**Design of an English E-book for Deaf Fifth-Graders from the Metropolitan Area of Bucaramanga**

Juan David Caballero Fuentes and Thomas Alexander Riddle Delgado

Undergraduate thesis for the Degree of Bachelor in Foreign Languages with Emphasis in English

Director

María Eugenia Rojas Villamizar

Master of Science in Education TESOL

Co-Director

Luisa Fernanda Hernández Valdivieso

Colombian Sign Language Teacher and Interpreter with Specialization in Virtual Environments

Universidad Industrial de Santander

Facultad de Ciencias Humanas

Escuela de Idiomas

Bucaramanga

2022

**Acknowledgements**

Throughout the development of this project, we received a great deal of support and assistance. First, we would like to thank our director, Professor María Eugenia Rojas Villamizar, whose expertise, constant guidance, and insightful feedback led us to conduct appropriate exploratory research. Second, we would like to acknowledge our Colombian Sign Language (CSL) consultants and interpreters, Luisa Fernanda Hernández Valdivieso and Claudia Patricia Hernández Valdivieso for their great commitment to our project and the deaf community giving us the opportunity to connect with this social group properly. Third, we are grateful to our adviser, Angélica María Romero Mateus for her bright observations that led us to create a bridge between English teaching and Colombian Sign Language students. Finally, we would like to thank our families for their support and advice through our university path who will be by our side in this new professional stage.

**Table of Contents**

**List of Tables**

# List of Figures

**List of Annexes**

**Abstract**

**Title:** Design of an English E-book for deaf fifth-graders from the metropolitan area of

Bucaramanga[1]

**Authors:** Juan David Caballero Fuentes and Thomas Alexander Riddle Delgado[2]

**Key Words:** Colombian Sign Language, Second Language Acquisition, English Learning,
Deaf Students

**Description:** Through this design-based research, an e-book to teach elementary English
vocabulary to deaf fifth-graders in the metropolitan area of Bucaramanga was designed and
validated. In order to create this material, de Benito´s three-stage methodological design was
adopted (2006). First, a contextualization and documentation were carried out, where concepts
such as the definition of deafness, features of linguistic and cognitive development, features of
didactic material, and the acquisition of English and its vocabulary were addressed considering
the target population. Second, for the data collection and analysis, a group of five teachers with
experience teaching deaf learners was surveyed to determine the lexical content of the e-book.
The third stage corresponds to the design and validation of the prototype. The e-book was
designed using Adobe InDesign and Adobe Illustrator and it was subsequently submitted to a
content validation procedure by a multidisciplinary panel of experts. The results indicate that two
main sets of characteristics emerged. One set aligned with Second Language Acquisition
Theories: from this perspective the e-book needs to be flexible, technology-based, visual, and
concrete. A second set responds to the needs of deaf fifth-graders: from this perspective, the e-
book should include strategies such as vocabulary personalization, emotionalization, and
visualization.

[1] Degree Work
[2] Human Sciences Faculty. School of Languages. Director: María Eugenia Rojas Villamizar. Master of Science in Education TESOL. Co-Director: Luisa Fernanda Hernández Valdivieso. Colombian Sign Language Teacher and Interpreter with Specialization in Virtual Environments.

## Resumen

**Título:** Diseño de un e-book en inglés para estudiantes sordos de quinto grado del área metropolitana de Bucaramanga[1]

**Autores:** Juan David Caballero Fuentes y Thomas Alexander Riddle Delgado[2]

**Palabras Clave:** Lengua de Señas Colombiana, Adquisición de una Segunda Lengua, Aprendizaje del Inglés, Estudiantes Sordos.

**Descripción:** A través de esta investigación basada en el diseño, se diseñó y validó un e-book para enseñar vocabulario básico del inglés a estudiantes sordos de quinto grado del área metropolitana de Bucaramanga. Para crear este material, se adoptó un diseño metodológico de tres fases propuesto por de Benito (2006). Primero, una contextualización y documentación fueron llevadas a cabo donde conceptos como la definición de sordera, características lingüísticas y cognitivas del desarrollo, características de material didáctico, y la adquisición del inglés y su vocabulario fueron abordados considerando la población objetivo. Segundo, para la recolección y análisis de datos, un grupo de profesores con experiencia en la enseñanza a aprendices sordos fue encuestado para determinar el contenido lexical del e-book. La tercera fase corresponde al diseño y validación del prototipo. El e-book fue diseñado utilizando Adobe InDesign y Adobe Illustrator, que fue posteriormente sometido a un proceso de validación por un panel multidisciplinario de expertos. Los resultados indicaron que dos conjuntos de características emergieron. El primer conjunto estuvo alineado con teorías de adquisición de una segunda lengua: Desde esta perspectiva, se determinó que el e-book fuese flexible, basado en tecnología, visual y concreto. El segundo conjunto respondió a las necesidades de los niños sordos de quinto grado: Desde esta perspectiva, el e-book incluye estrategias como la personalización, emocionalización y visualización del vocabulario.

[1] Trabajo de Grado
[2] Facultad de Ciencias Humanas. Escuela de Idiomas. Directora: María Eugenia Rojas Villamizar. Máster en Ciencias de la Educación TESOL. Codirectora: Luisa Fernanda Hernández Valdivieso. Docente e Intérprete en Lengua de Señas Colombiana con Especialización en Entornos Virtuales.

## Introduction

**Contextualization**

Colombian Sign language (CSL) emerged around the 1920's in a boarding school in Bogotá (Fonseca, 2019). During that period, research about deafness in Colombia was almost non-existent and the institutional approaches to handle deafness in society were inaccurate. For instance, from 1924 to 1954, deafness was considered a pathology, and deaf people (DP) were forced to learn Spanish through spoken language and labio-facial reading (Hurtado, 2003). Additionally, both blind and DP had to share the same educational facilities and policies in the *Instituto de Sordomudos y Ciegos* from 1925 to 1955. By 1955, this institution was rightly divided into two: *Instituto Nacional para Ciegos and Instituto Nacional para Sordomudos*. The last one evolved into what we know today as *Instituto Nacional de Sordos* (INSOR) (INSOR, 2016).

Although INSOR has played a fundamental role for the inclusion of DP in Colombia, most of the deaf community have lived apart from hearing people. According to Calderón (2014), this community shares most of their daily lives exclusively with analogue peers. Although hearing and DP share the same geographical location, they have different manners and cultures. Consequently, DP's educational model is designed to be bicultural and bilingual (Fonseca, 2019; Perdomo & Salinas, 2019). In this model, DP are meant to learn CSL to communicate with their peers and written Spanish to interact with hearing people. Nevertheless, the public proposal *Oferta Bilingüe Bicultural de Estudiantes con Discapacidad Auditiva by the Ministerio de Educación Nacional* (MEN) and INSOR have been trying to cease this isolation

though a project that establishes guidelines to include deaf and hearing people in the same educational environment to strengthen intercultural communal living. Additionally, along with universities, it aims to create opportunities for DP to receive their higher education in a bilingual setting through the training of university professors and the hiring of CSL interpreters qualified (INSOR, 2017).

In addition to this isolation, DP also face problems regarding their economic status and their access to higher education. It was reported that by 2019, around 554,119 DP existed in Colombia and 70% of them were poor or lived under economically vulnerable conditions (INSOR, 2019). Moreover, only 2% of Colombian DP can access higher education (Perdomo & Salinas, 2019), therefore they are very likely to continue reproducing the vulnerability and exclusion cycle.

Considering this context, DP in Colombia have the necessity to engage with the world, join the academic field, and improve their status. These needs can be met through education because it is an essential tool for guaranteeing socioeconomic mobility and information access. In fact, De Hoyos et al. (2010) found a positive correlation between academic and social mobility. In this vein, English as a Lingua Franca is the international tool for academic mobility since it provides access to academic information and interaction with the global community (O'Neil, 2018).

However, there are some limitations that impede DS from learning English. The revision of literature demonstrated the existence of enough teaching and learning material compatible with sign languages from other countries (Marschark et al., 2001; Domagała-Zyśk & Kontra, 2016) but not with CSL. Therefore, there is a scarcity of virtual English teaching material for L1 CSL speakers. Furthermore, in Colombia, teaching English to DS is not a priority for schools

because they fear students may have vocabulary interference with Spanish (Díaz & Cubillos, 2014). In fact, ICFES, a Colombian standardized exam that tests high-schoolers, does not evaluate English to DS (Najar & Fonseca, 2018). Consequently, there is a need to design virtual English teaching material for DS. In an effort to overcome this gap, we designed an e-book with the purpose of teaching elementary English vocabulary to deaf learners since vocabulary is fundamental to develop the communicative competence (Alzahrani, 2016). Considering this, this study has the following research question: What characteristics should an e-book have to assist deaf fifth-graders from the metropolitan area of Bucaramanga to recognize elementary vocabulary in English about daily life situations?

As a limitation, the scope of this project does not include an implementation stage because of time and participant constraints.

**Justification**

In the learning process, the role of learning materials is essential because it is the link between knowledge and students' realities. According to Amadioha (2009), "Instructional materials have a high degree of interest for the learner; for they offer a reality of experience, which stimulates self-activity on the part of pupils" (p.4). Regarding audio-visual material, Cakir (2006) adds that in language learning, audio-visual materials have a positive impact when applied in the right context. Since language learning is a field in constant improvement, the teaching of any foreign language for students whose L1 has a visual-manual modality with its own grammar and lexicon as sign languages, there is a necessity to address efforts to create new English teaching material aligned with DS' needs because there is a shortage of teaching material for this population in Colombia.

As it was mentioned, the material for learning and teaching English as a foreign language (EFL) to CSL speakers is almost non-existent. During the literature revision for this project, we found little documentation about material to teach English to deaf children in different databases and official websites such as Dialnet, Research Gate, Ibero, INSOR, Redae, CBIE, WHO, United Nations General Assembly, and repositories from different Colombian universities. Futhermore, INSOR created 120 pieces of pedagogical material considering information and communication technologies (ICTs) published in 2018: 20 module lessons, 37 streamed classes, 23 short videos and 40 units of knowledge about Colombian culture. This material was uploaded on INSOR's YouTube channel and included subjects such as math, social sciences, literature, and Colombian culture. However, none of the content was related to English learning (INSOR, 2018). This fact proves the need for material for the acquisition of ESL for CSL speakers; hence, our design is set to ameliorate this gap in the literature.

To contribute to the expansion of the literature regarding English teaching to DS, our main purpose is to design an e-book for deaf fifth-graders from the metropolitan area of Bucaramanga to learn elementary English vocabulary. We expect CSL teachers to use this material to lay lexical foundations of English in DS. In the long term, this project can pave the way to help DS to understand the English language and therefore, connect with the world, dabble in the academic field, and improve their socioeconomic status (INSOR, 2018).

Our e-book may articulate graphic design concepts and foreign language acquisition theory applied to DS in a Colombian context. Since there are no previous initiatives that combine these two fields in Colombia, our project may be useful for teachers interested in developing educational material for DS in the future. As pre-service teachers, we are trying to foster

communication and language learning, and help to break educational hindrances regarding

minorities.

# 1. Objectives

## 1.1 General Objective

To design an e-book to assist deaf fifth-graders from the metropolitan area of Bucaramanga to recognize elementary vocabulary in English about daily life situations.

## 1.2 Specific Objectives

- To determine the lexical content aligned with deaf fifth-graders needs from the metropolitan area of Bucaramanga.
- To design the e-book prototype for deaf fifth-graders from the metropolitan area of Bucaramanga.
- To validate the e-book by a panel of experts in the fields of language learning and Colombian Sign Language.

# 2. Theoretical Framework

## 2.1 Precedents

### 2.1.1 International Previous Work

Najar & Fonseca (2018) constructed a didactic strategy for a Dominican Republic school that intended to teach three deaf eleven-graders about the Colombian economic sectors. Researchers used Moodle for presenting audio-visual material and activities such as mind maps, questionnaires, and videos. In interviews, students manifested that interactivity and digitalization

of the material eased their learning process and increased their motivation. This article provides digital alternatives to present and assess comprehension of concepts on deaf students.

Lissi et al. (2012) discussed some features of the Swedish bilingual approach for deaf learners in Chile. They reviewed theoretical concepts and practical strategies to facilitate communication and learning. The authors examined concepts including the perception of auditory speech by DP such as body movement, the subordination of sign languages in presence of an oral language, and the similarities between hearing children learning an L1 and deaf people learning an L2. This article provides useful strategies and classroom management activities to include in our design. However, these activities should be adapted for a virtual environment.

Cano et al. (2015) created a mobile application used for teaching reading and writing to DP in Mexico. The mobile application was built upon a learning methodology called Fitzgerald. Even though this method was created to teach grammar to DS by a color system, it could be adapted to teach vocabulary in our design.

*2.1.2 National Previous Work*

Ramírez (2020) reviewed and organized literature about English reading and writing into national and international sources. In the national landscape, she concluded that Colombia's deaf population is interested in learning English but there are few trained English teachers. On the other hand, in the international landscape, she concluded that deaf students have syntactic, semantic, and morphological difficulties to learn an oral language and technology plays a fundamental role for this process. This paper defines DP's cognitive, social and psychological features and relates them to Colombia's political and educational reality.

Calderón & Flórez (2021) designed and validated an audio-visual resource for DP to learn CSL in compliance with the parameters proposed by the MEN. The book was developed

through an animated character who interprets oral language into sign language. The material

included topics such as the Colombian dictalological alphabet, emotions, and colors. This article

proposes a dynamic way of presenting the vocabulary and some general parameters to validate

audio-visual resources for deaf learners.

Arroyave et al. (2016) created an interactive website for the teaching of CSL through

elemental content such as numbers, alphabet, food, daily objects, and animals. The material was

built upon videos, images, and CSL with activities such as open questions and matching. This

material was validated by a panel of experts in the fields of CSL, web development, and the

participants of the project. The activities proposed and the multidisciplinary validation panel will

be essential for our design.

In conclusion, there exists documentation about practical experiences of material design

and its implementation for deaf schoolers in Colombia and other countries. However, none of

this material covered the learning of English as a foreign language. For this reason, we will adapt

some findings such as the lexical content (Arroyave, 2016), character illustration (Calderón &

Flórez, 2021), the linguistic features of deaf students (Ramirez, 2020), the Fitzgerald method

(Cano et al., 2015) and features such as interactivity and digitalization (Najar & Fonseca, 2018)

to our e-book.

## 2.2 Theoretical basis

### 2.2.1 Definition of Deafness

From a clinical perspective, deafness has been defined as an auditive loss of 70 DB which

can be low, moderate, severe, or deep (Navarro, 2020). This definition has been delimited under

physical parameters (lateral or bilateral), by its origin (congenital or acquired). Likewise, if there

was acquisition of language from the family environment at the moment of deafness, it can be

pre-locutive or post-locutive (INSOR, 2017). For the purpose of this project, our final product

aims at DP with a pre-locutive auditive loss that exceeds 70 DB.

### 2.2.2 Cognitive and Language Development of Deaf People

The psycho-evolutionary and language development of DP differ significantly from its

counterparts: the hearing community (See table 1). When it comes to linguistic development, DP

cannot have access to auditory input and consequently, they cannot create phonological

awareness and, therefore, they cannot easily understand the syntactical, semantic, and

morphological features of oral languages (Linares, 2009; Ramírez, 2020). Regarding their

psycho-evolutionary process, their lack of auditory input impacts their evolutionary stages

(Ramírez, 2020).

**Table 1**

*Auditory input impact*

| Age | Auditory input impact |
|---|---|
| 2 | No imitation of sound nor proper temporal-spatial structuring. |
| 7 | No use of language and socialization with their peers. |
| 11 | Just concrete thinking, not abstract. |
| 20 | Undeveloped hypothetical thinking. |

### 2.2.3 EFL Acquisition for Deaf People

Since DS cannot receive auditory input, their foreign language acquisition is restricted to

writing and reading and they tend to achieve low reading comprehension levels (Zazove et al.,

2013). In fact, Najar and Fonseca (2018) claim that in Colombia, DS score less on standardized

tests than hearing students due to reading comprehension difficulties. Therefore, the EFL

acquisition process for DS differs from hearing students in the teaching methods, presentation, and retention of information. Concerning the teaching methods, the direct method (DM) and total physical response (TPR) fulfill the needs of DP because, on the one hand, TPR is a flexible way to visually illustrate meaning, while the DM engages the learners in practical activities instructed by the teacher through English (Pritchard, 2016).

