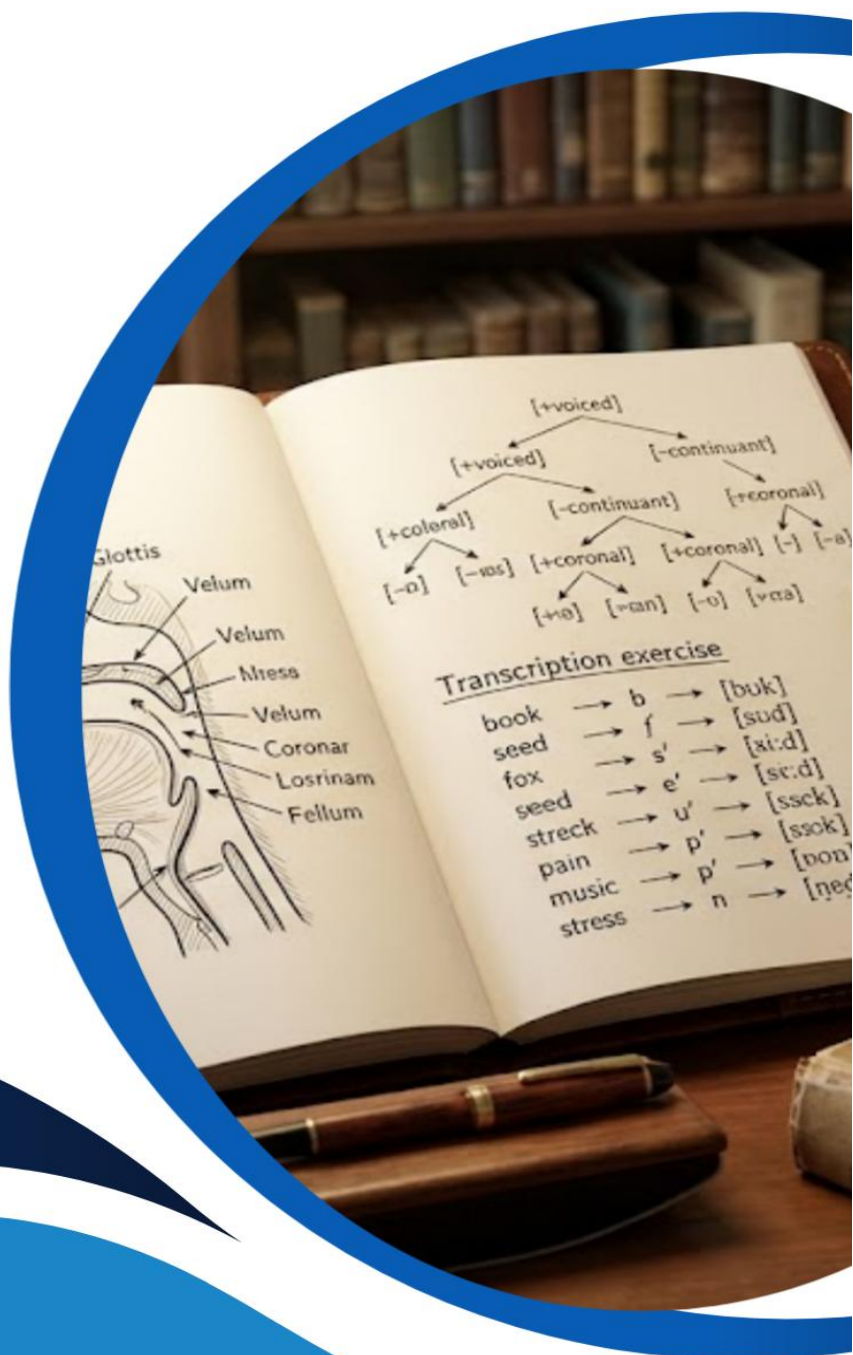


ENG203

INTRODUCTION TO GENERAL PHONETICS AND PHONOLOGY I



Course code: ENG203

Course title: Introduction to General Phonetics and Phonology I

Course credit load: 2 Units

Series 1 Principles of Phonetics and Phonology

Series 2 Description and Taxonomy of Phonological Systems

Series 3 Practical Phonological Exercises across Languages

Series 4 Phonology in English Language Teaching

Series 5 Laboratory Applications of Phonology

Proposed Outline for Series 1

Part 1 Foundations of Phonetics and Phonology

- 1.1.1 Definition of phonetics and phonology
- 1.1.2 Scope and relevance in language study
- 1.1.3 Distinction between phonetics and phonology

Part 2 Basic Elements of Phonetics

- 1.2.1 Speech organs and their functions
- 1.2.2 Classification of speech sounds
- 1.2.3 Phonetic transcription and symbols

Part 3 Basic Elements of Phonology

- 1.3.1 Phonemes and allophones
- 1.3.2 Phonological rules and processes
- 1.3.3 Syllable structure and stress patterns

Part 4 Applications of Phonetics and Phonology

- 1.4.1 Role in language description and analysis
- 1.4.2 Use in teaching Nigerian languages
- 1.4.3 Practical exercises for learners

Introduction

Human speech is one of the most remarkable features that distinguishes us as social beings. Every spoken word is shaped by physical processes in the body and organised by rules that govern how



sounds function within languages. This Series introduces you to the principles of phonetics and phonology, which form the foundation for analysing and teaching languages. By engaging with these principles, you will begin to appreciate how sounds are produced, classified, and patterned, and why these processes are essential for language study and teaching.

