, in support of LCDH are presented.

First, comparison studies, testing language skills in the native language and FL aptitude distinctions have been conducted, between good and poor FL students by Sparks and Ganschow and their colleagues. The findings indicated that successful college foreign language learners showed significantly stronger phonological/orthographic language skills (not semantic ones) in their native language and better FL aptitude (MLAT) when compared to unsuccessful foreign language learners (Ganschow, et al. 1991; as cited in Nijakowska, 2010).

Additionally, Sparks (2008b) cited Sparks, Ganschow, Javorsky, Pohlman, and Patton (1992a) who compared high-and low-achieving high school foreign language learners at their first year course. They were examined on native language literacy and achievement (spelling, vocabulary, word recognition, reading comprehension and written grammar) and foreign language aptitude (MLAT). The outcomes indicated that the high-achieving foreign language learners differed significantly in native phonological processing

(spelling, phonological awareness, reading) and syntactic skills (punctuation, grammar, capitalization) but not semantic ones (vocabulary, reading comprehension) and also higher foreign language aptitude in comparison to their low-achieving peers.

Further, Nijaroskwa (2010) cited Sparks et al. (1992b) who compared LD, high-, and low-risk first-year foreign language learners. The results showed that LD and high-risk learners exhibited weaker native language phonological/orthographic and syntactic ability (not semantic) and FL aptitude compared to low-risk learners. In addition, no significant difference was registered between the LD and high-risk learners on most native language and foreign language measures (except the spelling one).

In addition to the comparison studies reviewed above, prediction studies were conducted as well. Ganschow et al. (1998) reported the findings of two associated studies conducted by Sparks, Ganschow, & Patton (1995) who attempted to determine the best predictors of FL grades in the first year of study in ninth and tenth grade students (first high school year). Both studies showed that the best predictor was their eighth native language grade (English) and their foreign language aptitude (MLAT). Further, native language spelling significantly predicted foreign language grades confirming, thus, the important role of the phonological/orthographic ability in the native language for foreign language learning.

Sparks et al. (2008b) cites Sparks, et al. (1998) who conducted another study in which native language literacy and achievement, foreign language aptitude and grades in high-, average-, and low-achieving foreign language learners was examined. The learners were grouped by their scores on a foreign language proficiency measure at their second year of high-school foreign language learning. The findings indicated differences among the three proficiency groups on the native language literacy and achievement tests, foreign language aptitude (MLAT) and the final grades (end of year). Most of the discrepancies were registered between the low- and high achieving groups.

Additionally, the best predictors of oral and written foreign language proficiency after two years of study were attempted to be identified in two studies. End of first-year foreign language grades and foreign language word decoding, which directly measures phonological/orthographic skills, were found to best predict FL proficiency in both of the studies involved. Additionally, the native language vocabulary played an important role in FL proficiency in study 1 (Sparks, et al., 1997c; as cited in Ganschow et al. 1998).

Additionally, proficiency studies between native and foreign language skills were also conducted. Sparks (2009:19) cites Sparks, Patton, Ganschow, Humback, & Javorsky, (2006) study in which students were longitudinally followed from first to tenth grade and examined on the first language (spelling, reading, receptive vocabulary and listening comprehension and general IQ). These scores were examined as predictor factors to test their effect on foreign language proficiency and aptitude. The participants completed two-years-high-school foreign language courses in French, German and Spanish. The results indicated that first language literacy measures in elementary school were the best predictors in foreign language aptitude at the beginning of foreign language learning and general foreign written and oral proficiency after completing a two-year L2 study. The outcomes of the research strongly support the relation between first (reading, spelling) and foreign language skills (reading, spelling, listening and speaking) and aptitude. Furthermore, a vital finding of this study is that IQ cannot be treated as a good predicting variable of students' foreign proficiency. In another study conducted with the same students, the best predictor for foreign word decoding, after one and two years foreign study, was found to be a first language word decoding measure in elementary school. Equally, the best predictor in foreign language spelling was a first language spelling skill measure and a first language measure of phonological awareness skill measured in elementary school.

As reported in Nijaroskwa (2010), findings on studies of English as a foreign language in LD students that also seem to be in support of LCDH hypothesis were conducted by other researchers and are reviewed and presented below.

Ho and Fong (as cited in Nijakowska, 2010), indicated that Chinese dyslexia students with phonological deficits in their native language proved to be at high risk of having difficulties in English language learning despite the different characteristics of the two

languages in writing. The participants exhibited weak phonological awareness in both native and foreign language. These findings are also in support of the notion of cross linguistic transfer from first to foreign language. Further, the study conducted by Helland and Kaasa (as cited in Nijakowska, 2010), consistent with the previous studies, indicated that the dyslexic group in their experiment achieved significantly worse performance on an English proficiency test that measured syntax, morphology, semantics and orthography. Generally, the same findings were witnessed in dyslexics compared to non dyslexics, and language impairments transfer from native to foreign language were registered for Polish secondary school students (Jurek, 2004; Nijakowska, 2004; as cited in Nijakowska, 2010).

On the other hand, Nijaroskwa (2010) cites Miller, Guron and Lundburg (2000) who challenged the assumption that native reading deficits confidently lead to foreign language reading failure. In their study, they reported that Swedish dyslexic adults exhibited a really extraordinary preference for foreign language reading (English). This phenomenon was termed as dyslexic preference English reading (DPER) and it was hypothesized to occur maybe because of socio-cultural and affective reasons. It was concluded that early exposure to foreign language literature is accompanied with factors related to the English orthography system. More specifically, when reading English texts, word strategies are employed by readers to read large segments and even whole words. On the other hand, the shallow Swedish orthography system requires the adoption of grapheme-phoneme strategies and it places a greater morphosyntactic demand on the readers compared to English.

As Sparks et al. body of research examined only young adults and the analysis of the developmental and academic progress was limited, the need to examine young children arose. Ferrari and Palladino (2007) examined Italian students in grades 7 and 8. Findings indicated that native language reading comprehension was deficient in low-achieving foreign language students. Although their reading accuracy and speed was poorer than high-achieving students (not at significance level), they proved to be average according to Italian norms.

However, other researchers also support Sparks et al. findings as regards best foreign language proficiency predictors concerning younger children. Nijakowska (2010) cites, Kahn-Horwitz et al. (2005, 2006) studies that were in support of Sparks et al. results, as their study indicated that native language skills in Hebrew strongly predicted young students' foreign language learning skills. Further, Dufva and Voeten (as cited in Nijakowska, 2010) indicated that native language phonological/orthographic skills in Finnish first grade students predicted their performance in foreign language in the third grade. A similar significant relationship was registered between native language phonological/orthographic skills of Spanish students in first grade with their reading and decoding later skills in foreign language (English) by Lindsay, Manis, & Baily (as cited in Nijakowska, 2010).

3.3 Continuum of Language Learning Differences

In the 1980's the term "*Foreign Language Learning Disability*" (FLLD) was emerged in the literature suggesting that a distinct and unique kind of disability concerning foreign language learning exists (Ganschow & Sparks, 1986, 1987; Ganschow & Pohlman, 1989 as cited in Sparks, 2009:8). Later, other researchers also supported the distinct association between having a LD and a foreign language learning disability (e.g. Hu, 2003). However, Sparks and his colleagues, after conducting empirical research, supported that "*there is not a discrete entity that can be identified as a Foreign Language Learning Disability*" and that "*foreign language learning occurs along a continuum of very strong to very weak learners.*" More importantly, they acknowledged that their use of the FLLD term was "*premature, and, in retrospect, incorrect*" and that the students' ability of learning a language, both LD and non LD (low-achieving), occur on a continuum, with difficulties in leaning a foreign language varying from severe to mild (Sparks, 2009:9). Specifically, students with a diagnosis for LD rarely differed significantly with poor foreign language learners but without a diagnosis for LD in cognitive, native and foreign language measures. Additionally, LD learners did not always face difficulties with foreign language learning and on the other hand, non LD classified students exhibited difficulties and failure in foreign language learning (Sparks Phillips, & Javorsky, 2002, 2003). For a more detailed review of research supporting the notion of a continuum see Sparks (2006, 2009).

It is possible to conclude that, the research reviewed above, indicates that native language skills formulate the basis for foreign language aptitude and thus students with weaker language skills are expected to exhibit weaker foreign language aptitude and performance. It may also be added that children that progress faster in native language may also exhibit better foreign language aptitude. Further, there seems not to be a FLLD and language learning capacity which evidently exists on a continuum, and foreign language learning difficulties range from severe to mild. Also, most poor foreign language learners demonstrate mainly a difficulty in the phonological code. Finally, linguistic factors have been proved to be held responsible for foreign language failure or success whereas affective factors such as poor attitude, motivational and emotional disorders, and low self perception seem to be secondary and function as the result of the difficulties and not as the cause. In fact, the affective differences between good and poor language learners appear to be dependent on the intensity of difficulties met during language acquisition (Nijakowska, 2010).

Chapter 4

The importance of Vocabulary

Vocabulary is an important component of language and language learning process whether it is learners' first or second/foreign language. In this chapter, studies that reveal its importance are reviewed, first in the second/foreign language acquisition field and then in the LD field.

4.1 Vocabulary Importance in Second/Foreign Language Learning

Vocabulary is an integral and crucial part of language acquisition and a tool for communication. However, its teaching and learning was ignored in second language research for years. Zimmerman (1997) cites that Richards (1976), was one of the first to admit that vocabulary used to be typically undervalued and second/foreign language teaching. This was happening on account of the linguistic learning theories of the time that were placing emphasis on morphosyntax and phonology. More specifically, Zimmerman (1997) concludes that all language teaching methods, the Grammar Translation Method, the Direct Method, the Reform Movement, the Reading Method/Situational Teaching, the Audiolingual Method, the Natural approach, and the Communicative Language Teaching have all ignored the teaching and learning of vocabulary.

However, from the mid 1980's attention to vocabulary acquisition and learning began to be drawn. Carter and McCarthy (1988) argued there was an obvious gap in the vocabulary research and they further supported that vocabulary study should play an important role not only in the language teaching field but also that its research could promote our understanding of the acquisition processes. Further, as cited in Singleton (1999), Gross (1990) placed emphasis on lexicon importance and undervalued the so far belief of syntax importance by examining 12,000 simple French verbs. Additionally,

Nattinger and DeCarrico (1992) suggested a language teaching method that places emphasis on the lexical-phrase as a teaching unit that could be used in second language teaching suggesting that it was a promising new direction for the second language field. In support, Schmitt (2010:3) cites Wilkins (1972:111) maintaining emphatically that *“Without grammar very little can be conveyed, without vocabulary nothing can be conveyed”*. Further, as cited in Gass and Selinker (2001:372) a series of studies are cited that stress the importance of vocabulary errors compared to the errors regarding other components of language: Firstly, vocabulary errors are regarded as the gravest ones by the learners (Politzer, 1978). Secondly, Meera (1984) cited Baas (1982) who indicated that lexical errors were far more than the errors associated to grammar and further, native speakers regard vocabulary errors more bothersome when compared to the grammar ones. Thirdly, Gaas (1988b) also supported this argument by showing that vocabulary errors hindered communication whereas structures with grammar errors were finally easily comprehended. Further, Schmitt (2010:5) cites Alderson (2005) conducted a systematic examination (part of the DIALANG tests) examining the association between of vocabulary knowledge and language proficiency comparing scores on vocabulary and scores on other language components of the Dialang Test. Results showed that the size of the learners’ vocabulary is related to their language performance on any language test examined, a finding that shows that *“language ability is to quite a large extent a function of vocabulary size”*.

4.2 Vocabulary Importance in LD

As regards vocabulary, research has indicated that vocabulary knowledge is crucial in school success, generally, and in promoting reading comprehension, particularly, and this importance is well documented according to research (Anderson & Nagy, 1991; Cunningham & Stanovich, 1998; as cited in Jitendra et al., 2004). The RAND (Reading for Understanding) report suggested that vocabulary knowledge contributes to improvement in comprehension and provides the argumentation for an emphasis to be placed on vocabulary instruction (Snow, 2002; as cited in Jitendra et al., 2004). Although vocabulary knowledge is vital to reading comprehension (Baumann & Kame’ennui, 1991; Stanovich, 1986; as cited in Jitendra et al., 2004), research does not suggest a particular vocabulary development program or methodology so as to cater for the discrepancy between students with rich and poor vocabulary knowledge (Baker,

Simmons, & Kame'nnui, 1998; Snow, 2002; as cited in Jitendra et al., 2004). On the other hand, proficient reading skills are well documented as being the most effective independent strategy for vocabulary learning. More specifically, students who read for at least ten minutes a day seem to have more important and higher rates of vocabulary development compared to students who do very little independent reading (Anderson & Nagy, 1991; Cunningham & Stanovich, 1998; as cited in Jitendra et al., 2004). As expected, students who have difficulties and struggle with reading would subsequently avoid engagement in the independent exercise and enrichment of this tool and thus avoid its practice and development significantly (Baker, Simmons, & Kame'nnui, 1998; Stanovich, 1986; as cited in Jitendra et al., 2004). Similarly, students with LD fail to proficiently develop strategies for contextual word learning (Pany, Jenkins, & Schreck, 1982; as cited in Jitendra et al., 2004). The ineffective vocabulary learning strategies result in students with LD having fragmented and limited vocabulary knowledge and restricted understanding of specific word features (Swanson, 1986; as cited in Jitendra et al., 2004). Generally, limited independent reading, lack of vocabulary learning strategies to learn words from context, and disperse word knowledge seem to be the most crucial obstacles for students' with LD vocabulary development (Stahl & Shiel, 1999; as cited in Jitendra et al., 2004). Thus, vocabulary and vocabulary learning skills must be guided and instructed to students with LD (Jitendra et al., 2004).

