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DIAGNOSTIC STUDY OF LEXICAL RETENTION CHALLENGES IN AN ENGLISH AS A FOREIGN LANGUAGE (EFL) STUDENT WITH DOWN SYNDROME AT THE PRE-A1 LEVEL

ESTUDIO DIAGNÓSTICO DE LOS DESAFÍOS DE RETENCIÓN LÉXICA EN UN ESTUDIANTE DE INGLÉS COMO LENGUA EXTRANJERA (EFL) CON SÍNDROME DE DOWN EN EL NIVEL PRE-A1

María José Murillo Pavón[1*]
E-mail: maria.murillo.35@est.ucacue.edu.ec
ORCID: https://orcid.org/0009-0002-8940-3940
Esteban Arnoldo Valdiviezo Ramírez[1]
E-mail: esteban.valdiviezo@ucacue.edu.ec
ORCID: https://orcid.org/0000-0002-4828-2831
[1]Universidad Católica de Cuenca. Ecuador.
*Corresponding author

ABSTRACT

Retaining lexical terms is fundamental to English as a Foreign Language (EFL) learning. However, students with Down syndrome (DS) face significant challenges because of limitations in short-term memory. Although recent studies recognize the importance of lexical retention and acknowledge the factors that influence it, research specifically focusing on young adults with DS in an EFL context remains limited. To help bridge this gap, this diagnostic study investigated the extent of lexical retention in a young adult student with DS at the pre-A1 level of English proficiency and its influencing factors within the classroom. Employing a concurrent embedded design of mixed methods, this study utilized a single-case short-term longitudinal design as the primary method over four instructional sessions, complemented by a questionnaire with Likert scales and journal entries to identify the key factors influencing lexical retention. Pre- and post-session lexical retention tests were administered to examine the extent of lexical retention of the participant. Concurrently, the influencing factors were explored through a Lexical Retention Factors for Down Syndrome Students Questionnaire (LRFDSSQ) and the researcher's journal observations. The participant's lexical retention test scores demonstrated increased lexical retention. At the same time, motivation, student engagement, teaching effectiveness, a supportive learning environment, and teacher-student interaction and rapport were noted as potential contributing factors. This study provides teachers and researchers with valuable perspectives on possible solutions to improve lexical retention among students with DS, aiming to promote inclusion and equity in EFL education.

RESUMEN

La retención léxica es fundamental para el aprendizaje del inglés como lengua extranjera (EFL). Sin embargo, los estudiantes con síndrome de Down (SD) enfrentan desafíos significativos debido a limitaciones en la memoria a corto plazo. Aunque estudios recientes reconocen su importancia y los factores que influyen en ella, la investigación de este tema entre adultos jóvenes con DS en entornos de EFL sigue siendo limitada. Este estudio diagnóstico tiene como objetivo investigar la retención léxica de una estudiante adulta joven con DS en el nivel pre-A1 de competencia en inglés y los factores que influyen en esta. Empleando un diseño de métodos mixtos, se administraron pruebas de retención léxica antes y después de cuatro sesiones de instrucción para determinar el grado de retención léxica, mientras que los factores influyentes se exploraron a través de un Cuestionario de Factores de Retención Léxica para Estudiantes con Síndrome de Down (LRFDSSQ) con escalas Likert y observaciones registradas en el diario de la investigadora. Las puntuaciones de las pruebas de retención léxica de la participante demostraron un aumento en la retención léxica, mientras que se señaló a la motivación, la participación de la estudiante, la efectividad docente, un ambiente de aprendizaje de apoyo y la interacción y empatía docente-estudiante como posibles factores contribuyentes. Este estudio proporciona a docentes e investigadores perspectivas valiosas sobre posibles soluciones para mejorar la retención

léxica entre los estudiantes con SD, con el objetivo de promover la inclusión y la equidad en la educación de EFL.

Palabras clave:

Retención léxica, desafíos, factores, inglés como lengua extranjera (EFL), síndrome de Down.

