The Effects of Multisensory Learning on Second Language Acquisition for Students with Learning Disabilities

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Abstract

Students with learning disabilities often struggle to meet the demands of the foreign language curriculum and complete the levels required for graduation at their school. The purpose of this study is to examine whether a multisensory approach is effective for teaching high school learning disabled students Spanish vocabulary. A small group (15) of students with documented learning disabilities at an all-male high school was presented with vocabulary in the target language over a 5-week period. A multisensory learning experience applied during Weeks 2 through 4 served as the independent variable using Quizlet vocabulary sets (images, audio and text). Short vocabulary weekly assessments ranging from 17 to 20 words served as the dependent variable. Anomalies in the results for Week 5 were presented that differed significantly from the other weeks. However, the null hypothesis for Weeks 1, 2, 3, and 4 was retained, with no significant difference in the results. A number of threats to validity such as the small number of students assessed, length of the study, practice activities, and vocabulary content are discussed. Although multisensory instruction can have a positive effect in language learning for students with learning disabilities, the impact was not statistically significant in this study. Further research in this area is needed to ensure that all students have the opportunity to be successful and have a positive experience when learning a second language.

CHAPTER I

Overview

Students with learning disabilities, particularly those with language learning disabilities, have difficulty learning a second language due to deficiencies in phonological processing, working memory, information retrieval, and difficulty sustaining attention. In most educational environments, students with learning disabilities often struggle to meet foreign language curriculum demands. This affects their ability to successfully complete the foreign language requirement necessary to be able to graduate. Some institutions allow students to complete this requirement in a number of ways such taking sign language or through completion of a modified curriculum that emphasizes project-based learning. The students in this study are taking level 2 of a conversational Spanish curriculum that requires successful completion of three levels in order to meet the foreign language requirement at their school. Finding the most effective tool for vocabulary learning can be a challenge for language teachers, particularly for those teaching in a technology-driven classroom environment; therefore, it is important to find a technology tool that facilitates second language acquisition.

Statement of the Problem

This study attempts to find whether a multisensory tool for learning vocabulary in the target language is effective in facilitating language acquisition.

Hypothesis

The null hypothesis is that use of a multisensory tool (Quizlet) will not change or improve student achievement on vocabulary assessments.

Operational Definitions

Independent variable- In this study, the use of a multisensory tool in vocabulary instruction.

Dependent variable- In this study, student achievement in weekly assessments.

Multisensory learning- This is the theory that individuals learn better when instruction involves more than one of the senses.

Learning disabilities- Learning disabilities are characterized by a highly individualized dysfunction of the central nervous system that cause processing problems. These processing problems interfere with basic learning skills and with higher order skills such as organization, time planning, long or short -term memory and attention.

CHAPTER II

A REVIEW OF THE LITERATURE

This literature review explores issues involving second language learning and engagement in students with learning disabilities. Section one discusses learning disabilities and second language learning. Section two discusses methods and strategies as well as factors that facilitate second language learning for students with a learning disability. Section three discusses issues relating to the implementation of these methods and strategies in the classroom. The terms second language learning and foreign language learning are used interchangeably in this review.

Learning Disabilities and Foreign Language Learning

A learning disability can be defined as neurological disorder in which the results of standardized and achievement testing are substantially low considering the student's age, schooling and intelligence level. These neurological disorders have an adverse effect on academic achievement (Amend, Whitney, Messuri & Furukawa, 2009). Learning disabilities are associated with increased difficulty in learning a second language and pose challenges for instructors as well as the students of a second language.

Students considered at-risk for second language learning experience difficulty with language-based problems at the phonological and orthographic level and therefore struggle with understanding the rule systems of language (Leons, Herbert & Gobbo, 2009). Some learning disabilities that affect foreign language learning are dyslexia, phonemic awareness, auditory processing disorders, working memory, and attention deficit hyperactivity disorder.