In conclusion, it is possible to maintain that, despite the limited reviews of the related research presented above, vocabulary knowledge is important as it is a vital tool for successful communication and a refined explanation of concepts in different disciplines in both the L1 and the L2. More specifically, in second/foreign language teaching and learning and in particular in the LD field, the importance of vocabulary teaching and consequently learning is increased due to the memory limitations of LD learners. Finally, despite that the studies reviewed above indicate vocabulary as a crucial language component, with a vital role when compared to other language components, no studies were identified in the literature that examined its teaching effectiveness in second/foreign language or compare it to other language components in LD students.

Chapter 5

Vocabulary Instruction Practices

Beck & McKeown (1991) argue (as cited in Bryant et al., 2003) that the aim of vocabulary instruction is to assist students by promoting their ability to interact and engage in language situations and especially in text comprehension processes. More specifically, vocabulary instruction which leads to indepth word knowledge and promotes reading comprehension is vital for secondary LD students so as to meet the demands of school instruction (Simmons & Kameenui, 1990; as cited in Bryant et al., 2003).

5.1 Vocabulary Instruction Practices to Students with LD in the First Language

The aim of vocabulary instructional strategies is to enhance retention of the new target vocabulary at the word-meaning level and then transfer this knowledge in order to help with reading comprehension. Recognizing that more time is necessary for LD students to be able to learn strategies, explicit instruction and ample practice opportunities are vital components of vocabulary instruction (Bryant et al., 2003).

5.1.1 Mnemonic Strategy Instruction

Mnemonic strategies refer to a *“specific reconstruction of target content intended to tie new information more closely to the learners’ existing knowledge base, and, therefore, facilitate retrieval”* (Scruggs & Mastropieri, 1990a: 271-272). This method is based on the principle that concrete meaningful or familiar information could be elaborated and,

thus, made easier to learn compared to abstract and not related information (Scruggs & Mastropieri, 1990b). They aim at finding a connection between the already existed long-term knowledge and the new target information. Mnemonic instructional methods use strategies or techniques such as pictures (visual cues) or rhymes to help learners recall information. Students with LD benefit from this method and have the chance to learn information that would not be absorbed otherwise and also develop long-term target information retention (Mastropieri & Scruggs, 1991; as cited in Terill, Scruggs, & Mastropieri, 2004). Four mnemonic methods/ strategies are identified in the literature and are presented below.

a) The Mnemonic Keyword Method

This method aims at improving the link between known and unknown information. According to Mastropieri, Scruggs, and Fulk, (1990) keyword or mnemonic strategies engage two components, keyword and imagery associations. The keyword association offers a similar sounding already known word so as to relate it to the new target word. The imagery associations provide a picture of the definition of the new target word interacting with the picture of keyword. The visual imagery, the phonetic elements, as well as the definition of the new target word assist memorization, retention and recall of it. This method develops in a three-step process as described below (Terill, et al., 2004):

Step 1: an acoustically similar and already known familiar keyword for the new target word is created (e.g. *truck* is a good keyword for the new target word *truculent* as it sounds like it and also is easy to image).

Step 2: an interactive visual image is produced in which the meaning of the target word and the keyword are combined (e.g. an aggressive truck driver).

Step 3: learners are asked to think of the keyword (truck), think of the image produced with the truck, the action depicted in the picture (e.g. the driver was aggressive) and finally retrieve and state the description or the definition of the target word (e.g. *truculent* is aggressive).

b) Pegword Mnemonics

“Pegword Mnemonics is used to facilitate the learning of information in which number or order are part of what must be recalled”. Pegwords (e.g. one-bun, two-shoe) could also be used with interactive illustrations or keywords (e.g. a teacher might show a picture of a

spider weaving a web on a gate (pegword for eight) to help students remember that spiders have eight legs) (Fontana, Scruggs, & Mastropieri, 2007:346).

c) Letter strategies

Letter strategies employ the use of acronyms and acrostics and aim at facilitating information recall and more specifically the recall of lists of information (Scruggs, & Mastropieri, 1989b; as cited in Fontana, et al., 2007). For example, the acronym “FIRE” may represent the countries of the Allied Powers of WWI.

d) Reconstructive Elaborations

Reconstructive Elaborations is the most complicated method which might combine keyword, letter, and pegword mnemonics, as well as mimetic and symbolic illustrations (Fontana, et al., 2007).

5.1.2 Direct Instruction/Explicit Instruction

According to Archer & Hughes (2011) and Goeke, (2009) (as cited Hughes, Morris, Therrien, & Benson, 2017:1), since the 1990s, the term explicit instruction has been used to describe the instructional approach characterized as “*unambiguous, structured, systematic, and scaffolded*”. During the last decade, it has been included in various educational environments such as the Institute of Education Science (IES) Practice Guides (Gersten et al., 2009; as cited in Hughes et al., 2017), general and special education journals (e.g. Marin & Halpern, 2011; as cited in Hughes et al, 2017) and educational psychology (e.g. Lorch et al., 2010; as cited in Hughes et al., 2017). Further, explicit instruction has been recognized as an important element of educational approaches such as Response to Intervention (RTI). Most importantly, it has been identified by the Council for Exceptional children as one of 22 “High-Leverage Practices” in special education (McLeskey et al., 2017; as cited in Hughes et al., 2017).

In their recent article, Hughes, et al. (2017) attempted to overview the instructional method of explicit instruction in the LD literature due to its prominent role in interventions and teaching methods in learners with LD. More importantly, confusion as regards distinction between explicit instruction and other associated approaches such

as Direct Instruction (DI) was reported to be found in the literature. A short historical overview is presented below.

The term explicit instruction and Direct Instruction overlap greatly, but it is difficult to say exactly why or when explicit instruction seems to appear in the literature as an alternating term. The term explicit instruction seems to have entered the literature in the 1990s and the special education field as the term of choice in the 2000s. This shift in terminology took place perhaps of a tendency to give the impression of the “innovation” or perhaps of the criticism on the term “direct” that probably made reference to the teacher-centered teaching and learning method and thus a new term may have been more acceptable. Further, the change may have happened on a knowledge basis as a more descriptive term encompassing new effective procedures giving the learners opportunities to interact. An additional reason for the shift may have been because of Swanson et al. (as cited in Hughes et al., 2017) studies in which the term label strategy instruction emerged which required the instruction and use of more complex skills and elaborate modeling. Finally, a possible reason contributing to this shift may have been the development of cognitive learning strategies and procedures during which LD learners had to be both explicitly taught and follow a number of steps (e.g. self-monitoring, self-evaluating, Hughes, 2011). Taking into account the above mentioned reasons, it is clear that the term explicit instruction comes from Direct Instruction. However, the important thing to note is that both of them are effective for students with LD (Hughes et al., 2017).

Hughes et al. (2017) argue that Direct Instruction and explicit instruction have similar instructional components. On the one hand, Direct Instruction has scripted instruction and is very highly structured and meticulously organized through curriculum sequence. Thus, it includes both curriculum (what to teach) and instruction (how to teach). On the other hand, explicit instruction focuses mainly on the instruction (how to teach). Additionally, direct instruction (written with lower-case letters), another similar instructional approach was developed due to national research efforts during the 1970s and 1980s. However, direct instruction does not include curricula and scripted lessons

as Direct Instruction does. However, they overlap to a great extent and many may argue that they are fundamentally the same.

5.1.2.1 Direct Instruction

Hughes et al (2017) cite that Direct Instruction (DI) is an instructional approach/model first developed at the University of Illinois Institute for Research on Exceptional Children in 1960s. and is based on the analysis of three knowledge systems (Engelmann & Carnine, 1982): a) *analysis of communications* between instructors and learners were utilized so as to develop the clarity and simplicity of the language that teachers use to present notions in a way that permits learners to understand critical and important features and characteristics of content and how it associates or differs with similar content, b) the second analysis examined the way knowledge is organized and then, based on this information, the selection of the scope and sequence of curriculum was done so that students can have the chance to learn effectively and efficiently (teaching skills that can be generalizable, focusing on big ideas), c) finally, *applied behavior analysis* was used in order to determine universal principles about the way the environment influences behavior. These three analyses are the basis in order to design and deliver instruction.

When it comes to vocabulary, Direct Instruction “*includes an explicit, systematic presentation of a word and its meaning*” (Swanson, Hoskyen, & Lee, 1999; as cited in Jitendra, 2004:). During DI of vocabulary, teachers make sure that students have understood the target words, promote all students’ active involvement through teacher-guided applications and finally make the students responsible for their own independent word learning.

5.1.2.2 Explicit Instruction

As cited in Hughes et al. (2017:14) and as regards the definition of explicit instruction, it is not a unitary intervention but a grouping of teaching components used to plan and deliver instruction. This multicomponent aspect of explicit instruction may add and

explain the variability of definitions found in the literature. The below definition is based on the review of the literature conducted by the above mentioned authors and most importantly is based upon the systematic selection of the most common components used to describe explicit instruction in their sample of the literature. Five common instructional components were identified and characterized as “essential” at 75 percent of the 68 publications included in the sample. Seven additional components were found in 50-74 percent of the publications reviewed and were also characterized as common by the authors but were excluded from the definition. Thus, based on the five most common and important instructional components, explicit instruction is defined as a “*group of research-supported instructional behaviors used to design and deliver instruction that provides needed supports for successful learning through clarity of language and purpose, and reduction of cognitive load. It promotes active student engagement by requiring frequent and varied responses followed by appropriate affirmative and corrective feedback, and assists long-term retention through use of purposeful practice strategies*”. The Essential components of explicit instruction are presented below as cited in Hughes (2017:2-4):

a) Segment Complex Skills

The most commonly identified component was segmenting or chunking complex and difficult tasks and strategies into small and more controllable units or subskills. These chunks are taught separately following a logical sequence so as the cognitive load and difficulty to be decreased (Archer and Hughes, 2011 as cited in Hughes et al., 2017). When students master the first chunk, then they can move to the next one and so on. During the procedure, the previous mastered chunk must be integrated (e.g. through practice) with the new chunk so as a final integration of all chunks to be achieved in an instructional chain and practiced together as a whole with authentic tasks. Chunking is usually selected when teaching multistep strategies teaching a step at a time following the above procedure (Hughes, 2011; Swanson & Deshler, 2003; Swanson & Hoskyn, 2001; as cited in Hughes et al., 2017).

b) Draw student attention to important features of the content through modeling/think-alouds

This component aims at providing the learners with “*clear, concise and consistent descriptions and demonstrations*” on the way the target skills or strategies are

performed. Instructors use modeling and think-alouds in order to make the processes of learning explicit by showing (e.g. key physical actions) and telling (e.g. think-alouds) how to handle and solve problems or complete tasks. The descriptions and presentations are provided by the instructors using words students understand (clear), avoiding unnecessary words (concise) and by using the same key words (consistent), if needed, during the lesson as much as possible. Clear language use during teaching has been recognized to have a great impact on learning in both typical and LD students (Hattie, 2009; Hollo & Wehby, 2017; as cited in Hughes et al., 2017).

c) Promote Successful engagement by using systematically faded supports/prompts

When a strategy or skill has been modeled the instructor provides opportunities for practice promoting learners' accuracy and confidence supporting them with scaffolding guidance by using visual, physical and verbal prompts. The prompts are gradually withdrawn (fading) as learners exhibit accuracy of the target skill. Fading continues until learners can practice without using prompts but always under teacher monitoring so that he can verify when they are ready to practice autonomously (Hughes et al, 2017).

d) Provide opportunities for students to respond and to receive feedback

During an explicit lesson the instructor must elicit the learners' responses in order to continuously engage them in the learning procedure and get their attention. Further, the instructor gets continuous feedback about learners' understanding and performance and has the chance to provide them with corrective and affirmative feedback having the opportunity to adjust his instruction (Heward & Wood, 2013; as cited in Hughes et al., 2017). Learners' responses may be individual, pair or group and can be of various modalities (written, oral, action). Further, the responses can be assisted by using scaffolded help, for example, writing frames, sentence starters and simplification of questioning (Hughes et al. 2017).

e) Create purposeful practice opportunities

A lesson is followed by independent practice tasks and activities which are essential in order to generalize knowledge and the target new skill. The independent activities are most effective when designed in an intentional and purposeful way (Hattie,

Marsh, Neil, & Richards, 1997; as cited in Hughes et al., 2017) particularly for students with LD (e.g. Fucks & Fucks, Schumacher, & Seethaler, 2013; as cited in Hughes et al., 2017). Independent practice activities can be employed for various purposes using a range of formats and a range of learner arrangements such as groups, paired or individual. Despite purpose, format and arrangement, practice is identified as up to three times more effective when it is followed by corrective and affirmative feedback (Hattie & Yates, 2014; as cited in Hughes et al., 2017).

Further components of explicit instruction identified in the literature are the selection of critical content skills being logically sequenced, verification of students' prerequisite skills and background knowledge, provision of students' clear statement of goals and expectations, presence of a wide range of examples and nonexamples, a brisk pace maintenance, presentation of information in ways that help students organize knowledge. The abovementioned components are not new as explicit instruction is not a new instructional method. Rather, and it is related to direct instruction (Hughes et al., 2017).