INTRODUCTION

Lexical retention is an essential component of learning English as a Foreign Language (EFL) (Algrni, 2020; Patra et al., 2022). Nevertheless, students with Down syndrome (DS), often struggle to retain lexical terms because of limitations in short-term memory (Godfrey & Lee, 2020). Although research recognizes the importance of lexical retention in EFL learning, there is still a lack of studies specifically addressing it among young adult students with DS in an EFL context.

While existing research has emphasized the significant role of executive functioning skills in the linguistic ability of individuals with DS (Kristensen et al., 2022; Soltani et al., 2022), the results from these investigations are not directly applicable to young adults with DS learning EFL.

In addition, recent studies have identified several factors that influence lexical retention in EFL learning (Algrni, 2020; Namaziandost et al., 2020; Cancino, 2021; Lee et al., 2021; Nguyen, 2022). However, these studies have not specifically considered the unique learning needs and cognitive profiles of young adult students with DS. Therefore, further research is needed to understand how these factors affect lexical retention during EFL learning in this particular population.

The purpose of this concurrent mixed-methods diagnostic study was to investigate the lexical retention challenges and classroom factors that influence said retention in EFL learning for students with DS. This study employed a single-case short-term longitudinal design, incorporating pre- and post-session lexical retention tests, to assess the extent of retention of a selected set of lexical terms. At the same time, the key factors influencing the retention of lexical terms during instructional sessions were identified using a questionnaire with Likert scales and a journal. The participant was a 21-year-old female student with Down syndrome, currently studying at a private distance-learning high school in Ecuador, and possessing a pre-A1 level of English proficiency. Quantitative and qualitative data were combined to offer a broader overview of the research questions and to advocate for changes in EFL education for young adults with DS.

This study is significant for researchers and educators alike. By investigating these research questions, this diagnostic study refines existing knowledge in scholarly research in special education and EFL learning, informs about issues faced by students with DS in EFL learning contexts, offers valuable insights for developing potential solutions to support young adult students with DS in retaining lexical terms during their EFL learning, and contributes to future research efforts to improve instructional practices and promote inclusion and equity in the field of EFL teaching, particularly for students with DS.

The theoretical framework for this diagnostic study is anchored on the Cognitive Load Theory (CLT). Proposed by Sweller (1988), CLT offers important perspectives on the cognitive processes involved in learning and memory retention, with a particular focus on the limitations of working memory and the importance of instructional design in optimizing learning outcomes. Moreover, CLT underscores that effective learning can only occur when students' cognitive capacity is not overwhelmed and that exceeding manageable levels of cognitive load can lead to increased mistakes, reduced effort, and lower engagement, especially among struggling students who are more prone to shutting down (Sweller, 2011).

The acquisition and retention of lexical terms are the building blocks for the development of all other language skills in EFL learning (Algrni, 2020; Patra et al., 2022). However, individuals with DS often encounter difficulties in retaining lexical terms due to the memory deficits they experience, particularly in immediate verbal recall, learning, and prospective memory (Godfrey & Lee, 2020). Recognizing these cognitive limitations is critical to developing instructional interventions that can provide tailored support for students with DS.

As indicated by current studies, individuals with DS face intricate cognitive challenges related to retaining lexical terms. (Both Soltani et al., 2022; Kristensen et al., 2022), emphasized the crucial role of executive functioning skills for this population. Soltani et al. (2022), highlighted their importance in verbal fluency tasks, while Kristensen et al. (2022), underscored the strong association of attention, inhibition, and working memory with language ability in young adults with DS. On the other hand, Jackson et al. (2021), shed light on the significance of verbal working memory in word learning, a critical aspect of lexical retention, suggesting its potential relevance to those with DS. Furthermore et al., (2020), discovered that young people with DS struggle with memory deficits in prospective memory and immediate verbal recall but may perform similarly to their mental-age-matched peers in immediate visual recall and the percentage of items remembered on memory tasks following a delay, showing variability in the cognitive challenges encountered by this population.