The aim of this Series is to equip you with a clear understanding of the basic principles of phonetics and phonology, and to enable you to apply these principles in describing, analysing, and teaching languages, particularly Nigerian languages.

We shall commence this Series by examining the foundations of phonetics and phonology, focusing on their definitions, scope, and distinctions. Next, we will explore the basic elements of phonetics, including the organs of speech, classification of sounds, and phonetic transcription. Following that, we will move on to the basic elements of phonology, where we will study phonemes, phonological rules, and syllable structures. Finally, we will wrap up by considering the applications of phonetics and phonology in language description, analysis, and teaching, supported by practical exercises.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 1.1** define phonetics and phonology, and explain their scope and distinction,
- **SLO 1.2** describe the organs of speech and demonstrate how they contribute to sound production,
- **SLO 1.3** classify speech sounds using phonetic categories and apply phonetic transcription symbols accurately,
- **SLO 1.4** identify phonemes and allophones, and analyse basic phonological rules and processes,
- **SLO 1.5** evaluate syllable structures and stress patterns within different languages, and
- **SLO 1.6** apply principles of phonetics and phonology to language description, analysis, and teaching, with particular reference to Nigerian languages.

1.1 Foundations of Phonetics and Phonology

1.1.1 Definition of phonetics and phonology

Phonetics is the scientific study of human speech sounds, focusing on how they are physically produced, transmitted, and perceived. It deals with the mechanics of sound production and the acoustic properties of speech. **Phonology**, on the other hand, is the study of how sounds function within a particular language or across languages. It examines the rules and patterns that govern sound combinations and distributions.

Phonetics is concerned with the physical reality of sounds, while phonology is concerned with their abstract organisation in the mind. For example, the sounds [p] and [b] are physically different in terms of voicing, but phonology explains how they function as distinct phonemes in English.



Fill in the blank: Phonetics studies the physical production of sounds, while _____ studies their organisation in language.

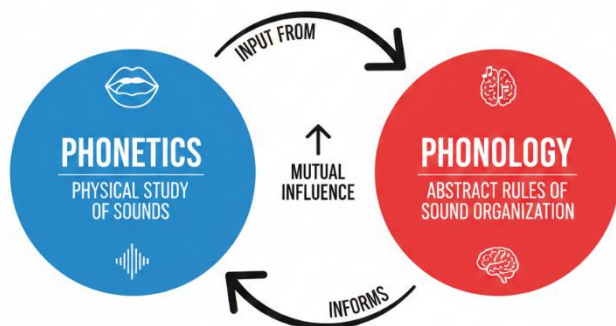


DIAGRAM: PHONETICS vs. PHONOLOGY
SOURCE: OER (Open Educational Resource)

Figure 1.1 Relationship between phonetics and phonology

1.1.2 Scope and relevance in language study

The scope of phonetics includes articulatory phonetics (how sounds are made with the speech organs), acoustic phonetics (the physical properties of sound waves), and auditory phonetics (how sounds are perceived by the ear and brain). The scope of phonology includes phonemes, syllable structures, stress, intonation, and rules governing sound patterns.

The relevance of phonetics and phonology lies in their application to language teaching, linguistic analysis, and communication studies. For instance, teachers of Nigerian languages need phonological principles to explain why certain sounds occur in specific contexts.

Fill in the blank: The three main branches of phonetics are articulatory, acoustic, and _____ phonetics.

Field	Core Scope & Focus Areas
Phonetics	The Physical Nature of Speech Sounds



Field	Core Scope & Focus Areas
	* Articulatory: How sounds are physically produced by the vocal tract (lips, tongue, larynx). * Acoustic: The physical properties of sound waves (frequency, amplitude, duration). * Auditory: How sound waves are perceived and processed by the ear and brain.
Phonology	The Mental Organization of Speech Sounds * Phonemes: The smallest units of sound that distinguish meaning (mental representations). * Syllables: The structural organization of sounds into rhythmic units. * Stress & Intonation: Patterns of emphasis and pitch across words and sentences.



Field	Core Scope & Focus Areas
	* Rules: The patterns and constraints that govern how sounds can be combined.

Box 1.1 Scope of phonetics and phonology

1.1.3 Distinction between phonetics and phonology

The distinction between phonetics and phonology is crucial. Phonetics provides the descriptive tools to analyse speech sounds, while phonology explains how these sounds are organised and function within a language system. Phonetics is universal, as all humans share the same physical capacity for producing sounds, whereas phonology is language-specific, since each language has its own rules and sound patterns.

For example, the sound [ŋ] (as in “sing”) exists in English but not in many Nigerian languages. Phonetics can describe the sound, but phonology explains why it is absent in certain languages.

Fill in the blank: Phonetics is universal, while phonology is _____ to each language.



ASPECT	PHONETICS	PHONOLOGY
FOCUS	Physical production and perception of sounds	Organisation and rules of sounds in language
SCOPE	Universal	Language-specific
EXAMPLE	[p] vs [b] voicing	Rules for syllable structure in Yoruba

TABLE: PHONETICS vs. PHONOLOGY
SOURCE: OER (Open Educational Resource)

Table 1.1 Distinction between phonetics and phonology

Pilot questions 1.1

1. Which branch of phonetics studies how sounds are physically produced by the speech organs?
2. What is the main difference between phonetics and phonology?
3. Give one example of a sound that phonetics can describe but phonology explains its distribution.
4. Which aspect of phonology deals with stress and intonation?
5. Fill in the blank: Phonetics is concerned with _____, while phonology is concerned with rules and patterns.

