Revista Educación, 2025, 49(2), julio-diciembre

ISSN: 0379-7082 / e-ISSN 2215-2644

Scientific research article

DOI: http://doi.org/10.15517/revedu.v49i2.61202

A Descriptive Analysis of Pronunciation Errors Made by Costa Rican Spanish L1 Learners of English as a Foreign Language

Un análisis descriptivo de errores de pronunciación cometidos por costarricenses aprendices de inglés como lengua extranjera

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Received: 8 August 2024
Accepted: 14 November 2024

¿How to cite this article?

Angulo Jiménez, H. y Bonilla López, M. (2025). A Descriptive Analysis of Pronunciation Errors Made by Costa Rican Spanish L1 Learners of English as a Foreign Language. Revista Educación, 49(2). http://doi.org/10.15517/revedu.v49i2.61202

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

ABSTRACT

This paper seeks to widen current knowledge on pronunciation instruction by exploring segmental pronunciation errors and their numerical prevalence. Specifically, the main goal of this corpus-aided investigation is twofold: (a) to identify the pronunciation errors in vowel and consonant production and (b) to recognize the pronunciation errors associated with the morphemes {-ed} and {-s} and the nature of such errors. To this end, forty intermediate third-year students of the Bachelor's degrees in English and English Teaching at a public Costa Rican university used Flip (a video-based tool) to record themselves completing three individual speaking tasks: two oral readings and a short impromptu speech—all of which rendered 65 video recordings. Main analyses and ensuing descriptive statistics with IBM SPSS Statistics revealed that learners made the most errors when pronouncing vowels /i, æ, ɪ/ and consonants /z, s, ð/. As for grammatical morphemes, while mispronunciation of {-s} (possessive, third-person singular, and plural) was the most prevalent error, omission was the predominant error when pronouncing {-ed}. Implications for instructors and other stakeholders include the need to (a) study the phonological system of Costa Rican Spanish in foundational courses, (b) invest more time in the study of troublesome vowels and problematic realizations of {-s} and {-ed}, (c) prioritize troublesome consonants, and (d) reflect on the effectiveness of instructional and feedback practices.

KEYWORDS: English as a Foreign Language, Pronunciation Instruction, Phonetics, Segmentals, Errors, Consonants, Vowels, Morphemes.

RESUMEN

Este artículo busca ampliar el conocimiento actual sobre la enseñanza de la pronunciación mediante la exploración de errores de pronunciación segmentales y su prevalencia numérica. Específicamente, esta investigación basada en corpus (a) identifica los errores de pronunciación en la producción de vocales y consonantes y (b) reconoce los errores de pronunciación asociados con los morfemas {-ed} y {-s} y la naturaleza de tales errores. Para ello, cuarenta estudiantes de tercer año intermedio de las carreras de Licenciatura en Inglés y Enseñanza de Inglés de una universidad pública costarricense utilizaron Flip (una herramienta basada en video) para grabarse completando tres tareas orales individuales: dos lecturas orales y una breve improvisación, lo cual generó 65 grabaciones de video. Los análisis principales y las estadísticas descriptivas subsiguientes con IBM SPSS Statistics revelaron que los estudiantes cometían la mayor cantidad de errores al pronunciar las vocales /i, æ, ɪ/ y las consonantes /z, s, ð/. En cuanto a los morfemas gramaticales, mientras que la mala pronunciación de {-s} (posesivo, tercera persona del singular y plural) fue el error más frecuente, la omisión fue el error predominante al pronunciar {-ed}. Las implicaciones para docentes y otros actores relevantes incluye la necesidad de (a) estudiar el sistema fonológico del español de Costa Rica en cursos iniciales, (b)

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

invertir más tiempo en el estudio de las vocales y las realizaciones de {-s} y {ed} que ofrecen mayor dificultad, (c) priorizar el estudio de consonantes problemáticas y (d) reflexionar sobre la efectividad de las prácticas pedagógicas y las técnicas de realimentación.

PALABRAS CLAVE: Inglés como lengua extranjera, Enseñanza de pronunciación, Fonética, Segmentales, Errores, Consonantes, Vocales, Morfemas.

INTRODUCTION

Pronunciation can be defined "as comprising both segmental (i.e., vowels and consonants) and prosodic (e.g., stress, rhythm, intonation) dimensions … [and as such] it is likely the linguistic component most amenable to diagnostic assessment" (Isaacs et al., 2017, p. 2). In fact, studies on second language (L2) pronunciation research could be divided into two lines of inquiry: those with a descriptive nature and those with an experimental design. On the one hand, specifically related to English L2, the former has sought to analyze, for example, issues pronouncing the {-ed} inflectional morpheme (e.g., Dávila, 2018), dental fricatives (e.g., Metruk, 2017), and consonants in general (e.g., Tuan, 2011). On the other hand, the latter has employed a pretest-test/posttest design to compare, among other things, the effect of pronunciation learning strategies on learners who are immersed in different macro contexts (Mirza, 2015), to test the effect of explicit rhythm instruction on L2 learners' prosody (Quesada & Romero, 2018), and to explore the effect of repeated reading on kids' L2 English pronunciation (Riquelme, 2017).

Notwithstanding their significant contribution, the state of the literature on L2 pronunciation reveals that out of the few research efforts that have taken place in English L2 non-predominant contexts with Spanish L1 speakers (e.g., Charpentier, 2020, 2022; Marín, 2008), none—to the best of the researchers' knowledge—has employed corpus methods, which "play a crucial role in second language research and pedagogy … and … offer a unique insight into the production of L2 speakers" (Brezina & Flowerdew, 2018, p. 1). With this gap in mind, a corpus-supported study with Costa Rican English L2 learners is called for.

Specifically, the main goal of this investigation is twofold: (a) to identify the pronunciation errors in vowel and consonant production and (b) to recognize the pronunciation errors associated with the morphemes {-ed} and {-s} as well as the nature of such errors. Below is a review of the few investigations on the matter within a Costa Rican context followed by a brief description of the phonological system of the participants' target language (i.e., North American English, hereafter NAE) and their L1 (i.e., Costa Rican Spanish, hereafter CRS) as well as the morphemes {-ed} and {-s}.

Literature Review

Pronunciation has received different degrees of attention in foreign language (FL) teaching throughout history, going from little consideration before the second half of the 19th century to a strong

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

interest over the last two decades (Derwing, 2018; Murphy & Baker, 2015). Such growing interest is readily apparent in research on pronunciation instruction (PI) as evidenced by one of the latest meta-analyses by Saito and Plonsky (2019). Unfortunately, as is also the case of research on pronunciation in general, little of this work has centered on learners who speak Spanish natively—let alone speakers of specific varieties of Spanish like CRS learning NAE.