According to recent research, several factors have been found to influence lexical retention in EFL learning. Algrni (2020), observed that using a multi-sensory approach

improved vocabulary achievement and retention in students with learning disabilities, suggesting that this approach may apply to students with DS. Cancino (2021), emphasized topic interest as a possible mediator of vocabulary gains and retention, facilitated by dictionary look-up behavior. Context-based learning strategies were revealed to have a higher impact on lexical retention than rote rehearsal (Nguyen, 2022), while gamified learning showed promise in enhancing the retention of vocabulary (Patra et al., 2022). Spaced distribution instruction, reading comprehension, and learning vocabulary through reading were also associated with improved lexical retention (Namaziandost et al., 2020; Lee et al., 2021; Binhomran & Altalhab, 2023).

While previous studies have revealed the cognitive challenges associated with DS and the factors influencing lexical retention in EFL learning, there are certain limitations as well.

Research has shown that there are strong correlations between speech fluency, language skills, and executive functioning in individuals with DS, indicating their potential role in lexical retention (Kristensen et al., 2022; Soltani et al., 2022); however, variations in cognitive challenges among individuals with DS have also been identified (Godfrey & Lee, 2020). These results suggest that the cognitive difficulties linked with lexical retention in DS are complex and can vary from person to person. Furthermore, current investigations have proposed that issues with encoding rather than with retention could be the cause of deficits in word learning in people with developmental language disorders (Jackson et al., 2021), warranting further research in the context of DS.

Previous literature has shed light on the cognitive challenges individuals with DS face in retaining lexical terms and identified key factors influencing them in EFL learning contexts. Yet, their implications for individuals with DS learning EFL remain limited.

MATERIALS AND METHODS

This diagnostic study employed a concurrent embedded design of mixed methods (Creswell, 2009). A single-case short-term longitudinal design served as the primary method, guiding the study's investigation into the retention of lexical terms. Embedded within this short-term longitudinal design and addressing a complementary question, the study analyzed key factors influencing lexical retention both quantitatively and qualitatively.

This study unfolded in three stages: inception, diagnostics, and solutions (Patankar, 2024). Inception began by obtaining authorization from the high school where the participant was enrolled and securing signed informed consent forms from both the participant and her parents.

This stage also encompassed the data collection process. Data collection to address the first research question occurred over two weeks, compromising four instructional sessions, each lasting 60 minutes. These sessions took place twice a week, following the participant's regular school schedule (the timeframe determined by constraints imposed by the school and the study's particular circumstances). Pre- and post-session lexical retention tests were administered to the participant to determine the extent of retention of a selected set of lexical terms throughout these instructional sessions. Conversely, a questionnaire with Likert scales and a journal were used to collect data to investigate the second research question, which aimed to determine the key factors influencing the retention of lexical terms in young adult students with DS during instructional sessions. For that purpose, English teachers who had worked with the participant and with students with characteristics similar to those of the participant were asked to respond to the questionnaire, while the researcher kept a journal to record information regarding the factors influencing lexical retention observed across the four instructional sessions. Next came diagnostics, where data was analyzed and interpreted to identify the problem and the factors responsible for it (Patankar, 2024). Lastly, the solutions stage reported the findings and suggested potential solutions to the identified problem (Patankar, 2024).

This study focused on a 21-year-old female adult with Down syndrome and 40% intellectual disability enrolled in a private distance-learning high school in Quito-Ecuador. Despite her age, the participant's instructional level was akin to that of a fourth-grade student. Convenience sampling was employed due to the accessibility and ready availability of the participant for the study purposes (Frey, 2018). Moreover, the decision to use convenience sampling was driven by its utility in identifying key features to investigate in more detail and testing the effectiveness of instruments before conducting larger-scale studies (Newby, 2014).

This diagnostic study implemented a single-case short-term longitudinal approach integrated with a Likert scale questionnaire and journal entries.

The first research question was answered using pre- and post-session lexical retention tests. These tests were adapted from activities found in the "Fun for Starters Student's Book Third Edition" by Cambridge University Press and comprised ten words selected from the Cambridge pre-A1 Starters Wordlist picture book PDF, focusing on the theme "At the Zoo." To ensure measurement consistency and facilitate direct comparison of retention levels over time, the tests evaluated the same words across all the instructional sessions. Moreover, each test featured different exercises

to assess the same vocabulary, promoting engagement and diversifying assessment methods.