5.1.3 Cognitive Strategy Instruction

Cognitive strategy instruction involves students drawing diagrams or frameworks of the associations among words according to their use. Bos and Anders (1990; as cited in Jitendra et al., 2004) developed an intervention experiment for vocabulary learning for students with learning disabilities. A series of ten similar experiments were conducted by Bos and his colleagues providing support for the use of interactive cognitive strategies to promote vocabulary learning in students with LD. Semantic Mapping (SM), Semantic Feature Analysis (SFA) and Semantic/Syntactic (SSFA) are three interactive cognitive or concept enhancement strategies that are developed to assist students classify words by noting differences and similarities among associated ideas. Three different strategies are found to be developed, the Semantic Mapping (MP), Semantic Features Analysis (SFA), and Semantic/Syntactic Features Analysis (SSFA). In Semantic Mapping (SM) students produce a map that shows visual diagrams of the associations among the target vocabulary items.

In Semantic Feature Analysis (SFM), an association matrix is developed by assigning the superordinate concept as the title. The words representing the coordinated concepts are put along the top of the matrix and the words that represented the subordinate concepts are put on the side. In the SSFA condition, students complete a relationship chart as well as completing cloze-type sentences which are developed according to the association chart that was utilized.

5.1.4 Peer-Based Approaches

Kuder (2017) cites that the peer-based methods such as cooperative learning (Okilwa & Shelby, 2010) and peer tutoring (Jenkins, Antil, Wayne, & Vadasy, 2003) promote the learning of students with LD. When it comes to vocabulary learning, two methods have been identified in the related literature and are presented below.

a) Cooperative learning

Shook, Hazelkorn, and Lozano (2011) used Collaborative Reading Strategy (CRS) to instruct science vocabulary to an inclusive biology class. CRS engage groups of learners at a different ability level, who collaborate and use a range of learning tasks/exercises to enhance their understanding of a particular subject (Klingner et al., 2004; as cited in Shook et al., 2011). CRSs can be effective for all students as they support learning and cultivate respect and friendship among different groups of students (Colorín Colorado, 2007; as cited in Shook et al., 2011). Cooperative learning can also support teachers with alternative methods of lecture, demonstrations, and autonomous study. CRS employs four strategies to improve reading skills and are (Shook et al, 2011):

- *Previewing*: before reading the text students brainstorm and activate their existing knowledge and make predictions as to what they will learn from the reading.
- *Click and Clunk*: while reading, students use the Click strategy if they have understood the part of the text, and the Clunk strategy if they have not understood a part of it. Then, they utilize the

- *Get the gist*: the get the gist strategy is employed by students when they have not understood a part of the text. They actually try to identify and summarize the main ideas in various sections of the text.
- *Wrap-up and Review*: Students summarize and review all they have understood in the topic and are ready to form and answer questions about their own learning.

b) Class-wide peer tutoring (CWPT)

As reported in Hughes and Fredrick (2006), classwide peer tutoring is an instructional method that aims at engaging all students with the curriculum content at the same time via mutual peer tutoring opportunities by employing basic CWPT approaches including partner pairing, competing teams, immediate error correction, and contingent point earning and posting of individual team performance. The CWPT method was designed by the Juniper Gardens Project as a strategy to promote low-achieving minorities, disadvantaged or mild disabled students' academic achievement (Delquadri, Greenwood, Whorton, Carta, & Hall, 1986; as cited in Hughes & Fredrick, 2006). Studies conducted with students with mild disabilities, and students who were low-achieving minority have demonstrated an increase in math, reading, social studies, spelling, and vocabulary skills with CWPT (Delquadri, Greenwood, Stretton, & Hall, 1983; Greenwood, Delquadri, & Hall, 1989; Harper, Maheady, Mallette, & Karnes, 1999; Maheady, Sacca, & Harper, 1988; as cited in Hughes & Fredrick, 2006).

5.1.5 Fluency Building Vocabulary Practice

Fluency building vocabulary practice exercises in LD students were examined in one article that included two studies (Stump, et al., 1992; as cited in Bryant et al., 2003). In this type of vocabulary instruction, the teachers introduce and explain the unit vocabulary words and the related concepts in the entire class. Then, students study the target vocabulary words independently for five to ten minutes. Following the study procedure, students are given three minutes to fill in a quiz with as many items as possible. Next, students exchange and correct the quizzes. Finally, the correct and incorrect answers are recorded in data sheets. This intervention lasts for two weeks

during which students work in pairs and practice the target vocabulary with the definitions for five to ten minute.

5.1.6 Learning Strategies

Harris, Schmaker, and Deshler (2011), in their study, characterized as generative and non-generative two instructional approaches to teach vocabulary. A Generative approach to vocabulary learning can be defined as an approach that instructs not only the meaning of a specific given word but also teaches how to identify and understand the meaning of new vocabulary items associated to the word given. A non-generative approach teaches students the meaning of specific targeted vocabulary through the help of a strategy or a device but cannot teach or be applied to new vocabulary. Below two strategies, the Word Mapping Strategy and the LINC strategy are presented.

5.1.6.1 Word Mapping Strategy

Morphemic Analysis instruction is a generative approach that can be used in order to provide vocabulary instruction to students with learning disabilities (LD) in order to learn the meaning of thousands of words (Blachowicz & Fisher, 2000; Ebbers & Denton, 2008; Graves, 1986; Nagy & Scott, 2000; as cited in Harris et al., 2011). Morphemic analysis includes obtaining the meaning of a word by combining the meaning of the parts (morphemes) of the word according to Spencer (2001) (as cited in Harris et al., 2011). The word parts with meaning are a) prefixes, b) roots, and c) suffixes. Harris et al. (2011) cite Nation (1990) that supports that morphemic analysis involves three skills: a) segmenting the new word into its morphological parts, b) linking a meaning to these parts, and c) combining the meanings of all three parts so as to define the word.

Harris et al. (2011) compared the effectiveness of the Word Mapping Strategy (WMS). The Word Mapping Strategy (WMS), a generative morphemic analysis strategy is a set of cognitive and behavioral stages learners use in order to predict the meaning of the targeted unknown words. It includes the use of four steps:

Step 1: Segmenting words into their morphemic parts (prefix, suffix, root)

Step 2: Giving meaning to each word part

Step 3: Predicting the meaning of the unknown word based on the meaning of the parts

Step 4: Looking up the dictionary for the definition and getting feedback for their prediction

Additionally, the mnemonic device MAPS is used through the whole procedure. MAPS is a graphic device that assists students learn and remember the names of the above four steps (Harris et al., 2011).

5.1.6.2 Vocabulary LINC Strategy

Harris et al. (2011) cites that the LINC Vocabulary Strategy (Ellis, 1992), a non-generative vocabulary strategy, is a set of cognitive and behavioral steps that learners can utilize in order to help them learn and recall the meanings of vocabulary words. It involves the employment of a set of mnemonic strategies that consist of (a) a keyword strategy, (b) a visual imagery strategy, (c) a story strategy to relate known word items and information to new vocabulary items and their definitions, and (d) a self-testing method used while practicing recalling the meaning of the word. The mnemonic device LINC helps students remember the steps which are presented below (Harris et al., 2011:22):

Step 1: Students write down the targeted word and its definition.

Step 2: Students name a Reminding Word that resembles the target new word.

Step 3: Students must produce a LINCing Story, a statement or expression that comprises both the Reminding Word and the definition.

Step 4: Students must draw a picture that comprises the significant elements of the story.

Step 5: Students must self-test using a process that assists them recall both the word and its meaning. During the self-test process, the students pronounce the word to themselves, think of the Reminding Word, think of the LINCing Story, think of the picture they have drawn, and finally remember the definition.

5.1.7 Activity-Based Instruction

In Jitendra et al. (2004), one study was identified to test the method of activity-based vocabulary instruction to LD students. During this method, vocabulary is instructed within the context of specific activities which are designed to be developmentally appropriate for the students. Students interact with new vocabulary terms by engaging in practical and hand-on learning.

5.1.8 Constant Time Delay

Hughes and Fredrick (2006) argue that Constant Time Delay (CTD) is a prompting procedure that requires immediate and multiple responses from the students and includes an almost-errorless approach to learning, offering regular opportunities to respond, and finally immediate feedback for students' responses. CTD is a methodical procedure that offers models of the accurate response until students can reply autonomously without the model. The model usually consists of flash cards showing the target skills to be learned. During the first trials, the students are offered the correct response immediately after the task request (0-s delay trials) for a prearranged number of trials. During the following trials, students are given the chance to respond before the answer is offered (e.g. 3 or 5 s wait time). Touchette in 1971 (as cited in Hughes & Fredrick, 2006) initially developed time delay to instruct plain form discrimination to teenagers with severe mental retardation. Later on, CTD has been employed to instruct separate educational skills such as sight word reading, spelling, and math (Gast, Ault, Wolery, Doyle, & Belanger, 1988; Hughes, Fredrick, & Keel, 2002; Koscinski & Gast, 1993; Stevens & Schuster, 1988; as cited in Hughes & Fredrick, 2006) and sequenced tasks such as preparing food and vocational tasks (Schuster, Gast, Wolery, & Guiltinan, 1988; Wolery, Ault, Gast, Doyle, & Griffen, 1990; as cited in Hughes & Fredrick, 2006).

5.2 Vocabulary Instruction Practices to Students with LD in Second/Foreign Language

Supportive Feedback Strategies

Supportive Feedback (SF) is a supportive mechanism of explicit instruction that aims at instructing and supporting the learning process. The notion and the term of Supportive Feedback was first introduced in Ypsilandis (2002) and then first examined in Ypsilandis (2006). Contrary to corrective feedback, its aim is not to correct the erroneous utterances produced by the learner but it aims at supporting and boosting the learning process and, thus, assist learners at an early stage before they produce any utterances. According to Ypsilandis (2006) two significant forces have led to the conceptualization of feedback as a supportive mechanism. First, language pedagogy has directed its attention from teachers to learners and from teaching to learning. Hence, great attention has been drawn to individuals' learning processes and abilities and how these processes are supported. Second, advancements in technology and software development have assisted learners with information provision and support through hypertexts, videos, pictures, and audios in CALL environments. Supportive Feedback aims at assisting and offering more information for the comprehension of the learning material (input) and promotes retention of it in short and finally long-term memory. Supportive Feedback is provided to the learner after upon his/her inquiries for more clarifications on the learning material and it can be delivered by the teacher, a classmate or software before learners produce any erroneous utterances (Ypsilandis, 2014).

In all Ypsilandis (2006, 2014) experiments different types of Supportive Feedback strategies were examined for their effectiveness in L2 vocabulary retention on a CALL environment in Typically Developing children (TD). In Ypsilandis (2006) explicit morphosyntactic information upon unknown vocabulary items in a hypelinked computerized test was offered through SF strategies and vocabulary retention in short and long-term memory was later examined. Results showed an advantage for the explicit rule clarifications as a SF strategy and particularly the kind of SF strategy which provided explicit morphosyntactic information (engaging the learner) accompanying with an off- screen task to be completed by the subjects. Further, in Ypsilandis (2014) study that included three similar repetitive experiments conducted in 2004, 2005 and 2006 different types of SF strategies were compared, all of which provided explicitly clarifications (morphosyntactic information) on unknown vocabulary of a hyperlinked computerized test. The effectiveness of each type of SF strategy upon vocabulary

retention in memory was tested. Results did not indicate any significant differences among SF strategies tested. As already mentioned above, in Ypsilandis studies the variable typical/non-typical development was not taken into account and mostly adults participated in the experiments.

However, Kotsoni (2017) conducted an experiment aiming at contributing to both Second/foreign language learning and Learning Disabilities fields by extending Supportive Feedback L2 vocabulary research to both students with typical development and children with Learning Disabilities. In this study, learners read a hyperlinked text with 10 unknown vocabulary items. Supportive Feedback provided the learner with morphosyntactic information for the unknown target words and more specifically, the definition of the word item in L2, an example and then the translation equivalent in the learner's L1. Two types of Supportive Feedback strategies were examined in TD and LD children, the Traditional and the Experimental strategies. Half of the words were supported with the Traditional SF strategy and half with the Experimental one:

- a) The Traditional (direct) Supportive Feedback strategy provided all the morphosyntactic information at once only in one page requiring from the learner to only click once on the word in the hyperlinked text in order to get the information for the unknown word,
- b) The Experimental (engaging) Supportive Feedback strategy which tried to engage the learner in an engaging hybrid condition. It offered morphosyntactic information in three successive pages requiring from the learner to move on to get more information by clicking the relevant link to the next page. Hence, the learners were engaged actively in their own learning procedure by energetically requiring more clarifications for the unknown word in the hyperlinked text.

Further, kotsoni and Ypsilandis (2018) tested and compared the Experimental and the Traditional Supportive Feedback strategies in Typically Developing children and children with Learning Disabilities on two different types of foreign language vocabulary items, namely, individual words and multi-word items in their retention in short and long-term memory.

5.3 Vocabulary Instruction Practices to Students with LD in CAI and Multimedia Instruction

Computer Assisted Instruction and multimedia instruction is being used in contemporary classrooms to support and supplement instruction, to offer students drill –and-practice on fundamental skills and assist with the instruction of content knowledge. The use of a range of technologies and appropriate applications have been found to assist the learning of students with disabilities (Jitendra et al., 2004; Kuder, 2017). In this chapter, CAI and multimedia instruction such as video anchors and podcasts are discussed.

