



PHONETIC AND PHONOLOGICAL CONTRAST: DIGRAPHS CH, LL, SH, RR IN ENGLISH, SPANISH, AND KICHLWA

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ABSTRACT

This research examined the phonetic and phonological contrast of the digraphs ch, ll, sh, and rr in English, Spanish, and Kichwa among Kichwa-speaking students at Yachay Tech University. A qualitative methodology was employed, applying document analysis, participant observation, and interviews as data collection methods. Based on the population size, a census sample equivalent to the total population was used, consisting of seventeen Indigenous students from Yachay Tech. Once the data had been collected, an in-depth phonetic and phonological analysis of Kichwa words and phrases was conducted. The results revealed that the Kichwa language contained more allophones of both vowel and consonant sounds compared to English and Spanish. Furthermore, through the phonetic and phonological distribution of the digraphs ch, ll, sh, and rr in Spanish, English, and Kichwa, two types of distribution were identified: total and partial. Total occurred when a phoneme or allophone appeared in initial, medial, and final positions; partial occurred when a phoneme or allophone did not appear in all positions. Finally, through the analysis of contrastive transfer between the languages, English and Spanish, English and Kichwa, and Spanish and Kichwa, two types of transfer were identified: positive and zero. Positive transfer occurred when the sound of a phoneme or an allophone was very similar in both languages, while zero transfer occurred when specific sounds were present in only one language and absent in the others.

Keywords: kichwa, phonetics, phonology

RESUMEN

Esta investigación examinó el contraste fonético y fonológico de los dígrafos ch, ll, sh, y rr en inglés, español y kichwa entre estudiantes kichwahablantes de la Universidad Yachay Tech. Se empleó una metodología cualitativa, aplicando análisis documental, observación participante y entrevistas como métodos de recolección de datos. Con base en el tamaño de la población, se utilizó una muestra censal equivalente a la totalidad de los participantes, conformada por diecisiete estudiantes indígenas de Yachay Tech. Una vez recolectados los datos, se llevó a cabo un análisis fonético y fonológico detallado de palabras y frases en kichwa. Los resultados revelaron que el idioma kichwa presentó un mayor número de alófonos tanto de sonidos vocálicos como consonánticos en comparación con el inglés y el español. Asimismo, a través de la distribución fonética y fonológica de los dígrafos ch, ll, sh, y rr en español, inglés y kichwa, se identificaron dos tipos de distribución: total y parcial. La total se presentó cuando un fonema o alófono apareció en posición inicial, medial y final; la parcial se presentó cuando un fonema o alófono no apareció en todas las posiciones. Finalmente, mediante el análisis del trasvase contrastivo entre los idiomas inglés y español, inglés y kichwa, y español y Kichwa, se identificaron dos tipos de transferencia: positiva y nula. La transferencia positiva se presentó cuando el sonido de un fonema o un alófono fue muy similar en ambos idiomas, mientras que la transferencia nula se presentó cuando determinados sonidos existieron únicamente en una lengua y estuvieron ausentes en las otras.

Palabras clave: fonética, fonología, kichwa

INTRODUCTION

Studying a language is, without a doubt, a linguistic matter. It requires prior knowledge of a language, such as one's mother tongue, and mastery of linguistic branches in order to establish effective communication in a foreign language, such as English, or an ancestral language, such as Kichwa. Currently, the loss of the Kichwa language in Indigenous communities of the Ecuadorian highlands and Amazon has a negative impact on intercultural communication and cultural identity.

Previous studies have shown that there is limited research concerning the phonetics and phonology of Kichwa. For instance, Romero and Camacho (2017) analyzed phonological interference from Kichwa and Spanish to English, finding that students transferred native sounds into English. Mejía (2024) compared English and Spanish phonology, providing a basis for contrastive studies involving Kichwa. Narváez (2020) focused on the sociolinguistic vitality of Kichwa Karanki, showing the cultural and educational factors leading to language loss. Puma (2022) and Yungán (2018) examined the influence of Kichwa on Andean Spanish, highlighting phenomena of prolonged linguistic contact and transfer. These studies provide valuable insights, yet they do not directly address the phonetic and phonological contrast of specific digraphs in Kichwa. This research therefore fills a significant gap in the state of the art.

This research represents a social and academic contribution to the study of the ancestral Kichwa language. From a social perspective, it strengthens understanding and interaction in multilingual and intercultural contexts of the Andean region, specifically in Imbabura. From an academic perspective, it enriches the field of contrastive linguistics and second language acquisition by identifying potential phonetic interferences and articulatory variations. Furthermore, the findings can contribute to the design of inclusive teaching strategies and educational policies that respect linguistic diversity.