The second research question was explored quantitatively and qualitatively. The quantitative instrument was a Lexical Retention Factors for Down Syndrome Students Questionnaire (LRFDSSQ). The LRFDSSQ consisted of 17 statements rated on a Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The LRFDSSQ was carefully developed by the researcher based on insights from relevant literature (Algrni, 2020; Namaziandost et al., 2020; Cancino, 2021; Lee et al., 2021; Patra et al., 2022; Nguyen, 2022; Binhomran & Altalhab, 2023), identifying various factors influencing lexical retention in EFL learning. To collect additional information, a journal was used for the qualitative part of the study. In this journal, the researcher recorded key factors influencing the retention of lexical terms that were observed during the instructional sessions with the participant.

The scores of the pre- and post-session lexical retention tests were mainly interpreted using descriptive statistics (Mackey & Gass, 2016). Measures of central tendency and variability were calculated to illustrate the variations between the lexical retention scores before and after the instructional sessions. Additionally, trend lines were added to the graphs to provide further insights into the direction and magnitude of change in retention levels over time during a visual inspection of the graphical data (Privitera & Ahlgrim-Delzell, 2019). Descriptive statistics, including measures of central tendency and variability (Mackey & Gass, 2016), were also used to summarize the responses from the LRFDSSQ, providing a comprehensive overview of teachers' answers to each question. Microsoft Excel was employed to compute descriptive statistics and examine the graphical data of the test scores.

The six-step method developed by Braun & Clarke (2006), was used to thematically analyze the qualitative data gathered from the entries made in the researcher's journal.

To safeguard the participant's rights, the following ethical procedures, as outlined by Creswell (2009), were adhered to:

1) The research questions and data usage intentions were thoroughly explained to the participant and her parents both verbally and in writing, in Spanish, their first language.

2) Informed consent forms, in Spanish, were secured from the participant and her parents before starting the study.

3) The school principal provided written consent and approval for the study, with all documentation presented in Spanish.

4) Full disclosure of each data collection instrument and activity was made to the participant, her parents, and the school principal.

5) All collected data, along with written and visual interpretations, were shared with the participant and her parents.

6) The participant's rights, interests, and preferences were given the utmost priority in decisions related to data reporting.

7) Personal anonymity matters were ultimately decided by the participant.

RESULTS AND DISCUSSION

The scores from the participant's pre- and post-session lexical retention tests were collected over four biweekly instructional sessions. An analysis of these scores was performed to address the first research question, which sought to examine the extent to which a young adult student with DS at the pre-A1 level retained lexical terms after an EFL instructional session. Data from eight lexical retention test scores were recorded, half corresponding to the pre-sessions and the other half to the post-sessions. Descriptive statistics and visual inspection using Microsoft Excel were used to analyze the data.

The data were summarized by computing descriptive statistics. Measures of central tendency (mean, median, mode) and variability (standard deviation, variance, range) were calculated for pre-session and post-session scores.

Table 1 summarizes the participant's pre-session lexical test scores for each of the four instructional sessions, with scores varying between 4 and 10.

Table 1. Pre-Session Lexical Retention Test Scores.

Instructional session	Test score
Session 1	4
Session 2	8
Session 3	10
Session 4	10

Source: Own elaboration

The Table 2 presents the descriptive statistics for the pre-session lexical retention test scores.

Table 2. Descriptive Statistics for Pre-Session Lexical Retention Test Scores.

Statistic	Value
Mean	8
Median	9
Mode	10
Standard Deviation	2,83
Sample Variance	8
Range	6

Source: Own elaboration

The Table 3 shows the participant's post-session lexical retention scores after each instructional session. The scores fell between six and ten.

Table 3. Post-Session Lexical Retention Test Scores.

Instructional session	Test score
Session 1	6
Session 2	10
Session 3	10
Session 4	10

Source: Own elaboration

The Table 4 displays the descriptive statistics for the post-session lexical retention test scores.