1.2 Basic Elements of Phonetics

1.2.1 Speech organs and their functions

Speech organs are the anatomical structures involved in producing speech sounds. They include the lungs, vocal cords, tongue, lips, teeth, and palate. These organs work together to generate airflow, vibration, and articulation, which result in the sounds used in language. For example, the tongue shapes vowels and consonants by altering its position, while the vocal cords control voicing.



Fill in the blank: The _____ are responsible for controlling voicing in speech production.

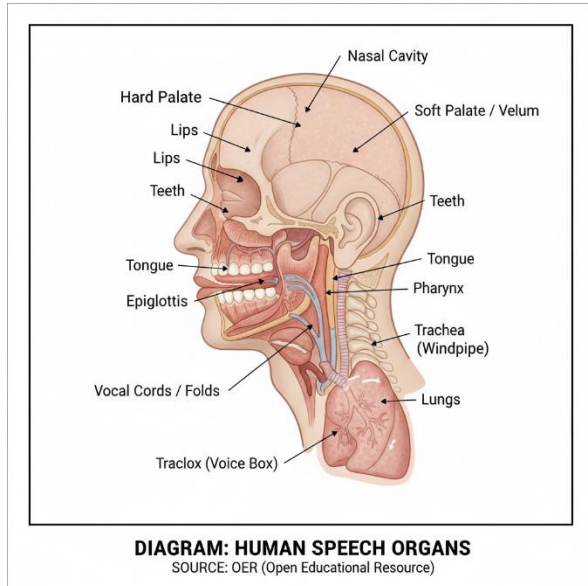


Figure 1.2 Major speech organs involved in sound production

1.2.2 Classification of speech sounds

Speech sounds are divided into **vowels** and **consonants**. **Vowels** are produced with an open vocal tract, allowing free airflow, while **consonants** are produced with some degree of obstruction in the vocal tract. Consonants are classified by their **place of articulation** (where the obstruction occurs, e.g., bilabial, dental, alveolar) and **manner of articulation** (how the obstruction occurs, e.g., plosive, fricative, nasal).

Vowels are classified by tongue height (high, mid, low), tongue position (front, central, back), and lip rounding. For example, the vowel [i] in “see” is a high front unrounded vowel.

Fill in the blank: Consonants are classified by place of articulation and _____ of articulation.



CATEGORY	EXAMPLES	FEATURES
VOWELS	[i], a [u]	Tongue height, position, lip rounding
	Universal	Place and manner of articulation, voicing
CONSONANTS	[p], t, [k]	

TABLE: CLASSIFICATION OF SPEECH SOUNDS
SOURCE: OER (Open Educational Resource)

Caption: Table 1.2 Classification of speech sounds

1.2.3 Phonetic transcription and symbols

Phonetic transcription is the representation of speech sounds using special symbols, most commonly from the **International Phonetic Alphabet (IPA)**. The IPA provides a standardised system for representing sounds across languages, ensuring accuracy in linguistic description. For example, the English word “cat” can be transcribed as [kæt], showing the precise sounds used.

Phonetic transcription is essential for language teaching and analysis, as it avoids confusion caused by spelling differences. Learners of Nigerian languages, for instance, can benefit from IPA transcription to capture sounds not represented in English orthography.

Fill in the blank: The International _____ Alphabet provides a standardised system for representing speech sounds.



	monophthongs				diphthongs			Phonetic symbol
	i:	ɪ	ʊ	u:	ɪə	eɪ		
	sheep	ship	good	shoot	here	wait		
	e	ə	ɜ:	ɔ:	ʊə	ɔɪ	əʊ	
VOWELS	bed	leather	bird	door	journal	boy	show	
	æ	ʌ	ɑ:	ɒ	eə	aɪ	aʊ	Phonetic symbol
	cat	up	far	on	hair	my	now	
	p	b	t	d	tʃ	dʒ	k	
CONSONANTS	pat	boat	tea	dog	church	jeans	car	
	f	v	θ	ð	s	z	ʃ	Phonetic symbol
	fly	video	think	this	see	zoo	shall	
	m	n	ŋ	h	l	r	w	
	man	now	ang	hat	love	red	well	

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Plate 1.1 International Phonetic Alphabet chart

Pilot questions 1.2

1. Which speech organ is primarily responsible for shaping vowels and consonants?
2. What is the main difference between vowels and consonants?
3. Give one example of a high front vowel.
4. What system is used to represent speech sounds across languages?
5. Fill in the blank: Vowels are classified by tongue height, tongue position, and _____.

1.3 Basic Elements of Phonology

1.3.1 Phonemes and allophones

A **phoneme** is the smallest unit of sound in a language that can distinguish meaning between words. For example, the difference between [p] in “pat” and [b] in “bat” changes the meaning of the word, showing that [p] and [b] are distinct phonemes in English. An **allophone** is a variation of a phoneme that does not change meaning. For instance, the [p] sound in “pin” (aspirated) and “spin” (unaspirated) are allophones of the same phoneme /p/.

Phonemes are abstract mental categories, while allophones are their physical realisations. This distinction is crucial for analysing sound systems in languages.

Fill in the blank: A phoneme is the smallest unit of sound that can _____ meaning in a language.