Pronunciation Errors by CRS L1 learners of English

There is a rather limited number of studies centering on pronunciation errors made by native speakers of Spanish. Research on errors made by native speakers of CRS is not the exception. To the best of the authors' knowledge, there are only four studies looking at segmental or morpheme pronunciation errors made by this group of EFL learners: Charpentier (2020, 2022), Marín (2008), and Pizarro and Cordero (2015).

In their descriptive study, Pizarro and Cordero (2015) used an observation sheet and two surveys to identify the sounds that were difficult to perceive and pronounce for 55 students of the Bachelor's degrees in English and English Teaching (hereafter the BA in English and the BA in English Teaching) at the Universidad Nacional of Costa Rica, an institution that is very similar to the University of the Central Valley (hereafter UCV[1]). Though only findings related to troublesome sounds are presented here, the survey also gathered information regarding strategies to deal with pronunciation difficulties. The authors explained that the surveys were filled in by the 55 students and 10 instructors with seven to 10 years of experience teaching pronunciation. The observation sheet was completed by one of the researchers who observed a group of students registered in her Linguistics course, for one year.

Main findings in Pizarro and Cordero (2015) revealed that most students reported difficulties involving /v, ð, θ, t, d, s, z, tʃ, dʒ, ʃ, ŋ/ and the vowels /æ, a, ə, ɚ/. More specifically, the students acknowledged trouble distinguishing between /z/ and /s/ in onset position, articulating initial s-clusters (an epenthetic /e/ was inserted), and pronouncing /z/ word-finally. They also said to delete /t/ and /d/, along with other phonemes, in final position, and to frequently substitute /θ, ð/ for /t, d/ correspondingly.

Another difficulty shared by students was the substitution of the English /r/ for the Costa Rican homologue. It is not specified, however, to which allophone of the Costa Rican /r/ students were referring. In contrast, results from the survey and the observation sheet completed by one of the researchers highlighted learners' difficulties with /ð, θ, v, s, z, ʃ, tʃ, dʒ, r, ŋ/, the vowels /i, ɪ, ə, æ, ɑ/, and s-clusters in initial position. The instructors also mentioned substitutions of /ʌ/ and /ɔ/ for /ʊ/. However, unlike the present study, results were based on researchers', instructors', and students' *perceptions* of their pronunciation difficulties.

Different from Pizarro and Cordero (2015), Marín (2008) worked with only three adult learners registered in a four-month English-With-Specific-Purposes course to analyze the usefulness of two

[1] For the sake of anonymity, the institution's name has been masked.

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

techniques to help students learn the pronunciation of {-ed}. Specifically, the researcher not only had participants share their perceptions about the usefulness of drilling and color coding but also gave them a test before and after using both techniques. The students had an intermediate to advanced level of English proficiency. The researcher found that drilling was effective to help students identify the allomorph used in past forms, while color-coding was more effective to help learners to self-correct. Consequently, the researcher advocated for the use of both techniques in the EFL classroom.

Also, despite the decrease in the number of errors—especially when color-coding was used—students continued to exhibit difficulties with the pronunciation of {-ed} by the end of the course. Marín (2008) reported that just as was the case in the pre-test, the pronunciation of the morpheme was most challenging when it had to be realized as /d/ or /t/ in the post-test. Like Marín (2008), Charpentier (2020) investigated the pronunciation of {-ed}, but he focused on adjectives and part participial forms. The researcher gave 61 sophomore students of the BA in English and the BA in English Teaching at UCV a multiple-choice test to explore their understanding of the rules underlying the pronunciation of adjectives ending in {-ed} and their exceptions. The author found that his participants' performance on said test was rather low. More concretely the students' average performance was 6,18 out of 10, with *SD* =1,13.

This means that, per UCV standards, where the minimum grade to pass a test is 7.0, the average student would not have passed, and those with a grade one standard deviation above the mean (i.e., 7.31) would barely have passed. Charpentier (2020) also reported that students' performance was best when {-ed} had to be pronounced as [əd]; it was worst when the morpheme had to be pronounced as [t]; and realizations of the morpheme as [d] fell in between. Finally, the researcher related that his participants performed much worse when deciding on the pronunciation of adjectives that represent exceptions to the rules.

Then, in 2022 Charpentier carried out another investigation with a focus on students' pronunciation of English words containing silent letters. For this study, the author had 46 junior students in the BA in English and the BA in English Teaching at UVA read sentences containing words with silent letters. The students' readings were recorded and then analyzed by three raters. The researcher described his participants performance at the task at stake "quite acceptable but highly variable [(*M* = 8.63/10, *SD* = 7.3)]" (*M* = 8.63/10, *SD* = 7.3)" (Charpentier, 2022, p. 49). The author shared that about 25% of the words with silent letters were challenging for students, with words containing silent <l>, <gh>, and <s> being the most troublesome, and words with silent <d> and <w> being the least troublesome. The author also reported that participants' performance on sentences with silent <n, b, g, t, c> was moderately accurate.

The studies reviewed above evidence the sparsity of research on segmental pronunciation errors made by CRS L1 learners of English. Overall, the body of extant research reveals difficulties with

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

/ð, θ, v, s, z, ʃ, tʃ, dʒ, r, ŋ, i, ɪ, ə, æ, ɑ/, challenges with {-ed}, particularly when the morpheme must be pronounced as [d] or [t], and trouble pronouncing words containing silent <l, gh, s>. It is worth emphasizing that the only study that sought to identify errors made by native speakers of CRS when pronouncing English (i.e., Pizarro & Cordero, 2015) was based on student, instructor, and researcher perceptions. The present investigation thus aims to contribute to the small body of research on this topic by analyzing actual pronunciation errors in a corpus of video recordings made by junior students of the BA in English and English Teaching at UCV.

Consonants and Vowel Phonemes of NAE and CRS

Pronunciation refers to the production and perception of a set of word- and discourse-based features (Levis, 2018; Richards & Schmidt, 2013). Among the former are segmentals (vowels and consonants) and word stress whereas the latter includes intonation, rhythm, phrasing, and focus (Levis, 2018). Given the emphasis of this paper on segmental features, only the vowels and consonants of NAE and CRS will be discussed here.