Regarding the information presentation, Podlewska (2016) and Pritchard (2016) propose cued speech (a mixture of oral speech and gestures), sign language, and visual materials (CD's, computer games, smartboards, and films with speech reading) as convenient. Considering this, since all these strategies rely on the visual channel, Pritchard (2016) stresses that there should be an adequate spatial distribution of the environment, materials, students, and teachers in which each element and actors in the classroom are properly visible.

### 2.2.4 Vocabulary Learning in Deaf Students' Foreign Language Acquisition Process

Deaf students tend to have a more restricted lexicon than hearing students due to the limited access to input (Ramírez, 2020; Domagaàa-zyĝk, 2016). As a result, DS do not acquire vocabulary, but they learn it. To solve this problem, Domagaàa-zyĝk (2016) and Pritchard (2016) propose strategies such as vocabulary personalization (selecting meaningful vocabulary to students' context), vocabulary emotionalization (linking vocabulary to students' emotional bonds), word semantic analysis (putting vocabulary in context), word morphological analysis (teaching students morphological rules of words) and vocabulary visualization (giving students visual aids about the vocabulary being taught).

### 2.2.5 Features of Proper Learning Material for Deaf People's Foreign Language Acquisition Process

Based on the aforementioned information, DS have specific needs in terms of learning material that can be fulfilled with flexible, technology-based, visual, and concrete features. First, the material must be flexible by having multiple means of representation (how information is presented) and expression (how learners can produce output) (Najar & Fonseca, 2018). Second, the material must be aligned with ICTs because these tools allow the presentation of the information in a multimodal way through videos, images, text, sign language, and other means of communication (Najar & Fonseca, 2018). Third, the material must contain mostly visual and gestural information for deaf students cannot use their auditory channels properly. Finally, abstract and hypothetical thinking is hardly developed by DS, therefore, the content of the material must be concrete (Ramírez, 2020).

**2.3 Legal References**

This project is framed under the following national and international legal documentation around deafness classification and educational assistance to the Colombian deaf community (See table 2).

*Table 2*

*Legal Framework*

| Year | Name | Unit | |
|------|------|------|---|
| | | **International** | |
| 1980 | International Classification of Impairments, Disability, and Handicaps (ICIDH) (World Health Organization, 1980) | ● | Determines the conditions of impairments, disabilities, and handicaps. |
| 1993 | Standard Rules on the Equalization of Opportunities | ● | Recognizes disability in its causes, consequences, and in the way economic, social, and cultural conditions are assumed. |

| | | |
|---|---|---|
| | for Persons with Disabilities (United Nations, 1993) | |
| | **National** | |
| 1991 | Political Constitution of Colombia (Const, 1991) | ● Art. 47: Social integration for people with disabilities. |
| 1993 | Act 60 (Ley 60 de 1993) | ● Art. 5: Establishes the resources for education and health through organisms as INSOR for people with disabilities. |
| 1994 | Act 115 of Education (Ley 115 de 1994) | ● Provides education for people with disabilities.<br>● Establishes the "Proyecto Educativo Institucional - PEI". |
| 1994 | Decree 1860 (De Bogotá, 1994) | ● Establishes general aspects of the "Proyecto Educativo Institucional - PEI". |
| 1996 | Decree 2082 (República de Colombia, 1996) | Proposes professional assistance to deal with disabilities.<br><br>Establishes educational attention for people with disabilities. |
| 1997 | Disability act<br><br>Act 361 (Ropero, 2020) | Art. 3: Establishes the social normalization and total integration of people with disabilities.<br><br>Art. 23: Establishes SENA as a mechanism of social integration for people with disabilities. |
| 2005 | Act 982 (Ley 982 de 2005) | Art. 1: Classifies the Colombian deaf community.<br><br>Art. 4: Provides the assistance of interpreters and guides.<br><br>Art. 9: Promotes quality bilingual education for people with disabilities. |
| 2009 | Act 1346 (Quintanilla, 2014) | Approves the "Convención sobre los Derechos de las Personas con Discapacidad" from the United Nations. |
| 2013 | Statutory Act 1618 (Bobadilla & Montilla, 2021) | Generates academic and labor spaces for the deaf community. |
| 2017 | Decree 1421 (Benitez et al., 2018) | Establishes attention for people with disabilities in the inclusive education framework. |

## 3. Methodology

### 3.1 Type of Study

For this project, the contextual conditions associated with deafness were framed upon Creswell's (2014) transformative paradigm, which intends to transform the lives of individuals from minority groups. In addition, the principles of applied research, being an inquiry that addresses a problem facing a society or industrial organization aiming at finding a practical solution, served as well to accomplish the main objective of this research study (Kothari, 2008; Bajpai, 2011). Considering the innovative nature of this study, the researchers adopted a design-based research as a type of study. Design-based research is the systematic study of designing and developing educational interventions such as strategies, teaching and learning material, products, and systems in order to solve problems from educational practice (Plomp, 2013). In this type of research, the methodology is flexible and adaptable to the needs of each design (de Benito and Ibáñez, 2016). Finally, this study was carried out through a three-stage methodology adapted from the design of de Benito (2006) (See figure 1).

**Figure 1**

*Methodology stages*
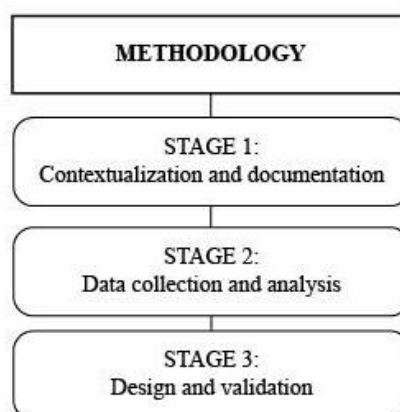
**3.2 Stages of the Methodology**

*3.2.1 Stage 1: Contextualization and Documentation*

For this stage (See figure 2), researchers reviewed the socio-political and educational environment of DP considering the national and international landscape. From a socio-political perspective, it was found that DP have been historically marginalized, having limited education support which have led them strained in low socioeconomic status (INSOR, 2019; Perdomo & Salinas, 2019). Considering these contextual conditions, this study explored the educational needs of this marginalized group of our society in terms of the learning of English as a foreign language. It was found that little teaching and learning material to teach English to DP exists. Additionally, the revision of literature concluded that material design requires specific characteristics according to the target population and its purpose (See figure 2). The main findings indicate the e-book should be flexible, technology-based, visual, and concrete (Najar & Fonseca, 2018; Ramírez, 2020), and its lexical content should be personalized, emotionalized, and visualized (Domagaàa-zyĝk, 2016; Pritchard, 2016).

**Figure 2**

*Stage 1: Contextualization and documentation*
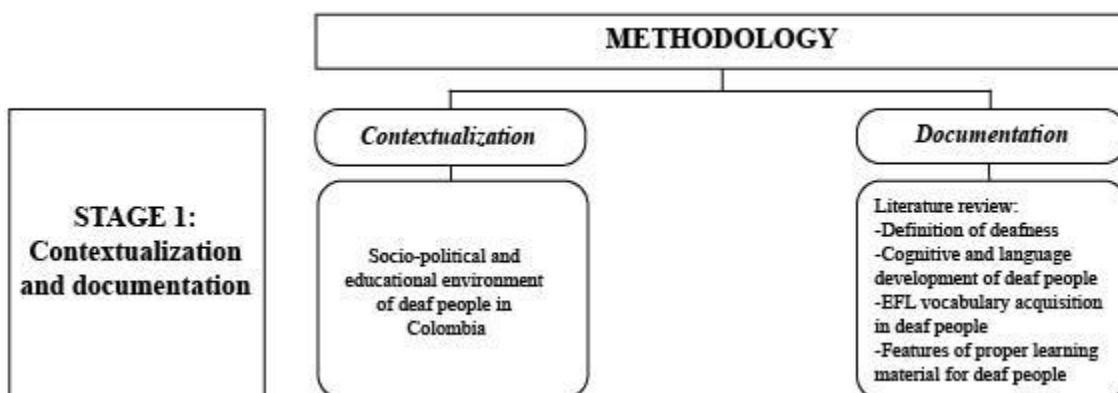
***3.2.2 Stage 2: Data Collection and Analysis***

The purpose of this stage of the study was to determine the lexical content aligned with deaf fifth-graders needs from the metropolitan area of Bucaramanga. In order to accomplish this aim, a survey was designed and administered. According to Creswell (2014), a survey "provides a quantitative or numeric description of trends, attitudes, or opinions of a population by studying a sample of that population" (p. 200). The sampling was purposeful since the researchers decided "who would most likely be of help in informing them about their construct" (Griffee, 2012, p.58).

In this sense, the participants were teachers that have taught deaf students from primary school at some point in their careers. Since there are not many teachers that fulfill these conditions, the sample for the instrument was reduced to five participants. In order to design the survey, the researchers constructed a variable operationalization matrix based on Espinoza (2019) to recognize the dimension and indicators from which the questions of the survey would stem out (See annex A).

The results from this operationalization process indicate two main dimensions: 'everyday-vocabulary' and 'real-life contexts'. The survey was piloted to one of the professors of CSL from the school of languages at Universidad Industrial de Santander, whose feedback was considered to restructure the questionnaire. Finally, the survey contained three sections and it was administered online asynchronously via Google Forms (See figure 3).

In the first section, the instrument introduced the project, the purpose of the research, and the researchers to the participants. It also presented the consent form to the respondents informing about data privacy treatment and provided with researchers' contact information in

case of doubts. As most respondents were deaf teachers whose second language was Spanish, the instrument was elaborated using that language.

The second section of the survey aimed to identify the lexical content of the e-book based on the dimension 'everyday-vocabulary'. Since DP have limited vocabulary in their native language, the researchers needed to inquire which words made part of the vocabulary repertoire of fifth graders from the metropolitan area of Bucaramanga. For this purpose, the researchers considered the fundamental vocabulary topics to be addressed when teaching EFL to deaf students proposed by Domagała-Zyśk (2016). Consequently, the questions were formulated around topics such as greetings, days of the week, days of the month, celebrations, family members, parts of the house, food, common objects, hobbies, animals, clothes, places of the city, and common verbs. This section contemplated ten multiple-choice questions with the possibility of multiple answers.

The third section inquired about the context of deaf fifth-graders from the metropolitan area of Bucaramanga based on the dimension 'real-life contexts'. In this section, participants were asked about the most frequented places for fifth graders. According to Domagała-Zyśk (2016), vocabulary should be linked to deaf students' context. This section contained one multiple-choice question where participants could choose the main parks, shopping malls, and educational institutions of the city visited by their students.

Subsequently to the implementation of the instrument, the data collected was analyzed. The survey contained closed-ended questions with the possibility for multiple answers, which are defined by Griffee (2012) as frequency data. This information was organized in a chart where the frequency of each item and each topic was recorded (See annex B). The arithmetic mean formula was computed to determine the most frequent items. It is defined as the "quotient of the sum of

the quantities by their number" (Coggeshall, 1886). Results show that 'family members' and 'food items' were the most recommended topics to be included in the e-book. Consequently, these two topics created two separate thematic units in the e-book. In contrast, the topics that obtained fewer votes were celebrations and greetings. From these two topics, only the lexical items with more votes were included in the e-book.

**Figure 3**

*Stage 2: Data collection and analysis*
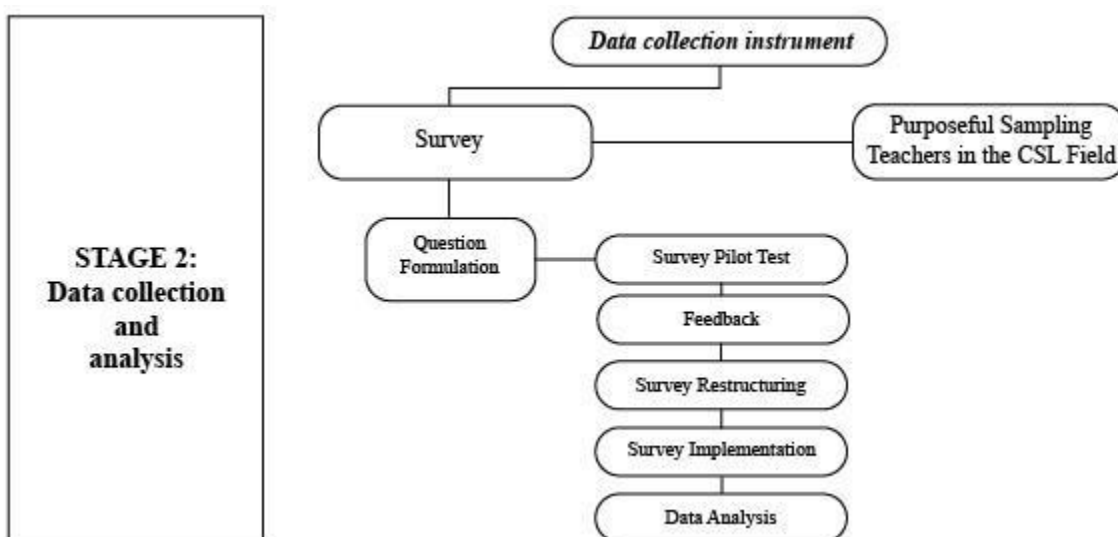


*3.2.3 Stage 3: Design and validation*

**3.3 Prototype Structure**

*3.3.1 Planning Stage*

The e-book prototype was initially organized into four thematic units. Information such as topics, the lexical items, and the possible communicative setting were considered for the

process of unit structuration. Therefore, each unit could be addressed in a specific environment that children could easily recognize from their reality. This structure responds to the need of contextualized vocabulary for deaf students (Domagaàa-zyĝk, 2016). From the eleven topics asked in the survey, four of them were not included in the units because they did not fit any of the communicative settings: celebrations, animals, clothes, and parts of the house. This decision was the result of making logical relationships between the topics and those four topics did not fit in any possible unit (See table 3).

**Table 3**

*First Draft of Planning*

| Topic | Setting | Unit |
|---|---|---|
| Family members | | |
| Greetings | Home | 2 |
| Food | | |
| Common objects | School | 3 |
| Hobbies (verbs) | | |
| City places | City | 4 |
| Frequent places | | |
| **Deleted topics** | | |
| Celebrations, animals, clothes, and parts of the house | | |

### 3.3.2 Lexical Content

New vocabulary items and some grammatical structures were included in the units in order for them to be cohesive and the vocabulary rehearsed in communicative situations.

In the first unit, as students need to refer to their relatives using 'subject pronouns', a basic vocabulary topic in Colombian Sign Language, was included. Also, in order to formulate basic sentences to talk about their family members, the 'verb to be' was presented and explained.

In the second unit, the topic 'main meals' (breakfast, lunch, and dinner) was added, so the topics 'food' and 'moments of the day' could be associated.

In the third unit, since it was decided that the school would be the communicative setting, it was necessary to introduce some 'parts of the school' and 'hobbies' that were associated with them. Furthermore, by this moment in the material, it was necessary to introduce 'verb conjugation in the present simple' in order for students to start formulating simple sentences. To finish this unit and take advantage of the topic 'common objects', 'numbers' and the verb 'have/has' were included, so students could create sentences about ownership.

Finally, as the fourth thematic unit was thought to be an opportunity to practice previous topics through the formulation of sentences, new 'common verbs' were added along with 'longer sentences' in the present simple that could describe time, subjects, actions, and places.

In this way, the structure of the e-book has a progressive structure to take students from simple lexical items and sentences using the verb to be to more complete sentences to express ideas about daily life situations. In order for this progression to happen, the e-book followed a recycling structure based on connectionism, which defines the language learning process as the connection of linguistic items through a rule-based system (Gasser, 1990). Thus, the e-book prototype introduced new topics while rehearsing and integrating the previous ones. Based on this, the final planning of the e-book emerged (See table 4).

**Table 4**

*E-book Planning*

| Topic | Setting | Unit |
|---|---|---|
| Subject pronouns | Family tree | 1 |
| Verb to be | | |

| | | |
|---|---|---|
| Family members | | |
| Greetings | Home | 2 |
| Food | | |
| Main meals | | |
| Moments of the day | | |
| Common objects | School | 3 |
| Hobbies (verbs) | | |
| Parts of the school | | |
| Verb conjugation in present simple | | |
| Numbers | | |
| Have/has | | |
| City places | City | 4 |
| Frequent places | | |
| Common verbs | | |
| Longer sentences in present simple | | |

## 3.4 E-book Design

After the content and the structure of the e-book design were defined, the first prototype

was created using Adobe Illustrator (See figure 5). This is a vector-based graphics software that

works with color, shapes, typography, and effects allowing the user to scale the artwork to

different sizes and media (Adobe, 2022a). Once the content of the units was illustrated, the

images were exported in Tiff format. The Tag Image File Format (Tiff) is a file format used to

raster graphics that provides flexibility, high quality, and great compatibility with different

design software (Adobe, 2022b).