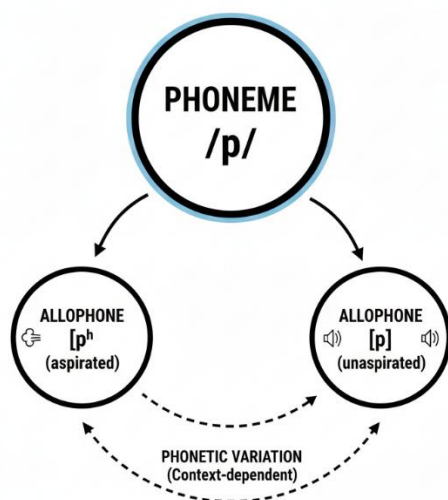


Figure 1.3 Phoneme and Allophone Relationship

SOURCE: OER (Open Educational Resource)

Figure 1.3 Phoneme and allophone relationship

1.3.2 Phonological rules and processes

Phonological rules are systematic patterns that describe how sounds interact in a language. They explain why certain sounds change depending on their environment. For example, in English, the plural morpheme “-s” is pronounced as [s] after voiceless consonants (cats), [z] after voiced consonants (dogs), and [ɪz] after sibilants (horses).

Phonological processes include assimilation (a sound becomes similar to a neighbouring sound), deletion (a sound is omitted), insertion (a sound is added), and metathesis (sounds switch places). These processes occur naturally in spoken language and help maintain ease of articulation.

Fill in the blank: When a sound becomes similar to a neighbouring sound, the process is called _____.

Process	Definition	Example
Assimilation	A sound becomes more similar to a neighboring sound.	<i>Handbag</i> pronounced as [ˈhæmbæg] (the [n] becomes [m] to match the labial [b]).
Deletion	A sound (segment) is omitted during speech, often for ease of articulation.	<i>Friendship</i> pronounced as [ˈfɹɛnʃɪp] (the [d] is dropped).



Process	Definition	Example
Insertion	A sound is added between two other sounds to make them easier to pronounce.	<i>Hamster</i> pronounced as ['hæmpstə] (a [p] is inserted between [m] and [s]).
Metathesis	The order of two neighboring sounds is reversed.	<i>Ask</i> pronounced as [æks] or the historical change from <i>brid</i> to <i>bird</i> .

Box 1.2 Common phonological processes

1.3.3 Syllable structure and stress patterns

A **syllable** is a unit of organisation for speech sounds, typically consisting of a vowel (nucleus) and optional consonants before (onset) or after (coda). For example, the word “cat” has the syllable structure CVC (consonant-vowel-consonant).

Stress patterns refer to the emphasis placed on certain syllables within words. Stress can change meaning, as in the English words “record” (noun: REcord) and “record” (verb: reCORD). Stress also plays a role in rhythm and intonation in speech.

Fill in the blank: The central part of a syllable, usually a vowel, is called the _____.

Word	Structure	Explanation
cat	CVC	Consonant-Vowel-Consonant: A closed syllable ending in a consonant.
go	CV	Consonant-Vowel: An open syllable ending in a vowel.
ask	VCC	Vowel-Consonant-Consonant: A syllable starting with a vowel followed by a consonant cluster.
play	CCV	Consonant-Consonant-Vowel: A syllable starting with a consonant cluster.
strengths	CCCVCCCC	Complex Cluster: Demonstrates the maximum complexity found in English syllables.

Table 1.3 Examples of syllable structures

Pilot questions 1.3

1. What is the difference between a phoneme and an allophone?
2. Give an example of a phonological rule in English.



3. Which phonological process involves omitting a sound?
4. What is the syllable structure of the word “go”?
5. Fill in the blank: Stress patterns can change the _____ of a word.

1.4 Applications of Phonetics and Phonology

1.4.1 Role in language description and analysis

Language description involves documenting the sounds and structures of a language, while **language analysis** refers to examining how these sounds interact and form patterns. Phonetics provides the tools to describe the physical properties of sounds, whereas phonology explains how these sounds function within a system. For example, phonetics can describe the nasal sound [ŋ], while phonology explains why it occurs at the end of English words like “sing” but not at the beginning.

These applications are vital for linguists who study Nigerian languages, many of which are under-documented. By applying phonetic and phonological principles, linguists can create accurate records of sound systems, which are essential for preservation and teaching.

Fill in the blank: Phonetics describes the physical properties of sounds, while phonology explains their _____ within a system.

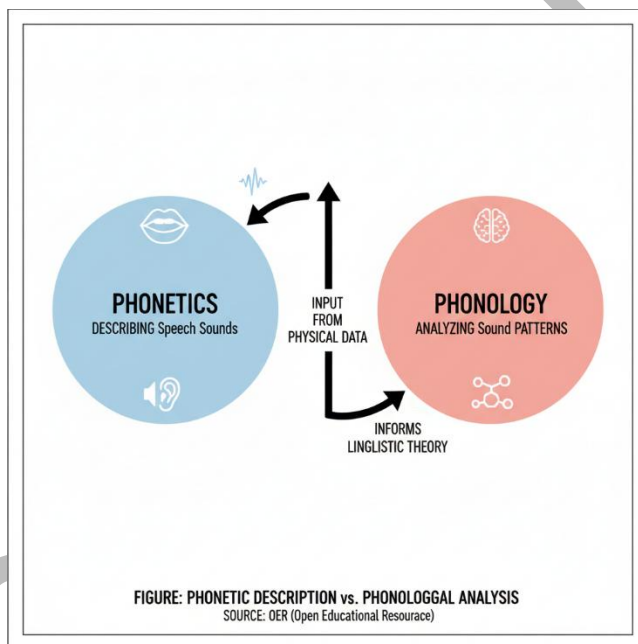


Figure 1.4 Application of phonetics and phonology in language study

1.4.2 Use in teaching Nigerian languages

Phonetics and phonology play a crucial role in teaching Nigerian languages. Many learners struggle with sounds that are not present in English, such as implosives or tonal variations.