First, despite the ongoing debate regarding the very existence and characteristics of NAE, this dialect of English can be said to have 24 consonants, 9 monophthong vowels, and five diphthong vowels (Deterding, 2015; Yavas, 2016). Table 1 below presents the consonants of NAE, classified by manner and place of articulation. As usual, when two segments are listed within the same cell, the one on the left is voiceless, and the one on the right is voiced. Table 2 presents the vowels of NAE, sorted according to their height and frontness. For the sake of simplicity, only three levels of height and frontness are presented (see Deterding, 2015 and Yavas, 2016 for more in-depth information).

Table 1.

Consonant Phonemes of NAE

Manner/Place	Bilabial	Labio-dental	Dental	Alveolar	Post-alveolar	Palatal	Velar	Glottal[a]
Plosive	p b			t d			k g	
Fricative		f v	θ ð	s z	ʃ ʒ			H
Affricate					tʃ dʒ			
Nasal	m			n			ŋ	
Approximant	w			l	r	j		

Note. [a][ʔ] is a considered an allophone of phonemes like /t/ and /d/.

Source: Based on Deterding (2015) and Yavas (2016).

Two points are worth highlighting before moving on to a description of the phonological system of CRS. First, the diphthongs of NAE (i.e., /eɪ, ɑɪ, ɔɪ, oʊ, ɑʊ/) result from the combination of monophthong vowels; hence, they are not listed in Table 2. Second, vowels can also be described in terms of roundedness and tension. In this sense, in NAE all back vowels are rounded. Regarding tension, [ɪ, ɛ, æ, ʌ, ʊ] are often considered lax, while [i, eɪ, ɑ, ɔ, oʊ, u, ɑɪ, ɑʊ] are usually considered tense (Yavas, 2016).

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

Table 2.

Vowel Phonemes of NAE

Height/ Frontness	Front	Central	Back
High	i ɪ		u ʊ
Mid	ɛ	ʌ[a]	ɔ
Low	æ		ɑ

Note. a/ɝ/ can be understood as an r-colored realization of /ʌ/. Schwa (/ə/) and its r-colored realization /ɚ/ are midcentral allophones of most other vowels when the latter occur in unstressed syllables.

Source: Based on Deterding (2015) and Yavas (2016).

Second, like NAE, CRS exhibits a great deal of variability (Instituto de Investigaciones Lingüísticas, n.d.). Furthermore, thorough descriptions of the dialect's phonological and phonetic inventories are widely missing (Quesada, 2010). Nevertheless, available sources (e.g., Calvo (2012); Calvo and Ortega (2017); Quesada (1996, 2010) point to the existence of the vowel and consonant phonemes listed in Tables 3 and 4, in CRS.

Table 3.

Consonant Phonemes of CRS

Manner/Place	Bilabial	Labio-dental	Dental	Alveolar	Postalveolar	Palatal	Velar [a]	Glottala
Plosive	p b		t d				k g	
Fricative		f		s			x	
Affricate					tʃ			
Nasal	m			n		ɲ		
Approximant				l		j		
Tap or flap				ɾ				
Trill				r[b]				

Note. [a]The velar nasal [ŋ] is an allophone of /n/ word-finally in most of the Costa Rican territory (Quesada, 2010). [b]The trill is currently undergoing a process of substitution by a retroflex or alveolar approximant, even in those regions where the trill allophone was ubiquitous (Quesada, 2010).

Source: Based on Calvo (2012), Calvo and Ortega (2017), Quesada (1996, 2010).

The vowel and consonant phonemes of NAE described above are studied in the oral communication courses of the BA in English and the BA in English Teaching at the public university where data was collected. However, while insightful, the only available evidence from this context originates from research attempts to examine the usefulness of two teaching techniques (i.e., Marín, 2008), to measure rule understanding (i.e., Charpentier, 2020), and to assess accuracy of pronunciation of silent letters (i.e., Charpentier, 2022). That is why the literature on PI would benefit from a study that paints a much larger picture (i.e., on issues involved in consonant, vowel, and morpheme production).

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

Table 4.

Vowel phonemes[a] of CRS

Height/ Frontness	Front	Central	Back[b]
High	i		u
Mid	e		O
Low		a	

Note. [a]As in the case of MAE, diphthongs in CRS (e.g., ue, ie) result from the combination of monophthongs and are thus not often included in phonological inventories (P. Guillén, personal communication, July 23, 2024). [b]The two back vowels of CRS are rounded (Quesada, 1996).

Source: Based on Calvo (2012), Calvo and Ortega (2017), Quesada (1996, 2010).

The Morphemes {-ed} and {-s}

One of the objectives of this study is to recognize the pronunciation errors associated with the morphemes {-ed} and {-s} and the nature of such errors. It is thus a must to briefly discuss the meaning and pronunciation of these inflectional suffixes. {-ed} indicates past tense in regular verbs (e.g., want → wanted), and {-s} is used to pluralize regular nouns (e.g., cat → cats), mark possession (e.g., Eric → Eric's house), and display agreement with the pronouns he, she, and it (e.g., She walks every day) (Yavas, 2016).

Per Yavas (2016), the pronunciation of {-ed} is underlain by a set of morphophonological rules associated with the voicing –or lack thereof—of the last sound in the word to which the suffix is attached. More concretely, {-ed} is pronounced as [d] when the word ends in a voiced sound, e.g., arrived →[2] arrived, with the italicized part pronounced as [d]). On the other hand, when the words ends in a voiceless sound, {-ed} is pronounced as [t], e.g., ask → asked, with the italicized part pronounced as [t]. For words ending in [d] or [t], {-ed} is pronounced as [əd] or [ɪd].

According to Yavas (2016), similar morphophonological rules underly the pronunciation of {-s}, regardless of its semantic value. Specifically, {-s} → [z] in words ending in any voiced sound except a voiced sibilant, [s] in words ending in a voiceless sound except a voiceless sibilant, and [əz] or [ɪz] in words ending with the voiced /z, ʒ, dʒ/ as well as voiceless, sibilant sounds /s, ʃ, tʃ/. Importantly, the phonetic realizations of {-ed} and {-s} are identical to the non-morphemic realizations of the phonemes /t, d, s, z/.

On the whole, research aiming to identify segmental and morpheme pronunciation errors in the speech of Spanish L1 EFL learners is sparse. In this respect, it would be empirically interesting to investigate which segmental pronunciation errors (i.e., vowel and consonant) seem to be more resistant to formal instruction and whether students have learned the morphonological rules underlying the pronunciation of {-ed} and {-s}. Exploratory studies of this type could inform decisions regarding topics in need of further study and practice. They could also aid in the transformation of courses with an oral communication component by prioritizing certain pronunciation contents (if need be).