**Figure 4**

*Adobe Illustrator in the illustration process*
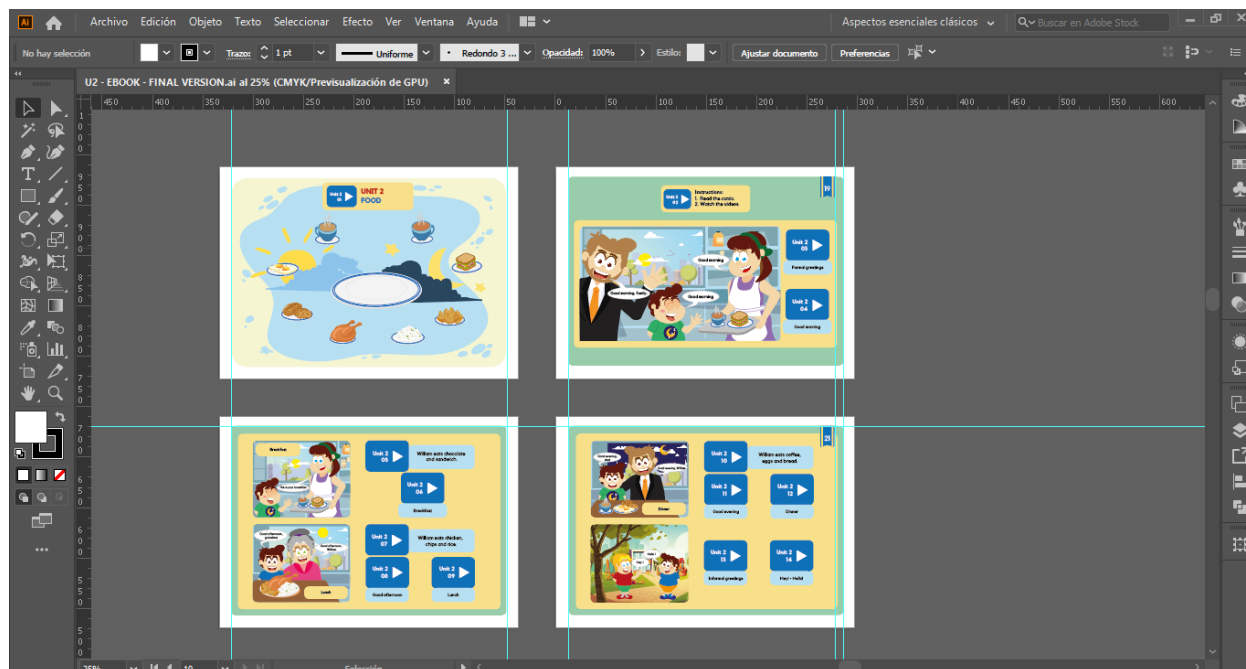


Subsequently, for the editorial process, Adobe InDesign was used to export the images into the first prototype document (See figure 6). Adobe InDesign is "a layout and page design software for print and digital media that has everything you need to create and publish books, digital magazines, e-books, posters, interactive PDFs, and more" (Adobe, 2022c). Not only was this software used to create the layout but also to incorporate interactive zones in the file that contained the hyperlinks to each video of the material. In this way, the users of the e-book are able to click a dialogue balloon and will be redirected to a specific video on YouTube with CSL interpretations created for the material.

**Figure 5**

*Adobe InDesign in the prototype layout*



Furthermore, InDesign was used to export the final file to PDF format. The Portable Document Format (PDF) is a versatile file format created by Adobe that gives people an easy, reliable way to present and exchange documents. PDF docs can contain links and buttons, form fields, audio, video, and business logic" (Adobe, 2022d). The e-book prototype was laid out in this software.

In essence, the e-book design process used Adobe Illustrator to create the illustrations and visual elements and export the pages into Tiff format to preserve their high quality with great compatibility across programs. Additionally, Adobe InDesign was used to establish the layout of the document and embed the video hyperlinks through interactive zones in the document. Finally, YouTube was used to host the video interpretations and organized into specific playlists for each unit.

**3.5 Prototype Validation**

The third specific objective of this study was to validate the e-book prototype by a panel of experts in the fields of Second Language Acquisition and Colombian Sign Language. To achieve this research objective, four experts assessed the content of the e-book using a rubric designed by the researchers (See annexes C and D).

This first view of the final product was validated by a multidisciplinary panel of experts through content validity, which is a method to determine the relevant elements to assess new products in order to identify strengths and weaknesses through the judgment of experts (Haynes et al., 1995; Sugiyono, 2015 as cited in Fetri & Eldarni, 2019). Since this e-book was designed under two main constructs, Colombian Sign Language and Second Language Acquisition, an instrument was constructed for each of them. These instruments were presented along with the e-book to the multidisciplinary panel of experts for each construct.

*3.5.1 Content Validity Instrument Construction*

In order to carry out the content validation process, Yusoff (2019) proposes the construction of a content validation instrument. Since our project contained two constructs, Second Language Acquisition and Colombian Sign Language, it was necessary to assess each domain separately. Both instruments were developed in Google Forms. This platform was used considering Bertea & Zait's (2013) claims that instruments that are carried out in an online manner are more practical in terms of "cost, time and response rate" (p. 51). In the Second Language Acquisition form, questions were elaborated to assess if the material was flexible, technology-based, visual, and concrete (Najar & Fonseca, 2018; Ramírez, 2020). These questions were assessed by Second Language Acquisition experts since they are familiar with language learning material.

On the other hand, the instrument created for the Colombian Sign Language panel, the questions assessed the adequacy of the personalization, emotionalization, and visualization of the lexical items for deaf fifth-graders from the metropolitan area of Bucaramanga. These strategies were assessed by Colombian Sign Language educators experienced in teaching deaf students. The questions from both instruments used a Likert scale of relevance, defined as a way of measuring a set of statements through individual judgment based on the level of agreement with a set of propositions (Schrum et al., 2020), for scoring the integration of the aforementioned features and strategies in the e-book

### 3.5.2 Content Validity Results and Analysis

To analyze the results, Bertea and Zait (2013) claim that a content validity index should be calculated. Since the answers of the two forms contained a Likert Scale, it was necessary to use a "scale-level content validity index based on the average method" (Yusoff, 2019). In this method, "all scores should be added and divided on the number of items" (Ibid, p.52). In order to determine if the results are valid, Newman et al. (2013) state that "an evaluator/researcher should aim for at least 80% agreement on the adequacy of each item" (p.250). Consequently, since the forms of this study were formulated on the basis of a one-to-five scale, items that scored at least four were adequate. Each question had room for the experts to make suggestions to add, remove or restructure items from the material. Finally, these instruments were sent and answered by the experts via e-mail with an explanation of the project and how the e-book works (See table 5).

**Table 5**

*Validation results*

| Dimension | Question | Expert 1 | Expert 2 |
|---|---|---|---|
| Second Language Acquisition (SLA) | To what extent is the e-book constructed under various means of representation (Input)? (Illustrations, Colombian Sign Language interpretations, and English vocabulary). | 4 | 5 |
| | To what extent is the vocabulary presented in the e-book rehearsed by various means of expression (output activities)? | 5 | 4 |
| | To what extent does the e-book present the information in a multimodal way? (Videos, images, text, sign language) | 4 | 5 |
| | To what extent is the content of the e-book constructed using visual elements? | 5 | 5 |
| | To what extent is the target vocabulary of the e-book concrete (not abstract)? | 5 | 5 |
| **Dimension** | **Question** | **Expert 1** | **Expert 2** |
| Colombian Sign Language (CSL) | To what extent is the vocabulary presented in the e-book contextualized to the reality of deaf fifth-graders from the metropolitan area of Bucaramanga? | 5 | 5 |
| | To what extent does the e-book take into account the emotional ties of deaf fifth-graders from the metropolitan area of Bucaramanga? | 5 | 4 |
| | To what extent do you consider the visual resources of the e-book appropriate for the acquisition of vocabulary of deaf fifth-graders in the metropolitan area of Bucaramanga? | 5 | 4 |

As shown in the results of the validation forms (See table 5), all items scored at least four in the Likert scale for the criteria proposed, meaning the content of the e-book was valid (Newman et al. 2013). However, some suggestions about the material were included. First, it was suggested that the videos containing the Colombian Sign Language interpretations should be attached directly to the PDF file as emergent windows instead of YouTube hyperlinks. This was

considered in the design stage but was not implemented since the attachment of 195 videos to the

PDF would make the file so heavy that its distribution could have been a limitation (See annex

F).

Considering this, first, future researchers in this field should explore another platform to

host this content. Second, it was suggested that the Colombian Sign Language interpretations

held on YouTube videos should include the source English information. This was implemented

in the design by including the English source information in the YouTube titles. These

recommendations from the experts in the field were implemented to improve the design of the e-

book in order to cover the features of a proper EFL learning material for DS (See figure 4).

**Figure 6**

*Stage 3: Design and validation*
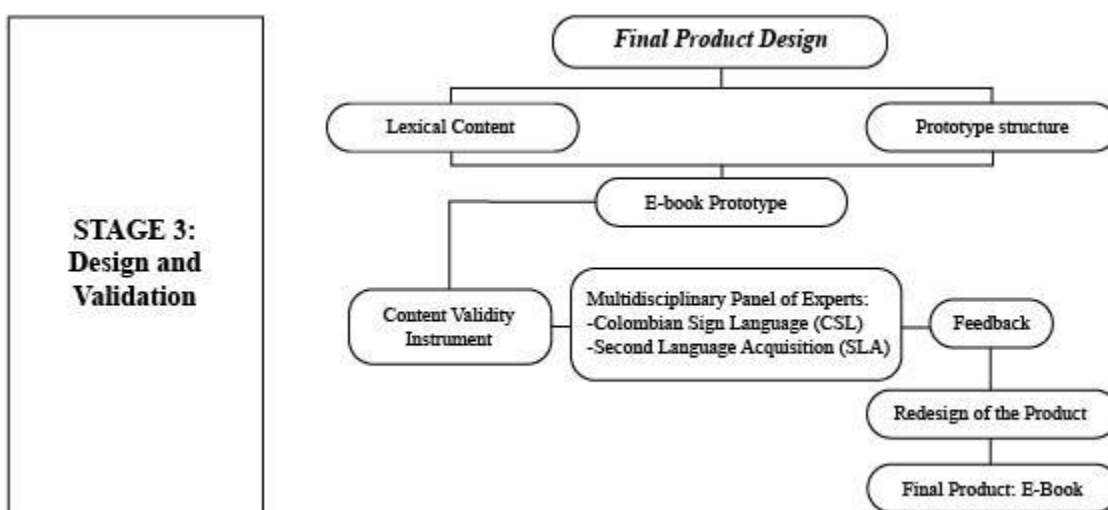
## 4.   Findings

This section answers the research question: What characteristics should an e-book have to assist deaf fifth-graders from the metropolitan area of Bucaramanga to recognize elementary vocabulary in English about daily life situations? After a thorough analysis of the data, the characteristics of the e-book are organized into two main sections: Second Language Acquisition and Colombian Sign Language.

### 4.1 Characteristics from the Second Language Acquisition Perspective

This design-based research identified that an e-book that aims at teaching elementary English vocabulary to deaf students has to be flexible, technology-based, visual, and concrete.

#### *4.1.1 Flexible*

The first main characteristic of this e-book prototype is its flexibility. This flexibility was achieved including different means of representation such as illustrations, Colombian Sign Language interpretations, and grammatical explanations. Similarly, a variety of means of expression made part of this book such as gap-fill, matching, spelling, image-describing, and drawing activities. This main characteristic is in agreement with the claims of Najar and Fonseca (2018), who state that in order for a didactic material to be inclusive, it should be fundamentally flexible. To do this, they recommend that such material should contain diverse forms of representation and expression. In other words, the material should contain different manners of presenting input and eliciting output.

**4.1.1.1 Multiple Means of Representation.** As it was mentioned before, in order for the

e-book to be flexible, it contains multiple means of representation such as illustrations,

Colombian Sign Language interpretations, and grammatical explanations.

The design of the final prototype supported the presentation of linguistic content with

visual elements (See figure 7). The importance of including a visual environment in the e-book is

rooted in the conception that "mental imagery provides a potentially powerful, alternative mode

of symbolic representation for young children, especially those of early elementary school age"

(Greeson & Zigarmi, 1985, p.42). Likewise, since deaf students cannot use their auditory

channel, this characteristic supports the need of deaf learners to rely on their visual channel in

their learning process (Marschark et al., 2013).

**Figure 7**

*E-Book illustrations*

Along with the illustrations, Colombian sign language interpretation was incorporated to facilitate input representation. Considering that deaf students have limited access to input (Ramirez, 2020), they tend to rely on Sign Language when they are learning a second language (Abubleamah, 2018). For this reason, in this design, all instructions, vocabulary presentation, grammatical explanations, and rehearsal activities were interpreted in Colombian Sign Language (See figure 8). The CSL teachers who recorded the interpretations for the e-book signed an informed consent and image use authorization in which the data management was explained (See annex E).

**Figure 8**

*Colombian Sign Language interpretations*

Another feature that assures multiple means of representation is grammatical explanations. Although this design intends to teach vocabulary to deaf fifth-graders from the metropolitan area of Bucaramanga, the vocabulary cannot be taught isolated, it needs to be contextualized to students' reality (Domagaàa-zyĝk, 2016). In the e-book, this was achieved through activities in which students are supposed to create simple sentences within communicative situations. In order to teach deaf students to write those sentences, it was necessary to teach them basic grammar topics such as the verb to be, conjugation of verbs in third person in the present simple and the usage of the verb have/has depending on the pronoun.

To achieve this purpose, the e-book used the principles of the Fitzgerald model.  A method to present grammatical structures to deaf children through visual stimuli (Cano et al., 2015). In this design, the Fitzgerald method (See figure 9) was integrated by assigning a color to each syntactic unit in the grammatical explanations: nouns were blue, verbs were red, and the complement was green. This was intended to create phonological awareness, defined as the segmental understanding of language, considering deaf students lack it (Linares, 2009).

**Figure 9**

*Fitzgerald Method*
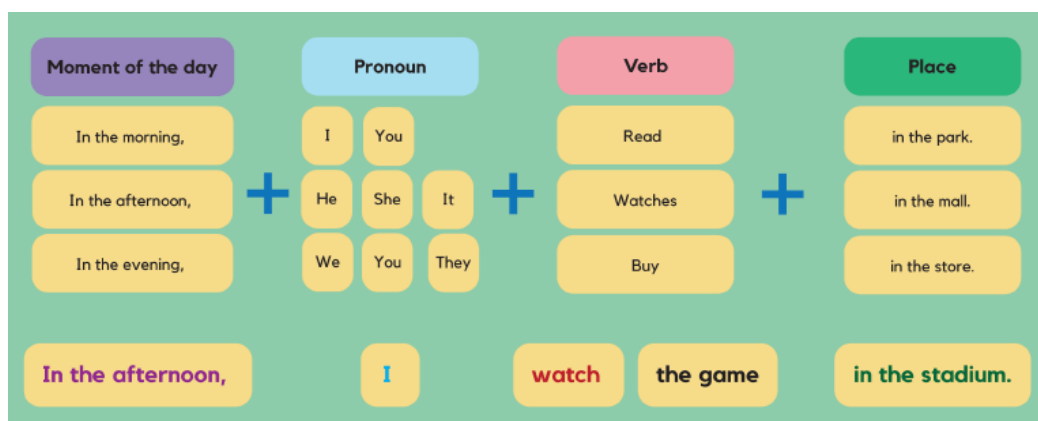
**4.1.1.2 Multiple Means of Expression.** As it was mentioned above, multiple means of expression (ways of eliciting output) such as gap-fill, matching, spelling, image-describing, and drawing activities were included in the e-book to add flexibility.

Gap-filled activities were included in each thematic unit with the purpose of checking students' understanding of the lexical items. In fact, Ur (2012) points out that gap-filling tasks are a good strategy to assess students' comprehension of spelling, meaning, grammar and collocation. In this e-book, gap-fill activities were designed for students to place the vocabulary taught in simple sentences (See figure 10).