5.3.1 CAI Instruction

Bryant et al. (2003) cites Johnson, Gersten, and Carnine (1987) who used CAI as a means of vocabulary instruction in a resource room where 25 students with LD in grades 9-12 worked independently and individually on computers without teacher instruction. There were two different CAI programs, the small teaching set (STS) and the large teaching set (LTS) in both of which the same 50 words were instructed in 11 20-minute sessions. Multiple choice, sentence completion exercises and arcade games were provided. In the STS, a bank of 7 unknown vocabulary items was identified and individualized for each different student. The exercises for practicing the words included three types of multiple choice items: a) the unknown word appeared alone and its correct definition was one among five options given, b) the unknown word appeared in a sentence with its correct definition was again among five options given and, c) a synonym appeared in a sentence with the correct unknown word among five options given. The criterion set for mastery of the word was when students identified the meaning of the unknown word four times in a row in two lessons. A further part of the program involved a cumulative review of ten mastered vocabulary items. The words that were not learnt by students were put back in the practice procedure and had to be mastered again. In the LTS, there were two sets of 25 words which were not individualized for each student which means that some of them were already known by some students. The program had a menu of four format choices given: word display, a

multiple choice quiz, sentence completion and an arcade game. Word displays and multiple choice quizzes were similar to the STS program. Sentence completion required spelling of the new words while the arcade game involved matching exercises. Students could play the arcade game only after mastering 84% and could move on to a new activity when scoring 84 % correct answers for two consecutive days. When students met the criterion set of scoring two days at 84%, then they could move on to the next set of 25 words following the same procedure. Upon completion of all activities for both lists of 25 words meant mastery for the program.

Jitendra et al. (2004) cited Boettcher (1983) who tested the effectiveness of the computer-based reading program Reading Comprehension System (RCS). This program was designed to diagnose and provide practice in five comprehension skills. The five targeted comprehension skills included a) semantics (e.g. antonyms, synonyms, and simple analogies), b) syntax (e.g. sentence structure, word order, c) relationships (e.g. comparisons and relationships between words), d) inferences (information implied, not explicitly stated, and in text), and e) interpretation (recognizing main characters, and generalizations based on story information.

Another computer-based vocabulary program (Horton, Lovitt, and Givens, 1988; as cited in Jitendra et al., 2004) that taught geographical terms was examined for its effectiveness in 6 students with LD in ninth grade. The students took part in computer sessions that were based on a pretest, practice, posttest procedure. Students were given self-paced computer-based individual vocabulary instruction on different word sets in a computer lab.

Jitendra et al. (2004) reported Herbert and Murdock (1994) who compared the effectiveness of three different output modes of CAI (no speech, digitized speech, and synthesized speech) to teach words to three LD students by using a single-subject alternating treatments study design. The Word Attack Plus program that offered definitions of the words, multiple choice tests and contextual sentences was also used along with all three different modes.

5.3.2 Video anchors

Jiendra et al. (2004) cited Koury (1996) who conducted a study using video anchors integrated with CAI in order to assist and promote the connection between already existent prior knowledge and new science vocabulary terms. In this study, the researchers aimed at preteaching new science vocabulary words before using the textbook with and without the use of video anchors. Anchored instruction is believed to help students activate background knowledge and thus facilitates their understanding of complex texts through presentation of visual supporting especially at-risk students (Bransford, Sherwood, Hasselbring, Kinzer, & Williams, 1990a).

5.3.3 Podcasts (Caps)

Content Acquisition Podcasts (CAPs) are multimedia-based instructional vignettes. Vocabulary CAPs provide student-friendly definitions and Evidence-Based Practices (EBPs) to assist learners comprehend key vocabulary terms. They include pictures and occasionally short texts together with carefully produced narration on relatively short instructional vignettes. Researchers have used CAPs with students with and without Learning Disabilities in two studies (Kennedy, Thomas, Meyer, Alves, & Lloyd, 2014; Kennedy, Deshler, & Lloyd, 2015). CAPs make certain that images depicted in these (both pictures and texts), and narrations are essentially related to the content that is presented trying also to assist learners to develop a routine in order to recognize the structure of each video vignette. Six instructional practices found in the empirical literature on vocabulary instruction (e.g., Bryant et al., 2003; Ebbers & Denton, 2008; Jitendra et al., 2004) that are embedded in the instructional format which is used in CAPs. These are cited below by Kennedy et al. (2015:26):

- a) *Promoting word consciousness. For example, spelling, pronunciation, syllables, prefix, suffix, root words* (Reed, 2008),
- b) *providing direct instruction of word meanings* (Archer & Hughes, 2011),
- c) *providing guided practice and scaffolding* (Dexter et al., 2011),
- d) *providing instruction that promotes awareness of closely related terms* (Graves, 2006),
- e) *using the keyword mnemonic strategy* (Mastropieri, Scruggs, & Levin, 1987),
- f) *providing a statement of purpose/rationale for why the student needs to learn a given term or concept* (Deshler & Shumaker, 2006).

Further, CAPs are based on Mayer’s 12 instructional principles in order to instruct vocabulary effectively in any content area (Mayer, 2008, 2009; as cited in Kennedy at al. 2015). Mayer’s instructional model CTML is an instructional theory and empirically based learner-oriented model that helps educators and instructional designers to promote understanding on how to use visual and auditory inputs when producing multimedia for learning tasks. Mayer’s design operates as a framework based on 12 principles that function together so as to minimize cognitive load and promote human ability to learn (DeLeeuw & Mayer, 2008; as cited in Kennedy at al. 2015). Each of the twelve principles is supported at least by 3-17 experimental studies (Mayer, 2008, 2011; as cited in Kennedy at al. 2015), some of which are the coherence principle, signaling principle, and redundancy principle. Table 1 presents a complete description of Mayer’s model with the 12 principles and how CAPs reflect these principles.

Research-Based Instructional Design Principles (Mayer, 2008; 2009)	Sample CAP - https://vimeo.com/39293791	Principle Met?
Coherence - Instructional materials are enhanced when irrelevant or extraneous information is excluded	The CAP only contains information relevant to the history term/concept being presented	Yes
Signaling - Learning is enhanced when explicit cues are provided that signal the beginning of major elements	There are recurring explicit cues to signal the beginning of a new section (e.g., definition, synonym, antonym, mnemonic)	Yes
Redundancy - Inclusion of extensive text (transcription) on screen along with spoken words and pictures hinders learning. Carefully selected words or short phrases, however, augment retention	The CAP only contains carefully selected key text	Yes
Spatial Contiguity - On screen text and pictures should be presented in close proximity to limit eye shifting	The on-screen text and pictures are presented in close proximity to one another	Yes
Temporal Contiguity - Pictures and text shown on screen should correspond to the audio presentation	Pictures and text correspond to the audio presentation	Yes
Modality - People learn better from spoken words and pictures than they do from pictures and text alone	Pictures and narration are used	Yes
Segmenting - People learn better when multimedia presentations are divided into short bursts as opposed to longer modules	The CAP is 2:52 long	Yes
Pretraining - People learn better when given an advance organizer or preliminary instruction for the content being introduced	The CAP begins with an explicit statement of purpose and an advance organizer for the term	Yes
Multimedia - People learn better from pictures and spoken words than from words alone	The video contains pictures and narration	Yes
Personalization - Narration presented in a conversational style results in better engagement and learning than more formal audio presentations	The narrator uses a conversational tone throughout the video	Yes
Voice - People learn better when narration is clearly spoken with respect to rate and accent	The narration is not unusual with respect to rate or accent	Yes
Image - People learn better when images are non-abstract, and clearly represent the content being presented	The pictures shown on screen are not abstract, and seem to represent the core content	Yes

Figure 3. Mayer’s 12 Instructional Design Principles and Corresponding Evaluation of Sample content acquisition podcast (CAP).

The six elements of effective vocabulary instruction, discussed above, combined with Mayer’s 12 instructive principles depicted in the table were adopted in order to create CAPs (see Kennedy, et al., 2012) which may be the foundation for an effective multimedia-based practice (as cited in Kennedy et al., 2015).

Chapter 6

Methodology

The purpose of this study is to review empirical research on second/foreign language vocabulary instruction to students with Learning Disabilities. In this chapter, the literature search procedure and the design of this review are presented.

6.1 Design

The registered scope of the study is explored through a thorough and systematic investigation of secondary sources despite the fact that a pilot on the topic revealed that research on second/language vocabulary learning in CALL or non-CALL environments was practically non-existent, except one study in the field, conducted by Kotsoni (2017) in the form of an MA dissertation and an article published by Kotsoni and Ypsilandis (2018).

Given the fact that: a) vocabulary learning in the first language is highly associated with vocabulary learning in the second/foreign language, b) language learning difficulties in children with LD were also attributed and associated to native language learning difficulties (Cohen, 1983; Lefebvre, 1984; Levine, 1987; Pompian, 1986; cited in Ganschow, Sparks, Javorsky, 1998), and c) according to which LCDH (Sparks et al., 1989; as cited in Ganschow et al., 1998), native phonological/orthographic, semantic and syntactic language skills depend on fundamental language mechanisms and difficulties which are likely to negatively affect both native and foreign language learning (Ganschow & Sparks, 1995, 1996; Ganschow et al., 1994; Ganschow et al. 1991; Sparks & Ganschow, 1993a, 1993b, 1993c, 1996; Sparks, Ganschow, Javorsky, Pohlman, & Patton,

1992a, 1992b; as cited in Ganschow et al., 1998), it was decided to start from and investigate the mirror field, that is vocabulary instruction in the first language of children with LD. Following the above argument, this work initially reports and investigates studies of vocabulary learning in first language settings, and accounts on findings resulting from that angle. Then, the two studies regarding second/foreign language vocabulary in the LD conducted by Kotsoni (2017) and Kotsoni and Ypsilandis (2018) are discussed and finally research integrating computers is considered.

6.2 Literature Search Procedure

Any empirical study and its findings is considered a subject in this study. Subjects were located through bibliographical electronic research with the use of the following keywords: “learning disabilities” and “learning difficulties”, “foreign language vocabulary instruction” and “second language vocabulary instruction”. These specific keywords were used in article titles, abstracts and keywords in all dates in Wiley Online Library. The same search was also conducted in the entire database of Sage Journals initially, and later, more specifically, in the following journals: *Journal of Learning Disability*, *Learning Disabilities Quarterly*, *Psychology Learning and Teaching*, *Remedial and Special Education*, *The Journal of Special Education*, *Teacher Education and Special Education*, *Second Language Research* and *Journal of Special Education and Technology*.

The above searches were conducted in December 2017. It must be noted that other sources (e.g. dissertations) were not included in the search. In December 2018 a final further search was also conducted: a) in Google Scholar with the same keywords, (in the first twenty shown pages). No further studies of foreign/second language vocabulary instruction to students with Learning Disabilities were located, b) a final additional search was performed, with the same keywords, looking at the first 5 pages of electronic databases of Willey Online, Sage Journals, Science Direct, and Taylor and Francis.

Chapter 7

Findings

A first research on the topic indicated that published empirical research on second/foreign language vocabulary instruction to LD students was non-existent to the best of the author's knowledge apart from one conducted by Kotsoni (2017) in the form of an MA dissertation and an article published by Kotsoni and Ypsilandis (2018). Three reviews of the research were identified that examined vocabulary instruction to LD students without making reference on the title whether the studies regarded participants' first or second/foreign language. These are presented below.

The first review reported the empirical research on vocabulary instruction to secondary students with LD (Bryant, et al, 2003). The purpose of their review was to summarize the outcomes of different vocabulary interventions and register their implications for vocabulary instruction. Based on specific selection criteria, six articles were spotted from 1978 to 2003 (see Bryant et al., 2003) and then analysed them into four categories, computer-assisted instruction (CAI), fluency-building vocabulary practice activities, mnemonic strategy instruction, and concept enhancement instruction.

The second review of the research was conducted by Kuder (2017) and was an update and extension of the Bryant at al. (2003) review. The purpose of the study was to update the previous review of research on vocabulary instruction for secondary students with LD from 2003 to 2016. Research in the related literature based on specific criteria seven studies were identified and were included in the updated review (see Kuder, 2017). The instructional methods that were identified and categorized were five; the mnemonic

instruction, learning strategies based on morphemic analysis, direct instruction, multimedia instruction, and peer-based instruction.

The third review of research that was identified was by Jitendra, Edwards, Sacks, and Jacobson (2004) which examined published research on vocabulary instruction to students with LD from 1978 to 2002. The studies included elementary, junior and high school students diagnosed with LD. Nineteen vocabulary studies that consisted of twenty-seven investigations were identified. For further selection criteria see Jitendra et al (2004). The instructional methods that were identified were: keyword or mnemonic instruction, cognitive strategy instruction, direct instruction (DI), activity-based methods, constant-time delay (CTD), and computer-assisted instruction (CAI). Some of the studies were included in two of the above reviews.

In this study, all the studies located in the three previous mentioned reviews of research, while where possible, the original research studies that were attempted to be spotted were presented below in more detail, were organized and discussed into the below categories according to our hypotheses: a) research on vocabulary instruction to LD students in the first language, b) research on vocabulary instruction to LD students in the second/foreign language and, c) research on computer-assisted vocabulary instruction (CAI) to LD students.

Results from all studies are presented and discussed below, initially independently and at a later stage in a summative review format at the discussion. The classification follows a systematic recording according to the vocabulary strategies tested in a chronological manner. In particular, the variables tested, the design and procedure and the results accomplished are presented.

7.1 Research on Vocabulary Instruction to Students with LD in the First Language

Research in the related literature, according to the search criteria mentioned in the methodology, indicated that almost all studies regarding vocabulary instruction to LD students spotted were in the students' first language. Note that the studies presented in the CAI and multimedia chapter are also in the students' first language. In this chapter, findings of the studies in the first language are presented according to the type of vocabulary intervention/strategy categorized by the researchers of the three above-mentioned reviews. Strategies were categorized as keyword or mnemonic strategies, direct instruction (DI), cognitive strategy instruction, peer-based approaches, constant time delay (CTD), fluency building vocabulary practice activities, learning strategies (Word Mapping Strategy and the LINC strategy), and activity-based method.