[2] As customary in phonological notation, the arrow (→) should be read as pronounced as.

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

The Current Study

The literature reviewed thus far reveals a gap in the context where investigations have taken place (i.e., only a few in Central America), the scope of pronunciation features under study (i.e., focused on a narrow number), and the samples used to analyze them (i.e., without the use of corpus[3] data). With this in mind, drawing on current distinctions in corpus linguistics (i.e., corpus-based, corpus-driven, and corpus-aided), the present investigation is corpus-supported (also known as corpus-aided) because a corpus is employed to find illustrative examples of, in this case, pronunciation errors by CRS L1 learners of English (see Lindquist, 2013 for a description). As such this exploratory study constitutes a novel addition to the literature on PI. The following research questions (RQ) guided this study:

RQ1. What pronunciation errors in vowel production do CRS L1 learners of English make?

RQ2. What pronunciation errors in consonant production do learners make?

RQ3. What pronunciation errors do these students make in their attempt to pronounce the morphemes {-ed} and {-s}?

RQ4. What is the nature of the morpheme-related errors?

METHODOLOGY

Participants and Setting

The study took place at the University of the Central Valley, a large public Costa Rican university. The participants (N = 40) were 16 male and 24 female native speakers of Spanish, whose age ranged from 19 to 24 years old. At the time of the study, they were third-year English and English Teaching majors enrolled in LE1361, which is an oral communication course of said study plan (see Table 6). This implied that their English proficiency level—as described in the course entry profile—was high intermediate. The participants attended LE1361 thrice a week. On two of these days, sessions focused on developing persuasive speaking skills. One day was dedicated exclusively to the study of articulatory phonetics in a language lab; see Table 6 for a complete list of the pronunciation contents of the course.

Materials

To create the oral corpus, learners completed three speaking tasks which ranged from controlled to spontaneous (see Appendix A). The first and second task were reading tasks. In the first one, participants read out loud a passage on learning to speak a foreign language. For the second task, they read a dialogue focusing on past events. The third task consisted of delivering a short impromptu speech based on a topic chosen by participants from a list of options provided by the researchers. In line with previous studies (e.g., Chela-Flores, 2006; Henderson, 2008), all speaking tasks were taken or adapted from Dauer (1993).

[3] Lindquist (2013) describes a corpus as "a collection of texts which is stored on some sort of digital medium and used by linguists to retrieve linguistic items for research or by lexicographers for dictionary-making" (p. 3).

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

Design and Procedures

The data collection period lasted three weeks. Participants completed the speaking tasks at the beginning of the semester, when it is customary to conduct diagnostic tests to identify learners' strengths and weaknesses and thus allow instructors to give them feedback on their entry level. Therefore, the researchers, who were also the instructors, proceeded to give the general instructions the first day of classes. Specifically, after the course introduction, the instructions included highlighting the relevance of completing the diagnostic exercises, summarizing their characteristics (i.e., from controlled to spontaneous), and explaining the features of Flip. Flip, formerly known as Flipgrid, is a video-based tool, and it was chosen for two main reasons: (a) lab time of Week 1 (i.e., 100 minutes) would not have been enough for introducing the course and completing all three tasks, and (b) Flip allowed the researchers to have access to visual information (e.g., lip rounding or tensing), which made the identification of errors both easier and more accurate. In other words, to clear any doubts, instructions were provided orally and in print during class time of Week 1, but the speaking tasks were recorded when and where learners found it convenient that same week.

A week later, after confirmation that a few learners had not finished recording their three tasks, friendly reminders were sent via email. By the end of Week 2, all participants had completed the exercises, which allowed the researchers to give feedback on Week 3. To this end, the researchers used a handout that they had piloted a semester before, which divided the feedback focus in three areas: vowels, consonants, and grammatical markers (see Appendix B). Finally, on Week 3, after all learners received their handout with feedback, the researchers proceeded to ask for permission to use the videos for research purposes. That is, because feedback was not contingent upon participation and was standard classroom practice, the researchers waited until having given feedback to ask for consent. This also means that as part of regular classwork, completing the speaking activities was not optional, but granting permission to use the videos was.

Data Coding and Analysis

Once the semester finished, videos from all learners were downloaded and assigned a code with information about their group, their nationality, their native language, and the participant number (e.g., G01-CR-SP-01). This system was used following Díaz-Negrillo's (2009) guidelines to tag learner corpora. If learners chose to record the tasks separately, their code would have an added lower-case letter next to the participant number (e.g., G01-CR-SP-01a, G01-CR-SP-01b, G01-CR-SP-01c). Thus, the corpus consisted of 65 recordings, which amounted to 21,719 words.

Once videos were stored in a shared filed, each researcher independently analyzed all of them based on Deterding's (2015) reference manual and Richards and Schmidt's (2013) definition of error, that is, "the use of a linguistic item in a way in which a fluent or native speaker of the language regards

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

as showing faulty or incomplete learning" (p. 200). Specifically, using a clean version of the handout that was used for feedback purposes, the analysis first consisted of writing down all mispronounced words and underlining the problem(s) in it: a vowel, a consonant, and/or a grammatical morpheme. To obtain an overall error count per issue, errors were then manually counted per problem area and added to an excel sheet which contained all possible categories: /i/, /ɪ/, /eɪ/, /ɛ/, /æ/, /ə/, /ʌ/, /ɚ/, /ɝ/, /u/, /ʊ/, /oʊ/, /ɔɪ/, /ɔ/, /ɑɪ/, /ɑʊ/, /ɑ/, /p/, /b/, /f/, /v/, /θ/, /ð/, /s/, /z/, /t/, /d/, /ʃ/, /ʒ/, /tʃ/, /dʒ/, /k/, /g/, /l/, /ɹ/, /j/, /w/, /m/, /n/, /ŋ/, and /h/. The morphemes {-ed} and {-s} (possessive, 3rd person singular, and plural) along with two possible types of error (i.e., omission or mispronunciation) were also included.

In cases in which the same error appeared more than once (i.e., in the same word in the same position), it was no longer added up. For example, when a participant recurrently mispronounced /ð/ in 'they', it was counted only once. The same goes for /z/ in 'was' and /s/ in 'student', which were repeatedly mispronounced in a single video by learners, yet only one occurrence was computed in /z/ and /s/, respectively. A relevant distinction was also made when mispronunciation involved a morpheme or not. To illustrate, a mispronounced /z/ in because and easy would add up to 2 in the tally of that consonant, but issues with the same consonant sound in days and problems would be accounted for twice in the {-s} (plural) grammatical morpheme and then further subdivided in the omission or mispronunciation category depending on the case.