**Figure 10**

*Gap-fill activities*
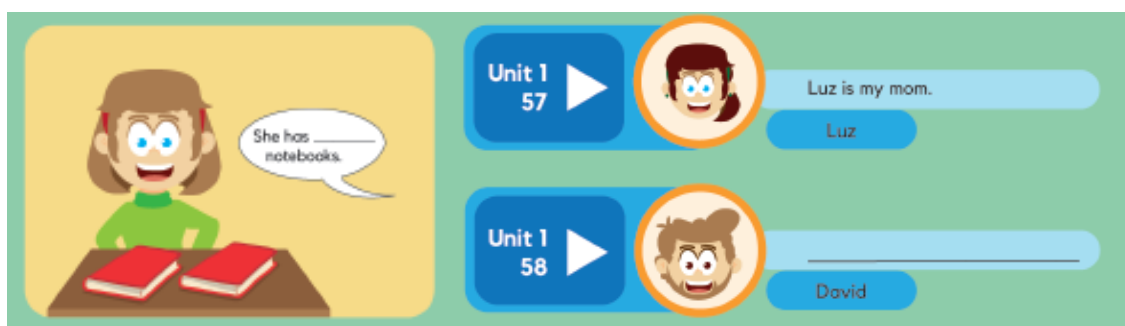


Another eliciting output strategy is matching activities, which are adequate for making students recycle the vocabulary learned. This is supported by Castillo-Cuesta (2020) who claims that digital matching activities can be a motivating tool for rehearsing students' vocabulary and grammatical knowledge (See figure 11). In this e-book, matching activities were thought to make students unite vocabulary items, images, and Colombian Sign Language interpretations so they could practice the vocabulary learned.

**Figure 11**

*Matching activity*



Additionally, spelling activities were included as a means of expression. They are ideal to remember the correct written form of a word and improve writing performance. Martins et al. (2016), concluded that spelling activities showed to have a positive impact on children's writing production at a beginner level. Based on this fact, spelling activities were included in the e-book before writing tasks, so vocabulary can be firstly rehearsed and then put in context (See figure 12).

**Figure 12**

*Spelling activity*
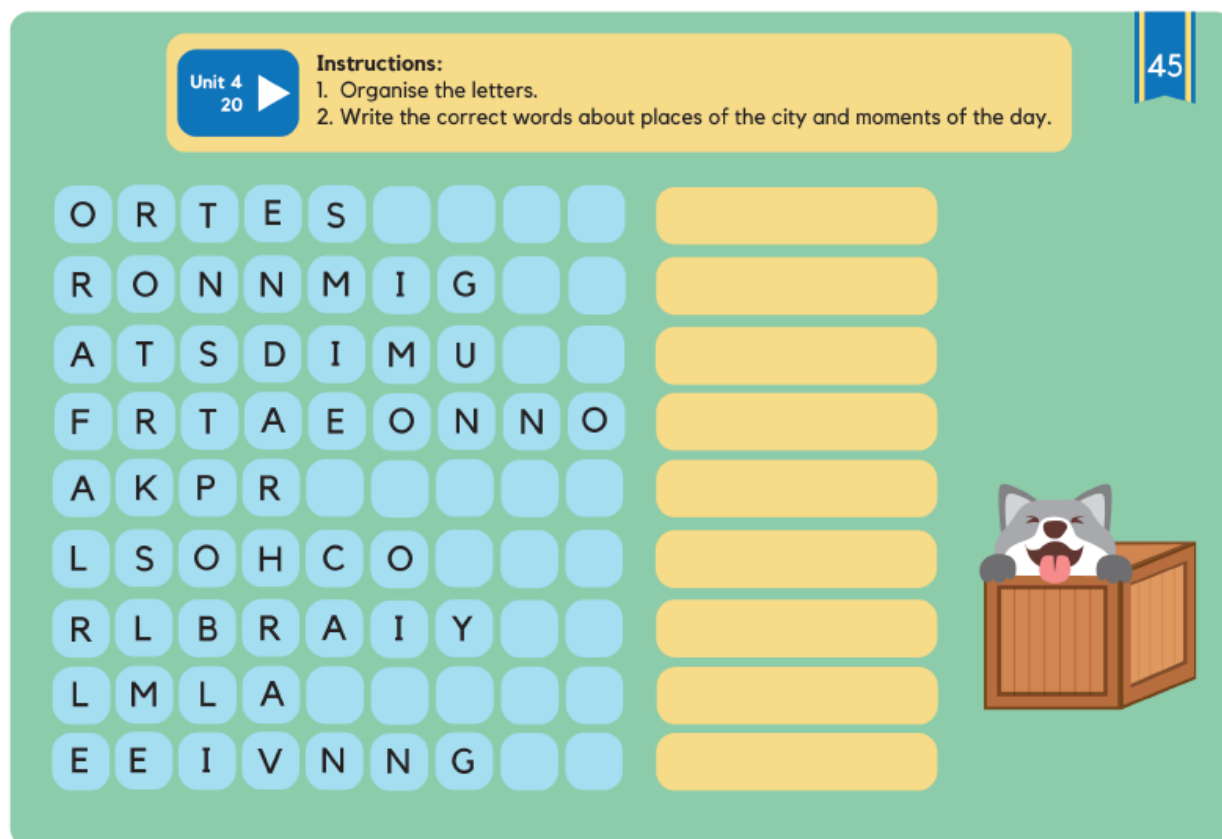


Image description is another way the learners can express comprehension. As it was stated in the design stage, the e-book followed a progressive structure based on connectionism where small tasks introduced students into bigger ones (Gasser, 1990). For this reason, the e-book was designed in a way that once vocabulary was rehearsed through low demanding activities such as spelling and matching tasks, students could do more demanding tasks such as producing simple sentences describing images containing vocabulary items previously presented (See figure 13).

**Figure 13**

*Image-describing activity*



Finally, drawing activities were included in the e-book in order to foster students' output in a creative and contextualized way. First, since deaf students need the vocabulary taught to be contextualized to their reality (Domagaàa-zyĝk, 2016), drawing activities intend to make students recreate elements from their daily context (See figure 14). In addition to this, drawing activities were included in the e-book multiple times since there exists a correlation between creative activities and learning (Karwowski et al., 2020).

**Figure 14**

*Drawing activity*
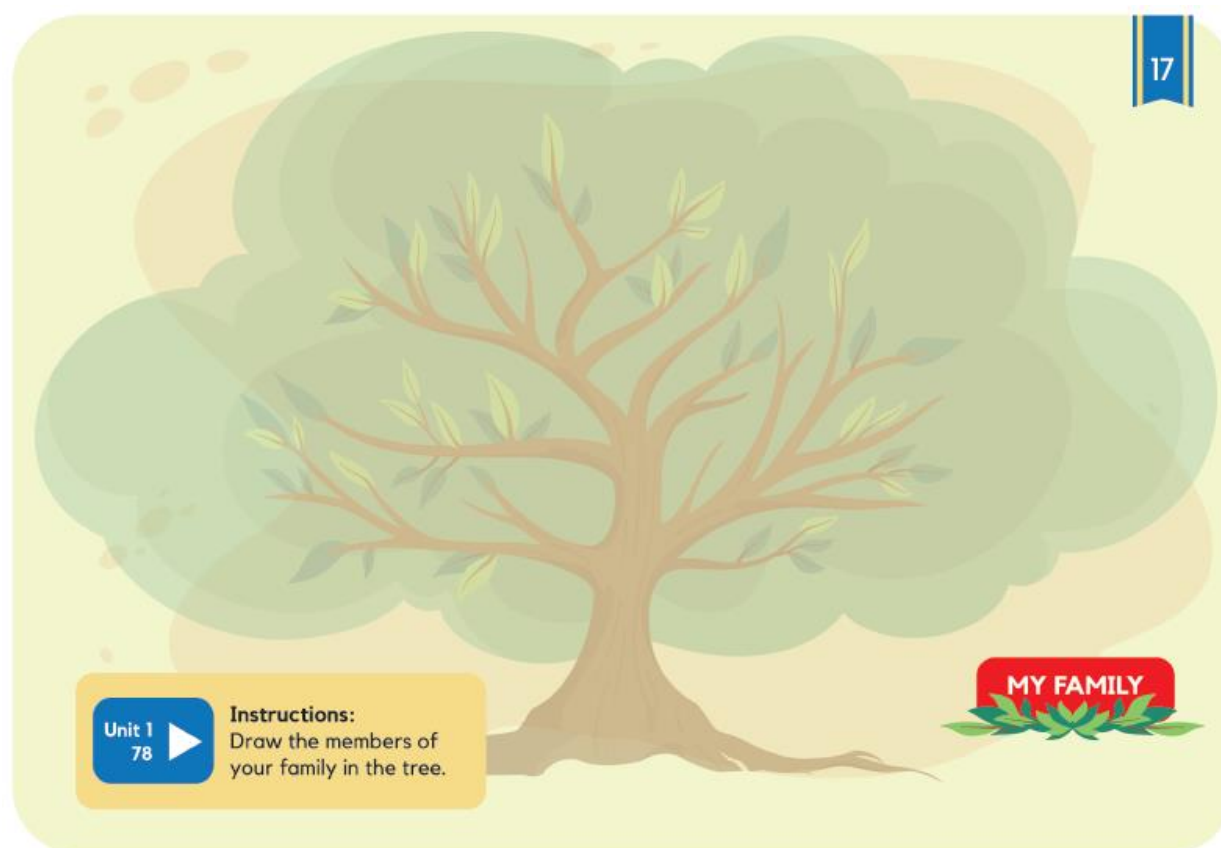


### 4.1.2 Technology-based characteristic

The second main characteristic of this e-book prototype is its technology-based nature.

Najar and Fonseca (2019) state that technology allows information to be displayed through

multiple means of representation, which is beneficial for deaf learners in general. For this reason,

the material was presented in an interactive way through a PDF. In this file, future users of the e-

book will be able to get exposed to information through multiple means such as Colombian Sign

Language interpretations, colorful illustrations, and English vocabulary.

### 4.1.3 Visual characteristics

Along with the two previous characteristics of this e-book: flexibility and technology-based nature, a visual component is part of this prototype. As it was mentioned in the literature review, the e-book had to be constructed under a visual basis since deaf students cannot rely on their auditory channel. For this reason, this teaching material contains visual elements such as illustrations and Colombian Sign Language interpretations.

**4.1.3.1 Illustrations.** The illustrations from the e-book contained concepts of typography, color theory, and color psychology. These concepts will be addressed in this section.

Typography is defined by Blackwell (2004) as the art or technique of reproducing communication through the printed word. Typographies tend to be described in morphological terms. This description determines the situations in which the typographies are used (See table 6)

**Table 6**

*Typography classification*

| Typography | Morphology | Association | Examples |
|---|---|---|---|
| Serif | It is ornamented with finials at the end of its main lines. | -Classic and traditional concepts. <br> -Suitable for text blocks. <br> -It brings seriousness, authority, and seniority. | Times New Roman, Didot, Palatino, Times, Georgia, Garamond |
| San-Serif | It is characterized by its lack of finials in its strokes, uniform, and clean lines. | -It is appropriate for more modern and current concepts. <br> -Suitable for short texts and with little density. <br> -Provides a sober and clean appearance. | Arial, Calibri, Helvetica, Century Gothic, Futura, Open Sans, Kollektif |

| | | | |
|---|---|---|---|
| Script | Its manual appearance imitates handwriting so they usually have ligatures that join some letters with others. | -Suitable for short sentences or signatures. -It brings elegance, creativity, and closeness. | Vives, Parisienne, Edwardian Script |
| Decorative | It is designed with its own concrete style with an ornamental purpose. | -Suitable for specific and isolated uses such as advertising phrases. -It brings its own personality since each one represents a unique and different meaning. | Art Nouveau, Pop Art, Bangers, Monoton |

From the previous classification, this project considered a style, and based on it, the

typography and the font family were chosen. First, the San-Serif font style was adopted since it is

considered the most modern and minimalist type whose usage provides a clear and legible

reading with a young sense and offers flexibility through screens (Valenzuela, 2016). Second, the

typography chosen was San-Serif: Kollektif was chosen because the final product should look

young and modern for children. This typography was designed by Doğu Kaya as a substitute to

the 21st-century low-contrast, geometric and clean typefaces that suits perfectly for both display

and text in printed or digital media (Befont, 2017). Finally, regarding these typographical

features, for this e-book, it was implemented the font family Kollektif (See figure 15).

**Figure 15**

*Kollektif Family Font*



In order to choose the size of the font, various guidelines from famous e-book devices were considered. In e-book devices such as Kindle from Amazon, the recommendation about the font is a minimum of 7 points and for Apple products, it should not be less than 10 points (Amazon Kindle, n.d; Ambwani, 2020). Aligned with these minimum requirements, the eBook Partnership, a worldwide company in charge of the conversion and distribution of e-books, the appropriate font size for reflowable e-books should be between 12 and 16 points (Ebook Partnership, 2020). Considering such guidelines, the content of the e-book ended up having 18 points bold for titles and 14 points regular for body text.

According to color theory, the balance of color is called 'chromatic composition' which is a set of colors that interact harmonically between them because it considers the proportional number of colors (Hernández-Castro, 2016; Itten, 1992). For the final product, it was necessary to take into account not only the color theory but its psychology. According to García (2017), colors are a strong resource that helps the learning process by modifying perception and making

feelings arise but taking into consideration that should not be a visual and cognitive overload as a result of immoderate use of color.

For the final product, it was implemented a palette composed of yellow and blue tones for backgrounds and the most relevant elements such as instructions, display of information, and grammatical structures. This selection was based on considered colors' virtues which presents blue as a color to transmit confidence and yellow as proper for wisdom and discernment (García, 2017). In terms of their usage for graphic pieces, the author claims that blue should not be incorporated in titles, thin lines, and small figures, and yellow would fit for indicators. Additionally, since yellow and blue are opposite colors, their juxtaposition is harmonious. Finally, the psychology field also provides insights into the behavioral effects of colors in children; they associate stories or happy scenes with colors such as orange, yellow, green, and blue (Boyatzis & Varghese, 1994). These visual and psychological considerations determined the color palette for the e-book and how it could impact children's perception (See figure 16).

**Figure 16**

*Color palette*
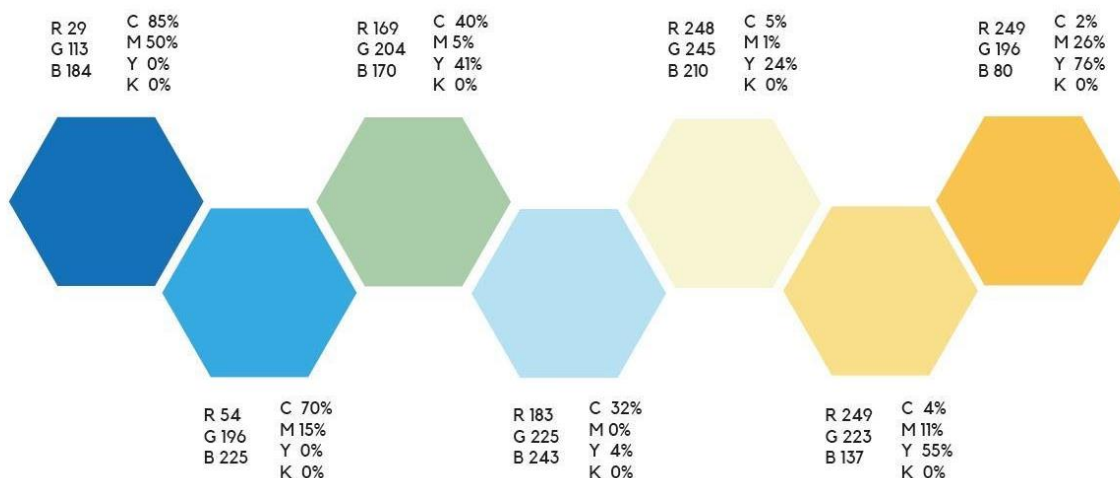
**4.1.3.2 Colombian Sign Language Interpretations.** Along with the illustrations, the Colombian Sign Language, make part of the visual characteristics of this prototype. As we mentioned before, Colombian Sign Language interpretations were fundamental for our e-book design because deaf students tend to be dependent on their L1 (Sign Language) to understand a second language (Abubleamah, 2018).