Dyslexia is a language -based learning disorder that affects single word decoding and phonological processing. Students with dyslexia experience difficulty in acquiring proficiency

with different forms of language, particularly reading and writing. Phonemic awareness is "the awareness of the sounds that make up whole words" (Amend, et al., p. 36). Problems with phonemic awareness lead to the omission, substitution, or reversing of sounds and letters within words.

Students with auditory processing disorder (APD) experience difficulty with the processing of auditory information in the central nervous system, therefore resulting in poor performance in at least one of the following: auditory discrimination, pattern recognition and sound localization (Amend, et al., 2009). Auditory processing disorder is the impairment in the ability to manipulate auditory input (Veselovska, 2015). An APD diagnosis may affect learning a language in a variety of ways because it is influenced by and dependent on language abilities; therefore, there are many effective ways in which auditory problems can be treated using authentic and functional intervention targets to get to the core of a problem that has many layers, just like an onion needs to be peeled to get to its core (Wallach, 2011).

Working memory plays an important role in cognitive tasks involving reading comprehension, conversations, mental arithmetic and problem - solving (Hayashi, Kobayashi, & Toyoshige, 2016). Difficulties with working memory, which is defined as the ability to hold necessary information to complete a task and manipulate it for short periods of time, also impair the ability to learn a second language (Amend, et al., 2009). For example, it may be very challenging for students to hold grammar, vocabulary and pronunciation rules in hand in order to speak accurately in a normal time frame.

Finally, students with attention deficit hyperactivity disorder also experience difficulty earning a second language; these students lack executive functioning skills (the ability to plan, organize, maintain focus and follow through tasks) and active working memory result in uneven

focus and the inability to practice consistently a practice that is necessary to build proficiency and achievement in a second language (Leons, et al., 2009).

For instructors, the challenge lies in creating learning experiences that engage these students and developing alternative methodologies so that they can experience success. Ofiesh (2007) as cited by Leons, Herbert and Gobbo (2009) explains the challenge well: "the dilemma in accommodating students with LD is that so much of the language interacts directly with the characteristics of LD. Minimal or no cognitive resources are left for scaffolding, or the development of compensatory strategies that might be in place for other academic courses" (p. 240). Several methods which may be helpful are reviewed below.

Strategies to Facilitate Foreign Language Learning for Students with a Learning Disability

Multi-sensory learning

Multi-sensory learning involves the use of two or more senses in learning. The foundation for this approach is the belief that using more modalities during instruction (visual, auditory, kinesthetic, and tactile) will result in better learner mastery of material taught (Skinner and Smith, 2011). For students with learning disabilities, this has been proven as a very effective method to facilitate foreign language learning. For example, Sparks and Ganschow (1993) as cited by Skinner & Smith, (2011) determined that a multi-sensory approach to teaching phonological skills improved phonemic awareness. According to Gass and Selinker (2001) as cited by Skinner and Smith, (2011) elaborate experiences and repetition are crucial to the storage of new information, and to associating new input with previous knowledge through meaningful repetition of information and patterns relate to learning foreign languages. In fact, multi-sensory approaches have been deemed indispensable to students with an LD in experiencing success in the standard curriculum. Sparks and Miller (2000) found that multi-sensory instruction that systematically and

explicitly uses both English and Spanish can lead to significant improvement in both native language and foreign language proficiency (as cited in Tolbert, Killu and Lazarus, 2015). For example, in teaching grammar, a professor may present morphemes (the smallest grammatical unit in language) as objects that can be manipulated through the use of color-coded index cards. Another example is manipulating text on a board by using magnetic strips so that the stem of a verb can be removed from its ending. Practice that involves tactile activities is a key to learning grammar in multi-sensory instruction (Amend, et al., 2009).