During the 6-month data analyses, the researchers met three times to discuss any unresolved issue in the error identification process. In such cases, the researchers held thorough analyses until consensus was reached (see Creswell, 2008). Four months later, a data subset was randomly chosen to obtain interrater reliability scores based on the overall number of pronunciation errors per participant (n = 14), which researchers independently analyzed again. Reliability (Cronbach's alpha) for interrater consistency was $\alpha = .911$. The value reached acceptable reliability, that is, greater than .70 (for a review, see Taber, 2017). The data were then analyzed using IBM SPSS Statistics (Version 29).

RESULTS AND DISCUSSION

This investigation sought to identify the pronunciation errors in vowel (RQ1) and consonant production (RQ2). It also aimed at recognizing the pronunciation errors associated with the morphemes {-ed} and {-s} (RQ3) and the nature of such errors (RQ4).

Vowel Errors

On the identification of troublesome vowels (RQ1), results show that the pronunciation errors that the participants made when attempting to pronounce words containing NAE vowels were greater than the number of errors they made when targeting NAE consonants. Table 5 provides an overview of descriptive statistics of errors in vowel production. As can be seen, participants made the most errors when pronouncing words with the front vowels /i/ (n = 166), /æ/ (n = 109), and /ɪ/ (n = 92). It is also

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

worth noting that even with lower occurrence, learners had trouble producing central vowels such as /ʌ/ (*n* = 57), /ə/ (*n* = 36), and /ɝ/ (*n* = 35) as well as the back vowel /ɑ/ (*n* = 40). All errors were substitutions, most of them for a CRS or a CRS-like vowel.

Table 5.

Vowel Pronunciation Errors

	Sum	*M*	*SD*	Min.	Max.
Front					
/i/	166	5.72	3.09	1	11
/ɪ/	92	3.17	2.85	0	10
/eɪ/	10	.34	.721	0	3
/ɛ/	7	.24	.511	0	2
/æ/	109	3.76	3.27	0	15
Central					
/ə/	36	1.24	.132	0	5
/ʌ/	57	1.97	1.84	0	7
/ɚ/	8	.28	.528	0	2
/ɝ/	35	1.21	1.11	0	4
Back					
/u/	24	.83	.759	0	3
/ʊ/	5	.17	.384	0	1
/oʊ/	19	.66	.769	0	2
/ɔɪ/	0	.00	.000	0	0
/ɔ/	12	.41	.628	0	2
/ɑɪ/	5	.17	.384	0	1
/ɑʊ/	2	.07	.258	0	1
/ɑ/	40	1.38	1.474	0	5

Source: Elaborated by authors.

The following are some examples of mispronounced words including NAE vowels. As customary, the symbol ~ indicates an alternation: /i/→[ɪ] in feel; /ɪ/→[i] in English, is; /æ/→[a] in bad; /ʌ/→[u] in frustrating; [ə]→[e] ~ [eɪ]) in foreign; /ɝ/→[er] in first; /ɑ/→ [a] in start. These findings lend support to those reported in Pizarro and Cordero (2015) who, unlike the researchers in the present study, relied solely only on student, instructor, and researcher perceptions to identify troublesome segments.

Though explaining the reasons behind the identified (greater) difficulties with vowels falls outside the scope of this study, two observations are worth making. First is the relatively limited time dedicated to the study of NAE vowels in the BA in English and the BA in English Teaching in the context of this investigation. To illustrate, the study program of the BA in English at the Foreign Language Department at UCV comprises 140 credits spread across 42 courses that students take over the cour-

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

se of four years. Six of these 42 courses (26 credits) are oral communication courses taken by both English and English Teaching majors. Table 6 summarizes the distribution of articulatory phonetics topics across said courses.

Table 6.

Articulatory Phonetics Topics in Oral Communication Courses

Year	Course	Pronunciation Contents
2	LE1230	The International Phonetic Alphabet, Vowels (classification, reduction), Basic word stress rules (e.g., pronunciation of noun-verb homographs like record)
2	LE1240	Consonants, Pronunciation of {-ed}[a], Pronunciation of {-s}
3	LE1351	Consonants, Consonant substitutions, Advanced word stress rules (e.g., pronunciation of words ending in {-esque})
3	LE1361	Consonant-related rules (e.g., lengthening, aspiration, flapping), Pro-nunciation of consonant clusters. Stress, rhythm, and intonation
4	LE1471	Intonation
4	LE1481	Consonant clusters, Intonation

Note. [a] Third person singular of the simple present, plural morpheme, and possessive marker.

Source: Elaborated by authors.

As shown in Table 6, by the time students take LE1361 (third year, second semester), they have—in theory—already studied all the vowel and consonant phonemes of NAE. They have also reviewed [4]the morphonological rules underlying the pronunciation of {-ed} and {-s}. Nevertheless, Table 6 also shows that only one course (LE1230) focuses on vowels, and no vowel is prioritized (i.e., all the NAE are expected to be studied in the course). Furthermore, in LE1230 only one (out of three weekly sessions) is allotted to the study of vowels, and no time is invested in the study of CRS vowels. This leaves learners with a rather limited number of opportunities to hear the target vowels, learn to perceive them, and practice them in both controlled and spontaneous tasks—let alone compare them to the vowels in their L1 and transfer knowledge about NAE vowels from classroom to everyday settings. Indeed, this has significant practical implications if we consider the *transfer appropriate processing* principle, which posits that "we can better remember what we have learned if the cognitive processes that are active during learning are similar to those that are active during retrieval" (Lightbown, 2008, p. 27). Simply put, if such conditions have not been met in the context of this investigation, the aforementioned results should not be surprising.

A second observation refers to the comparatively simple vowel system of CRS. While CRS has five vowel phonemes, NAE English has at least nine (Quesada, 1996, 2010). Moreover, the Spanish vowels are different from the English ones (Hualde, 2014). Put differently, the students from the BA in English

[4] These contents are studied in first year courses, LE1001 and LE1002, Integrated English I and II, correspondingly.

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

and the BA in English Teaching have limited time to learn a set of vowels that differ—several of them rather considerably—from those in their native language. This may prove problematic because a paramount condition for L2 learning is exposure (also referred to as input[5]). As Leow (2015) rightly asserts:

> Are we aware that when we attend to some information in the L2 input we raise our perception, which may then lead to some of the information being taken into our short-term or working memory, which may then lead to potential internalization of such information, ultimately leading to learning and remembering? (p. 23)

Hence, a reflection worth making is the extent to which the conditions above are met in the context of this investigation (or in any other context with L2 learning goals for that matter).