### 4.1.4 Concreteness

Concreteness is the last characteristic from the Second Language Learning perspective. As it was described in the theoretical framework, deafness impacts the cognitive and language development of deaf people. As a matter of fact, deaf students, when they are eleven years old, tend to have a more concrete way of thinking than hearing students (Ramírez, 2020). For this reason, the vocabulary topics were taken from Domagała-Zyśk's (2016) fundamental vocabulary topics to be addressed when teaching EFL to deaf students which were mostly concrete.

## 4.2 Characteristics from the Colombian Sign Language Perspective

Once the characteristics of the e-book prototype from the Second Language perspective were defined, this design-based study determined the characteristics of the e-book prototype aligned with the reality of deaf fifth-graders from the metropolitan area of Bucaramanga. The main findings indicate that the vocabulary needs to be personalized, emotionalized, and visualized.

### 4.2.1 Vocabulary Personalization

The review of literature indicated that vocabulary addressed to deaf learners needs to be personalized (Domagała-Zyśk, 2016). In this sense, vocabulary items had to match   the student's

reality. This was achieved through two strategies: the usage of local environments and character design.

**4.2.1.1 Local Environments.** As this project was established for a specific target population located in Bucaramanga, it was pertinent for the communicative settings of the e-book to be set in this city. As a matter of fact, it is stated that when it comes to learning, teachers should encourage students to settle meaningful mental images by themselves instead of imposing realistic and preconceived images. This line of thought is aligned with the strategy of vocabulary personalization proposed by Domagaàa-zyĝk (2016), who encourages to link lexical items with deaf students' reality (See figure 17).

**Figure 17**

*Local environments*

For this reason, this feature was considered in the data collected by the survey in which in the third section, the participants were asked about students' local context and their most frequented places in the city. As a result of these considerations, the e-book included some parts of the city such as Cacique Mall, Gabriel Turbay Library and San Pío Park, and local food in everyday Colombian families to create closeness with students' reality.

**4.2.1.2 Character Design.** The design of characters aimed to create remembrance with their roles in a story in which layers of visual detailing such as basic shapes, proportions, skin tones, hairstyles, posture, and facial expressions were employed (Islam et al, 2010). This project, intended to design visual elements that were meaningful and appealing for children. The creation of two characters that students could feel identified with required specific characteristics such as correct age and proportions, skin tones proper from Colombian kids, and facial expressions that reflected their joyfulness and interest in learning. Furthermore, the drawing style was quite important since children have specific aesthetic preferences in terms of audiovisual input, and it was concluded that the style that could boost better engagement was a cartoon. This drawing trend could be divided into cartoons of opinion and joke cartoons, and this project implemented the first one since they are visual resources to communicate attitudes, opinions or to sum up situations (Kemnitz, 1973). In addition to this, illustrations produce a psychological effect on children because they are established as a guide for coping with problems in their lives and to eventually be adults (Joseph Schwarcz as cited in Roethler, 1998).

The aforementioned features and considerations were taken into account to design a boy and a girl around 11-12 years old from Bucaramanga, Colombia. In the case of proportions, the children's measurement ratio is quite smaller in which the head does not change but the body is much shorter in comparison (DrawingCoach, 2006). Moreover, the characters were inspired in

the cartoon style of Alex Hirsh, a well-known artist, and creator of the most popular Disney's cartoons: Gravity Falls.

Finally, the names of the characters were selected from two renowned figures in the history of the deaf community. The boy's name was William for William Stokoe, an American educator, and linguist whose work was based on improving 'manual communication' which would later be turned into 'American Sign Language (ASL)' through listing signs with their meanings and usages under a linguistic analysis (New World Encyclopedia, 2020). In the case of the girl, her name was taken from Helen Keller, an American author and a social, political, and cultural activist for the deaf community (New World Encyclopedia, 2020).

### 4.2.2 Vocabulary Emotionalization

According to Calderón (2014), deaf people tend to share most of their time with analogue peers. For this reason, they tend to have strong emotional bonds with their relatives and friends. Being aware of this, Domagała-Zyśk (2016) recommends that in order to teach a foreign language to deaf people, it would be ideal to connect the vocabulary presented with their emotional bonds. This strategy is called emotionalization. In this e-book, the vocabulary was emotionalized through output activities where the friends and relatives of deaf fifth-graders from the metropolitan area of Bucaramanga were included.

### 4.2.3 Vocabulary Visualization

As it was already discussed earlier in the results, the e-book was constructed on a visual basis since deaf students cannot receive auditory input. For this reason, the input from the material was constructed over visual elements which were contextualized to students' reality. The strategies used to visualize vocabulary were illustrations and Colombian Sign Language interpretations.

## 5. Conclusions

As a conclusion, it was found that there is very little research about English Language teaching and learning to deaf people in the Colombian context. Also, there have been many misconceptions about deaf students' education from a historical viewpoint, such as the imposition of Spanish as an L1 through labio-facial reading, the pathologization of deafness and the inclusion of deaf and blind people in the same institution. Nowadays, deaf people face other challenges such as socioeconomic vulnerability, lack of participation in higher education, and the non-inclusion of English as a Foreign Language in their curriculum among others. Considering the aforementioned challenges, this project emerged as an innovative proposal to ground the foundations for teaching and learning English as well as material design for deaf people in Colombia. Therefore, the main objective of this research was to design an e-book to assist deaf fifth-graders from the metropolitan area of Bucaramanga to recognize elementary vocabulary in English about daily life situations. By designing this e-book, it was found that first, teaching material that intends to teach a foreign language to deaf students must contain specific features aligned with their cognitive and linguistic characteristics. For this reason, from the perspective of Second Language acquisition theories, the e-book is flexible, technology-based, visual, and concrete: Additionally, from the DF perspective, it embraces strategies such as vocabulary emotionalization, personalization, and visualization.

Finally, it is relevant to mention that this study faced some limitations: First, the e-book could not be implemented in real English classes with deaf students. Therefore, information about its execution could not be collected to complement the validation process. Second, since the e-book was contextualized for deaf fifth graders from the metropolitan area of Bucaramanga, it may not meaningful to deaf teenagers and adults nor people from other areas in Colombia.

## 6. Recommendations

Drawing on the research background and the limitations of this project, there are some recommendations to foster English teaching and learning for deaf people in Colombia. First, the researchers recommend English teachers with Colombian Sign Language knowledge to implement this material in classrooms with deaf fifth graders in the metropolitan area of Bucaramanga. Second, since there is little institutional interest in EFL initiatives for this social group, teachers should start designing and testing appropriate material for them. Third, as this material was created by teachers for teachers, it is recommendable for future proposals to include graphic designers that could explore different formats to display the e-book such as animation, interactive means, or a website. Fourth, as this material was designed for children, it could be adaptable for teenagers and adults in future projects considering the appropriate features of those target groups. Finally, considering that this project aimed for the design and validation of the e-book, its future implementation is suggested so as to get feedback from the target group that could provide useful insights in order to make improvements to the prototype.

**References**

Abubleamah, Y. A. S. (2018). Difficulties Facing the Elementary Deaf Students in Learning

    English as a Foreign Language in Gaza Deaf Schools (Doctoral dissertation)

    http://dstore.alazhar.edu.ps/xmlui/bitstream/handle/123456789/863/20120128.pdf?sequen

    ce=1&isAllowed=y

Adobe (2022d). *Everything you need to know about the PDF.* Adobe. Retrieved from

    https://www.adobe.com/acrobat/about-adobe-pdf.html

Adobe (2022a). *If you can dream it, you can design it with Illustrator.* Adobe. Retrieved from

    https://www.adobe.com/products/illustrator.html

Adobe (2022c). *The next page in layout design.* Adobe. Retrieved from

    https://www.adobe.com/products/indesign.html

Adobe (2022b). *TIFF files.* Adobe. Retrieved from https://www.adobe.com/creativecloud/file-

    types/image/raster/tiff-file.html

Alzahrani, H. (2016). Examining the effectiveness of utilizing mobile technology in vocabulary

    development for language learners. Arab World English Journal (AWEJ) Vol, 6.

Amadioha, S. W. (2009). The importance of instructional materials in our schools an overview.

    New Era Research Journal of Human, Educational and Sustainable Development, 2(3), 4-

    9.development for language learners. Arab World English Journal (AWEJ) Vol, 6.

Amazon Kindle (n.d.). Paperback fonts. Kindle direct publishing.

    https://kdp.amazon.com/en_US/help/topic/G202145450

Ambwani, P (2020). A swift guide to better typography for iOS. UX Collective.

    https://uxdesign.cc/a-five-minute-guide-to-better-typography-for-ios-4e3c2715ceb4

Arroyave, A. F., Hernández, E. J., Pérez, Á. M., & Duque, N. D. (2016). Recurso educativo web

    para la enseñanza de lengua de señas colombiana. Ingeniería e Innovación, 4(2).

Bajpai, N. (2011) "Business Research Methods" Pearson Education India.

Befont (2017). Kollektif Typeface. Befonts. https://befonts.com/kollektif-typeface.html

Benítez Turriago, L. A., Bohórquez Bohórquez, S. C., & Plazas Hernández, C. Y. (2018).

    Decreto 1421 de 2017: Derecho a la educación de las personas con discapacidad, entre la

    norma legal y la voluntad política, perspectiva administrativa y financiera para Bogotá

    DC.

Bertea, E., & Zaiţ, P. A. (2013). Scale validity in exploratory stages of research. Management

    and Marketing Journal, 11(1), 38-46.

Blackwell, L. (2004). Tipografía del siglo XX. Gustavo Gili.

Bobadilla Puentes, D. A., & Montilla Fernandez, R. N. (2021). Derechos e inclusión: impacto de

    la ley estatutaria 1618 de 2013, en la protección del derecho a la educación de los NNA

    con discapacidad física en la ciudad de Neiva.

Boyatzis, C. J., & Varghese, R. (1994). Children's emotional associations with colors. The
    Journal of genetic psychology, 155(1), 77-85.

Calderón, A. A. (2014). La construcción cultural del sujeto sordo. Ponto Urbe. Revista do núcleo
    de antropologia urbana da USP, (14)

Calderón Guzmán, E. D., & Flórez Manotas, Y. (2021). Diseño y producción de una serie
    audiovisual educativa como estrategia didáctica en la enseñanza de la lengua de señas
    colombiana.

Cano, S., Muï, J., Collazos, C., & Amador, V. B. (2015, October). Aplicación Móvil para el
    aprendizaje de la lectoescritura con Fitzgerald para niños con discapacidad auditiva. In
    Anais dos Workshops do Congresso Brasileiro de Informática na Educação (Vol. 4, No.
    1, p. 240).

Cakir, I. (2006). The use of video as an audio-visual material in foreign language teaching
    classroom. Turkish Online Journal of Educational Technology-TOJET, 5(4), 67-72.

Castillo-Cuesta, L. (2020). Using Digital Games for Enhancing EFL Grammar and Vocabulary
    in Higher Education. International Journal of Emerging Technologies in Learning (iJET),
    15(20), 116-129.

Coggeshall, F. (1886). The arithmetic, geometric, and harmonic means. The Quarterly Journal of
    Economics, 1(1), 83-86.

Creswell, J. W. (2014). Research Design: Qualitative, Quantitative and Mixed Methods
    Approaches (4th ed.). Thousand Oaks, CA: Sage

de Benito, B. (2006). Diseño y validación de un instrumento de selección de herramientas para

entornos virtuales basado en la toma de decisiones multicriterio. Universitat de les Illes

Balears.

de Benito Crosetti, B., & Ibáñez, J. M. S. (2016). La investigación basada en diseño en

Tecnología Educativa. Revista Interuniversitaria de Investigación en Tecnología

Educativa.

De Bogotá, C. D. C. (1994). Decreto 1860 de 1994.

De Hoyos, R., Martínez de la Calle, J., & Székely, M. (2010). Educación y movilidad social en

México. Movilidad social en México. Población, desarrollo y crecimiento. México DF:

Centro de Estudios Espinosa Yglesias.

Díaz Cortés, M. A., & Cubillos Cardozo, J. R. (2014). Interesante sería, pero pues¿ quién la

daría? porque como no hay nadie que se dedique a ello discursos en torno a la enseñanza

y aprendizaje de inglés escrito a estudiantes sordos.

Domagała-Zyśk, E., & Kontra, E. H. (Eds.). (2016). English as a foreign language for deaf and

hard-of-hearing persons: Challenges and strategies. Cambridge Scholars Publishing.

Domagała-Zyśk, E. (2016). Chapter Eight Vocabulary Teaching Strategies in English as A

Foreign Language Classes for Deaf and Hard-Of-Hearing Students. English as a foreign

language for deaf and hard-of-hearing persons: Challenges and strategies, 135.

Ebook Partnership (2020). What size font should I use for the text in my eBook? Ebook

Partnership.

https://ebookpartnership.com/support/knowledge-base/what-size-font-should-i-use-for-the-text-

in-my-ebook/

Espinoza Freire, E. E. (2019). Las variables y su operacionalización en la investigación

educativa. Segunda parte. Revista Conrado, 15(69), 171-180. Recuperado de

http://conrado.ucf.edu.cu/index.php/conrado

DrawingCoach (2006). Cartoon Kids and Basic Proportions. DrawingCoach. Retrieved from

http://www.drawingcoach.com/cartoon-kids.html  2022

Fetri Yeni, J., & Eldarni, U. R. (2019). The Validation of Digital Learning Materials Using

Edmodo for Elementary School.

Fonseca, D. F. P. (2019). Un cambio hacia las prácticas y los discursos incluyentes basado en un

currículo colaborativo enfocado en el inglés como lengua extranjera.

García, J. F. C. (2017). Psicología del color aplicada a los cursos virtuales para mejorar el nivel

de aprendizaje en los estudiantes. Gráfica, 5(9), 51-56.

Gasser, M. (1990). Connectionism and universals of second language acquisition. Studies in

second language acquisition, 12(2), 179-199.

Greeson, L. E., & Zigarmi, D. (1985). Piaget, learning theory, and mental imagery: Toward a

curriculum of visual thinking. Journal of Humanistic Counseling, Education &

Development.

Griffee, D. T. (2012). An introduction to second language research methods. New York: TESL-
EJ Publications.

Haynes, S. N., Richard, D. C. S., and Kubany, E. S. (1995). Content validity in psychological
assessment: a functional approach to concepts and methods. Psychol. Assess. 7, 238–247.

Hernández-Castro, F. (2016). Teoría del color (ingredients). Instituto Tecnológico de Costa Rica.
Repositorio TEC: https://repositoriotec. tec. ac. cr/handle/2238/7314.

Hurtado Tarazona, A. (2003). Entre la integración y la diferenciación-la lucha por la
revindicación de los sordos como comunidad lingüística en Colombia (Bachelor's thesis,
Uniandes).

INSOR (2016). 61 Años Dejando Huella. Recuperado de http://www.insor.gov.co/home/61-
anos-dejando-
huella/#:~:text=El%20inicio%20histórico%20del%20INSOR,Instituto%20de%20Sordom
udos%20y%20Ciegos.&text=Posteriormente%20con%20la%20Ley%20143,Federación
%20de%20Ciegos%20y%20Sordomudos.

INSOR (2017). Lineamientos para la implementación de la oferta bilingüe bicultural de
estudiantes con discapacidad auditiva. Bogotá: Instituto Nacional para Sordos - INSOR

INSOR (2018). Informe de gestión 2018 [Report]. https://www.insor.gov.co/home/wp-
content/uploads/filebase/Informe_Gestion_2018.pdf

INSOR (2019). Plan estratégico institucional 2019-2022 [Proposal].
https://www.insor.gov.co/home/descargar/plan_estrategico_INSOR_2019_2022V1.pdf

Islam, M. T., Nahiduzzaman, K. M., Why, Y. P., & Ashraf, G. (2010, October). Learning

 character design from experts and laymen. In 2010 International Conference on

 Cyberworlds (pp. 134-141). IEEE.

Itten, J. (1992). El arte del color. México DF: Editorial Limusa.

Karwowski, M., Jankowska, D. M., Brzeski, A., Czerwonka, M., Gajda, A., Lebuda, I., &

 Beghetto, R. A. (2020). Delving into creativity and learning. Creativity Research Journal,

 32(1), 4-16.

Kemnitz, T. M. (1973). The cartoon as a historical source. The Journal of Interdisciplinary

 History, 4(1), 81-93.

Kothari, C.R. (2008) "Research Methodology: Methods and Techniques" New Age International

Ley 60 de 1993. Por la cual los estatutos del INSOR son modificados.

Ley 115 de 1994. Por la cual se genera la ley nacional de educación.