Teachers can use phonetic transcription to represent these sounds accurately and phonological rules to explain their distribution.

For instance, Yoruba uses tone to distinguish meaning between words. Phonological analysis helps learners understand why “owo” can mean “money” or “hand” depending on tone. Phonetics provides the tools to describe how these tonal differences are produced.

Fill in the blank: In Yoruba, the word “owo” can mean different things depending on _____.

Application	Description	Benefit for Learners
IPA Transcription	Using the International Phonetic Alphabet to represent unique Nigerian sounds (e.g., implosives like [ɓ] or labial-velars like [kp]).	Provides a standardized way to read and produce sounds not found in English.
Phonological Rules	Explaining tone patterns (High, Low, Mid) and how they change in context (tone sandhi) or during word formation.	Helps learners distinguish between words that look the same but have different meanings based on pitch.
Syllable Analysis	Teaching the predominantly CV (Consonant-Vowel) structure of most Nigerian languages.	Improves rhythmic accuracy and helps students avoid inserting "illegal" consonant clusters.
Practical Exercises	Using minimal pair drills (e.g., <i>bá</i> 'with' vs. <i>bà</i> 'land' in Yoruba) and dictation.	Reinforces the mental connection between physical sound and linguistic meaning.

Box 1.3 Teaching Nigerian languages with phonetics and phonology

1.4.3 Practical exercises for learners

Practical exercises help learners apply theoretical knowledge. These may include transcription tasks, identifying phonemes and allophones, analysing syllable structures, and practising stress patterns. For example, students may be asked to transcribe English words into IPA or compare syllable structures in Hausa and English.

Such exercises reinforce the importance of phonetics and phonology in real-world contexts. They also prepare learners to teach languages effectively, as they gain hands-on experience in analysing and representing sounds.

Fill in the blank: Practical exercises such as transcription tasks help learners apply _____ knowledge in real contexts.



Exercise	Purpose	Example
IPA Transcription	To represent speech sounds accurately and consistently, bypassing the irregularities of spelling.	Transcribe “school” as [sku:l] or “physics” as [ˈfɪzɪks].
Phoneme Identification	To distinguish between sounds that change the meaning of a word (minimal pairs).	Identify the contrast between /p/ and /b/ in “ pat ” and “ bat ”.
Syllable Analysis	To break words into structural units and identify constraints on sound sequences (phonotactics).	Breaking “ computer ” into com.pu.ter (CVC.CV.CV) and comparing it to structures like Hausa's “ naka ” (CV.CV).
Stress Practice	To recognize and produce the correct emphasis, which can change a word's grammatical category.	Contrasting RE-cord (noun) with re-CORD (verb) or PER-mit vs per-MIT .
Articulatory Description	To understand the physical mechanics of how specific sounds are made.	Describing [f] as a voiceless labiodental fricative .

Table 1.4 Examples of practical phonetics and phonology exercises

Pilot questions 1.4

1. What is the difference between language description and language analysis?
2. Give one example of how phonology is applied in teaching Nigerian languages.
3. Which Nigerian language uses tone to distinguish meaning between words?
4. What is the purpose of transcription exercises in phonetics?
5. Fill in the blank: Stress patterns can change the _____ of a word.

Series summary

This Series has introduced you to the principles of phonetics and phonology, laying the foundation for understanding how speech sounds are produced, classified, and organised within languages. Its relevance lies in equipping you with the tools to describe and analyse sound systems, which is essential for linguistic study and for teaching Nigerian languages effectively.

We began by exploring the foundations of phonetics and phonology, clarifying their definitions, scope, and distinctions. Then we examined the basic elements of phonetics, including speech organs, sound classification, and transcription. Following that, we studied the basic elements of



phonology, focusing on phonemes, allophones, rules, and syllable structures. Finally, we considered practical applications in language description, teaching, and exercises. By completing this Series, you should now be able to define and explain key concepts, describe and classify speech sounds, apply transcription symbols, analyse phonological rules and syllable structures, and apply these principles to language teaching, thereby achieving the Series Learning Outcomes (SLOs 2.1–2.6).

Glossary of terms

- **Allophone:** A variation of a phoneme that does not change the meaning of a word, such as the aspirated [p^h] in “pin” and the unaspirated [p] in “spin”.
- **Consonant:** A speech sound produced with some obstruction of airflow in the vocal tract, classified by place and manner of articulation.
- **International Phonetic Alphabet (IPA):** A standardised system of symbols used to represent speech sounds across all languages accurately.
- **Phoneme:** The smallest unit of sound in a language that can distinguish meaning between words, for example /p/ and /b/ in “pat” and “bat”.
- **Phonetics:** The scientific study of human speech sounds, focusing on how they are physically produced, transmitted, and perceived.
- **Phonological process:** A natural change in speech sounds, such as assimilation (sounds becoming similar), deletion (sounds omitted), insertion (sounds added), or metathesis (sounds switching places).
- **Phonological rule:** A systematic pattern that explains how sounds change depending on their environment within a language.
- **Phonology:** The study of how sounds function within a language, focusing on rules and patterns that govern their organisation.
- **Speech organs:** The parts of the human body involved in producing speech sounds, including the lungs, vocal cords, tongue, lips, teeth, and palate.
- **Stress pattern:** The emphasis placed on certain syllables within words, which can change meaning, as in “REcord” (noun) and “reCORD” (verb).
- **Syllable:** A unit of organisation for speech sounds, usually consisting of a vowel (nucleus) and optional consonants before (onset) or after (coda).
- **Vowel:** A speech sound produced with an open vocal tract, classified by tongue height, tongue position, and lip rounding.