Consonant Errors

Regarding problems with consonant production (RQ2), Table 7 presents the descriptive statistics of the errors made when pronouncing the NAE consonants.

Table 7.

Consonant Pronunciation Errors

	Sum	*M*	*SD*	Min.	Max.
Bilabials					
/p/	2	.07	.258	0	1
/b/	1	.03	.186	0	1
Labiodentals					
/f/	2	.07	.258	0	1
/v/	15	.52	.785	0	3
Interdentals					
/θ/	27	.93	1.13	0	5
/ð/	77	2.66	2.10	0	9
Alveolar					
/s/	58	2.00	2.12	0	9
/z/	88	3.03	2.12	0	8
/t/	22	.76	1.09	0	4
/d/	23	.79	1.14	0	4
Alveopalatals					
/ʃ/	11	.38	.862	0	11
/ʒ/	19	.66	.857	0	19
/tʃ/	19	.66	.936	0	19
/dʒ/	15	.52	.738	0	15
Velars					
/k/	3	.10	.310	0	3
/g/	0	.00	.000	0	0

[5] Input is understood as "language that is available to the learner through any medium" (Gass & Mackey, 2006, p. 5).

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

Approximants					
/l/	4	.14	.351	0	4
/ɹ/	4	.14	.351	0	4
/j/	20	.69	1.039	0	20
/w/	3	.10	.409	0	3
Nasals					
/m/	8	.28	.649	0	8
/n/	8	.28	.455	0	8
/ŋ/	6	.21	.412	0	6
Glottals					
/h/	4	.03	.186	0	1

Source: Elaborated by authors.

As can be noticed, learners made very few errors pronouncing bilabials, velars, nasals, and glottals. However, errors were particularly prevalent in three areas. First, the participants made a considerable number of errors when attempting to pronounce the alveolar fricatives /z/ (*n* = 88) and /s/ (n = 58)[6] as well as the voiced interdental fricative /ð/ (*n* = 77). Second, although less widespread, the participants also made several errors pronouncing the voiced alveopalatal fricative /ʒ/ (*n* = 19), the voiceless affricate /tʃ/ (*n* = 19), and the palatal approximant /j/ (*n* = 20). Third, with a slightly smaller number of errors, the voiced labiodental /v/ (*n* = 15) also proved to be troublesome for participants. The following are examples of mispronounced words involving NAE consonants: /z/→[s] in easy, because; /Ø/→[e] in speak; /ð/→[d] in another, there; /ʒ/→[ʃ] in pleasure; /tʃ/→[ʃ] in change, beach; /tʃ/→[t] in natural; /j/→[dʒ] in young, you; /v/→[b] in very, invited. Interestingly, a closer look at the data reveals that overall consonant pronunciation errors included substitutions, omissions, and epenthesis, the last one when pronouncing initial s-clusters.

As was the case with vowels, this study's findings are in line with those of Pizarro and Cordero (2015), except for the case of /ɹ/ and /ŋ/, for which a total of only four and six errors correspondingly were registered in this investigation. The findings also highlight the prevalence of consonant pronunciation errors despite years of formal instruction. As can be seen in Table 6, by the time of their participation in this research, the participants had studied the English consonants in at least two previous courses, which suggests that the input provided so far may not have been sufficient to consolidate such knowledge—and that of vowels as well. Additionally, it may be worth bringing instructors' teaching and/or feedback practices into question, namely, whether or not learners are given the chance to notice the input and to process it (for more on the importance of noticing and the conscious attention to input, see Gass & Mackey, 2006; also, for a description of the Noticing Hypothesis, see Schmidt, 2001).

[6] Errors made while pronouncing initial s-clusters were coded as /s/ pronunciation errors. Errors related to the pronunciation of {-s} were not codes as /s/ pronunciation errors but as errors pronouncing the morpheme.

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

Interestingly, previous studies have explained their findings in light of interference- and fossilization-based claims—both defined respectively as a "the effect of one language on the learning of another" (Richards & Schmidt, 2013, p. 322) and a process "in which incorrect linguistic features become a permanent part of the way a person speaks" (Richards & Schmidt, 2013, p. 230). For example, Pizarro and Cordero (2015), when attempting to explain segmental pronunciation errors, instructors and students themselves often referred to L1 interference due to the inexistence of the target sound in the L1 and/or the transfer of a similar sound from the L1 to the target language. Applied to the present study, interference-related explanations for the consonant pronunciation errors registered in our findings might be stronger for the observed difficulties with /ʒ/ and /v/, but they might not hold as well for other phenomena. To illustrate, /s/ is a phoneme in CRS and occurs in all positions. Moreover, the phoneme is realized as /s/—not aspirated [h]—in the areas where most participants are likely to be from (i.e., the Central Valley and its areas of dialectal influence) (Quesada, 2010). Even so, many errors related to the omission of /s/ word-finally.

Another argument against an interference-based explanation being applied to our findings is the case of /tʃ/, which, like in English, is a phoneme in CRS, occurring in onset and medial position. Despite this, the phoneme proved to be relatively problematic for participants, who often pronounced it as /ʃ/. It is a must to acknowledge, though, that the realization of /tʃ/ as /ʃ/ has been recorded among speakers of CRS, principally among those from the northwest area and the Pacific coast, and the phenomenon has even been described as an unfolding phonological change (Quesada, 2010). Therefore, more research is needed to rule out—or ratify—an interference-based explanation for /tʃ/ → /ʃ/ in the participants' speech.

Finally, [ð], [z], and even [θ] occur as allophones of /d/ and /s/ in CRS. More concretely, an approximant version of the interdental fricative [ð] is the most frequent realization of the CRS /d/, occurring everywhere except after pause, /l/, and /n/ (Hualde, 2014; Quesada, 2010). In Spanish, /s/ is realized as [z] after voiced consonants (e.g., mismo), and even realizations of /s/ as [θ] have been registered along the Costa Rican Pacific coast (Quesada, 2010). Thus, it could be misleading to say that EFL learners cannot pronounce these sounds because they do not exist in CRS, as at least /d/ → [ð] and /s/ → [z] are widespread in this Spanish dialect. It might be argued, though, that the exclusively allophonic status of [ð] and [z] in CRS makes them less salient and thus more difficult for learners to pronounce them when speaking English. This hypothesis, however, needs to be further explored.

Grammatical Morpheme Errors

Related to the pronunciation errors associated with the morphemes {-ed} and {-s} (RQ3) and the nature of such errors (RQ4), Table 8 provides the descriptive statistics of the errors themselves as well as their nature.