Table 4. Descriptive Statistics for Post-Session Lexical Retention Test Scores.

Statistic	Value
Mean	9
Median	10
Mode	10
Standard Deviation	2
Sample Variance	4
Range	4

Source: Own elaboration

Tables 2 and 4 depict descriptive statistics that offer meaningful perspectives on the participant's retention of ten words from the "At the Zoo" lexical set over four instructional sessions. A comprehensive understanding of the participant's lexical retention ability before and after instructional sessions was obtained through the examination of central tendency and variability measures. The consistently higher scores observed in the post-session tests in comparison to the pre-session tests revealed a significant improvement in the participant's lexical retention ability.

The graphical data from the pre- and post-session lexical retention test scores was visually inspected to enhance the descriptive statistics, providing a more nuanced understanding of the participant's lexical retention dynamics across time. Figure 1 illustrates the trends and patterns in the participant's retention levels throughout the four instructional sessions.

Fig. 1. Linear Trend Lines for Pre- and Post-Session Lexical Retention Test Scores.
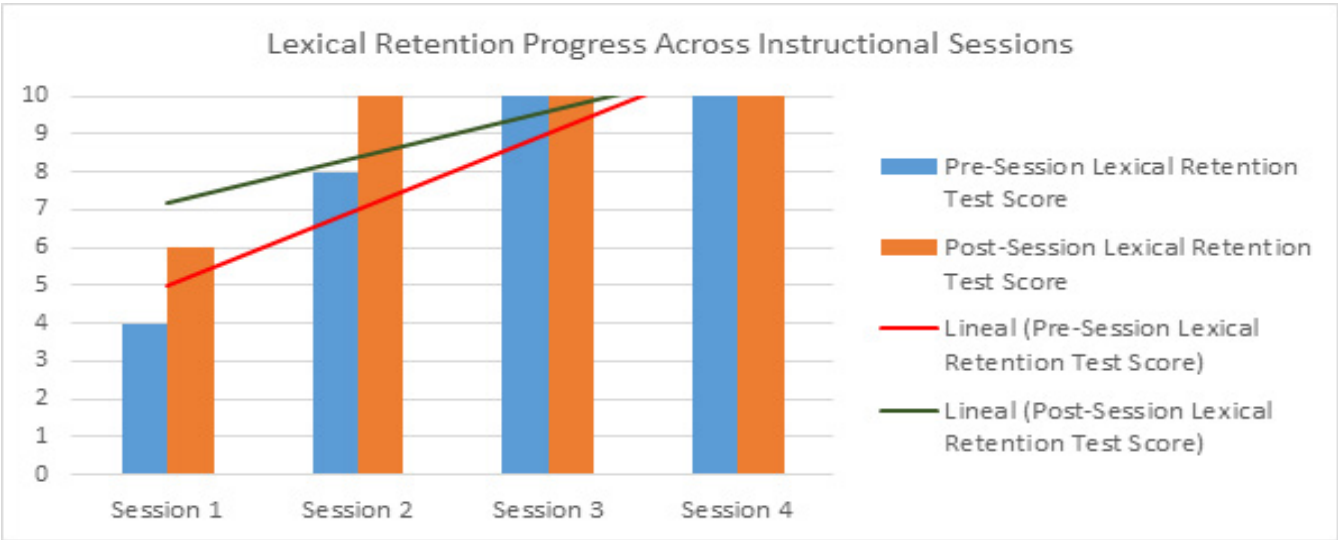
Source: Own elaboration

Figure 1 displays the instructional sessions along the x-axis and the lexical retention test scores on the y-axis. Lexical retention scores showed an increasing trend throughout the four instructional sessions, with the participant achieving near-maximum or maximum scores on the lexical retention tests.

Overall, both the descriptive statistics and the visual inspection of the graphical data demonstrated the participant's lexical retention improvement following EFL instructional sessions.

In the second research question, a Lexical Retention Factors for Down Syndrome Students Questionnaire (LRFDSSQ) and the researcher's journal entries were used to determine what key factors influence the retention of lexical terms in young adult students with DS at the pre-A1 level during EFL instructional sessions.