The main objective of this study was to develop a matrix of phonetic and phonological contrast for the digraphs ch, ll, sh, and rr in English, Spanish, and Kichwa. The specific objectives were:

1. To analyze the phonetic and phonological distribution of the digraphs in the three languages.
2. To identify the allophones of each digraph in English, Spanish, and Kichwa.
3. To examine the presence of positive and zero transfer across the three languages.

THEORETICAL FRAMEWORK

This research is supported by several linguistic concepts:

Phonology studies how sounds function and are organized within a language system. It seeks to explain how speakers differentiate sounds to form meaningful words.

Phonetics analyzes speech sounds from a physical and articulatory perspective, focusing on their production, transmission, and perception.

Phoneme refers to the smallest unit of sound in a language that can distinguish meaning between words.

Allophone is a variant of a phoneme whose different realizations do not change meaning.

Contrastive Linguistics compares two or more languages to identify similarities and differences, aiming to understand linguistic structures and predict potential areas of interference in second language acquisition.

By integrating these concepts, the study situates itself within phonetics, phonology, and contrastive linguistics, while emphasizing their application to the analysis of Kichwa, English, and Spanish.

METHODOLOGY

This research was grounded in the epistemological paradigm of **constructivism**, which understands knowledge as an active, dynamic, and contextual construction by the subject. From this

perspective, the researcher acted as an active agent who built knowledge through interaction with social, cultural, and linguistic contexts, as well as with the participants.

The study followed a qualitative approach, aimed at gaining an in-depth understanding of the phonetic and phonological contrast of the digraphs *ch*, *ll*, *sh*, and *rr* in Kichwa, Spanish, and English. This approach was selected because it prioritizes meaning-making, interpretation, and context over quantification.

Participants

The study involved a census sample consisting of all 17 Indigenous students from Yachay Tech University whose mother tongue is Kichwa.

- **Inclusion criteria:** students who self-identified as native Kichwa speakers, enrolled in undergraduate programs, and who gave informed consent to participate.
- **Exclusion criteria:** students with documented hearing or speech disorders, or who did not consent to participate.

A basic sociolinguistic profile of the participants included age range (18–24 years), gender (10 women and 7 men), level of education (undergraduate students), and cultural context (bilingual Kichwa-Spanish communities from the Imbabura region).

Data Collection

The data collection process lasted three months and employed several qualitative techniques:

1. **Documentary analysis:** review of relevant linguistic and pedagogical materials.
2. **Semi-structured interviews:** designed to capture participants' perceptions and experiences.
3. **Participant observation:** conducted during classroom and extracurricular activities to identify real use of Kichwa, Spanish, and English.

Each technique was supported by instruments (document review guides, interview protocols, and observation checklists).

Validation of Instruments

The instruments were validated through expert judgment. Three linguists (specialists in English, Spanish, and Kichwa) reviewed the tools to ensure content validity, coherence with research objectives, and methodological rigor. A pilot test with two Kichwa-speaking students (not included in the main sample) also allowed refinement of interview questions and observation guidelines.

Data Analysis

The analysis followed a contrastive linguistic approach, focusing on phonetic and phonological transcription, categorization of allophones, and identification of patterns of transfer. A process of coding and categorization was applied to the data, integrating information from interviews, observations, and documents. This was followed by a reflective interpretation aligned with the constructivist paradigm, emphasizing subjectivity, context, and the situated nature of knowledge.

RESULTS

The results were presented through tables showing the contrastive transfer analysis, as well as tables indicating the phonetic and phonological distribution of the digraphs *ch*, *ll*, *sh*, and *rr* in the English, Spanish, and Kichwa languages.

Table 1
Allophones of the grapheme "ch"

Grapheme "ch"	Kichwa word	Meaning	Phoneme position	Allophone position
Phoneme /tʃ/	chilina	naranja	/tʃilina/	
Allophone (Variant 1) [tʃ]	achachay	jqué frío!		[atʃa'tʃay]
Allophone (Variant 2) [ts]	achira	achera		[a'tsira]
Allophone (Variant 3) [s]	chawar	penco, cabuya		[sawar]
Allophone (Variant 4) [λ]	puncha	día		[punλa]
Allophone (Variant 5) [z]	chunchulli	intestino		[tʃunžuži]

Table 2
Phonetic and phonological distribution of /tʃ/

English		Spanish		Kichwa						
Position	/tʃ/ [tʃ]	Position	/tʃ/ [tʃ]	Position	/tʃ/ [tʃ]	[ts]	[s]	[λ]	[z]	
Initial	✓	Initial	✓	Initial	✓	✓	✓	✓	✓	
Middle	✓	Middle	✓	Middle	✓	✓	✓	✓	✓	
Final	✓	Final	x	Final	x	x	x	x	x	

From Table 2, it is established that in the English language, the phonological distribution of the grapheme "ch" is complete, as the phoneme /tʃ/ occurs in initial, medial, and final positions. The phonetic distribution of the grapheme "ch" is also complete, since the allophone [tʃ] appears in the initial, medial, and final positions.