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

Table 8.

Pronunciation Errors in Grammatical Morphemes

	Sum	*M*	*SD*	Min.	Max.
{-ed} (past tense or regular verbs)	32	1.10	1.11	0	4
Omission	30	1.03	1.08	0	4
Mispronunciation	2	.07	.258	0	1
{-s} (possessive)	18	.62	.820	0	2
Omission	2	.07	.258	0	1
Mispronunciation	16	.55	.783	0	2
{-s} (3rd person singular)	16	.55	.948	0	4
Omission	2	.07	.258	0	1
Mispronunciation	14	.48	.829	0	3
{-s} (plural)	88	3.03	2.21	0	8
Omission	4	.14	.351	0	1
Mispronunciation	84	2.90	2.20	0	8

Source: Elaborated by authors.

As shown in Table 8, omission was the predominant error made when pronouncing {-ed} (n = 30 out of 32). These deletions affected most severely the [d] and [t] realizations of {-ed}. The following are examples of mispronounced words including the grammatical morphemes at stake: /d/→[Ø] in continued; /əd/→[Ø] in started; /t/→[Ø]: asked. These findings, along with those of Charpentier (2020), who worked with a very similar sample of students from UCV, evidence that the students from the BA in English and the BA in English Teaching continue to experience important challenges associated with the pronunciation of {-ed}, especially when the morpheme is pronounced as [d] or [t], even after they have received overt instruction on the topic. It should be mentioned, though, that at least when it comes to oral communication courses and using course syllabi as the only source of information, the amount of explicit instruction on the topic is limited to one or a couple sessions from one course: LE1240, Oral Communication II.

Regarding {-s} and as specified in Table 8, the bulk of pronunciation errors were substitutions of the right allomorph for another, and these replacements affected the plural marker most. The following are some examples: /z/→[s] in Martha's, mentions, sounds; /z/→[Ø] in days, Martha's; /s/→[Ø] in takes. Though the morphophonological rules underlying the pronunciation of {-s} are the same regardless of its semantic value (i.e., plural, third person singular, or possessive), the stark difference between the number of errors associated with the pluralizer and the other two morphemes (88 versus 18 and 16) might trick readers into thinking that there might be something that makes accurate pronunciation of the plural marker harder. This is certainly a noteworthy observation that should be

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

explored in upcoming studies. Nevertheless, an alternative account for the greater number of errors associated with the pluralizer is simply the greater number of pluralized words in the corpus. Put differently, given the nature of the tasks completed for the study (see Appendix A), participants might have been just more likely to use plural nouns than possessive forms or conjugations of the third person singular in present tenses (see Caines & Buttery, 2018 for an explanation of *opportunity of use*).

Equally important is to highlight that the participants also made from many to several errors when pronouncing *non-morphemic* /t, d, z, s/, and interestingly, the bulks of these errors occurred when the non-morphemic consonants were at the end of words. It is thus not farfetched to suggest that the participants' struggle with {-s} and {-ed} might not be exclusive to the pronunciation of the morphemes but hold for any word-final /t, d, z, s/. In other words, the issue might not be grammatical but exclusively phonetic in nature.

CONCLUSIONS AND PEDAGOGICAL IMPLICATIONS

Contributing to PI instruction/learning, main results evidenced that errors affecting vowels can outnumber those affecting consonants and can go from several to many depending on the segment at stake. This is not to say that consonants and the morphemes {-ed} and {-s} are not without their problems. As mentioned above, the participants' speech exhibited noticeable deviations in the pronunciation of /s, z, ð, ʒ, tʃ, j/, the [d,t] realizations of {-ed}, and the [z] realization of {-s}. Possible explanations included the stark differences between the phonological systems of CRS and NAE and the potential interference of the former in the production of L2 speech, insufficient input and explicit instruction, and ineffective feedback-associated practices. Against this background, the following are several practical implications for stakeholders under similar conditions.

First is the recommendation to dedicate some time to study the CRS phonological system in the first oral courses of the undergraduate programs at stake. Though this used to be done when the majors started, the practice was abandoned when contrastive analysis fell in disuse. Even a brief, contrastive overview of the phonological system of CRS should enhance learners' understanding of the similarities and differences between the L1 and the target sounds, thus eventually reducing the number of interference-related issues.

The second implication concerns the need to invest more time in the study of vowels and the morphophonological rules underlying the pronunciation of {-ed} and {-s}. In this sense, stakeholders should prioritize those vowels and morphophonemic realizations that research has identified as most troublesome, i.e., /i, æ, ɪ, ʌ, ə, ɝ, ɑ/), [t, d], and [z]. To make room for more extensive study and practice of these contents, vowels and phonetic realizations that seem to offer little difficulty could be either studied later in the study program or removed from the list of contents altogether.

A third implication relates to consonants and focuses on the need to prioritize the study of those consonants that cause learners the most trouble. These are /s, z, ð, ʒ, tʃ, j/ and initial s-clusters. Cu-

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

rrently, all consonants are studied in the oral courses in the context of this investigation. As was the case with vowels, to make room for more extensive study and practice of these segments, non-troublesome consonants could be studied in the last oral courses or not studied altogether.

A fourth and last implication for the different stakeholders is an invitation to reflect on the effectiveness of instructional and feedback-related practices. Given the significant amount of time invested in the study of consonants in the BAs in English and English Teaching, one would expect third-year students to have a better command of this aspect of pronunciation, especially when similar phones exist in CRS. As evidenced by this and previous studies, this does not seem to be the case. It is then worth asking whether the resources, activities, and techniques used to teach these segments and provide feedback on their production are the most effective. Stakeholders, especially pronunciation instructors, interested in a refresher on pronunciation instruction and oral feedback techniques are referred to Levis (2018), Derwing and Munro (2015) as well as Li (2018) and Lyster et al. (2013), respectively.