The Total Physical Response (TPR) method of language teaching developed in 1988 is another example of multi-sensory instruction since it involves hearing, seeing, speaking and moving or acting out new vocabulary. When using TPR, students engage in oral activities typical of a communicative classroom in which grammar is not explicitly taught until they can produce language easily (Amend, et al., 2009). The TPR method is based on the premise that humans are biologically programmed to learn languages. The method typically involves a series of steps that include listening, modeling, and repeating, for example by acting out a series of commands to teach the imperative mode or daily routine actions to teach reflexive verbs (Skinner & Smith, 2011).

Metacognitive Strategies

Metacognitive strategies deal with the organization of one's own learning and the process of planning, checking on progress, and self-evaluating performance (Veselovska, 2015). Metacognition has two dimensions: knowledge about cognition and regulation of cognition; it is one of the factors that can influence performance in learning a foreign language (Henter, 2014).

Leons et al. (2009) recommend that teachers help students become more strategic in their learning by fostering metacognitive skills. In order to develop these skills, students need direct

instruction on how to manage their learning and use specific strategies with specific tasks. This explicit instruction has proven to be effective in helping students successfully use learning strategies; however, researchers have different views about how to teach the strategies. In one experimental study, students that were taught metacognitive skills (the experimental group) showed a significant difference compared to the control group, therefore demonstrating the effectiveness of metacognitive training (Henter, 2014).

Working memory training

Working memory is an important factor in learning a foreign language. One approach involving training working memory through use of a computerized program (pattern completion in matrices) along with foreign language instruction resulted in improved performance on certain cognitive tasks and foreign language knowledge in university learners of English as a second language (Hayashi, et al., 2016). However, the results of the study show it is unclear if the effects will be maintained overtime say why this is the case.

Self-instructional strategies such as the cover, copy, compare (CCC) technique have been shown to increase recall and acquisition of new written vocabulary in students with learning disabilities. The strategy is useful in school settings for both individual and large groups of students. It is individualized and self-paced, and therefore it can result in learning new written vocabulary at a fast pace. In the CCC procedure, students view a specific stimulus, then cover it, then makes a response (writing the word previously seen). After making the response, the student uncovers the original stimulus and compares his/her response to the original stimulus. Incorrect responses result in student having to write the accurate response three times before moving on to the next academic stimulus (Carter, Wong & Mayton, 2013).

Classroom environment

A positive and supportive learning environment is key in foreign language learning for all students, but most particularly for students with a learning disability. Instructors can help create classroom environments that can be described as learning communities in which students support each other as they work to meet goals. This is most likely to be accomplished in small classrooms (15 students or less). The smaller class size allows the use of pedagogical approaches that support peer assistance and collaboration, which lead to increased confidence and lower anxiety. It also allows for more individualized instruction and evaluation, immediate feedback, opportunities for student responses, and accountability. Most important, teachers should consistently implement research-based approaches which have proven effective (TPR, explicit strategies/metacognition, review and repetition) to foster a positive view of and motivation for foreign language learning for these students (Skinner & Smith, 2011). Moreover, student-instructor contact, monitoring affective issues, and providing a structured environment while making language - learning fun can positively impact foreign language learning (Leons, et al., 2009).

Reduced scope /cognitive load

Reducing the scope or cognitive load may also be an effective tool in facilitating foreign language learning for students with a learning disability. Carefully choosing the scope and pacing of the curriculum is key (Leons, et al., 2009). Reducing or modifying the scope of a course may lead to better performance but it is not clear whether modifying content without modifying the teaching methodology or vice versa would lead to better performance, or whether both modifications are needed in other to achieve best results. Examples of modifications used are: breadth of vocabulary, reduction in chapter coverage, grammar expectations/focus and pacing of units (Amend, et al., 2009).

Cross-language connections

Finally, cross-language connections can benefit foreign language learners with disabilities. Cross-language connections involve comparing similarities and differences in phonology, morphology, semantics and/or syntax. First language literacy helps students develop second language literacy when the languages are similar in structure (Cardenas-Hagan, 2018).