Ley 982 de 2005. Por la cual se establecen normas tendientes a la equiparación de oportunidades

 para las personas sordas y sordociegas y se dictan otras disposiciones.

Linares, E. R. (2009). El aprendizaje de la lectoescritura en los niños y niñas sordos.

 Caleidoscopio, Revista digital de contenidos educativos, (2), 1.

Lissi, M. R., Svartholm, K., & González, M. (2012). El Enfoque Bilingüe en la Educación de

 Sordos: sus implicancias para la enseñanza y aprendizaje de la lengua escrita. Estudios

 pedagógicos (Valdivia), 38(2), 299-320.

Martins, M. A., Salvador, L., Albuquerque, A., & Silva, C. (2016). Invented spelling activities in

      small groups and early spelling and reading. Educational Psychology, 36(4), 738-752.

Marschark, M., Lang, H. G., & Albertini, J. A. (2001). Educating deaf students: From research to

      practice. Oxford University Press.

Marschark, M., Morrison, C., Lukomski, J., Borgna, G., & Convertino, C. (2013). Are deaf

      students visual learners?. Learning and individual differences, 25, 156-162.

Najar Ruiz, Z., & Fonseca Calderón, G. I. (2018). Construcción de una estrategia didáctica

      basada en el uso de recursos digitales aplicada al área de ciencias sociales que responda a

      los principios del diseño universal de aprendizaje, para población con discapacidad

      auditiva, en el colegio República Dominicana IED

Navarro Murillo, M. E. (2020). Estrategias metodológicas para la iniciación de la lectoescritura

      en niñas y niños sordos de preparatoria (Bachelor's thesis, Quito: UCE).

Newman, I., Lim, J., & Pineda, F. (2013). Content validity using a mixed methods approach: Its

      application and development through the use of a table of specifications methodology.

      Journal of Mixed Methods Research, 7(3), 243-260.

New World Encyclopedia (2020). Helen Keller. New World Encyclopedia.

 https://www.newworldencyclopedia.org/entry/Helen_Keller

New World Encyclopedia (2020).William Stokoe. New World Encyclopedia.

 https://www.newworldencyclopedia.org/entry/William_Stokoe

O'Neil, D. (2018). English as the lingua franca of international publishing. World Englishes, 37(2), 146-165.

Perdomo Ortiz, A. F., & Salinas (2019). Lizarazo, B. F. Estado del Arte sobre los procesos de alfabetización en la comunidad sorda colombiana desde el año 2000 hasta el 2018.

Plomp, T. (2013). Educational design research: An introduction. Educational design research, 11-50.

Podlewska, A. (2016). The use of cued speech to support the development of verbal language skills in English language instruction for deaf and hard-of-hearing students. English as a foreign language for deaf and hard-of-hearing persons: Challenges and strategies, 23-40.

Political Constitution of Colombia [Const]. Art. 47 from July from 1991 (Colombia)

Pritchard, P. (2016). Experiences in teaching English to deaf and severely hard-of-hearing pupils in Norway. English as a Foreign Language for Deaf and Hard-of-Hearing Persons: Challenges and Strategies. Newcastle upon Tyne: Cambridge Scholars Publishing, 41-54.

Quintanilla Rubio, L. V. (2014). Un camino hacia la educación inclusiva: análisis de normatividad, definiciones y retos futuros. Facultad de Medicina.

Ramírez, M. C. M. (2020). Lectoescritura en inglés para estudiantes sordos. Educación y Educadores, 23(4), 596-610.

República de Colombia. Decreto 2082 por el cual se reglamenta la atención educativa para personas con limitaciones o con capacidades o talentos excepcionales. [Internet]. 1996

[citado 17 de noviembre de 2013]. Recuperado a partir de:

http://www.alcaldiabogota.gov.co/sisjur/normas/Norma1.jsp?i=1519

Roethler, J. (1998). Reading in color: Children's book illustrations and identity formation for

Black children in the United States. African American Review, 32(1), 95-105.

Ropero, L. N. L. (2020). Inclusión laboral de personas con discapacidades físicas, psíquicas y

sensoriales en el marco de la ley 361 de 1997. Jangwa Pana: Revista de Ciencias Sociales

y Humanas, 19(1), 8.

Schrum, M. L., Johnson, M., Ghuy, M., & Gombolay, M. C. (2020, March). Four years in

review: Statistical practices of Likert scales in human-robot interaction studies. In

Companion of the 2020 ACM/IEEE International Conference on Human-Robot

Interaction (pp. 43-52).

United Nations (1993) Standard Rules on the Equalization of Opportunities for Persons with

Disabilities.

https://www.ohchr.org/en/professionalinterest/pages/personswithdisabilities.aspx

Ur, P. (2012). A course in English language teaching. Cambridge University Press.

World Health Organization. (1980). International classification of impairments, disabilities, and

handicaps: a manual of classification relating to the consequences of disease, published in

accordance with resolution WHA29. 35 of the Twenty-ninth World Health Assembly,

May 1976. World Health Organization.

Valenzuela, V. (2016). Serif vs. Sans Serif: Differences and Similarities. Silo Creativo.

      https://www.silocreativo.com/en/serif-vs-sans-serif-differences-similarities/

Yusoff, M. S. B. (2019). ABC of content validation and content validity index calculation.

      Resource, 11(2), 49-54.

Zazove, P., Meador, H. E., Reed, B. D., & Gorenflo, D. W. (2013). Deaf persons' English

      reading levels and associations with epidemiological, educational, and cultural factors.

      Journal of health communication, 18(7), 760-772.

**Annexes**

**Annex A**

*Variable operationalization matrix*

| Variable | Conceptual definition | Dimensions | Indicators | Survey questions |
|---|---|---|---|---|
| Deaf learners who are 11-12 years old in Colombia | L1 Colombian Sign language speaking primary schoolers in Bucaramanga | Real-life contexts | -Everyday experiences (frequent places) -Hobbies -Interests -Cultural background -Visual content of preference. -Social media -Sports -Job requirements for deaf people -Holidays -Deaf culture events | -To what extent is the vocabulary presented in the e-book contextualized to the reality of fifth grade deaf students in the metropolitan area of Bucaramanga? -Do you have recommendations on the contextualization of the vocabulary presented in the e-book? (Optional) -To what extent does the e-book take into account the emotional ties of deaf fifth grade students from the metropolitan area of Bucaramanga? -Do you have recommendations on the connection between the vocabulary presented in the e-book and the emotional ties of deaf fifth-grade students in the metropolitan area of Bucaramanga? (Optional) -To what extent do you consider the visual resources of the e-book appropriate for the acquisition of vocabulary of deaf fifth-grade students in the metropolitan area of Bucaramanga? -Do you have recommendations about the |

| | | | | visual resources used in the e-book? (Optional)<br>-Do you have any final recommendations about the e-book? (Optional) -Do you have any final recommendations about the e-book? |
|---|---|---|---|---|
| English vocabulary as a foreign language | "Language consists not of traditional grammar and vocabulary but often of multi-word prefabricated chunks" | Everyday vocabulary | -Prefabricated chunks they know in CSL<br>-Greetings | -To what extent is the e-book constructed under various means of representation (Input)? (Illustrations, Colombian Sign Language interpretations, and English vocabulary)<br>-Do you have any recommendations about the means of representation (input) used in the e-book? (Optional)<br>-To what extent is the vocabulary presented in the e-book rehearsed by various means of expression (output activities)?<br>-Do you have any recommendations about the means of expression (output activities) used in the e-book? (Optional)<br>-To what extent does the e-book present the information in a multimodal way? (Videos, images, text, sign language)<br>-Do you have any recommendations about the technological resources used in the e-book? (Optional)<br>-To what extent is the content of the e-book constructed using visual elements?<br>-Do you have any recommendations about the |

visual elements included in the e-book? (Optional)
-To what extent is the target vocabulary of the e-book concrete (not abstract)?
-Do you have any recommendations about the target vocabulary of the e-book? (Optional)
-Do you have any final recommendations about the e-book? (Optional)

**Annex B**

*Survey results*

| Question | Options | Frequency | Average |
|---|---|---|---|
| ¿Cuáles de las siguientes expresiones de saludos son conocidas por los estudiantes sordos de quinto grado en Lengua de Señas Colombiana (LSC)? | Hola | 5 | 3 |
| | Buenos días/tardes/noche | 4 | |
| | Adiós | 4 | |
| | Nos vemos después | 2 | |
| | Hasta luego | 2 | |
| | Ten un buen día | 1 | |
| ¿Cuáles de las siguientes celebraciones son conocidas por los estudiantes sordos de quinto grado en Lengua de Señas Colombiana (LSC)? | Amor y amistad | 5 | 3 |
| | Día de la madre | 4 | |
| | Día del padre | 4 | |
| | Semana Santa | 4 | |
| | Navidad | 4 | |
| | Halloween | 3 | |
| | Año nuevo | 3 | |
| | Papá | 5 | 4.5 |

| | | | |
|---|---|---|---|
| ¿Cuáles de los siguientes miembros de la familia son conocidos por los estudiantes sordos en Lengua de Señas Colombiana (LSC)? | Mamá | 5 | |
| | Abuelo/Abuela | 5 | |
| | Tío/Tía | 4 | |
| | Hermano/Hermana | 4 | |
| | Primo/Prima | 4 | |
| ¿Cuáles de las siguientes partes de la casa son conocidas por los estudiantes sordos de quinto grado en Lengua de Señas Colombiana (LSC)? | Sala | 5 | 3.625 |
| | Cocina | 5 | |
| | Baño | 5 | |
| | Comedor | 4 | |
| | Habitación | 4 | |
| | Garaje | 2 | |
| | Jardín | 2 | |
| | Patio | 2 | |
| ¿Cuáles de las siguientes comidas son conocidas por los estudiantes sordos de quinto grado en Lengua de Señas Colombiana (LSC)? | Pan | 5 | 4 |
| | Café | 5 | |
| | Huevos | 5 | |
| | Pollo | 5 | |
| | Carne | 5 | |
| | Arroz | 5 | |
| | Papa | 5 | |
| | Chocolate | 4 | |
| | Fruta | 4 | |
| | Queso | 3 | |
| | Ensalada | 2 | |
| | Pescado | 2 | |
| | Sandwich | 2 | |
| ¿Cuáles de los siguientes objetos comunes son conocidos por los estudiantes sordos de quinto grado en Lengua de Señas Colombiana (LSC)? | Celular | 5 | 3.4 |
| | Computador | 5 | |
| | Cuaderno | 5 | |
| | Lápiz | 5 | |
| | Borrador | 4 | |
| | Billetera | 2 | |
| | Llaves | 2 | |
| | Morral | 2 | |
| | Lapicero | 2 | |
| | Gafas | 2 | |
| ¿Cuáles de los siguientes hobbies son | Perro | 5 | 3.642 |
| | Gato | 5 | |

| | | | |
|---|---|---|---|
| conocidos por los estudiantes sordos de quinto grado en Lengua de Señas Colombiana (LSC)? | Caballo | 5 | |
| | Vaca | 5 | |
| | Conejo | 5 | |
| | Cerdo | 4 | |
| | Gallina | 4 | |
| | Pájaro | 3 | |
| | Gallo | 3 | |
| | Tortuga | 3 | |
| | León | 3 | |
| | Elefante | 2 | |
| | Jirafa | 2 | |
| | Serpiente | 2 | |
| ¿Cuáles de las siguientes prendas de ropa son conocidas por los estudiantes sordos de quinto grado en Lengua de Señas Colombiana (LSC)? | Camisa | 5 | 3.75 |
| | Pantalón | 5 | |
| | Falda | 5 | |
| | Zapatos | 5 | |
| | Vestido | 3 | |
| | Medias | 3 | |
| | Camiseta | 2 | |
| | Blusa | 2 | |
| ¿Qué lugares frecuentan los estudiantes sordos de quinto grado? | Centro Comercial Cacique | 5 | 3.153 |
| | Biblioteca Gabriel Turbay | 4 | |
| | Parque de los Niños | 4 | |
| | Centro Comercial Caracolí | 3 | |
| | Centro Comercial La Florida | 3 | |
| | Centro Comercial Cañaveral | 3 | |
| | Escuela Anexa a la Normal | 3 | |
| | Parque San Pío | 3 | |
| | Cine Colombia | 3 | |
| | Cinemark | 3 | |
| | UIS | 3 | |
| | Centro Comercial Megamall | 2 | |
| | Parque Turbay | 2 | |

**Annex C**

*Validation instrument for experts in Second Language Acquisition (SLA)*

## Validation form of an English learning e-book for deaf fifth graders from the Metropolitan area of Bucaramanga from a Second Language Acquisition approach

Dear experts,

This is a content validation instrument for our e-book which intends to teach basic vocabulary knowledge to deaf fifth graders from the Metropolitan area of Bucaramanga. We need your expertise on the domain of Second Language Acquisition to assess our e-book. Please be as objective and neutral as possible and keep in mind the following rating scale to judge it:

1 = The e-book is by no means appropriate to the measured domain
2 = The e-book is somewhat appropriate to the measured domain
3 = The e-book is quite appropriate to the measured domain
4 = The e-book is highly appropriate to the measured domain
5= The e-book is perfectly appropiate to the measured domain

In addition to that, each question is going to be followed by another question where specific suggestions can be made.

:::

To what extent is the e-book constructed under various means of representation (Input)?    *
(Illustrations, Colombian Sign Language interpretations and English vocabulary)

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| | ○ | ○ | ○ | ○ | ○ |

Do you have any recommendations about the means of representation (input) used in the e-book?
(Optional)

Long-answer text

To what extent is the vocabulary presented in the e-book rehearsed by various means of    *
expression (output activities)?

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| | ○ | ○ | ○ | ○ | ○ |

:::

Do you have any recommendations about the the means of expression (output activities) used in the
e-book? (Optional)

Long-answer text

To what extent does the e-book present the information in a multimodal way? (videos, images,    *
text, sign language)

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| | ○ | ○ | ○ | ○ | ○ |

Do you have any recommendations about the technological resources used in the e-book?
(Optional)

Long-answer text

To what extent is the content of the e-book constructed using visual elements? *

|  | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
|  | ○ | ○ | ○ | ○ | ○ |

Do you have any recommendations about the visual elements included on the e-book? (Optional)

Long-answer text

To what extent is the target vocabulary of the e-book concrete (not abstract)? *

|  | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
|  | ○ | ○ | ○ | ○ | ○ |

Do you have any recommendations about the target vocabulary of the e-book? (Optional)

Long-answer text

Do you have any final recommendations about the e-book? (Optional)

Long-answer text

**Annex D**

*Validation instrument for experts in Colombian Sign Language (CSL)*

## Validación de un e-book para el aprendizaje vocabulario de inglés de estudiantes de quinto grado en el área metropolitana de Bucaramanga desde la Lengua de Señas Colombiana.

Queridos expertos en Lengua de Señas Colombiana,

Este es un instrumento de validación de contenido para nuestro e-book, que tiene el propósito de enseñar vocabulario básico a niños sordos del área metropolitana de Bucaramanga que estén cursando el grado quinto. Necesitamos su experiencia en el campo de Lengua de Señas Colombiana para evaluar el contenido de nuestro e-book Por favor, sean tan objetivos y neutrales como les sea posible y mantengan la siguiente escala en mente para juzgarlo:

1 = El e-book no es para nada apropiado en el dominio medido.
2 = El e-book es de alguna manera apropiado para el dominio medido.
3 = El e-book es bastante apropiado para el dominio medido.
4 = El e-book es altamente apropiado para el dominio medido.
5= El e-book es perfectamente apropiado para el dominio medido.

Adicionalmente, cada pregunta estará seguida de otra pregunta donde sugerencias específicas pueden ser formuladas.

¿En qué medida está el vocabulario presentado en el e-book contextualizado a la realidad de *
estudiantes sordos de quinto primaria del área metropolitana de Bucaramanga?

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| | ○ | ○ | ○ | ○ | ○ |

¿Tiene recomendaciones sobre la contextualización del vocabulario presentado en el e-book? (Opcional)

Long-answer text

¿En qué medida el e-book tiene en cuenta los lazos afectivos de estudiantes sordos de quinto *
primaria del área metropolitana de Bucaramanga?