7.1.1 Mnemonic Strategy Instruction

In Jitendra et al. (2004) six studies were reported that registered the effect of mnemonics as a vocabulary instruction intervention for LD students. Three of these studies were also included in Bryant et al. (2003) review of the research.

The first study is by Mastropieri, et al. (1985) (as cited in Jitendra et al., 2004) who conducted two experiments to measure the effects of the keyword mnemonic strategy. In the first experiment, 32 students with identified LD in Grades 7, 8, and 9 were randomly allocated to one of the two conditions, direct instruction or mnemonic strategy, and specific material was designed for each one. For the mnemonic condition, a card showed the vocabulary word, the acoustically similar keyword interacting with each definition (mnemonic pictures). For the direct instruction condition, only the vocabulary word and its definition were written on index cards. An experimental intervention session was allowed where students had to learn the words. At the end of the intervention, vocabulary words were examined on a quiz at random order. Results showed that the students who were assigned in the mnemonic intervention outperformed the ones assigned in the direct instruction intervention.

In the second experiment, the same researchers tried to examine the effects of student-generated interactive pictures (mnemonic imagery). 37 students with LD in Grades 6, 7,

and 8 had to construct an interactive picture on their own for the vocabulary words. Researchers compared this mnemonic strategy to the same direct instruction experiment implementation procedures as in the first experiment. The results indicated again that the mnemonic imagery intervention was more effective compared to direct instruction as far as vocabulary learning and more specifically vocabulary meaning is concerned.

Condos, Marshall, and Miller (1986) studied the mnemonic keyword strategy and its effectiveness for vocabulary learning and retention. The participants were 64 students with LD. They were divided into 32 low and 32 high receptive vocabulary abilities and then were randomly assigned to one of four different experiment conditions, a keyword-mnemonic strategy, picture context, sentence-experience context, and a control group. 50 words had to be learnt in sets of ten that were instructed each week. In the keyword-image condition, participants were required to learn the keyword (phonetic link), then remember the drawing interacting with the definition (imagery link) and finally recall the keyword and the drawing when the word was provided. In the sentence-experience context condition, participants listened to a short passage read by a teacher containing the word and were required to answer a question especially designed to assist them relate the word meaning to a personal experience. Results showed that students in the keyword-image condition scored better compared to students in all other conditions in both immediate and long-term measurements (2 and 8 weeks after treatment). In addition, high receptive abilities students significantly outperformed students with low receptive vocabulary abilities in all conditions in all measurements- immediate and weekly ones. Further, at the eighth week measurement, low receptive vocabulary students in the keyword-image condition outperformed students with both high and low receptive abilities in any other conditions. Findings of this study showed that the keyword mnemonic strategy both promoted participants' vocabulary and also improved their recall performance.

Mastropieri, Scruggs, and Fulk (1990) examined the effect of the keyword condition compared to a rehearsal condition. The participants were 25 middle LD school students in Grades 6, 7, 8 who were given an one-on-one session of 16 minutes , in order to learn

a list of 16 words in two conditions, the rehearsal condition and the keyword one. In the keyword condition, participants were instructed using mnemonic pictures and keywords interacting with the definitions. In the rehearsal condition, participants were instructed the same words by using only drills and practice and corrective feedback without pictorial information. The results indicated that in the production and generalization after intervention tests, the keyword condition facilitated vocabulary retention, recall, and generalization on a new task.

Jitendra (2004) cited Veit, Scruggs, and Mastropieri (1986) study who compared the effectiveness between a mnemonic strategy and a direct questioning condition (Direct Instruction). The participants were 64 students with LD in Grades 6, 7, and 8 who were randomly assigned to one of two instructional conditions upon word parts of dinosaur names, dinosaur extinction and characteristics. Both groups were instructed three sessions associated with parts of dinosaur names, and characteristics. Results showed that students in the condition of the mnemonic strategy significantly outperformed the students who were treated with the direct questioning condition when used loose scoring (exact response for any part or close synonym scored as correct). When using strict scoring (only correct responses scored correct) the students in the mnemonic condition also performed better compared to direct questioning but a statistical significance was not registered. However, the mean score of the mnemonic strategy was also significant higher compared to the direct questioning on both production and identification recall tests related to the content of the three intervention sessions.

Jitendra et al. (2004) cited McLoone, Scruggs, Mastropieri, and Zucker (1986) who examined the effectiveness of a keyword mnemonic strategy and a directed rehearsal strategy. Sixty students with LD in Grades 7 and 8 were assigned randomly to one of the two experimental conditions in order to learn 16 low frequency English words and 16 Italian words. Students in both experimental conditions were instructed to both use the assigned strategy after receiving teacher instruction but also to apply and transfer it independently. In the mnemonic condition, students were taught to produce their own keywords and pictures during completing the transferring task. In the rehearsal condition, students were instructed two steps (to verbally say the word and the

definition) in order to apply the rehearsal condition. Outcomes indicated that both strategies were equally effective in vocabulary instruction to LD students. However, students in the keyword condition scored significantly better compared to the direct rehearsal condition on recall ($ES=3.13$) and transfer ($ES=2.98$) measures.

In sum, Jitendra (2004) argues that mnemonic keyword instruction strategies tested above in six group design studies put emphasis on the importance of the keyword mnemonic strategy over traditional practice and drill methods to enhance LD students' on vocabulary performance (mean $ES=1.93$; $SD=1.03$, $n=5$). More specifically, explicit imagery and phonetic links play an important role and promote recall of the definition of the target vocabulary word. Maintenance and transfer effects were large in the study (Veit et al., 1986) ($ES=1.74$) and (MacLoone, 1986) ($ES=2.98$) respectively.

7.1.2 Direct Instruction

In Jitendra et al (2004) two articles were identified that tested the effects of direct instruction whereas in Kuder (2017) direct instruction was compared to repeated reading. Findings of the studies are presented below. Further, a fourth study conducted by Terill et al. (2004) is presented separately at the end of this chapter as it compares the mnemonic strategy and direct instruction.

Jitendra et al. (2004) reports Pany and Jenkins (1978) who tested the effects of three instructional strategies in relation to the amount of DI that was provided. The participants of this experiment were 6 LD elementary students and they were examined on reading comprehension. The first condition provided no DI in word meanings and the students were assumed to learn the meaning of new words from context (MC) clues while story reading. In the condition where the meanings were given (MG) the instructor gave the students the meanings of the words while they occurred in the story. In the third condition, the students received the most direct instruction. Students practiced the meanings (MP) of the words through flash cards before reading the story. Findings indicated that students in the third condition, MP, outperformed the students in the MC ($ES=5.16$) and MG (4.30) conditions on the immediate vocabulary test. On the

vocabulary words in context test students in the MP condition also scored better than students in the MC (ES=4.62) and MG (ES=3.61) conditions. Further, mean scores registered from pretest to posttest on vocabulary in context test were statistically significant in the MP (ES=4.01) and MG (1.52) conditions only. In addition, significant differences were registered favoring the MP condition compared to MC (ES=3.65) and MG (ES=2.89) on the delayed isolated vocabulary test completed 3 to 8 weeks later.

Pany, Jenkins, and Schrek (1982) (as cited in Jitendra et al., 2004) conducted two similar experiments further providing support for Direct Instruction for vocabulary development. They had the same instructional procedures as in their previous experiment in order to teach vocabulary word meanings. In the Experiment 2, 6 elementary school LD students in Grades 4 and 5 participated and the three instructional procedures were compared to the no-meaning condition in which students just read the word printed on a card. In Experiment 3, the same researchers with 10 elementary school LD students in Grade 4 were tested so as to examine the effects of vocabulary instruction on both sentence and passage comprehension. Findings for Experiment 2 showed that the conditions that required the most Direct Instruction were the most effective for synonyms teaching. On the isolated vocabulary test, practice (PC) condition mean scores were better than given (GC) condition (ES = 2.12), context clues (CC) condition (ES=3.43), and control means (ES=4.50). On the multiple choice test, practice condition (PC) mean scores were better than given (GC) condition (ES = 1.93), context (CC) (ES = 3.19), and control means (ES = 3.19). In addition, significant pretest to posttest differences were registered only for practice (PC) and given (GC) conditions on isolated word and multiple choice vocabulary tests. Maintenance data showed that students retained more words in the practice condition (PC) and significantly scored better than those in the control condition (ES = 0.92) on the delayed multiple choice test. In addition, statistically significant differences were registered from pretest to posttest only for the practice (PC) condition on the isolated word delayed test. Instruction in the practice condition (PC) also led to the best outcomes in sentence comprehension. Further, significant pretest to posttest changes were found for practice group only on both sentence anomaly and paraphrase tests. Results of Experiment 3 indicated that practice on synonyms was much more effective than the no-synonym instruction condition for vocabulary instruction on isolated vocabulary (ES = 36.88) and multiple

choice word tests (ES = 12.60). Further, findings showed positive transfer to passage comprehension tests (ES = 1.96) and sentence anomaly (ES = 10.10) only for the synonym practice condition.

Kuder (2017) reported Seifert and Espin (2012) study who conducted a study and studied the effectiveness of a “vocabulary learning” approach compared to a “text reading” (repeated reading) approach and a third mixed that combined both two approaches to teach vocabulary skills to students with LD in Grade 10 that were in regular education biology class. The vocabulary learning condition used direct instruction during which students were shown flashcards with the target word, the instructor read its definition and an example that the student repeated and finally the instructor asked two questions that aimed at helping students associate the word with information in their textbooks. The text reading condition was aimed at helping students read texts more fluently by using repeated reading intervention such as automatic word identification, adult modeling, reading aloud, repeated reading, and error correction. The combined condition utilized elements of both conditions tested. Findings indicated that students in the vocabulary learning (Direct Instruction) and in the combined condition scored better and learned more words compared to the text reading condition. Nevertheless, students in the repeated reading and in the combined conditions read more words significantly compared to the vocabulary learning condition. However, neither vocabulary learning nor text reading contributed to improving reading comprehension.

To sum up, Jitendra (2004) supports that findings of the effectiveness of DI tested in three group design experiments by both studies conducted by Pany and colleagues (Pany and Jenkins, 1978; Pany, et al., 1982; as cited in Jitendra et al., 2004) which showed that the more DI of word definitions increased, the better performance students had on vocabulary measurements mean (ES = 9.78; SD = 12.97, n = 3) and these were maintained over time (mean ES = 0.97; SD = 1.46; n = 2). Further, Kuder (2017) cites that the findings of the Seifert and Espin (2012) confirm that simple reading for LD students does not result into improved better vocabulary knowledge or improved reading comprehension. On the contrary, instruction aiming at vocabulary knowledge is

necessary and when combined with repeated reading which assists fluency may result in better reading performance for LD students.

In the studies reviewed above, the keyword mnemonic strategy and Direct Instruction was compared to other conditions and results indicated that they were the most effective compared to all the other ones tested. This study is presented here as it reviews the study conducted by Terill et al. (2004) that compares the effectiveness of the two specific strategies, the mnemonic keyword strategy and direct instruction and special attention is worth paying as these two strategies were the most effective when compared to others tested.

Terill et al. (2004) conducted a study with eight students with LD attending 10th grade in a special education class. Students were instructed new vocabulary words using the instructional conditions of the mnemonic keyword strategy and Direct Instruction in alternating order. They were instructed with the one condition for one week and with the other condition the following week for a six-week period. For the mnemonic keyword method students received a packet of pages (included in their vocabulary workbook) containing 10 words, their definitions, the keyword and an illustration so as to link the new word to the keyword. For the students received a packet of pages with 10 words from their vocabulary workbooks with the accompanying practice exercises. Students studied the words through direct instruction (DI) by repeating the words after the teacher and then completed the practice pages which included fill-in-the blank definitions, synonyms and sentence completion activities. Results indicated that students' word recall was more effective in the mnemonic keyword condition with a mean of 27.5 out of 30 vocabulary items (91.7%) compared to the non mnemonic condition where students scored a mean of 14.6 out 30 vocabulary items (48.8%). Further, a statistically significant difference was registered between the two conditions $t(7) = 7.74, p < .001$. Descriptive analysis of each student's scores showed that all students achieved better scores on vocabulary tests in the keyword mnemonic strategy. An additional finding of this study is that generally students indicated a preference for the mnemonic keyword instruction as it both facilitated their learning of words and they

also enjoyed having succeeded as a few of these students had never reached this level of achievement before.

To conclude, this study shows that the mnemonic keyword instruction is significantly more effective compared to direct instruction.

7.1.3 Cognitive Strategy Instruction

In this chapter, ten similar experiments that tested the effectiveness of cognitive strategy instruction through provision of semantic word networks, conducted by Bos and her colleagues and cited by Jitendra et al. (2004) are presented.

As reported in Jitendra et al. (2004) Bos and her colleagues conducted ten similar studies providing support for interactive cognitive strategies. Cognitive strategy instruction offer students a framework for enhancing comprehension of the semantic network of words in order to promote vocabulary learning by students with LD. Interactive cognitive strategies that were designed in order to assist students categorize words through noting resemblances and differences among associated ideas are Semantic Features Analysis (SFA), Semantic Mapping (SM) and Semantic/Syntactic Feature Analysis (SSFA).