Issues in the Implementation of Methods and Strategies

Formal training and administrative support

The main purpose of using instructional strategies is to improve comprehension of listening input. However, isolated use of strategies is not effective. The strategies must be embedded in the curriculum to be most effective. Furthermore, proper instruction of learning strategies demands meticulous organization, perseverance, and continuous evaluation of results (Veselovska, 2015). Henter (2014) stated that "metacognition can be taught only by teachers who practice metacognition and only if it is supported by those who decide on the curriculum of various subjects" (p. 55).

Reduced class-size is beneficial as it allows for more individualized instruction, among other benefits mentioned above. A challenge to its implementation is that it requires additional resources which schools may not be able or willing to afford. The implementation of other methods and strategies such as TPR and multi-sensory instruction require teacher training before implementation or more specifically, before materials (such as a Smart Board, TPR curriculum, etc.) are used. Overall, support from a school's administration is key to the success of such interventions to target and benefit foreign language acquisition in students with learning disabilities because most of such accommodations require that the school invest considerable time and resources in order to properly implement the programs (Skinner & Smith, 2011). A qualitative study by Brendle, Lock, & Piazza (2017) on effective implementation strategies and

the instructional method of co-teaching found that all the teachers involved, regardless of prior experience with the strategy , need in-depth and ongoing training to successfully implement the strategies involved in co-teaching. The co-teaching method of instruction requires a general education and a special education teacher to work in collaboration utilizing their strengths (Rea & Connell, 2005 as cited by Brendle, et al., 2017). The administrative support mentioned in the study included providing adequate planning time, listening to teacher needs, and providing extensive and ongoing training to the teachers involved. Furthermore, positive administrative support for the teachers was also identified as essential to implementation of the co-teaching strategy.

Another study by Paulsen (2005), highlighted the importance of explicit instruction of strategies to teachers in education methods courses. The study on special education teacher preparation programs concluded that explicit instruction of strategies is key in order to develop the skills needed to implement the strategies effectively in the classroom.

The research demonstrates that in order for teachers to be successful in implementing a new method or strategy adequate training and support from the school administration is key. As a result, students with learning disabilities have the opportunity to learn in a way that fits their needs and abilities and be able to succeed academically.

Summary

Students with learning disabilities need to use a variety of learning tools to in order to learn a second language. Multi-sensory learning is one tool that has shown to be effective, particularly for students with language-learning disabilities such as auditory processing disorder. A modified curriculum, explicit instruction of metacognitive skills, and use of repetition are also important in successful second language acquisition. School administrators must be supportive of a modified

curriculum for these students and support use of new and innovative resources along with providing the necessary training for the teachers so that they can implement new methods and techniques of language instruction successfully.

CHAPTER III

METHODS

The purpose of this study is to examine whether a multisensory approach is effective for teaching High School learning disabled students Spanish vocabulary.

Design

This study is a quasi-experimental repeated measure/ time series design involving learning disabled students mastery of new Spanish vocabulary.

The multisensory experience served as the independent variable using Quizlet vocabulary sets (images, audio and text). Short vocabulary assessments ranging from 17 to 20 words served as the dependent variable. The vocabulary used included expressions, such as phrases or idiomatic expressions from a unit on the human body, health and medical conditions.

Participants

This study used a convenience sample of 15 male students (ages 15-17) attending a private high school in a northern suburb of Baltimore City. The students were enrolled in a conversational beginner-intermediate level Spanish course and all had documented learning disabilities involving language-learning disabilities, or working memory issues, and a few also were diagnosed with attention-deficit disorder. The instruction is designed to meet the learning styles of these students. Student engagement is a key element in sustaining attention and to facilitating retention of material.

Instrument

At the end of each week a quiz was administered on the new vocabulary words. Week one included words related to eating at a restaurant, week two included nouns relating to the human body, week three included verbs relating to medical conditions, week 4 included health-

related vocabulary, and week 5 included vocabulary relating to a documentary film on poverty. The format of each quiz included matching, multiple choice, and/or translation from Spanish to English.