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| | ○ | ○ | ○ | ○ | ○ |

¿Tiene recomendaciones sobre la conexión entre el vocabulario presentado en el e-book y los lazos afectivos de los estudiantes sordos de quinto primaria del área metropolitana de Bucaramanga? (Opcional)

Long-answer text

:::

¿En qué medida considera apropiados los recursos visuales del e-book para la adquisición de  *
vocabulario de estudiantes sordos de quinto primaria del área metropolitana de Bucaramanga?

|   | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
|   | ○ | ○ | ○ | ○ | ○ |

¿Tiene recomendaciones sobre los recursos visuales utilizados en el e-book? (Opcional)

Long-answer text

¿Tiene alguna recomendación final sobre el e-book? (Opcional)

Long-answer text

**Annex E**

*Informed consent and image use authorization*

Bucaramanga, Febrero 3 de 2022

**CONSENTIMIENTO INFORMADO Y AUTORIZACIÓN DE USO DE IMAGEN**

Por la presente, nosotras, *Claudia Patricia Hernández Valdivieso* y *Luisa Fernanda Hernández Valdivieso*, damos nuestra autorización para la captación de nuestra imagen y trabajo como intérpretes en Lengua de Señas Colombiana a los estudiantes *Juan David Caballero Fuentes* y *Thomas Alexander Riddle Delgado*, estudiantes de último semestre de la *Licenciatura en Lenguas Extranjeras con Énfasis en Inglés.*

El material requerido por los estudiantes consta de una serie de videos en lengua de señas para ser utilizados como recurso de acompañamiento en el proceso de aprendizaje del idioma inglés para estudiantes sordos en el área metropolitana de Bucaramanga. Somos conscientes de que dicho material será subido a la plataforma YouTube para la creación de listas de reproducción que estarán intrínsicamente vinculadas con los contenidos de las unidades del material correspondiente al proyecto de grado: *"Design of an English E-book for L1 Colombian Sign Language Primary Schoolers in the Metropolitan Area of Bucaramanga".*
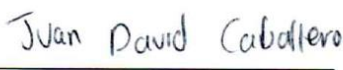
En tal sentido, autorizamos tanto a los estudiantes como a la *Universidad Industrial de Santander (UIS)* que nuestro trabajo e imagen sean incorporados en dicho proyecto y su divulgación. Dejamos expresa constancia de que, por medio del presente documento, cedemos a la UIS y a los estudiantes, de manera gratuita, el derecho a divulgar nuestra Imagen en los términos del presente, y nos reservamos el derecho a retirar el consentimiento en cualquier momento.

**Participantes**

_____
Claudia Patricia Hernández Valdivieso

_____
Luisa Fernanda Hernández Valdivieso

**Investigadores**

_____
Juan David Caballero Fuentes

_____
Thomas Alexander Riddle Delgado

**Annex F**

*E-book*

This annex is attached as a separate file along with this document since it is the final product.

# Cómo usar este e-book

1. Este libro ha sido diseñado como una herramienta orientadora para profesores de lengua de señas que quieran enseñar inglés a estudiantes sordos.

2. A lo largo del libro el profesor encontrará unidades temáticas. Cada una dispone de una ayuda visual de interpretación en lengua de señas colombiana.

3. Para acceder a este material visual el profesor deberá clickear los hipervínculos en cada imagen. Esto lo redireccionará al video exacto de la playlist de YouTube elaborada para cada unidad.

Unit 1
05

Hey!
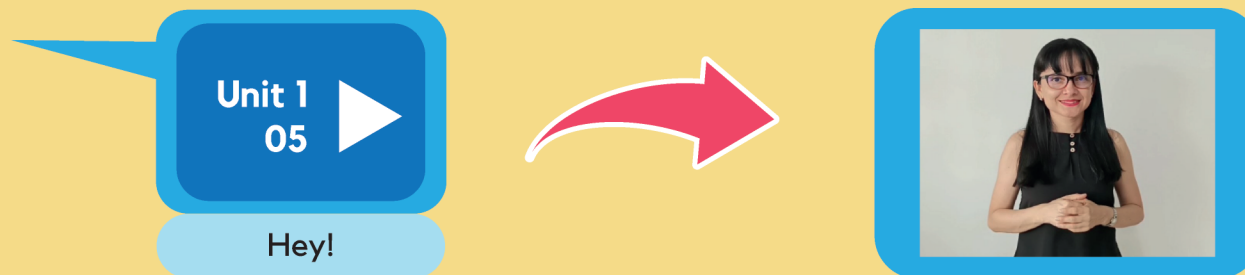
4. La enseñanza del inglés a través de este material deberá hacerse de manera simultánea con los estudiantes tanto para las explicaciones como para los ejercicios dado que se requiere la visualización de los videos y el acompañamiento del docente.

HELEN KELLER

Unit 0 07 ▶

**Helen Keller:**
Fue una autora estadounidense y una activista social, político y cultural por la comunidad sorda.
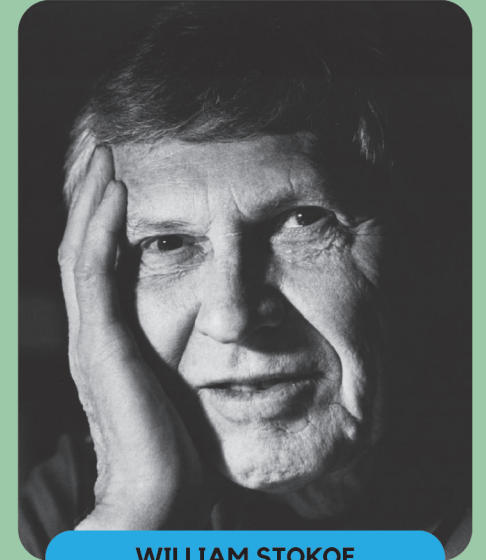
**William Stokoe:**
Fue un autor estadounidense creador de la lengua de señas americana.

Unit 0 08 ▶

WILLIAM STOKOE

Hello! I'm Helen.

And I'm William.

Unit 0 09 ▶

Unit 0 10 ▶

UNIT 1
FAMILY

Unit 1 02 ▶ **PRONOUNS**

I
Unit 1 03 ▶

YOU
Unit 1 04 ▶
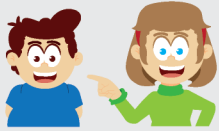
HE
Unit 1 05 ▶
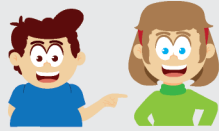
SHE
Unit 1 06 ▶

IT
Unit 1 07 ▶

WE
Unit 1 08 ▶

YOU
Unit 1 09 ▶

THEY
Unit 1 10 ▶

Unit 1 11 ▶ **SINGULAR**

Unit 1 12 ▶ **PLURAL**

I

YOU

HE

SHE

IT

Unit 1
14 ▶

Unit 1
15 ▶

Unit 1
16 ▶

Unit 1
17 ▶

Unit 1
13 ▶

**Instructions:**
1. Look at the pictures and videos.
2. Match the correct picture with the video.

Unit 1
18 ▶

Unit 1
19 ▶

Unit 1
20 ▶

Unit 1
21 ▶

WE

YOU

THEY

**Unit 1 22** ▶

**Instructions:**
Complete the sentences with the correct pronoun.

_____**I**_____ am William.

_____ is Andrés.

_____ is Olga.

_____ are Hellen and Max.

_____ is Max.

_____ are Hellen and William.

**SINGULAR**
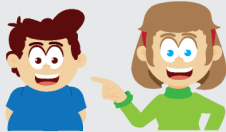
Unit 1 23
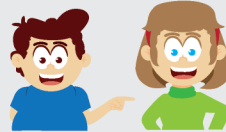
Unit 1 24

Unit 1 25

Unit 1 26

Unit 1 27

**PLURAL**

Unit 1 28

Unit 1 29

Unit 1 30

Unit 1 31

**Instructions:** Write the correct pronoun.
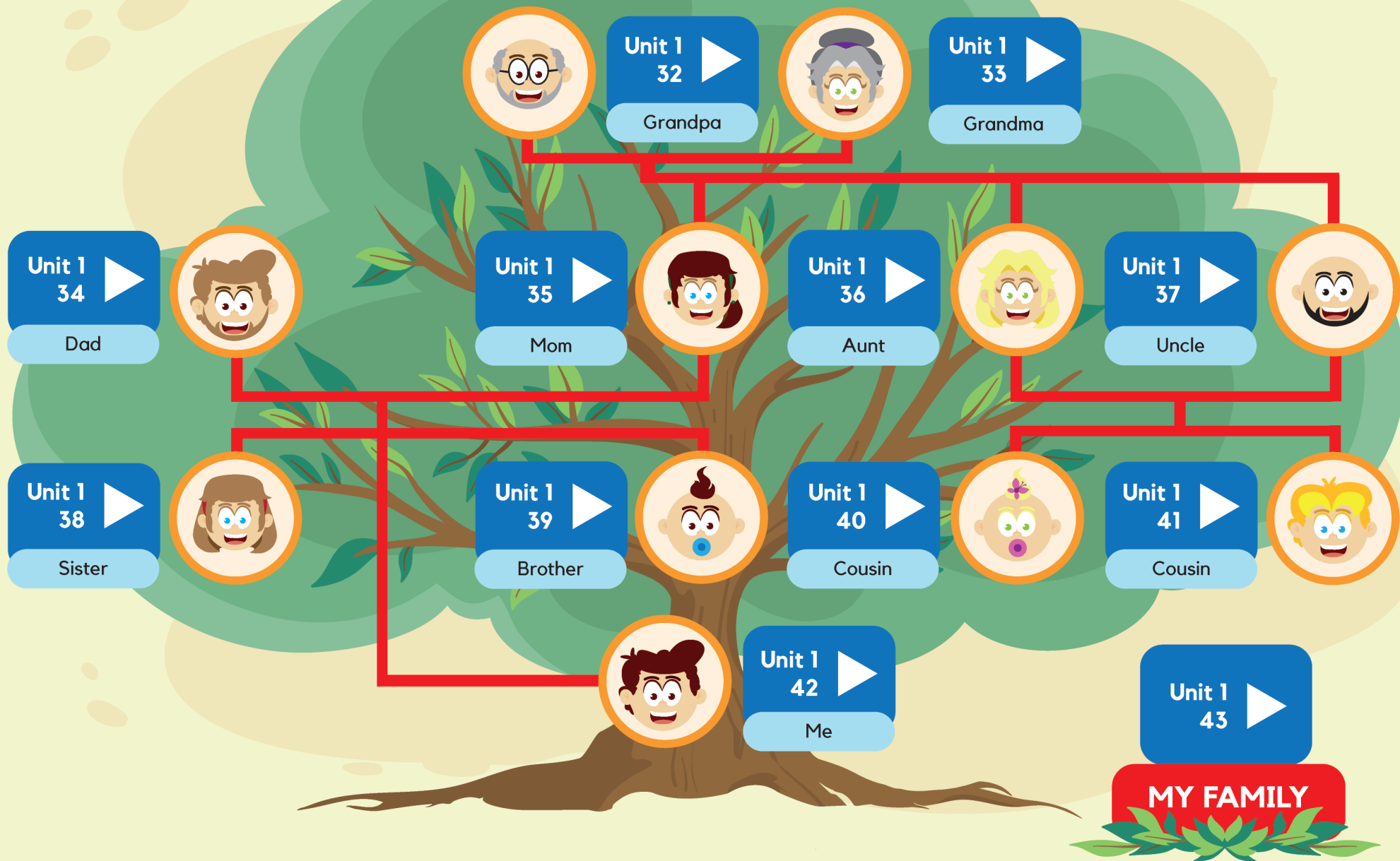
**Unit 1**
**44**

**Instructions:**
1. Look at the pictures and names.
2. Match the correct picture with the name.

**Unit 1 45**

**Unit 1 46**

**Unit 1 47**

**Unit 1 48**

**Unit 1 49**

Grandpa

Cousin

Sister

Cousin

Dad

Grandma

Uncle

Aunt

Mom

Brother

**Unit 1 50**

**Unit 1 51**

**Unit 1 52**

**Unit 1 53**

**Unit 1 54**
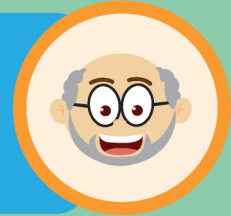
**Instructions:**
1. Organise the letters.
2. Write the correct words about family members.

N M P G A D A
N U A T
A D D
S E I T S R
M M O
O S C U N I
G M A D A R N
N C U E L
R O B E H T R
U C I S O N

**Unit 1** ▶ **56**

**Instructions:**
1. Look at the order of the words.
2. Look at the videos.
3. Complete the sentences with the family members.

| Luz | is | my | mom. |

**Unit 1** ▶ **57**
Luz is my mom.
Luz

**Unit 1** ▶ **58**
_____
David

**Unit 1** ▶ **59**
_____
María

**Unit 1** ▶ **60**
_____
Alfonso

**Unit 1** ▶ **61**
_____
Gabriela

**Unit 1** ▶ **62**
_____
Christian

**Unit 1** ▶ **63**
_____
Andrés

**Unit 1** ▶ **64**
_____
Laurent

**Unit 1** ▶ **65**
_____
Olga

**Unit 1** ▶ **66**
_____
Luis

**Instructions:**
1. Look at the pictures and videos.
2. Complete the sentences with the names of your family members.

Unit 1
68

_____ is my mother.

Unit 1
73

_____ is my brother.

Unit 1
69

_____ is my father.

Unit 1
74

_____ is my cousin.

Unit 1
70

_____ is my aunt.

Unit 1
75

_____ is my cousin.

Unit 1
71

_____ is my uncle.

Unit 1
76

_____ is my grandmother.

Unit 1
72

_____ is my sister.

Unit 1
77

_____ is my grandfather.

17
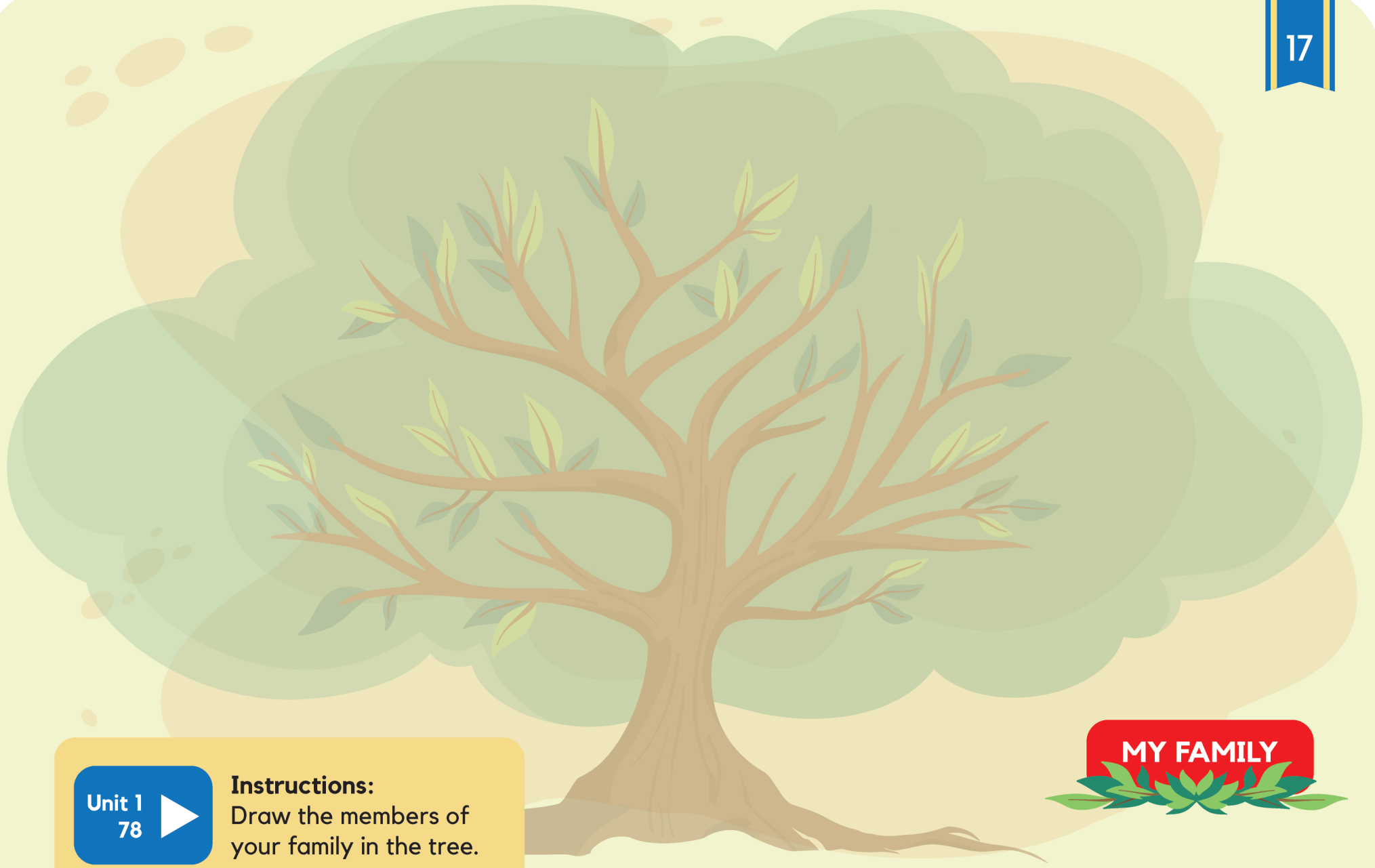
**MY FAMILY**

**Instructions:**
Draw the members of
your family in the tree.
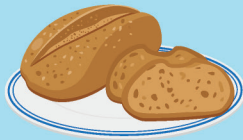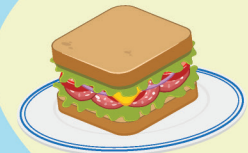
**Unit 2 02** ▶

**Instructions:**
1. Read the comic.
2. Watch the videos.



**Unit 2 03** ▶

Formal greetings

**Unit 2 04** ▶

Good morning

Good evening, dad

Good evening, William

Dinner

Hello !