Concept check questions [Series 1]

Objective questions

1. Which branch of phonetics studies how sounds are physically produced by the speech organs? (Linked to SLO 2.2)
2. A phoneme is the smallest unit of sound that can _____ meaning in a language. (Linked to SLO 2.4)
3. Which of the following is a high front vowel? a) [a] b) [i] c) [u] d) [o] (Linked to SLO 2.3)



4. Stress patterns can change the _____ of a word. (Linked to SLO 2.5)
5. The International _____ Alphabet provides a standardised system for representing speech sounds. (Linked to SLO 2.3)

Short-answer questions

6. Define phonetics and phonology, and explain one key difference between them. (Linked to SLO 2.1)
7. Give one example of a phonological rule in English. (Linked to SLO 2.4)
8. Describe the role of speech organs in producing consonant sounds. (Linked to SLO 2.2)
9. State the syllable structure of the word “cat” and explain briefly. (Linked to SLO 2.5)
10. Identify one way phonetics and phonology can be applied in teaching Nigerian languages. (Linked to SLO 2.6)

Long-answer questions

11. Analyse the distinction between phonemes and allophones, providing examples from English or Nigerian languages. (Linked to SLO 2.4)
12. Evaluate the importance of phonetic transcription in language teaching, particularly in Nigerian contexts. (Linked to SLO 2.3, SLO 2.6)
13. Discuss how phonological processes such as assimilation and deletion contribute to ease of articulation in spoken language. (Linked to SLO 2.4)

Answers to Concept Check Questions [Series 1]

Objective questions

1. Articulatory phonetics.
2. Distinguish.
3. [i].
4. Meaning.
5. Phonetic.

Short-answer questions

6. Phonetics is the study of the physical production and perception of sounds, while phonology studies how sounds are organised and function in a language. The key difference is that phonetics is universal, whereas phonology is language-specific.
7. The plural morpheme “-s” in English is pronounced differently depending on the preceding sound: [s], [z], or [ɪz].
8. Speech organs such as the tongue, lips, and teeth create obstructions in the vocal tract to produce consonant sounds.
9. “Cat” has a CVC structure: consonant-vowel-consonant.
10. Teachers can use IPA transcription to represent sounds accurately and explain tonal rules in Nigerian languages.



Long-answer questions

11. **Basic response:** Phonemes are abstract units that distinguish meaning, while allophones are variations of phonemes that do not change meaning. For example, /p/ in “pat” and “spin” has aspirated and unaspirated allophones. **Value-added response:** In Hausa, the phoneme /k/ may have different realisations depending on context, showing how allophonic variation is language-specific. This highlights the importance of distinguishing phonemes from their allophones in linguistic analysis.
12. **Basic response:** Phonetic transcription ensures accurate representation of sounds, avoiding confusion caused by spelling. It is particularly useful in teaching Nigerian languages where sounds may not be represented in English orthography. **Value-added response:** Beyond teaching, phonetic transcription supports language documentation and preservation. For under-documented Nigerian languages, IPA transcription provides a reliable record of sound systems, aiding research and revitalisation efforts.
13. **Basic response:** Assimilation makes sounds more similar to neighbouring sounds, while deletion removes sounds for easier pronunciation. These processes help maintain fluency in speech. **Value-added response:** In Yoruba, assimilation occurs when tones influence neighbouring syllables, while in English, deletion is common in rapid speech (e.g., “friendship” pronounced as [frenʃɪp]). These examples show how phonological processes adapt language to natural human articulation.

Answers to Pilot Questions [Series 1]

Part 1 Foundations of Phonetics and Phonology

1. Articulatory phonetics
2. Phonology
3. The sound [ŋ] in “sing”
4. Suprasegmental phonology
5. Physical sounds

Part 2 Basic Elements of Phonetics

1. Tongue
2. Vowels are produced with an open vocal tract, consonants with obstruction
3. [i]
4. International Phonetic Alphabet (IPA)
5. Lip rounding

Part 3 Basic Elements of Phonology

1. A phoneme distinguishes meaning, an allophone is a variation that does not
2. The plural morpheme “-s” pronounced differently depending on preceding sound
3. Deletion
4. CV



5. Meaning

Part 4 Applications of Phonetics and Phonology

1. Description documents sounds, analysis examines their patterns
2. Explaining tonal rules in Yoruba using phonological principles
3. Yoruba
4. To represent sounds accurately and avoid spelling confusion
5. Meaning

References and Attributions [Series 1]

- International Phonetic Association. (1999). *Handbook of the International Phonetic Association: A guide to the use of the International Phonetic Alphabet*. Cambridge University Press.
- Ladefoged, P., & Johnson, K. (2014). *A course in phonetics* (7th ed.). Cengage Learning.
- Fromkin, V., Rodman, R., & Hyams, N. (2018). *An introduction to language* (11th ed.). Cengage Learning.
- Crystal, D. (2008). *A dictionary of linguistics and phonetics* (6th ed.). Wiley-Blackwell.