Table 5. Descriptive Statistics of Teachers' Responses for Each Item in the LRFDSSQ.

Question	Question Text	Median	Mode	Standard Deviation	Sample Variance	Range
1	Student's motivation to learn English	4	4,5	0,84	0,7	2
2	Ability to focus and sustain attention	4	4	1,10	1,2	3
3	Effectiveness of teaching methods.	4	4,5	1,22	1,5	3
4	Student's comfort with the learning environment.	5	5	0,55	0,3	1
5	Student's comfort with the teacher.	5	5	0,55	0,3	1
6	Presence of distractions or interruptions.	4	4	1,52	2,3	4
7	Student's engagement in learning activities.	4	4	0,71	0,5	2
8	Clarity of teacher's instructions.	4	4	0,45	0,2	1
9	Availability of visual aids or supportive materials.	5	5	0,45	0,2	1
10	Repetition and reinforcement of vocabulary.	5	5	0,55	0,3	1
11	Student's comfort and familiarity with English.	4	3,5	1,00	1	2
12	Types of didactic materials used.	5	5	0,89	0,8	2
13	Types of activities done.	5	5	0,89	0,8	2
14	Number of lexical terms taught.	4	4,5	1,22	1,5	3
15	Topic of the lexical set used.	4	4	1,14	1,3	3
16	Use of spaced distribution instruction.	4	4,5	1,22	1,5	3
17	Use of massed distribution instruction.	4	2,5	1,52	2,3	3

Source: Own elaboration

A total of five teachers filled out the LRFDSSQ, including three who had directly taught the participant and two who had previously taught students with DS in the same cognitive age group. A descriptive analysis of the LRFDSSQ responses was conducted in Microsoft Excel following the data collection.

Descriptive statistics were calculated to synthesize the teachers' responses to each item. This included determining measures of central tendency (median, mode) and variability (standard deviation, variance, range) for each item, providing a synopsis of the teachers' perspectives, as illustrated in Table 5.

Note: This table is based on teachers' responses regarding factors that influence lexical retention in young adult students with Down syndrome during EFL instructional sessions. As shown in the table, some items have bimodal results.

The descriptive statistics presented in Table 5 offered relevant interpretations of teachers' views on the key factors influencing lexical retention in young adult students with DS during EFL instructional sessions. The data revealed generally favorable teacher perceptions across various areas.

Teachers rated the student's motivation to learn English (Item 1), their ability to focus and sustain attention (Item 2), and their engagement in learning activities (Item 7) highly, with median scores of 4. Similarly, the effectiveness of teaching methods (Item 3), the clarity of the teacher's instructions (Item 8), and the number of lexical terms taught (Item 14) received positive median scores of 4.

Furthermore, teachers emphasized the significance of a supportive learning environment, as indicated by high median scores for student's comfort with the learning environment (Item 4), comfort with the teacher (Item 5), and availability of visual aids or supportive materials (Item 9), all with median scores of 5.

Also positively evaluated were repetition and reinforcement of vocabulary (Item 10), the types of didactic materials used (Item 12), and the types of activities performed (Item 13), each with a median score of 5.

However, there were differences in opinions regarding the presence of distractions or interruptions (Item 6), the student's comfort and familiarity with English (Item 11), the topic of the lexical set used (Item 15), the use of spaced distribution instruction (Item 16), and the use of massed distribution instruction (Item 17), with median scores of 4 and some variability in responses.

These findings collectively underscored the multifaceted nature of factors influencing lexical retention in young adult students with DS during EFL instructional sessions, highlighting the importance of a supportive learning environment, effective teaching methods, and student engagement.

The researcher's journal entries were analyzed manually following the six-step method developed by Braun & Clarke (2006), to conduct thematic analyses. The analysis focused on four journal entries, each corresponding to one of the instructional sessions with the participant of the study. The data were initially coded, and several potential codes related to factors influencing lexical retention in young adult students with DS during EFL instructional sessions were identified. These codes were then used to generate themes so that patterns could be derived. In the end, three overarching themes were established. These overarching themes provided a comprehensive overview of the factors influencing lexical retention among young adult students with DS during EFL instructional sessions.