Hey !

**Unit 2 10** ▶
William eats coffee, eggs and bread.

**Unit 2 11** ▶
Good evening

**Unit 2 12** ▶
Dinner

**Unit 2 13** ▶
Informal greetings

**Unit 2 14** ▶
Hey! - Hello!

| | | | |
|---|---|---|---|
|  | **Unit 2** ▶ **16** <br> Sandwich |  | **Unit 2** ▶ **20** <br> Chips |

**Instructions:** Watch the videos.

| | | | |
|---|---|---|---|
|  | **Unit 2** ▶ **17** <br> Chocolate |  | **Unit 2** ▶ **21** <br> Eggs |
|  | **Unit 2** ▶ **18** <br> Chicken |  | **Unit 2** ▶ **22** <br> Bread |
|  | **Unit 2** ▶ **19** <br> Rice |  | **Unit 2** ▶ **23** <br> Coffee |
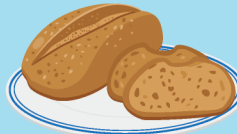
**Unit 2**
**24** ▶

**Instructions:**
1. Organise the letters.
2. Write the correct words about food.

N D A H S W C I R

F O E F E C

H P S C I

K I C C E H N

C I E R

G E G S

C L C H A O O E T

D E B R A

**Instructions:**
1. Write the name of each part of the food in each white box.
2. Write the name of each food of the day.
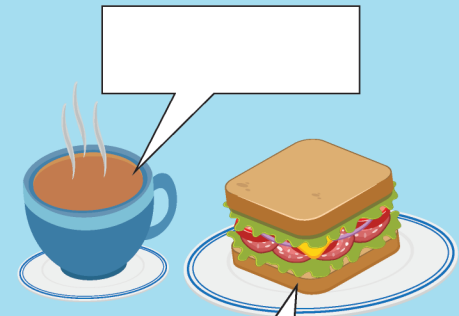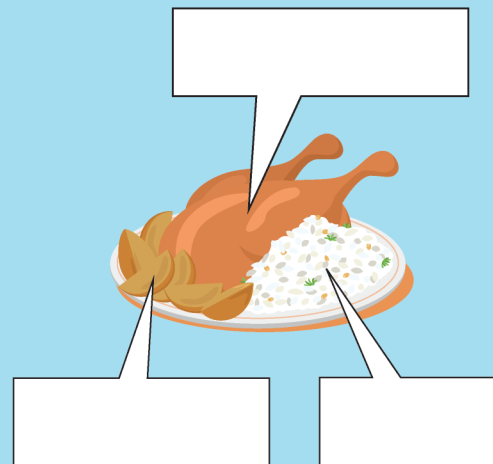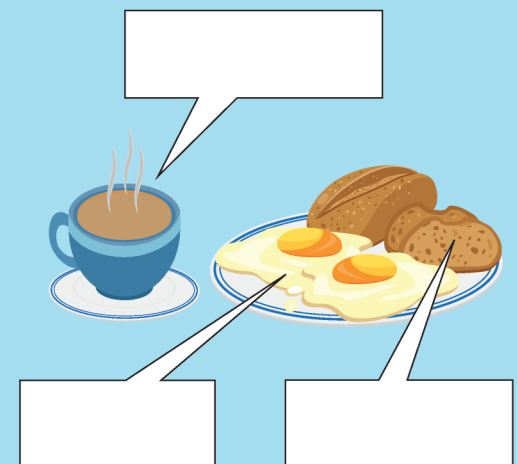
**Instructions:**
1. Look at the pictures and names.
2. Match the correct pictures with the moment of the day.



**Good evening**





**Good afternoon**





**Good morning**
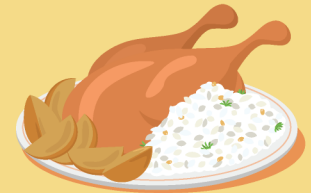
**Instructions:**
1. Look at the pictures.
2. Write the correct greetings in the dialogue balloon.

Good evening

Hi !

Good morning

Hey !

Good afternoon

**Unit 2**
**28** ▶

**Instructions:**
1. Write what you eat each moment of the day.
2. Draw each food for each moment of the day in the white box.

For breakfast, I eat ...

For lunch, I eat ...

For dinner, I eat ...

Unit 3
01

UNIT 3
SCHOOL

Unit 3
02 ▶

**Instructions:**
Watch the videos.

Unit 3
05 ▶

Computer

Unit 3
03 ▶

Cellphone

Unit 3
06 ▶

Pencil

Unit 3
04 ▶

Notebook

Unit 3
07 ▶

Eraser

Unit 3
08 ▶

**Instructions:**
Watch the videos.

Unit 3
09 ▶

School

Unit 3
10 ▶

Art classroom

Unit 3
11 ▶

Library

Unit 3
12 ▶

Field

**Unit 3** ▶
13

**Instructions:**
Watch the videos.

**Unit 3** ▶
14

They watch movies in the school.

**Unit 3** ▶
15

He draws in the art classroom.

**Unit 3** ▶
16

She reads in the library.

**Unit 3** ▶
17

He plays soccer in the field.

SCHOOL

He | plays | soccer | in the field.

**Instructions:**
Complete the sentences with the words in the boxes.

| | | | |
|---|---|---|---|
| Library | Art classroom | School | Field |
| Draw | Watch movies | Read | Play soccer |

Unit 3
19
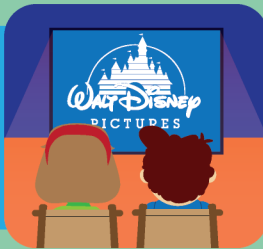


They _____

_____

Unit 3
20



He _____

_____

Unit 3
21



He _____

_____

Unit 3
22



She _____

_____

**Unit 3**
**23** ▶

**Instructions:**
Write the correct name of the objects with the words in the boxes.

Eraser

Cellphone

Computer

Notebook

Pencil

**Unit 3**
**24** ▶

_____

**Unit 3**
**25** ▶

_____

**Unit 3**
**26** ▶

_____

**Unit 3**
**27** ▶

_____

**Unit 3**
**28** ▶

_____

**How to use verbs in English:**
In English, verbs change with the pronouns *'he'*, *'she'* and *'it'*.
1. Look at the final letters of the verb.
2. Apply the rule.
**Note:** Verbs do not change with the other pronouns.

HE

SHE

IT

**+**

verb | Final vowel + y  **+** s **=** Plays
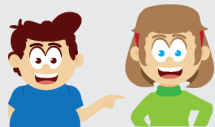
verb | Final consonant + y  **+** ies **=** Studies

verb | Final ss, sh, ch, x, o  **+** es **=** Watches

**Unit 3**
**30** ▶

**Instructions:**
1. Organise the letters.
2. Write the correct words about objects and school places.
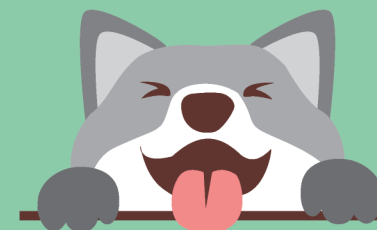
| Letters | Answer |
|---|---|
| M P T O U E C R | |
| B O E N T K O O | |
| E P L C I N | |
| C L P L E H N O E | |
| A S E R R E | |
| T C L R A A S O R S M O | |
| I L R B A Y R | |
| D E I F L | |
| C O H S O L | |

Unit 3
31 ▶

**Instructions:**
Watch the videos.

1

Unit 3
32 ▶

One

2

Unit 3
33 ▶

Two

3

Unit 3
34 ▶

Three

4

Unit 3
35 ▶

Four

5

Unit 3
36 ▶

Five

6

Unit 3
37 ▶

Six

7

Unit 3
38 ▶

Seven

8

Unit 3
39 ▶

Eight

9

Unit 3
40 ▶

Nine

**Unit 3**
**41**

**Use of 'have' and 'has':**
In English, we use *'have'* and *'has'* to express ownership.
1. Look at the pronoun.
2. Apply the rule.

I + HAVE = I have one bag.
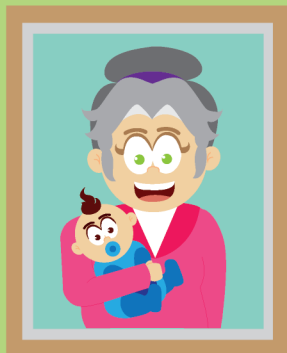
YOU + HAVE = You have two pencils.

HE SHE IT + HAS = He has three keys.

WE YOU THEY + HAVE = They have four wallets.

**Instructions:**
Watch the videos.

Bag

Keys

Wallet

Glasses

**Unit 3**
**47**

**Instructions:**
Complete the sentences with the correct number.

She has _____ pencils.

I have _____ cellphones.

He has _____ bags.

We have _____ computer.

She has _____ notebooks.

I have _____ wallets.

I have _____ erasers.

He has _____ glasses.

We have _____ keys.
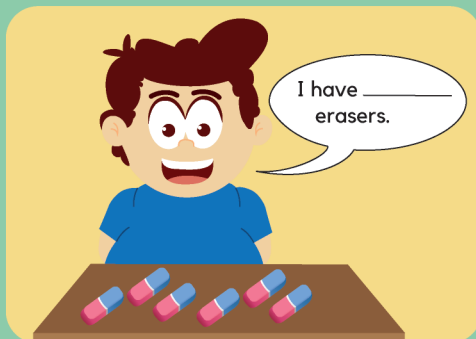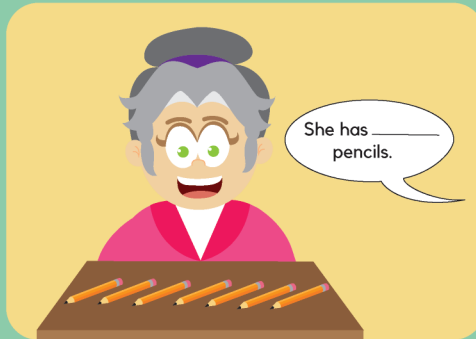
**Instructions:**
1. Read the sentences.
2. Draw your classmates in the white boxes according to the sentences.

They play soccer in the field.

He has two keys.

She draws in the school.

He has glasses.

She reads in the library.

We have one computer.

Unit 4
01 ▶

**UNIT 4**
**CITY PLACES**

Unit 4
03 ▶

Mall

Unit 4
04 ▶ She eats a sandwich in the mall.



Unit 4
05 ▶

School

Unit 4
06 ▶ I study in Anexa school.



Unit 4
07 ▶

Park

Unit 4
08 ▶ They play soccer in the park.

**Instructions:**
Watch the videos.

Unit 4
10 ▶

Library

Unit 4
11 ▶ We read books in the library.

Unit 4
12 ▶

Stadium

Unit 4
13 ▶ He watches the game in the stadium.

Unit 4
14 ▶

Store

Unit 4
15 ▶ You buy bread in the store.

Unit 4
16 ▶ **Instructions:**
Watch the videos.

Unit 4
17 ▶

In the morning
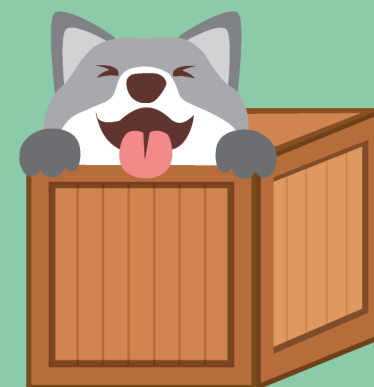
Unit 4
18 ▶

In the afternoon

Unit 4
19 ▶

In the evening

**Unit 4**
**20**

**Instructions:**
1. Organise the letters.
2. Write the correct words about places of the city and moments of the day.

| Letters | Answer |
|---|---|
| O R T E S | STORE |
| R O N N M I G | MORNING |
| A T S D I M U | STADIUM |
| F R T A E O N N O | AFTERNOON |
| A K P R | PARK |
| L S O H C O | SCHOOL |
| R L B R A I Y | LIBRARY |
| L M L A | MALL |
| E E I V N N G | EVENING |

**Instructions:**
1. Look at the pictures and videos.
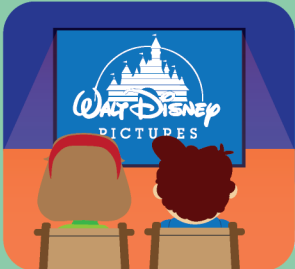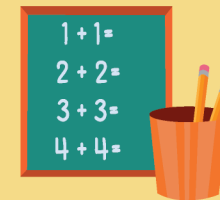2. Match the correct pictures with the place.

Unit 4
22

Read

Unit 4
23

Watch

Unit 4
24

Buy

Unit 4
25

Study

STORE

SCHOOL

MALL

Unit 4
26

Bread

Unit 4
27

Math

Unit 4
28

Books

Unit 4
29

Movies

**Instructions:**
1. Look at the pictures.
2. Write the name of the places.
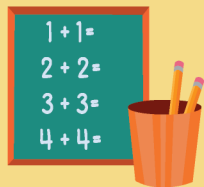

_____


_____


_____


_____


_____


_____

**Instructions:**
Write the correct name of the objects and verbs with the words in the boxes.



_____



_____



_____



_____

Study

Watch

Read

Math

Buy

Books

Bread

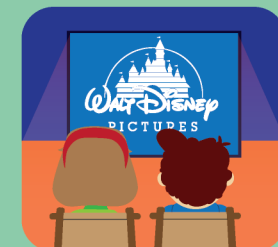

_____



_____



_____



_____

**Unit 4**
**32** ▶

**Instructions:**
1. Look at the structure of the sentences.
2. Pay attention to the order of the words.

| Moment of the day | Pronoun | Verb | Place |
|---|---|---|---|
| In the morning, | I  You | Read | in the park. |
| In the afternoon, | He  She  It | Watches | in the mall. |
| In the evening, | We  You  They | Buy | in the store. |

**+** **+** **+**

**In the afternoon,** **I** **watch** **the game** **in the stadium.**

**Instructions:**
1. Look at the structure of the sentence.
2. Complete the sentences with the moment of the day and names of places in your city.
3. You can use vocabulary from previous units.

_____ , I study math in the _____ .

_____ , I buy bread in the _____ .

_____ , I play soccer in the _____ .

_____ , I read books in the _____ .

_____ , I watch movies in the _____ .

_____ , I play soccer in the _____ .

Unit 4
34

**Instructions:**
1. Draw your favorite place in the city from the vocabulary.
2. Write a sentence that describes what you do in that place and the moment of the day.

**Investigadores/Creadores**
Juan David Caballero Fuentes
Thomas Alexander Riddle Delgado

**Directora**
María Eugenia Rojas Villamizar
*Máster en Ciencias de la Education TESOL*
*Especialista en Gestión Educativa y Enseñanza del Inglés*

**Asesoras**
Claudia Patricia Hernández Valdivieso
*Licenciada en Literatura y Lengua Castellaña*
*Modelo lingüístico e intérprete de Lengua de Señas Colombiana*

Luisa Fernanda Hernández Valdivieso
*Psicóloga, docente e intérprete de Lengua de Señas Colombiana*
*con especialización en Entornos virtuales de Aprendizaje*

Angélica María Romero Mateus
*Licenciada en Inglés*

Universidad
Industrial de
Santander