Illustrations and OER references

- Figure 1.1 Relationship between phonetics and phonology
 - AI-generated using prompt: “Generate a simple diagram showing phonetics as physical study of sounds and phonology as abstract rules of sound organisation, with arrows linking them.”
 - Suggested OER search string: “phonetics vs phonology diagram OER”.
- Box 1.1 Scope of phonetics and phonology
 - AI-generated using prompt: “Create a text box summarising the scope of phonetics (articulatory, acoustic, auditory) and phonology (phonemes, syllables, stress, rules).”
 - Suggested OER search string: “scope of phonetics and phonology OER summary”.
- Table 1.1 Distinction between phonetics and phonology
 - AI-generated using prompt: “Generate a simple comparative table showing differences between phonetics and phonology in terms of focus, scope, and examples.”
 - Suggested OER search string: “difference between phonetics and phonology table OER”.
- Figure 1.2 Major speech organs involved in sound production



- AI-generated using prompt: “Generate a labelled diagram of human speech organs including lungs, vocal cords, tongue, lips, teeth, and palate.”
- Suggested OER search string: “diagram of human speech organs OER”.
- Table 1.2 Classification of speech sounds
 - AI-generated using prompt: “Create a table showing classification of vowels and consonants with examples and features.”
 - Suggested OER search string: “classification of speech sounds vowels consonants OER”.
- Plate 1.1 International Phonetic Alphabet chart
 - Source: International Phonetic Association (IPA) official chart, available as an open educational resource at <https://www.internationalphoneticassociation.org/content/ipa-chart..>
 - Suggested OER search string: “IPA chart OER phonetic transcription”.
- Figure 1.3 Phoneme and allophone relationship
 - AI-generated using prompt: “Generate a diagram showing phoneme /p/ with two allophones [p^h] (aspirated) and [p] (unaspirated).”
 - Suggested OER search string: “phoneme vs allophone diagram OER”.
- Box 1.2 Common phonological processes
 - AI-generated using prompt: “Create a text box listing common phonological processes with short definitions.”
 - Suggested OER search string: “phonological processes assimilation deletion insertion metathesis OER”.
- Table 1.3 Examples of syllable structures
 - AI-generated using prompt: “Generate a table showing examples of syllable structures with words and explanations.”
 - Suggested OER search string: “syllable structure examples OER”.
- Figure 1.4 Application of phonetics and phonology in language study
 - AI-generated using prompt: “Generate a diagram showing phonetics describing sounds and phonology analysing sound patterns in language.”
 - Suggested OER search string: “phonetics phonology application diagram OER”.
- Box 1.3 Teaching Nigerian languages with phonetics and phonology
 - AI-generated using prompt: “Create a text box summarising applications of phonetics and phonology in teaching Nigerian languages.”



- Suggested OER search string: “phonetics phonology Nigerian languages teaching OER”.
- Table 1.4 Examples of practical phonetics and phonology exercises
 - AI-generated using prompt: “Generate a table showing examples of phonetics and phonology exercises with purpose and examples.”
 - Suggested OER search string: “phonetics phonology exercises IPA syllable stress OER”.

Course code: ENG203

Course title: Introduction to General Phonetics and Phonology I

Course credit load: 2 Units

Series 1 Principles of Phonetics and Phonology

Series 2 Description and Taxonomy of Phonological Systems

Series 3 Practical Phonological Exercises across Languages

Series 4 Phonology in English Language Teaching

Series 5 Laboratory Applications of Phonology

Proposed Outline for Series 2

Part 1 Principles of phonological description

- 2.1.1 Definition and purpose of phonological description
- 2.1.2 Levels of phonological analysis (segmental and suprasegmental)
- 2.1.3 Tools and methods for describing sound systems

Part 2 Taxonomy of phonological units

- 2.2.1 Phonemes and their classification
- 2.2.2 Distinctive features and natural classes
- 2.2.3 Syllables, stress, and intonation

Part 3 Comparative phonological systems

- 2.3.1 Cross-linguistic similarities and differences
- 2.3.2 Phonological typology (tone languages, stress languages, etc.)
- 2.3.3 Case examples from English and Nigerian languages

Part 4 Applications of phonological taxonomy



- 2.4.1 Role in language teaching and learning
- 2.4.2 Use in linguistic research and documentation
- 2.4.3 Practical exercises for learners

Introduction

In the last Series, we explored the foundations of phonetics and phonology, focusing on how speech sounds are produced, classified, and organised. Building on that knowledge, this Series turns to the description and taxonomy of phonological systems. This area is central to understanding how languages structure their sound systems, and it provides learners with the analytical tools needed to compare, classify, and apply phonological principles across different languages, including Nigerian languages.

The aim of this Series is to introduce you to the principles of phonological description and taxonomy, and to equip you with the skills to classify phonological units, compare systems across languages, and apply these insights in teaching and linguistic research.

We shall commence this Series by examining the principles of phonological description, including its definition, purpose, and levels of analysis. Next, we will move on to the taxonomy of phonological units, where we will study phonemes, distinctive features, syllables, and intonation. Following that, we will explore comparative phonological systems, highlighting similarities and differences across languages with examples from English and Nigerian languages. Finally, we will wrap up by considering the applications of phonological taxonomy in teaching, research, and practical exercises, thereby rounding off the Series with hands-on relevance.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 2.1** define phonological description and explain its purpose in language study,
- **SLO 2.2** distinguish between segmental and suprasegmental levels of phonological analysis,
- **SLO 2.3** classify phonemes using distinctive features and organise them into natural classes,
- **SLO 2.4** analyse syllable structures, stress, and intonation patterns within phonological systems,
- **SLO 2.5** compare phonological systems across languages, highlighting similarities and differences,
- **SLO 2.6** evaluate phonological typologies such as tone languages and stress languages,
- **SLO 2.7** apply phonological taxonomy to teaching Nigerian languages and conducting linguistic research, and
- **SLO 2.8** demonstrate practical skills through exercises that involve describing, classifying, and comparing phonological systems.