On the other hand, in the Spanish language, the phonological distribution of the grapheme "ch" is partial, as the phoneme /tʃ/ occurs only in initial and medial positions. The phonetic distribution of the grapheme "ch" is also partial, since the allophone [tʃ] is produced only in initial and medial positions.

Finally, in the Kichwa language, the phonological distribution of the grapheme "ch" is partial, because the phoneme /tʃ/ occurs only in the initial and medial positions. The phonetic distribution of the grapheme "ch" is also partial, as the allophones [tʃ], [ts], [s], [λ], and [z] occur only in the initial and medial positions.

Table 3
Contrastive transfer analysis of /tʃ/ in English and Spanish

English	Analysis	Spanish
/tʃ/	+	/tʃ/
[tʃ]	+	[tʃ]

Table 3 showed that the phonological transfer of /tʃ/ in the grapheme 'ch' was positive, as its articulation was similar in both English and Spanish. Therefore, in both languages, the grapheme "ch" is apico-alveolar, laminofronto-palatal, voiceless, oral, and affricate.

Table 4
Contrastive transfer analysis of /tʃ/ in English and Kichwa

English	Analysis	Kichwa
/tʃ/	+	/tʃ/
[tʃ]	+	[tʃ]
x	Ø	[ts]
x	Ø	[s]
x	Ø	[λ]
x	Ø	[z]

From Table 4, it can be inferred that the phonological transfer /tʃ/ of the grapheme "ch" is positive, since the sound of the grapheme "ch" is similar in both languages, English and Kichwa. Therefore, in both languages, the grapheme "ch" is apico-alveolar laminofronto-palatal, voiceless, oral, and affricate.

The phonetic transfer [tʃ] of the grapheme "ch" is positive and zero. Positive, since the allophone [tʃ] of the grapheme "ch" is similar in both languages, English and Kichwa. Zero, since the allophones [ts], [s], [λ], and [z] of the grapheme "ch" do not occur in English; they only occur in Kichwa.

Table 5
Contrastive transfer analysis of /tʃ/ in Spanish and Kichwa

Spanish	Analysis	Kichwa
/tʃ/	+	/tʃ/
[tʃ]	+	[tʃ]
x	Ø	[ts]
x	Ø	[s]
x	Ø	[λ]
x	Ø	[z]

Table 5 establishes that the phonological transfer of /tʃ/ from the grapheme "ch" is positive, since the sound of the grapheme "ch" is similar in both languages, Spanish and Kichwa. Therefore, in both languages, the grapheme "ch" is apico-alveolar, laminofronto-palatal, voiceless, oral, and affricate.

The phonetic transfer [tʃ] of the grapheme "ch" is positive and zero. Positive, since the allophone [tʃ] of the grapheme "ch" is similar in both languages, Spanish and Kichwa. Zero, since the allophones [ts], [s], [λ], and [z] of the grapheme "ch" do not occur in Spanish; they only occur in Kichwa.

Table 6
Allophones of the grapheme "ll"

Grapheme "ll"	Kichwa word	Meaning	Phoneme position	Allophone position
Phoneme /λ/	llama	oveja	/λama/	
Allophone (Variant 1) [λ]	llakta	Pueblo, ciudad		[λakta]
Allophone (Variant 2) [l]	alli	bien		[ali]
Allophone (Variant 3) [tʃ]	allku	perro		[atʃku]
Allophone (Variant 4) [ʃ]	kullki	dinero		[kuʃki]
Allophone (Variant 5) [r]	killpana	cubrir		[kirpana]
Allophone (Variant 6) [z]	llullana	mentir		[žužana]

As can be seen in Table 6, the Kichwa language grapheme "ll", whose phoneme is represented by the symbol /λ/, has six allophones: [λ], [l], [tʃ], [ʃ] [r], and [z̥]. Therefore, the Kichwa lexemes that etymologically, geographically, and historically occur in the forms [λ], [l], [tʃ], [ʃ] [r], and [z̥] will be written with the grapheme "ll".