Procedure

The study was carried over a 5 week period. At the end of each week, after working with the vocabulary for approximately 3 days, students took a short assessment. On Week 1, students received a set of approximately 20 new vocabulary words to learn from English to Spanish or Spanish to English without any other sensory input. On Week 2, students received a set of 20 new words to learn, this time using multisensory input from Quizlet (audio, text and images). On Week 3, students received a set of 20 new vocabulary words to learn using multisensory input from Quizlet. On Week 4, students received a new Quizlet set (same number of words) and played the Quizlet Live! game option for that vocabulary. On Week 5, students received a set of new vocabulary words to learn without any sensory input. The quiz format for the sets not involving multisensory learning was the same or very similar to the other quizzes.

The only instructions given to participants was to study the vocabulary for a quiz at the of the week using a vocabulary list (Weeks 1 and 5) or a Quizlet set with multisensory input (Weeks 2, 3 and 4). Students were informed of the format, which involved matching, multiple-choice items, and Spanish to English translation. The appendix shows a sample assessment.

CHAPTER IV

RESULTS

The purpose of this study is to examine whether a multisensory approach is effective for teaching high school learning disabled students Spanish vocabulary. A quasi-experimental, repeated measure/ time series design analyzed whether learning disabled students could master new Spanish vocabulary learning better through a multisensory experience with images, audio, and text "Quizlet" (independent variable). Short vocabulary assessments ranging from 17 to 20 words served as the dependent variable. The vocabulary on Weeks 2 through 4 included expressions, such as phrases or idiomatic expressions from a unit on the human body, health and medical conditions while vocabulary on Weeks 1 and 5 included other themes such food/restaurant, and vocabulary relating to a film.

Measures were taken over a five-week period on each subject. Data on measures of central tendency are presented in Table 1. Additionally, the analysis consisted of dependent or paired tests where contrasts between the largest differences were first run and then further differences analyzed. All analyses are presented in the tables below with short observations about the analysis follow each table.

Table 1

Measures of Central Tendency for Variables

		N	Mean	Std. Deviation	Order of Means by Size
Week 1 Percentage		15	84.7059%	15.68978%	3
Week 2 Percentage		15	86.0000%	17.84857%	2
Week 3 Percentage		15	83.0000%	15.44576%	4
Week 4 Percentage		15	88.3333%	12.90994%	1
Week 5 Percentage		15	57.0000%	23.05273%	5
Valid N (listwise)		15			

Week 4 has the largest percent of students passing the tests and Week 3 the smallest, other than Week 5. If there is no difference between Week 4 and Week 3 then the only possible differences are those between the various weeks and Week 5. This analysis is shown in Table 2.

Table 2
Analysis Comparing Week 4 (Max Score) to Week 3 (Lowest Score)

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Week 4 Percentage Week 3 Percentage	5.3%	12.7%	3.3%	-1.7%	12.4%	1.621	14	.127

There is no difference between Week 4 and Week 3 thus only comparisons of the weeks to Week 5 remains.

Table 3 shows that the analyses of the weeks to Week 5 (post experiment) shows that Week 1 is statistically significantly different than Week 5 (post treatment) with poorer performance to Week 1.

Table 3

Pairwise Comparison for Week 1 to Week 5

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Week 1 Percentage - Week 5 Percentage	27.7%	18.7 %	4.8%	17.3%	38.1%	5.730	14	.000

Tables 4 through Tables 6 show that all the weeks are significantly different from Week 5 with Week 5 performance after the experiment significantly different than all other weeks, prior to the experiment and through the experiment.