Jitendra et al. (2004) cites Anders Bos, and Filip (1984) who, in their first experiment, compared the effects of SFA (Semantic Features Analysis) traditional look-up vocabulary exercise. The participants were 64 LD students. Students in the traditional look-up vocabulary condition were asked to look up ten difficult words in a dictionary and then write a definition and produce a sentence for every word. Students in the SFA condition, after having received clarifications for the major concepts and the related vocabulary, were instructed to rate the words as having “a positive relation”, “a negative relation”, “unrelated” or “do not know the relation” with the concepts. Then, they read the

passage to assess their ratings. Results indicated that students in the SFA condition outperformed students in the traditional look-up condition in both vocabulary (ES=1.35 for vocabulary conceptualization; ES=1.52 for vocabulary comprehension) and (ES=1.70) comprehension assessments.

Bos, Anders, Filip, and Jaffe (1989) (as cited in Jitendra et al., 2004) conducted a second study comparing the short-term and long-term effects of the Dictionary Method (DM) and SFA method in LD students. In the SFA condition, instruction focused on discussion and completion of a relationship chart trying to activate prior knowledge, predicting associations between old and new knowledge and finally producing definitions of unknown vocabulary in context reading a text. Students in the dictionary method condition used a dictionary in order to define words and then to produce sentences for each one. Findings indicated that students in the SFA significantly outperformed students in the dictionary method condition on vocabulary (ES=1.64) and conceptual items (ES=1.63).

In their third study, Bos, Allen, Scanlon (1989) (as cited in Jitendra et al., 2004) investigated the differential effectiveness among SM (Semantic mapping), SFA (Semantic Features Mapping) and SSFA (Semantic/Syntactic Feature Mapping), and Direct Instruction on word knowledge learning and retention. The participants were 42 bilingual (English/Spanish) elementary LD students. In the DI group, instruction included oral recitation techniques, corrective and positive feedback, regular practice and review of the vocabulary and definitions in order to facilitate memory retention of context-related definitions. On the other hand, students in the three cognitive interactive conditions were invited to predict word definitions and to use prior knowledge so as to associate the new words to their personal experiences. Further, the SM group discussed their predicted meanings and also constructed a map, the SFA group completed a relationship chart and finally the SSFA group completed a relationship chart and five cloze-type sentences with information from the chart. Findings indicated that students in the SSFA group significantly outperformed (ES=.49) students in the Direct Instruction group on the vocabulary word tests. No other significant comparisons were registered. On the comprehension tests, students in the SM (ES=.87) and SFA (ES=1.03) groups

scored statistically significant better compared to students in the DI condition. Further, even though written recall posttest scores were all significant better compared to follow-up on holistic and conceptual parts, no significant among group differences were registered.

Jitendra et al. (2004) cited Bos and Anders (1990), in their fourth study, who examined the short and long-term effects of DI, SFA, SSFA, and SM. Participants were 61 junior high school LD students. They were randomly assigned to one of the four different conditions and received instruction. Findings showed that the SFA (ES=1.06) and SM (ES=1.25) groups significantly learned more words compared to the DI group. Further, students in all three interactive instructional groups scored better than the DI group at follow-up tests (mean ES=1.05). Although all three cognitive interactive groups performed significantly better (ES=1.35) on the posttest on comprehension items, only the group in the SSFA condition scored better than DI at the follow-up. No significant differences were registered across the three conditions in short and long-term learning.

Jitendra et al. (2004) report the findings of Bos and Anders (1992) who conducted a fifth study which included a series of six experiments (two experiments in each of the three phases) and offered further support for the interactive cognitive SM, SSFA and SMA strategies. The studies were conducted in three phases with elementary bilingual students with reading/ learning disabilities (n=42, 47, and α 26 in 1st, 2nd, and 3rd Phases respectively) studying social studies and high school students (n= 61, 53, and 22 in 1st, 2nd, and 3rd Phases respectively) studying science. In Phases 1 and 2 students took part in one of the three interactive experimental conditions (SM, SMA, SSFA) in comparison with definition instruction. In the 1st Phase, researchers instructed the students while in the 2nd Phase, special education teachers were the instructors and in the 3rd phase special education teachers implemented the SM and SFA learning strategies and students used them in cooperating groups. Results for the Phase 1 and 2 showed that post-test and long-term effects for the interactive learning strategies in comparison to the definition instruction were substantial for both groups of bilingual elementary LD students (vocabulary test score range E=.50 to 1.28; comprehension score range E=.81 to 1.46) and high school students (vocabulary test score range E=.83 to 1.01;

comprehension test range $E=.78$ to 1.55). Further, the comparison between teachers and researchers' conditions showed similar effects sizes. Results from Phase 3 showed that both elementary (mean $ES=2.82$) and high school students and ($E=3.64$) with LD increased their content knowledge from pre-test to post-test and this learning was maintained at the follow-up measurement a month later.

To sum up, as reported in Jitendra et al. (2004), the ten studies conducted by Bos and colleagues indicated the superiority of the cognitive strategy instruction to other traditional methods (e.g. dictionary method). More specifically, large effects were registered for interactive strategies (SFA, SSFA, SM) (mean $ES=1.10$; $SD=.39$, $n=10$). Additionally, in seven experiments, follow-up effects were large (mean $ES=0.94$; $SD=0.31$), and transfer effects were moderate in two studies (mean $ES=0.59$; $SD=0.45$).

7.1.4 Peer-based approaches

Kuder (2017) cites that peer-based methods that have been found to be effective for assisting students with LD are peer tutoring and cooperative learning. These methods have been examined in vocabulary learning of secondary students with LD in the following two studies.

Hughes and Frederick (2006) combined a peer-mediated method and more specifically, class-wide peer tutoring combined with constant time delay. Class-wide peer tutoring is designed to engage students during reciprocal peer tutoring using educational elements such as teams, partner pairing, immediate error correction provision, contingent point earning and posting of group performance. In the experiment, 19 sixth-grade language arts students participated, three of whom were students with LD in order to learn three sets of vocabulary words from a novel. The participants were given the correct answer immediately following the task demand (0-s delay trials) for ten trials. During the trials, the participant had the chance to answer correctly within 5 s. The students were assessed according to a pre- test and then paired the best scoring students with the ones that performed the worst. Then, they received training on how to tutor and how to use constant time delay and how to provide feedback to their partner. Then, the pairs

collaborated for 16 minutes a day changing tutor and tutee roles for 8 minute each. They continued working together until all three sets of words had been mastered. Results indicated that all three LD students mastered two word sets and two students mastered all three word sets. Further, the LD students learned the words at a similar rate as their peers without disabilities. The generalization probe conducted a week after the end of the tutoring between the peers indicated that LD students could recall all the words they had learned.

Kuder (2017) reports Shook et al. (2011:160) who conducted an experiment using a collaborative learning strategy, the CSR model (Vaughn, Klingner, and Bryant, 2001) in order to teach scientific vocabulary to 26 ninth grade students, six of whom were identified as students with LD and one as other health impaired. The CSR model makes use of four strategies in order to improve reading skills. These include previewing, clicking and clunking, getting the gist and finally wrapping-up and reviewing. First, students previewed the text to get a general idea of the content, they read the text to spot the already understood vocabulary (“clicks”) and the items that were unknown to them (“clunks”). Using a pre assessment test the teacher spotted the “clunks” and used them to assign study groups to review the reading including the vocabulary. The students worked with their groups for ninety minutes two days a week for a total of eight weeks. With the use of pre- post test the researchers found that the participants without disabilities improved by an average 13 points (out of 100 points) but the participants without LD improved by an average 34 points (from 60 to 94 points).

To sum up, Kuder (2017) reports that the two studies suggest that peer-mediated methods could be useful methods to promote vocabulary acquisition of secondary students with LD. Nevertheless, neither of the two studies employed a comparison group and thus it is difficult to determine the superiority of the methods over other methods. Further, both experiments had a small number of participating students and in addition, the number of LD participants was even more limited.

7.1.5 Fluency Building Vocabulary Practice Activities

Bryant et al. (2003) identified one article regarding fluency building vocabulary practice activities in students with LD comprising two studies.

Bryant et al. (2003) reports Stump et al., (1992) who conducted two experiments (the second experiment was a replication of the first one) to test the effects of a vocabulary fluency-building activity upon student's vocabulary learning and retention. Both experiments had the same single-subject design that incorporated a baseline stage. 18 special and general education teachers instructing students in science, social studies, math and language arts took part in Grades 6-12. Teachers introduced and gave explanations upon the unit vocabulary and associated concepts to the whole class. Then, students studied on their own for 5-10 minutes. Then, they were given a quiz to complete the items they remembered in 3 minutes. Next, students exchanged, corrected and recorded data sheets. This intervention lasted for two weeks and students worked and practiced in pairs the vocabulary words and definitions.

In the first study, 18 special education and general teachers who taught grades 6-12 took part. Results indicated that the 236 typically developing students' performance improved as a group from a baseline mean 73% to 85%. 34 LD students in general education class, 72% improved, 8% remained about the same and 20% worsened. 57 LD students in resource rooms, showed 49% improvement, 23% remained the same and 28% worsened.

In the second experiment, the same teachers participated and implemented the treatment. 34 LD students as a group improved from a baseline 52% to 73%. 248 typically developing students improved 21% from 71% baseline to 79%. Finally, 30 LD students in general education class, 70% improved, 10% remained stable and 20% worsened. LD students in resource rooms, 80% improved, 0% remained the same and 20% worsened.

7.1.6 Learning Strategies

In Kuder (2017) one study was spotted that examined the effectiveness of two different types of learning strategies in LD students. More specifically, the study conducted by Harris et al. (2011) examined the Word Mapping Strategy (WMS) which provides morphological analysis and the LINCS vocabulary strategy in which students learnt a mnemonic strategy. The study and its finding are analyzed below.

Harris et al. (2011) compared a generative approach using morphological analysis, Word Mapping Strategy (WMS), to a non-generative approach that employed steps which assisted students to memorize the meaning of words, Vocabulary LINCS (Ellis, 1992). The WMS consists of a set of cognitive and behavioral steps that assist students to predict the meaning of new unknown words. The mnemonic device MAPS also aims at helping students learn and remember the steps which are a) breaking the words into their morphemic parts (prefix, root, suffix), b) meaning attaching to each one word part, c) predicting the meaning of the new unknown word according to the meaning of each part and d) looking up for the definition in the dictionary. They also used a graphic device to help and guide the students with the steps of the strategy. In contrast, the Vocabulary Strategy (LINCS) consists of a set of behavioral and cognitive steps to help students memorize and recall the meaning of words. This procedure uses mnemonic strategies that include a keyword strategy, a visual imagery strategy, a story strategy so as to connect known words and information to new words and their definitions and finally a self-testing method to help word recall. The participants of the experiment were 230 public school students in 9 classes in Grade 9. 206 of them were students without disabilities and 24 of them were previously diagnosed with disabilities. The 9 classes were instructed by three teachers but only two teachers agreed to participate with their six classes. The six classes were randomly assigned to the two intervention groups, the Word Mapping (WM) group and the Vocabulary LINCS (VL) group. The third teacher with her three classes agreed to take part in the experiment as a normative comparison group and serve as a Test-only (TO) group. Results indicated that participants in both groups learned significantly and were able to use the strategy they were instructed. Further, both students with and without LD in both groups made statistically significant learning gains in defining the target words examined. Nevertheless, students in the WMS group outperformed the students in the LINCS group. In addition, although students

with LD significantly made gains on both treatments, they underperformed compared to their peers without LD (Harris et al., 2011; Kuder, 2017).

7.1.7 Activity- Based Method

In Jitendra et al. (2004) a study conducted by Scruggs, Mastropieri, Bakken, and Brigham (1993) was spotted that examined the effectiveness of an activity-based approach compared to a textbook reading approach.

Jitendra et al. (2004) reported Scruggs, et al. (1993) who examined the effects of an activity based approach which was inquiry-oriented compared to a textbook approach in order to instruct science vocabulary to middle school students with LD. The study design was a within subject crossover in which all students were instructed under both conditions. In the activity-based condition, students worked on activities in groups while the textbook condition involved teacher presentation or text reading. Findings showed that activity-based approach, when it was appropriately structured, facilitated content vocabulary knowledge compared to the textbook instruction (ES=.45). Further, students in the activity-based condition scored better in the maintenance post-test (after a week) than the students in the textbook condition (ES=.48).

7.1.8 Constant Time Delay

A study that examined constant time delay was identified by Jitendra et al. (2004) and is presented below

Jitendra et al. (2004) identified and reported one study by Schuster, Stevens, and Doak (1990) who used a multiple probe design study in two LD students. The aim of the study was to instruct vocabulary definitions so as to test the effectiveness of a 5-s Constant Time Delay procedure. The target words to be instructed included two sets of five words taken from the students' reading book. The sessions involved 30 trials during which each set was presented six times at random order. Findings showed improved vocabulary post-test performance for both students with LD. Additionally, the students

achieved 100% accuracy after 3 to 4 teaching sessions. Further, maintenance of correct responds for both students was evident up to fourteen weeks after the treatment ended.

7.2 Research on Vocabulary Instruction to students with LD in Second/Foreign Language

Research in the related literature, using specific search criteria, indicated no studies to be conducted in second/foreign vocabulary language instruction in students with LD, to the best of our knowledge. The studies below examine Supportive Feedback Strategies that instruct foreign language vocabulary to LD students learning English as a foreign language. The first study was conducted in the form of a MA dissertation study.