Table 7
Phonetic and phonological distribution of /λ/

English		Spanish						Kichwa								
Position	/λ/	[λ]	Position	/λ/	[λ]	[ʃ]	[z̥]	[y]	Position	/λ/	[λ]	[l]	[tʃ]	[ʃ]	[r]	[z̥]
Initial	x	x	Initial	✓	✓	✓	✓	✓	Initial	✓	✓	✓	✓	x	✓	
Middle	x	x	Middle	✓	✓	✓	✓	✓	Middle	✓	✓	✓	✓	✓	✓	
Final	x	x	Final	x	x	x	x	x	Final	x	x	x	x	x	x	

Table 7 establishes that, in the English language, the phoneme /λ/ does not exist. This phoneme only occurs in Spanish and Kichwa.

On the other hand, in Spanish, the phonological distribution of the grapheme "ll" is partial, since the phoneme /λ/ occurs only in initial and medial position. The phonetic distribution of the grapheme "ll" is also partial, since the allophones [λ], [ʃ], [z̥], and [y] only occur in initial and medial position.

Finally, in the Kichwa language, the phonological distribution of the grapheme "ll" is partial, since the phoneme /λ/ occurs only in initial and medial position. The phonetic distribution of the grapheme "λ" is also partial, since the allophones [λ], [l], [tʃ], [ʃ], [r], [z̥] only occur in initial and medial position, while the allophone [r] only occurs in medial position.

Table 8
Contrastive transfer analysis of /λ/ in Spanish and Kichwa

Spanish	Analysis	Kichwa
/λ/	+	/λ/
[λ]	+	[λ]
x	Ø	[l]
x	Ø	[tʃ]
[ʃ]	+	[ʃ]
x	Ø	[r]
[z̥]	+	[z̥]
[y]	Ø	x

From Table 8, it is established that the phonological transfer /λ/ of the grapheme "ll" is positive, since the sound of the grapheme "ll" is similar in both languages, Spanish and Kichwa. Therefore, in both languages, the grapheme "ll" is fronto-palatal, voiced, oral, and lateral.

The phonetic transfer [λ] of the grapheme "ll" is positive and zero. Positive, since the allophone [λ] of the grapheme "ll" is similar in both languages, Spanish and Kichwa. Zero, since the allophone [y] is only produced in Spanish. The allophones [l], [tʃ], [r] of the grapheme "ll" are not produced in Spanish; they are only produced in Kichwa.

Table 9
Allophones of the grapheme "sh"

Grapheme "sh"	Kichwa word	Meaning	Phoneme position	Allophone position
Phoneme /ʃ/	shunku	corazón	/ʃ/	/ʃ/
Allophone (Variant 1) [ʃ]	shuk	uno		[ʃ]
Allophone (Variant 2) [s]	shina	así		[s]
Allophone (Variant 3) [tʃ]	chinallatak	igualmente		[tʃ]
Allophone (Variant 4) [z]	mashna	Cuánto, cuántos		[z]

As can be seen in Table 9, the Kichwa language grapheme "sh", whose phoneme is represented by the symbol /ʃ/, has four allophones: [ʃ], [s], [tʃ], and [z]. Therefore, the Kichwa lexemes that etymologically, geographically, and historically occur in the forms [ʃ], [s], [tʃ], and [z] will be written with the grapheme "sh".

Table 10
Phonetic and phonological distribution of /ʃ/

English	Spanish		Kichwa								
Position	/ʃ/	[ʃ]	Position	/ʃ/	[ʃ]	Position	/ʃ/	[ʃ]	[tʃ]	[s]	[z]
Initial	✓	✓	Initial	x	x	Initial	✓	✓	✓	✓	x
Middle	✓	✓	Middle	x	x	Middle	✓	✓	✓	✓	✓
Final	✓	✓	Final	x	x	Final	✓	✓	x	x	x

From Table 10, it is established that in the English language, the phonological distribution of the grapheme "sh" is complete, since the phoneme /ʃ/ occurs in initial, medial, and final positions. The phonetic distribution of the grapheme "sh" is also completely complementary, since the allophone [ʃ], which is frontopalatal, oral, and fricative, occurs in initial, medial, and final positions.

On the other hand, in the Spanish language, the grapheme "sh" does not exist; it only exists in English and Kichwa.

Finally, in the Kichwa language, the phonological distribution of the grapheme "sh" is complete, since the phoneme /ʃ/ occurs in initial, medial, and final positions. The phonetic distribution of the grapheme "sh" is partially complementary, since the allophones [tʃ] and [s] occur only in initial and medial positions. It is complementary, since the allophone [z] occurs only in medial position.