Table 4

Pairwise Comparison for Week 2 and Week 5

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Week 2 Percentage - Week 5 Percentage	29.0%	15.7%	4.1%	20.3%	37.7%	7.1	14	.000

Table 5

Comparison of Week 3 to Week 5

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Week 2 Percentage - Week 5 Percentage	26.0%	14.2%	3.7%	18.2%	37.7%	7.1	14	.000

Table 6

Pairwise Comparison for Week 4 and Week 5

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Week 2 Percentage - Week 5 Percentage	31.3%	17.1%	4.4%	21.9%	40.9%	7.1	14	.000

In summary, then, all the weeks are different than Week 5 and the premeasure and the multisensory intervention was different than after the interventions. The null hypothesis can be rejected for Weeks 1 through 4 and Week 5. However, there were no significant differences between Weeks 1, 2, 3, and 4.

CHAPTER V

DISCUSSION

The purpose of this study is to examine whether a multisensory approach is effective for teaching high school learning disabled students Spanish vocabulary. The null hypothesis was partially rejected in that the approaches used in Weeks 1 through 4 differed statistically significantly from Week 5. But the null hypothesis for Weeks 1, 2, 3, and 4 was retained, the premeasure and the interventions performance was not significantly different. However performance deteriorated after the interventions and was lower than before the experiment was begun.

Threats to Validity

Threats to validity include the small sample size and that sample was a purposive one thus ability for generalization to the subject group itself is limited. Further there appeared to be data anomalies' noted on the performance of some of the subjects in Week 5 which distorted the data. This was a quasi-experimental or what is also referred to as a pre-experimental study and problems associated with lack of randomization and adequate control groups were present. Further, history threats to validity appeared to be present with the performance of some students toward the end of the study in Week 5 seemed to be greatly impacted in a negative way. This data table is presented here to highlight the issue involved.

Table Illustrating Anomalies in the Data

Students	Week #1 (vocabulary list w/out multisensory input) "En el restaurante", 17 pts.	Week #2 (use of Quizlet: audio, images and text) "El Cuerpo", 20 pts.	Week #3 (use of Quizlet: audio, images and text) "Verbos", 20 pts.	Week #4 (use of Quizlet: audio, images and text, plus game) "La salud", 20 pts.	Week #5 (vocabulary list w/out multisensory input) "Vocabulario de la pelicula", 20 pts.
1	17	20	20	20	17
2	16	18	18	19	10
3	16	17	16	18	10
4	15	18	20	18	14
5	15	20	20	20	16
6	13	17	18	20	11
7	14	20	16	20	18
8	16	20	16	14	12
9	17	20	20	20	19
10	14	20	19	18	11
11	6	9	11	14	4
12	13	14	14	16	7
13	14	10	16	13	8
14	14	17	11	15	5
15	16	18	14	20	9

The anomalies in Week 5 may be explained by a number of factors. First, students did not get to work with the vocabulary with a variety of activities as they did with the vocabulary on Week 1. Although the vocabulary in Week 1 was assesses exactly the same way as in Week 5, the theme was one that students had been working on by completing a number of activities involving listening, speaking and some writing. The restaurant theme is one that students had prior knowledge on and could easily relate to; in contrast, the movie vocabulary presented on Week 5 was on social justice topics presented in a movie that the students watched in English. Not only this was higher-level vocabulary in comparison to the restaurant themed vocabulary, but the

activities that students completed with it where limited to writing a short paragraph summarizing events and presenting information on a Spanish speaking country. The was not enough listening or visual input to aid students recall of this vocabulary. Furthermore, because of a school schedule issue, week 5 assessment was moved from a Friday to a Monday. Although this would have given students more time to prepare, this particular set of students benefit most from continuity and do better overall when assessed at the end of the week. Data from some students (students 1, 12, and 14) who struggle most in this class also impacted the results. These students struggle in a number of ways in the class, and were most affected by the last assessment. Also, it is important to note that the validity of the results may have been affected by changing the vocabulary topics in Week 1 and Week 5, and that consistency in the type of vocabulary used in the study would have allowed for more reliable data.