Kotsoni (2017) examined the effectiveness of two Supportive Feedback Vocabulary Strategies on a CALL environment in 33 Typically Developing (TD) children and 19 children with Learning Disabilities (LD) aged 9-12 attending a foreign language school at A1 level of CEFR (Common European Framework for Languages). Both SF strategies provided clarifications upon ten unknown foreign contextualized vocabulary words through direct instruction. Both strategies provided the same morphological information on each word item. This included: a) the definition of the word item in the target language, b) an example using the word item in the target language and c) the equivalent translation of the word item in the participants' mother tongue. The difference lied in the way Supportive Feedback was presented. The Traditional SF Strategy (direct) provided supportive feedback (morphological information) presented only in one page requiring only one response from the subjects' side with one click on the relevant item. The Experimental SF Strategy (engaging) provided supportive feedback in three successive pages asking the subjects to move on by selecting (clicking) the relevant link to the next page in order to get more the rest of the information. In this way, the subjects were more engaged in their own learning process by actively asking for more information which was hypothesized to lead to their better retention in memory (Ypsilandis, 2014). The experiment followed a pre-test, post-test1, and post-test2 procedure. Participants were given the pre-test to provide the translation equivalent in their mother tongue (L1) so that the items already known to them to be

excluded from the experiment. Then, they read the hyperlinked text on a computer screen without time limitation. The same 10 vocabulary items were hyperlinked and offered supportive feedback to the participants through the two types of SF (described above) when they clicked on them. Half of the words were supported with the Traditional and the rest with the Experimental SF strategies. Post-Test1 and Post-test2 (a week later) examined the word retention in participants' short and long-term memory respectively. The experiment phase lasted about 10 minutes and students worked independently with the teacher just supervising. Results indicated that both SF strategies had statistically significant benefits in both groups of children, TD and LD, in both short and long-term memory. More specifically, Wilcoxon Signed-Ranks Tests indicated a statistically significant difference between the pre-test, and post-test1 ($Z=-4.88, p<.001$) and post-test2 ($Z= -4.80, p<.001$) which showed that the TD participants retained a statistically significant number of word items in short and long-term memory respectively. For the LD group, Wilcoxon Signed-Ranks Tests also indicated a statistically significant difference between the pre-test, and post-test1 ($Z=-2.91, p=.004$) and post-test2 ($Z=-2.62, p=.009$) respectively which indicated that also LD participants had significant learning benefits. As far as the effectiveness of the two SF strategies was concerned, results indicated that the traditional SF strategy was more effective compared to the experimental one in both short and long-term memory of both TD and LD groups of children with a statistically significant difference to be registered in the long-term of TD children. Further, as expected, between groups statistically significant differences were registered in both short and long-term memory with the TD group outperforming significantly the LD group.

Kotsoni and Ypsilandis (2018) compared the retention of two types of foreign language vocabulary items, namely, individual words and multi word items in short and long-term memory of 33 TD and 19 LD children through the provision of SF strategies in an experiment following the procedure of the previous research mentioned above (Kotsoni, 2017). Statistically significant learning benefits were registered for both types of vocabulary items tested in both short and long-term memory for both TD and LD groups. Further, descriptive statistics showed that retention percentages of multi-word items were higher than the individual words in both short and long-term memory for both TD and LD groups of children. Nevertheless, there were no statistically significant

differences between the two types of vocabulary. Further, TD children outperformed statistically significantly the LD children in both individual words and multi-word items in both short and long-term memory retention.

7.3 Vocabulary Instruction to Students with LD in CAI and Multimedia Instruction

This chapter analyzes studies identified in the three reviews of the research that examined vocabulary instruction combined or through CAI or Multimedia to LD students. In the first place, CAI or CALL instruction studies are presented. Then, multimedia and more specifically, studies examining video anchors and podcasts are analyzed.

7.3.1 CAI Instruction

Jitendra et al. (2004) reports the following studies that have been identified in the literature and include CALL or CAI methods and strategies to teach vocabulary to students with LD.

Jitendra et al. (2004) cites Johnson, Gersten, and Carnine (1987) who used computer assisted instruction (CAI) to instruct vocabulary. The effects of size were studied and of each instructional set according to the number of word items presented. The participants were 25 LD students from grades 9 to 12 who were matched from a word achieving pretest and then randomly assigned to one of the two CAI instruction sets, the small teaching test (SMT, 7 words) and the long teaching test (LTS, 25 words). Students worked individually on a computer environment. Results showed that significantly more students in the STM achieved mastery within 11 sessions compared to students in the LTM ($ES = -0.88$). Instruction for both groups contributed to enhanced vocabulary learning retention two weeks after the study. Nevertheless, vocabulary learning for the students in the STM (7.6 sessions) compared to the LTS (9.1 sessions) group was more efficiently.

Boettcher (1983) (as cited in Jitendra, et al. (2004), in a two-pilot experiment, employed a one group pretest-posttest design to examine the effectiveness of Reading Comprehension System (RCS), a reading program which was computer based designed to diagnose and practice in five comprehension skills such as a) semantics, b) syntax, c) relationships, d) inferences, e) interpretations. Participants in the first pilot study were 28 students with LD in grades 4 to 6 from two whole classes. After a 9-week treatment period, the mean time having used the program was 6.8 hours and results indicated the average gain for the participants was close to or over a year for the vocabulary ($M=+1.32$) and comprehension tests ($M=+1.58$) of the California Achievement Test. The second pilot experiment examined the RCS during an entire school year in 22 students with LD aged 7 to 13 years in a classroom. The mean time was 7.4 hours and results did not indicate posttest gains on the standardized tests (0.9 grade gain to 1.2 grade loss).

Jitendra et al. (2004) cites Horton, Lovitt, and Givens (1988) who examined geographical vocabulary terms using a pre-test, post-test design in six students with LD in Grade 9. Participants got self-paced computer instruction on vocabulary word sets in the computer laboratory. Results showed that LD students got significant benefit from pretest to posttest (mean ES = 2.22) on the experimental items only. Further, students' performance of both groups was enhanced over time over practice from pretest to posttest 1 to posttest 2 and 3 with Computer Assisted Instruction (CAI).

Jitendra et al. (2004) reported the study conducted by Hebert and Murdock (1994) who taught vocabulary to three students with LD using a single-subject alternating treatments design so as to compare three types of CAI instruction conditions a) no speech, b) synthesized speech, and c) digitized speech. The vocabulary program Word Attack Plus with a definition, contextual examples and multiple choice questions was employed in all three treatment types. Generally, results showed that students performed better and mean scores improved over baseline for all three students in the study. Students' mean scores were better with the synthesized and digitized speech treatment (PND = 72% and 61%) respectively compared to the no speech treatment.

7.3.2 Video Anchors

Koury (1996) (as cited in Jitendra et al., 2004) examined the effectiveness of pre-teaching new science vocabulary before using the content textbook with and without using video anchors in 123 fifth grade students with and without LD. The experiment tested their performance on science definitions in writing and the effects of vocabulary instruction supported by extensive discussion with and without video anchors (video clips) on the written definitions knowledge to assist the connection between prior knowledge to the new vocabulary words. Group I and group II were all general education students while group III were students with LD. Results indicated that both group I that received vocabulary instruction with extensive discussion without video anchors and group II that had the same treatment with video anchors performed similarly well. Group III (special education students) that received the same treatment as Group I (without video anchors) performed significantly worse than their general education peers (ES = -2.02) and Group II (ES = -1.79) on the on the vocabulary knowledge test.

7.3.3 Podcasts

In Kuder (2017) two studies by Kennedy and his colleagues (Kennedy et al., 2014; Kennedy et al., 2015) were identified that tested the use of podcasts to instruct vocabulary in social studies contents to high school students with LD. Kennedy et al. (2014) developed 81 content acquisition podcasts (CAPs) to instruct vocabulary to students (10th grade) in social studies classes in 5 sessions all of which were taught by the same teacher. The sections included 27 students with LD who were instructed with either “traditional” methods (e.g., text-based definitions presentation through a projector that students copied) or with CAPs. Results indicated that when students were instructed vocabulary using CAPs performed significantly better on vocabulary probes and learnt the words faster compared to the traditional instructional approach with effect size (ES=1.82)(Kuder, 2017).

In a second experiment, Kennedy et al. (2015) examined the effectiveness of two kinds of CAPs to 279 high school students, thirty of whom were identified with LD. Participants were assigned randomly to one of the four treatments: explicit vocabulary instruction, a mnemonic method (keyword), a combination of explicit and mnemonic or

a text presentation (without the images of the other presentations). After a three-week instruction, the LD students that were assigned to the combination of both explicit and mnemonic instruction significantly scored higher on the 30-item posttest ($ES=1.40$). The same results were registered for the students without LD (Kuder, 2017).

In sum, as cited in Jitendra et al. (2004) findings of six CAI studies and video anchors indicated mixed effects ($ES = 0.16$, $SD = 2.92$, $n = 2$). Positive effects were registered for CAI in four experiments while results of using video anchors as integrated media and extended use of CAI for 9 months were limited. Regarding podcasts, Kuder (2017) found large size effects ($ES=1.82$) and ($ES=1.40$) arguing that the kind of technology examined by Kennedy and his colleagues (2014, 2015) may be more effective than the other CAI and multimedia conditions as it goes beyond just drill and practice activities as the ones used in the past.

Chapter 8

Discussion

The aim of this study was to examine vocabulary instruction strategies for LD students through findings in the related to the field bibliography and thus as an initial reconnaissance study in the field. By that respect this is a secondary type research though it was conducted in an empirical manner. Findings are discussed below and are presented in groups: a) those related to the instruction of the first language, b) those related to the instruction of the second/foreign language, and c) those related to the integration of computers for the task. It should be noted at this stage that all scholars seem to agree that vocabulary is of outmost importance in both first and second/foreign language as it is the tool that assists and promotes communication and it is associated with high scores in reading as well.

8.1 Vocabulary Instruction Practices to Students with LD in First Language

All the studies reviewed on vocabulary instruction to students with LD examined participants' first language. Despite this fact, researches support that the research on the field is limited and, further, paucity is registered (Jitendra et al., 2004; Kuder, 2017).

As regards research on the keyword mnemonic strategy vocabulary instruction to students with LD in their first language, it was found that it was proved superior compared to all other strategies examined in these six experiments. More specifically, the keyword mnemonic strategy was more effective compared to direct instruction in the two experiments conducted by Mastropieri et al. (1985; as cited in Jitendra, et al., 2004) and more effective compared to all three other experimental conditions, the picture context strategy, the sentence experience context strategy, and the control condition (Condus, Marshall, and Miller, 1986). The same results were registered in the

experiment conducted by Veit et al. (1986; as cited in Jitendra et al., 2004) where the keyword mnemonic strategy proved more effective than the direct questioning strategy. Jitendra et al (2004) cites Mcloone et al. (1986) and Mastropieri et al. (1990) who come to a similar conclusion and found the keyword mnemonic strategy more effective than the rehearsal strategies which they tested in their studies. Summarizing, Jitendra (2004) supported the superiority of the keyword mnemonic strategy instruction registering large effects on vocabulary performance in five studies, large maintenance in one and transfer effects in another.

Similarly, Direct Instruction (MP) performed better than the other conditions tested as it registered better scores compared to the other two conditions of meaning given from context clues (MC), and in word meanings given (MG) (Pany and Jenkins, 1978; as cited in Jitendra et al., 2004). The same results were repeated in the next two experiments conducted by Pany, Jenkins, and Schrek (1982; as cited in Jitendra et al., 2004) in which the more Direct Instruction was offered to students the better scores were registered in all measurements. Kuder (2017) cites Seifert and Espin (2012) whose findings also supported direct instruction of vocabulary over the text reading approach. Jitendra et al. (2004) further cites Pany et al.'s (1982) and argues that in the experiment for synonym-no synonym treatment on isolated post-test, multiple choice post-test, and transfer test, large positive size effects were registered at 36.88, 12.60, and 10.10 respectively. These large size-effects are attributed to the study design that used a control group with a no-treatment condition and thus the comparison between the groups was unweighted. Interestingly, Kuder (2017) suggests (in favour of direct instruction) that the Seifert and Espin (2012) study confirms the fact that, for LD students, reading more texts does not mean enhanced vocabulary knowledge or enhanced comprehension and instruction which focuses on vocabulary knowledge is necessary. The researchers further concluded that direct instruction in vocabulary learning, combined with repeated reading which enhances fluency, may be the most successful and efficient way for improving the reading of students with LD, acknowledging, though, that even the combined approach did not improve reading comprehension.

As far as the comparison between the mnemonic keyword strategy and direct instruction is concerned, the importance of Terill et al. (2004) study lies on the fact that it compares the two conditions that were found to be the most effective compared to all other conditions tested with. Results indicated the superiority of the keyword mnemonic strategy over Direct Instruction.

Ten reported studies, conducted by Bos and her colleagues (as cited in Jitendra et al., 2004), examined cognitive strategy instruction. These demonstrated the superiority of the three interactive cognitive strategies (SM, SFA, SSFA) compared to the other conditions examined. More specifically, Bos and Anders (1984) showed that SFA was more effective compared to the traditional look-up condition while in a second experiment Bos, et al. (1989) it was evidenced that the SFA condition was significantly more effective than the traditional definition condition. In the third study Bos et al. (1989) also indicated that students in the SSFA condition significantly outperformed students in the Direct Instruction condition in the vocabulary test and students in the SM and SFA condition performed significant better than those in the DI condition on the comprehension test. The next study conducted by Bos and Anders (1990) indicated that the SFA and SM conditions were significant more effective compared to the DI condition in the vocabulary word test and, further, all three interactive cognitive strategies were more effective than the DI at follow-up tests. Bos and Anders (1992), in a series of six experiments, substantiated that cognitive interactive strategies were more effective when compared to the traditional definition instruction condition for both bilingual and high school LD bilingual students in vocabulary and comprehension tests. Overall, it seems possible to conclude that cognitive interactive strategies were superior to the traditional conditions as: a) large effects were registered in ten studies, b) large follow up effects in seven studies, and c) moderate transfer effects in two studies. The mnemonic keyword strategy performed equally well while the direct instruction was outperformed by the cognitive interactive strategies despite the fact that its initial performance was not disappointing (as cited in Jitendra et al., 2004).