Table 11
Contrastive transfer analysis of /ʃ/ in English and Kichwa

English	Analysis	Kichwa
/ʃ/	+	/ʃ/
[ʃ]	+	[ʃ]
x	Ø	[tʃ]
x	Ø	[s]
x	Ø	[z]

From Table 11, it is established that the phonological transfer /ʃ/ of the grapheme "sh" is positive since the sound of the grapheme "sh" is similar in both languages, English and Kichwa. Therefore, in both languages, the grapheme "sh" is fronto-palatal, voiceless, oral, and fricative.

The phonetic transfer [ʃ] of the grapheme "sh" is positive and zero. Positive, since the allophone [ʃ] of the grapheme "sh" is similar in both languages, English and Kichwa. Zero, since the allophones [tʃ], [s], and [z] of the grapheme "sh" do not occur in English; they only occur in Kichwa.

Table 12

Phonetic and phonological distribution of /r/

English			Spanish			Kichwa		
Position	/ ŋ /	[ŋ]	Position	/ ŋ /	[ŋ]	Position	/ ŋ /	[ŋ]
Initial	x	x	Initial	x	✓	Initial	x	✓
Middle	x	x	Middle	✓	✓	Middle	x	✓
Final	x	x	Final	x	✓	Final	x	x

Table 12 showed that / ŋ / doesn't exist in initial position in any languages, and the allophone [ŋ] just exists in Spanish and Kichwa. That's why, it is not possible to do the complete contrastive transfer analysis.

RESULT DISCUSSION

The findings of this research revealed that Kichwa presents a wider variety of allophones for the digraphs ch, ll, sh, and rr than English and Spanish. This result aligns with previous studies that demonstrated phonological interference between Kichwa and Spanish in second language learning (Romero & Camacho, 2017). However, while Romero and Camacho focused on bilingual learners' pronunciation in English, the present study examined the structural distribution of digraphs in Kichwa itself, thus extending the scope of analysis.

The results also confirmed that transfer phenomena occurred across all three languages. Positive transfer was observed when similar sounds appeared in both languages, while zero transfer emerged when sounds were exclusive to Kichwa. This distinction echoes the pedagogical concerns raised by Mejía (2024), who emphasized the importance of contrastive phonology for second language teaching.

Sociolinguistic studies such as Naváez (2020) and Puma (2022) also support the interpretation that language contact between Kichwa and Spanish is not limited to lexical borrowings but extends to phonological and morphosyntactic levels. The current findings reinforce this argument by showing how Kichwa digraphs influence learners' articulation patterns in multilingual settings.

Finally, this study provides evidence that phonetic and phonological variation in Kichwa is not merely a linguistic matter but also reflects historical and sociocultural dynamics. This is consistent with Yungán (2018), who highlighted how bilingualism in Pilahuín produced hybrid linguistic forms. In sum, the findings illustrate that phonetic transfer is both a linguistic and a sociocultural phenomenon, deeply tied to identity and educational context.

CONCLUSIONS

This research established that:

1. Phonetic and phonological distributions of digraphs ch, ll, sh, and rr were either total (occurring in initial, medial, and final positions) or partial (restricted to some positions).
2. Allophonic variety was greater in Kichwa than in Spanish and English. For instance, /tʃ/ had five allophones in Kichwa, compared to one in English and one in Spanish.
3. Transfer phenomena were classified as positive or zero. Positive transfer occurred when sounds were similar across languages, while zero transfer appeared when certain sounds were absent in one of the compared languages.
4. The research contributed to the documentation and systematization of Kichwa phonology, filling an important gap in contrastive linguistics and providing a basis for educational applications.

Limitations

The study was limited to a relatively small sample (17 students) from a single university, which restricts the generalizability of results.

The analysis focused only on four digraphs (ch, ll, sh, and rr), leaving aside other relevant phonological features of Kichwa.

The qualitative design, while rich in interpretation, did not include acoustic phonetic measurements, which could provide additional precision.

Future Research

Future studies should:

- Expand the sample to include participants from different Kichwa-speaking regions in Ecuador.
- Incorporate acoustic analysis tools (e.g., Praat) to complement phonetic transcription with instrumental data.
- Examine additional phonological phenomena, such as vowel variation or suprasegmental features.
- Explore the pedagogical implications of phonetic transfer in the teaching of English and Spanish as second languages for Kichwa speakers.
- Address the sociolinguistic dimension more deeply, linking phonological findings with identity, language policy, and revitalization efforts.

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