Theme 1: Student Engagement and Motivation. The student showed high levels of motivation and engagement throughout the four instructional sessions. The student participated in the learning activities with enthusiasm, and her genuine interest in learning the lexical terms was evident.

Theme 2: Effectiveness of Instructional Tools and Methods. Digital flashcards, interactive online games, and multimedia resources were used during the instructional sessions, which positively influenced the student's retention of the lexical terms.

Theme 3: Teacher-Student Interaction, Rapport, and Support. The positive interaction and rapport between the teacher and the student helped establish a supportive learning environment. Positive reinforcement and encouragement in the form of nonverbal cues and verbal praise were given to the student through the four instructional sessions. Additionally, strategies such as the use of Total Physical Response (TRP) and translanguaging were applied to address confusion or mistakes during the learning process and also to provide tailored support to the student.

These themes underscored the fact that to understand the dynamics of lexical retention in young adult students with DS during EFL instructional sessions, various factors need to be taken into consideration.

This diagnostic study investigated the challenges and factors influencing lexical retention among young adult students with DS during EFL instructional sessions.

A significant improvement in the participant's lexical retention was observed throughout the study's instructional intervention. During the four instructional sessions, the participant showed a steady upward trend in lexical retention test scores, indicating enhanced lexical retention ability. Although individuals with DS face challenges in lexical retention due to short-term memory limitations, the findings of this study are corroborated by existing literature emphasizing the cognitive variability among individuals with DS (Godfrey & Lee, 2020). The study's findings also correspond with research underscoring the role of spaced distribution instruction in promoting improved lexical retention in EFL students (Namaziandost et al., 2020; Lee et al., 2021). Furthermore, the use of engaging and interactive tools, like digital flashcards and games, likely contributed to the participant's positive retention rates, aligning with studies advocating for the integration of multisensory approaches and multimedia in EFL teaching (Algrni, 2020; Patra et al., 2022).

In addition, the study identified effective instructional methods, student engagement, student motivation (Algrni, 2020; Cancino, 2021), a supportive learning environment, and teacher-student interaction and rapport as essential factors in promoting lexical retention.

While this study provides valuable insights into lexical retention among young adults with DS learning EFL, it is important to acknowledge various limitations. Firstly, the single-case design of the study restricts the applicability of its findings to a wider DS population. Future research with a larger sample size may offer a more thorough understanding of lexical retention patterns in this population. Similarly, the LRFDSSQ sample comprised only five teachers. Increasing the sample size would strengthen the external validity of the results. Another limitation is that the study was confined to four instructional sessions over two weeks. A longer period of intervention might have provided a deeper understanding of the participant's lexical retention abilities over time and allowed for the exploration of potential long-term effects.

CONCLUSIONS

This diagnostic study revealed an increase in lexical retention in a young adult student with DS, as demonstrated by the participant's improved lexical retention test scores throughout the four instructional sessions. These positive results could be attributed to effective instructional methods, student engagement, student motivation, a supportive learning environment, and teacher-student interaction and rapport.

This study suggests using tailored instructional strategies that incorporate the aforementioned factors as well as engaging and interactive teaching tools to improve lexical retention for individuals with DS in EFL learning contexts, while also highlighting future research opportunities. Firstly, given the limitations of the single-case design and small teacher sample size, future studies could use larger sample sizes to enhance the generalizability of the results. Furthermore, extending the duration of the study beyond four instructional sessions may yield a better understanding of the dynamics of lexical retention over time and its possible long-term impacts. Moreover, future research may also explore particular instructional methods and strategies to find what are the best for enhancing lexical retention in individuals with DS. Longitudinal studies tracking lexical retention outcomes over an extended period could illuminate the sustainability of intervention effects and inform the development of evidence-based instructional approaches. Ultimately, these recommendations aim to promote inclusion and equity in education and ensure that students with DS receive the necessary support for effective language learning.

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