Comparison of The Findings of the Research to That Discussed in the Review of the Literature

The results of Week 5 assessment may have been different had students used the cover, copy and compare (CCC) technique used in one of the studies reviewed (Carter, et al., 2013). This is the only study I found that focuses on the use of a particular technique to facilitate second language vocabulary learning. The CCC technique is an individualized and self-paced strategy that facilitates recall and seems particularly suited for the nature of the vocabulary presented on Week 5. Although the students had a list with words in Spanish and then the English, they did not have any additional instruction on techniques to help with recall for that type of vocabulary. The CCC technique may have allowed students to perform better because it is both visual and kinesthetic (multisensory) in that it involves a visual stimulus which is covered and uncovered and then compared to the original stimulus.

The use of a another multisensory method in vocabulary instruction for Week 2 seemed to have a positive effect in student performance. Students practiced the new vocabulary words through class participation in activities involving the Total Physical Response (TPR) method of language teaching, in which students hear, see, speak and act out the vocabulary. The vocabulary theme, the human body, was well-suited for the TPR technique and students results for that week's assessment show. The use of the TPR involves a series of steps that help student recall by utilizing a number of the senses. The students listen and touch parts of the body taught as the teacher models, eventually repeating the vocabulary along while acting it out. This supports research by Tolbert, et al., (2015) and shows that multisensory instruction is indispensable to students with LD in experiencing success when learning a second language.

Finally, the impact of cross- language connections (Cardenas-Hagan, 2018) may have facilitated achievement in Week 4 when vocabulary involving a number of cognates (medical vocabulary in Spanish involves a large number of Latin root words and prefixes that are common to English as well). It must be noted that the additional use of the game feature this particular week added another dimension to multisensory learning and may also be related to increased achievement.

Summary, Conclusions, and Directions for Future Research

Although it is evident that although multisensory instruction can have a positive effect in language learning for students with learning disabilities, the impact was not statistically significant in this study. Repetition, practice through a variety of methods, and prior knowledge are also relevant and seem to have a direct correlation with retention of vocabulary. Use of both multisensory and non-multisensory methods combined with repetition seems to be most effective in improving the ability of students to learn vocabulary in the target language. Future studies involving larger groups of LD students and better control of other relevant variables such as type

of vocabulary used (higher-level/low-level), and the specific activities used during the study along with the independent variable will help ensure the validity of the study. A time -series design over a longer period of time would allow for increased validity. Research in the area of second language acquisition and students with learning disabilities is limited, particularly with secondary level students. More research is needed in which a particular method of language learning is studied in isolation, particularly with this population. Furthermore, these studies should differentiate between students with language-learning disabilities and students with attention-deficit issues or other learning disabilities that do not involve language learning so that the results can be better evaluated by those interested implementing new methods of language teaching in the classroom.

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Appendix A

Sample assessment:

Matching questions

1. lavarse
2. despertarse (e-ie)
3. peinarse
4. ducharse
5. bañarse
6. secarse

A. to shower

B. to wake yourself up

C. to comb your hair

D. to bathe

E. to dry yourself off

F. to wash yourself

Multiple choice questions

1. to brush your teeth
    1. despertarse (e-ie)
    2. peinarse
    3. cepillarse los dientes
    4. cepillarse el pelo
2. to get dressed
    1. acostarse (o-ue)
    2. dormirse (o-ue)
    3. despertarse (e-ie)
    4. vestirse (e-i)
3. to brush hair
    1. despertarse (e-ie)
    2. cepillarse el pelo
    3. acostarse (o-ue)
    4. cepillarse los dientes
4. to get up
    1. ducharse
    2. levantarse
    3. bañarse
    4. peinarse
5. to fall asleep
    1. vestirse (e-i)

2. dormirse (o-ue)
3. despertarse (e-ie)
4. acostarse (o-ue)

6. to go to bed
    1. dormirse (o-ue)
    2. acostarse (o-ue)
    3. vestirse (e-i)
    4. cepillarse el pelo

Translate to English:

7. dormirse_____

8. vestirse_____

9. acostarse_____

10. despertarse_____