Peer-based methods were tested in two studies which suggest that students can benefit from these to improving their vocabulary. More specifically, Hughes and Frederick (2006) pointed that two students had learnt all three sets of words with this method while three LD students mastered two word sets. The LD students learnt the vocabulary

at the same rate as their typical peers and could recall the target words a week after the experiment. In Shook et al. (2011) study, the results showed that the CSR method improved LD students by an average of 34 points and typical students by an average of 13 points. In conclusion, the above mentioned studies support that peer-mediated methods may be useful didactic tools to promote vocabulary acquisition of secondary students with LD. However, the studies did not involve a control group and so it is difficult to determine the superiority of the specific method over others. Additionally, both experiments involved a very small number of LD students (Kuder et al., 2017) and thus external validity of results may be jeopardised.

Another strategy that was tested involved a fluency building vocabulary practice, Stump et al. (1992) (as cited in Bryant et al., 2003) that included two replicating experiments. The study indicated that, fluency building practice exercises for a two-week intervention led the majority of both TD and LD students to improve their performance while a percentage of students remained at the same level. A certain percentage indeed worsened their vocabulary performance in social, science and language arts classes.

Regarding learning strategies, Harris et al. (2011) compared the generative approach WMS, that used cognitive and behavioral steps to also predict the meaning of new unknown words, with the generative vocabulary LINCS strategy which also included a keyword mnemonic step. The latter proved to be more effective. This finding comes in contrast to other conclusions as this work is the only study that showed that the keyword mnemonic strategy was less effective when compared to WPS.

The activity-based method was examined by Scruggs et al. (1993) and reported in the review by Jitendra et al. (2004), indicated that the vocabulary instruction method in question assisted content vocabulary learning when compared to the textbook reading or teaching presentation condition. It is worth noticing here, that this approach actively engaged students to participate, answer and produce the target vocabulary whereas in the textbook condition, students passively listened to the teacher or read the text. This

method suggests that active student participation may increase quality of learning although the two instructional approaches are not fully comparable.

Finally, Constant Time Delay that was examined by Schuster et al, (as cited in Jitendra et al., 2004) in two LD students showed both improved performance for both LD students in post-test and maintenance performance tests and large size effects were registered.

8.2 Vocabulary Instruction Practices to Students with LD in Second/Foreign Language

The findings of this study are consistent with Wight (2015) and DiFino and Lombardino (2004) who support that a gap exists in the literature of foreign language learning in the LD field. More specifically, and as regards the second hypothesis of this study, regarding second/foreign language vocabulary instruction to LD students, it was not supported by relevant bibliography as there were only two studies that were identified, namely one by kotsoni (2017) in the form of an MA dissertation, in which the effectiveness of two Supportive Feedback strategies in second/foreign language on a CALL environment were experimentally examined. The traditional (direct) and the experimental (engaging) SF strategies were tested in typically developing students and LD students. Results indicated statistically significant gains from pre-test to both post-tests 1 (short) and 2 (long term memory) for both groups of students. This signifies that both TD and LD students learnt significantly through both strategies. The traditional SFS (direct) was more effective than the experimental one (engaging) in both groups and in both post-test measurements with a statistically significant difference to be registered in the long term memory of the TD group. Additionally, significant differences between the two groups were reported in all test measurements. Further, Kotsoni and Ypsilandis (2018) compared foreign language individual words and multi-word items in TD and LD students' retention in short and long term memory through SF strategies. Findings indicated statistically significant learning gains for both types of vocabulary items in both TD and LD children in short and long term learning which means that SF strategies may be an effective way to instruct second/foreign language vocabulary in both TD and LD students. Note that multi-word items were better retained in memory compared to

the individual words in all measurements in both groups. Overall, SF strategies with direct instruction seem to assist both TD and LD students to significantly learn contextualized foreign language vocabulary items on a CALL environment without teacher instruction. Importantly, both TD and LD students significantly retained vocabulary items in memory a week after the experiment. Given the advancement of technology, and its potential for independent learning, CAI or CALL instruction in both first and second/ foreign language learning should be further investigated especially in the LD field as a huge gap is reported in the related literature especially as far as vocabulary instruction is concerned.

8.3 Vocabulary Instruction Practices to Students with LD in CAI and Multimedia Instruction

A few studies seem to support the value of the technological input in language learning of LD student. Johnson et al. (1987, as cited in Jitendra et al., 2004) stated that more students in the Small Teaching Set (STM) significantly achieved vocabulary mastery compared to the Long Teaching Set (LTS). Boettcher (1983, as cited in Jitendra et al., 2004) in a two-pilot CAI experiment indicated average vocabulary gain in the first experiment, and no posttest vocabulary gain in the second experiment. In support of the above claim, Horton, Lovitt, and Givens (1988; as cited in Jitendra et al., 2004) found that LD students significantly benefited from pre- to post test on the experimental items only and generally students' performance was enhanced over practice with CAI. Herbert and Murdock more recently (1994; as cited in Jitendra et al., 2004) showed that vocabulary performance was improved for all three LD students through Word Attack Plus program. More specifically, the synthesized and digitized speech condition was more effective than the no speech condition.

The study conducted by Koury (1996; as cited in Jitendra et al, 2004) indicated that both groups of general education students who received the same treatment with and without video anchors had the same good performance without the group with the video anchors to register a better performance. LD students who were in the treatment

without video anchors performed significantly worse than their typical peers in the other two conditions.

Regarding Podcasts, Kennedy et al. (2014) indicated that LD students that received CAPs instruction performed significantly better in outcome and time as they learnt the words faster compared to the traditional approach. In another study, Kennedy et al. (2015) showed that the type of CAPs that involved a combination of both mnemonic and explicit instruction significantly promoted vocabulary performance compared to the other conditions tested in both LD and typical students.

Summarizing, Kuder reports that previous reviews came to different conclusions regarding CAI. More specifically, Bryant et al (2003) reviewed one study that registered positive effects for CAI reaching the conclusion that it can improve vocabulary knowledge while on the other hand, Jitendra et al. (2004) that reported that findings of six CAI and video anchors studies on vocabulary instruction showed mixed effects. Other positive effects were reported for CAI instruction in four experiments. However, the use of integrated media (video anchors) and extended CAI use for the 9 months study resulted in limited effect sizes. More specifically, Jitendra et al (2004) supported that the large negative effect sizes that were registered in Koury's (1996) study could be explained by the use of general education students as a comparison group to LD ones. Further, Kuder (2017) argues that the studies conducted by Kennedy and his colleagues (2014, 2015) regarding podcasts could be more effective since they did not only involve drill and practice. Further, he supports that using emerging technologies that include multimedia instruction is worthy of further investigation.

8.4 Conclusions

Kuder's (2017) findings, as well as those of the reviews conducted by Bryant et al (2003) and Jitendra et al. (2004), suggest that vocabulary instruction leads to enhancement of vocabulary knowledge in students with LD and the several approaches and strategies tested are promising. In more detail, Jitendra et al.'s (2004) study showed that, large size

effects were registered for the mnemonic strategy instruction, the cognitive strategy instruction, direct instruction and constant time delay. Similarly, Kuder (2017) found that mnemonic instruction, direct instruction and learning strategies that included morphemic analysis also registered large size effects. The CAI and activity-based instruction registered small to moderate size effects in the strategies tested as reported by Jitendra et al. (2004) while Bryant et al. (2003) reported a positive effect size in one study only. Finally, Kuder (2017) found that multimedia instruction through podcasts examined by Kennedy and his colleagues (2014, 2015) lead to large effect sizes. It should be noted here that there is a paradox in CAI or Computer Assisted Language Learning policies. This regards the tendency in CALL to abandon ready and tailored-made computer software dedicated to language learning and concentrate on the use of applications that can promote live Computer Mediated Communication or applications that could lead to incidental rather than instructive learning. On the other hand, regarding second/foreign language vocabulary instruction to LD students, studies conducted by Kotsoni (2017) and Kotsoni and Ypsilandis (2018), in a computer environment, proved that both supportive feedback strategies were effective for both groups of TD and LD students as students had significant word gain in both post-tests, despite the fact that the traditional strategy was more effective than the experimental tested. Notice also that, vocabulary instruction through SF strategies in a computer environment helped learners have significant vocabulary gains independently without teacher's intervention and in a short amount of time (10-15 minutes).

All three researchers of the previous reviews note that there are several limitations in their studies as a small number of articles were included in their reviews, met by the selection criteria set, which suggests that, research on effective vocabulary instruction for LD students is limited and at its infancy. Research in the related literature on second/foreign language vocabulary instruction strategies to LD students seems to be almost nonexistent, to the best of the author's knowledge, intensifying thus the previous arguments. This further adds to the problem, as vocabulary is of vital importance in both first and second language learning. Further, the restricted number of articles may be taken to indicate the narrow scope of instructional choices, as noted by Jitendra et al. (2004), in that from 1996 to 2002 there is an observed paucity of research on vocabulary instruction to LD students. Indeed, a large number of the identified reviews in her study were conducted by the same research teams in which the same individuals had participated (Bos and colleagues, and Mastropieri and colleagues). This clearly

signifies that the topic has not become property of a larger number of scholars. Kuder (2017) further states that of the seven studies reviewed in his work, only four included a comparison group, indicating the need for better-designed studies with larger samples of participants and appropriate comparison groups (more scholarly accepted procedures).

The problem is intensified when it comes to the assessment of students with LD. For example in the USA, there is a failure of the LD field to develop an empirically-based definition and valid diagnostic criteria for LD students. The problem is twofold as it leads to misdiagnoses of LD or non-LD students while it presents a failure to assess and diagnose students with LD. That creates an immense confusion to both second language learners and second language educators with the former group suffering from the consequences. The puzzle starts from students facing difficulties in their native language and transfers to poor L2 language learning instruction and thus limited educational opportunities (Sparks, 2013). The situation becomes even more complex in second language environments where the second language is the means of communication in the society and the professional world out of the safety of the school environment; one out of five students in the U.S. public schools speaks a language at home that is not English. Wagner, Francis & Morris's (2005) warning, depicts particularly this situation in which the lack of definition and diagnosis of LD adds to an alarming extend to the complexity of the interaction between learning on the one hand and language as the principal means of communication in the educational system for students who are learning in a second language environments. In practical terms, the question becomes whether to assess English language learners in English or in their native language. This rather complicated issue depends on proficiency levels of both the native and the societal language. In order to tackle this dilemma, hypotheses need to be empirically or experimentally tested to explore whether English language learners could be assessed in both native and English language by comparable tests. It is clear that the situation is extremely complex to develop, as difficulties would be expected to occur, among others, due to the different orthographies between languages (e.g. Roman vs. Cyrillic) and alphabetic and non-alphabetic languages (Wagner, Francis & Morris, 2005). Notice also the case of bilingual children whose assessment is already difficult as it is in that, language proficiency as well as social and prior schooling issues may arise and interact. Finally, despite the noted and other difficulties which may arise, assessment tools that

cater for these students need to be developed as assessment and diagnosis is necessary for students to benefit from Special Education services.

As far as CALL or CAI in the vocabulary instruction LD field, research reviewed above seems to be restricted and a further paucity is registered. Limiting that research in second/foreign language vocabulary learning is almost nonexistent except for the studies conducted by kotsoni (2017) and Kotsoni & Ypsilandis (2018) that specifically focus comparatively on foreign language vocabulary instructive strategies to TD and LD students in a CALL environment. Despite the mixed results about CAI registered in the three reviews of research analysed above, the Supportive Feedback experiments showed significant gains for TD and LD groups of students for both posttests examining vocabulary retention an hour and a week after the experiment in only 10-15 minutes of independent instruction (kotsoni, 2017; Kotsoni & Ypsilandis, 2018). Therefore, computers, tablets, interactive boards and other technologically assisted instruction tools seem to undoubtedly provide a promising way forward and thus should be further implemented and researched in all classroom environments in typically developing and LD students. Experimental studies in CAI or CALL environments, with reference to LD, would need to attempt to replicate experiments and longitudinal studies testing the same or similar traditional teaching strategies with the assistance of the machine should be conducted. Different vocabulary teaching strategies that have been and will be explored could be examined in twos generally supporting or rejecting initial hypotheses.

Notice, however, that although findings are significant for language instruction they do not lead to a better understanding of the problem nor do they create a pattern of teaching that could form a methodology, as yet (despite the fact that this is the final target). This is due to the fact that our knowledge of the problem that is causing the symptoms is still not profound enough to cater for it, not only for the learning deficits of LD children but also for the limited knowledge that we have for the learning process in general. In this light, research would need to concentrate on the healing of the indicators in a non-systematic but rather a trial and error manner examining different types of strategies, which often do not relate to each other. Findings from the neurological side attempting to decipher human brain operations would help significantly in this direction, as results in both first and second/foreign language are not conclusive as there is lack of: a) external validity in most studies due to the fact that studied samples are not representative of the entire population, b) systematicity of design and

procedures in the studies conducted (most are of the experimental type, run for a short period of time), and c) a common framework of analysis among those reported as quite often each researcher follows different types of statistical tests than the other. Finally, it is evident that the study of LD is not going to help only LD students but also their typical peers and to a certain extent language education in general. Despite the limited external value of the studies conducted so far, it is possible to claim that in the years to come our knowledge of brain operations and brain-based language learning will be extended and more concrete good-practice will become apparent and offered at the hands of both first and second/foreign language teachers who work in the front line of the profession.

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