Limitations and Suggestions for Future Research

The novelty of this study lies in its use of corpus-based data to examine more than a handful of pronunciation issues in a context that had been overlooked to this day. Nevertheless, no study is without limitations. Specifically, for the present study it was impossible to triangulate perspectives by integrating native speakers of NAE as well as native speakers of other L1s into the research team. Doing so would further enrich information about the pronunciation differences that are perceived as errors and their prevalence in the participants' speech. Future studies could thus integrate native and other non-native raters in their research teams and explore topics as the correlation between time invested studying CRS and NAE vowels and the incidence of vowel pronunciation errors. Still another topic to investigate would be the correlation between the degree of similarity/differences among phonological/phonetic vowel systems and accuracy at vowel production. Investigations of this type would not only help fill the gap in the literature about segmental pronunciation errors among CRS L1 learners but also inform curricular decisions. FuWrthermore, although testing whether the nature of errors is grammatical or phonetic was beyond the scope of this investigation, a ripe area for future research is comparing and contrasting the number and characteristics of pronunciation errors involving morphemic and non-morphemic /t, d, z, s/. Doing so could certainly contribute to corroborating or rejecting that some errors may be purely phonetic in nature as posited in this study. There is also an undeniable need to more thoroughly investigate the recurrent interference-based explanations for learners' difficulties with NAE consonants. Studies on such topic should take note of the characteristics of the Costa Rican dialect of Spanish and not rely solely on participant accounts of their trouble with consonant pronunciation. Among possible topics for future investigation is the contribution of phonological status (allophone or phoneme) to students' ease or difficulty to pronounce a target consonant accurately. In addition, this study raises several questions. Among them are whether the

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

plural marker is more difficult to pronounce for CRS L1 English learners even though the rules for pronouncing this morpheme are the same as those for pronouncing the possessive marker and the third person singular marker in present tenses. Another research avenue is if the errors associated with the pronunciation of the [t,d] and [z,s] realizations of {-ed} and {-s} are exclusive phonological in nature. Lastly, it is also worth exploring if the fact that [t,d,z,s] carry grammatical information makes them more difficult to pronounce.

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APPENDICES.

Appendix A.

The following are the instructions to carry out three diagnostic tasks, which are meant to give you feedback from the start of the semester. Please, read them carefully. The tasks are meant to be

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

completed asynchronously during the first week of classes. You may record them gradually over the week and at your own pace—as long as you complete them all. Visit https://flip . . . to start working.

TASK 1. ORAL READING. Record yourself reading the following passage.

Learning to speak a foreign language fluently and without an accent isn't easy. In most educational systems, students spend many years studying grammatical rules, but they don't get much of a chance to speak. Arriving in a new country can be a frustrating experience. Although they may be able to read and write very well, they often find that they can't understand what people say to them. English is especially difficult because the pronunciation of words is not clearly shown by how they're written. But the major problem is being able to listen, think, and respond in another language at a natural speed. This takes time and practice.

TASK 2. ORAL READING. Record yourself reading the following conversation.

A: Hi Bob. Gee, I haven't seen you in a while. How are you doing?

B: Not so good. Unfortunately, I've had a bad cold for the last three or four days, and I feel a little tired. How about you? What have you been up to recently?

A: Well, I just came back from a weekend at the shore. Do you know Liz? She invited me out to her family's place on Martha's Vineyard.

B: Is her house on the beach or in town?

A: It's a few minutes away from a big beach on the south coast. We usually walked out in the morning, brought sandwiches and soft drinks with us, and stayed all day.

B: I've heard enough! Would you take me along some time?

A: With pleasure.

TASK 3. SHORT IMPROMPTU SPEECH.

Give a short two-minute impromptu speech about one of these prompts: An embarrassing or humorous situation that you had with the English language or culture; your first day at this university; your problems speaking English; areas I am interested in; my journey as an English learner.

The tasks were adapted from Dauer (1993).

Appendix B.

Name of the Student:	UCV ID:
Native Language:	Date:

Instructions: Write an (X) inside the parentheses preceding the phonological process observed in your student's speech. Focus on those processes that affect your ability to understand what the speaker says (intelligibility), make understanding difficult effortful (comprehensibility), and/or distract you from the idea the speaker is trying to convey.

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

VOWELS

Vowel	Processes in Each Possible Position		
	Initial Position	Medial Position	Final Position
Front			
( ) /i/[7] → [ ]			
( ) /ɪ/ → [ ]			
( ) /eɪ/ → [ ]			
() /ɛ/ → [ ]			
( ) /æ/ → [ ]			
Central			
( ) /ə/ → [ ]			
( ) /ʌ/ → [ ]			
( ) /ɚ/ → [ ]			
( ) /ɝ/ → [ ]			
Back			
( ) /u/ → [ ]			
( ) /ʊ/ → [ ]			
( ) /oʊ/ → [ ]			
( ) /ɔɪ/ → [ ]			
( ) /ɔ/ → [ ]			
( ) /ɑɪ/ → [ ]			
( ) /ɑʊ/ → [ ]			
( ) /ɑ/ → [ ]			
Other			
( ) / / → [ ]			

[7] Vowels shaded in gray are tense.

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

CONSONANTS[8]

Consonant	Processes in Each Possible Position		
	Initial Position	Medial Position	Final Position
Bilabials			
( ) /p/ → [ ]			
( ) /b/ → [ ]			
Labiodentals			
( ) /f/ → [ ]			
( ) /v/ → [ ]			
Interdentals			
( ) /θ/ → [ ]			
( ) /ð/ → [ ]			
Alveolars			
( ) /s/ → [ ]			
( ) /z/ → [ ]			
( ) /t/ → [ ]			
( ) /d/ → [ ]			
Alveopalatals			
( ) /ʃ/ → [ ]			
( ) /ʒ/ → [ ]			
( ) /tʃ/ → [ ]			
( ) /dʒ/ → [ ]			
Approximants			
( ) /l/ → [ ]			
( ) /r/ → [ ]			
( ) /j/ → [ ]			
( ) /w/ → [ ]			

[8] Shaded rows include voiced plosives that have a voiceless counterpart. Since all nasals and approximants are voiced in English, they are not shaded. /h/ is neither voiced nor voiceless given its point of articulation. Sounds do not occur in positions shaded in black.

Revista Educación, 2025, 49(2), julio-diciembre ISSN: 0379-7082 / e-ISSN 2215-2644

Velars
( ) /k/ → [ ]
( ) /g/ → [ ]

Nasals
( ) /m/ → [ ]
( ) /n/ → [ ]
( ) /ŋ/ → [ ]

Glottals
( ) /h/ → [ ]

Others
( ) /ø/[9] → [ ][10]

GRAMMATICAL MORPHEMES

Morpheme	Process (i.e., deletion or mispronunciation)
{-ed} (Past tense or regular verbs)	( ) / / → [ ]:
{-s} (3rd person singular of simple present)	( ) / / → [ ]:
{-s} (Plural)	( ) / / → [ ]:
{-s} (Possessive)	( ) / / → [ ]

[9] /ø/ stands for phonetic zero, i.e., no sound.
[10] Use this cell for epenthetic sounds, e.g., /ø/ → [e] / school. Add rows with this symbol if different epentheses are found.