2.1 Principles of Phonological Description

2.1.1 Definition and purpose of phonological description

Phonological description refers to the systematic account of how sounds are organised and function within a language. It goes beyond identifying individual sounds to explain the rules and patterns that govern their use. The purpose of phonological description is to provide a framework for analysing sound systems, comparing languages, and supporting teaching and research.

Phonological description is essential because it helps linguists and language teachers explain why certain sounds occur in specific contexts and how they contribute to meaning. For example, in English, the difference between [p] and [b] is phonologically significant because it distinguishes words like “pat” and “bat”.

Fill in the blank: Phonological description explains how sounds are _____ and function within a language.

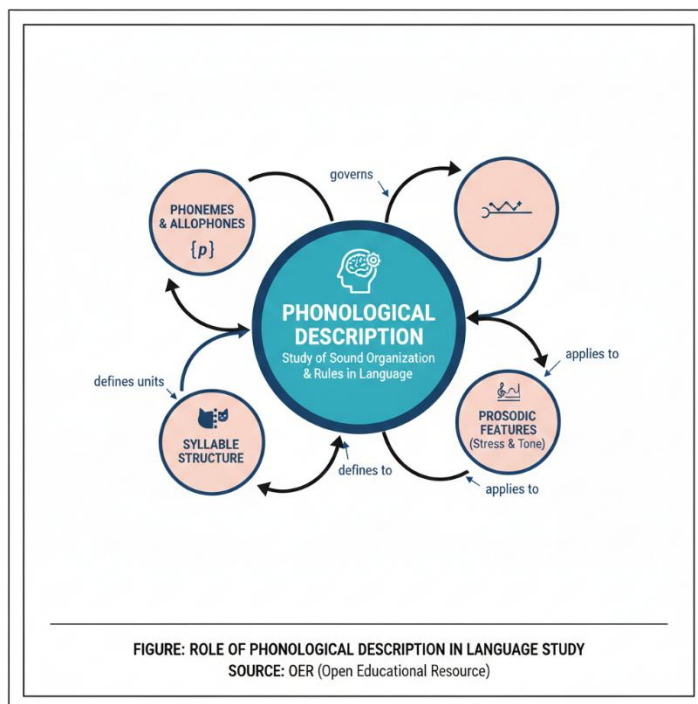


Figure 2.1 Role of phonological description

2.1.2 Levels of phonological analysis (segmental and suprasegmental)

Phonological analysis operates at two main levels. **Segmental analysis** deals with individual sounds such as consonants and vowels, focusing on how they combine to form words. **Suprasegmental analysis** examines features that extend over more than one sound, such as stress, tone, and intonation.



Segmental features are crucial for distinguishing words, while suprasegmental features influence rhythm, emphasis, and meaning. For example, in Yoruba, tone is a suprasegmental feature that changes the meaning of words, while in English, stress can distinguish between “REcord” (noun) and “reCORD” (verb).

Fill in the blank: Stress, tone, and intonation are examples of _____ features in phonological analysis.

Level	Focus	Examples
Segmental	Individual sound units (segments) that can be isolated and identified in a sequence.	Consonants (e.g., [k], [t]) and Vowels (e.g., [i], [u]).
Suprasegmental	Prosodic features that extend over more than one sound segment, such as a syllable or whole word.	Stress (emphasis), Tone (pitch changes), and Intonation (melody of speech).

Table 2.1 Levels of phonological analysis

2.1.3 Tools and methods for describing sound systems

Phonological description relies on several **tools and methods**. These include phonetic transcription using the International Phonetic Alphabet (IPA), identification of phonemes and allophones, analysis of syllable structures, and formulation of phonological rules.

Phonetic transcription provides a precise way to record sounds, while phoneme analysis helps identify meaningful contrasts. Syllable analysis reveals how sounds are organised into larger units, and phonological rules explain sound changes in different contexts. Together, these tools allow linguists to describe and compare sound systems across languages.

Fill in the blank: Phonetic transcription using the _____ provides a precise way to record speech sounds.

Method / Tool	Explanation
Phonetic Transcription (IPA)	The use of the International Phonetic Alphabet to provide an unambiguous, 1-to-1 mapping of speech sounds to symbols, capturing the exact physical production.
Phoneme & Allophone Identification	The process of using minimal pairs to find the distinctive sounds (phonemes) and analyzing phonetic environments to find their variants (allophones).



Method / Tool	Explanation
Syllable Structure Analysis	Breaking down words into their constituent parts— onset, nucleus, and coda —to determine the permitted sound combinations (phonotactics) of a language.
Phonological Rule Formulation	Creating formal statements (e.g., \$A \rightarrow B / C_D\$) to explain how sounds change predictably in specific contexts, such as nasalization or aspiration.

Box 2.1 Tools for phonological description

Pilot questions 2.1

1. What is the main purpose of phonological description?
2. Which level of phonological analysis deals with stress and intonation?
3. Give one example of a suprasegmental feature in Yoruba.
4. Name two tools used in phonological description.
5. Fill in the blank: Segmental analysis focuses on _____ sounds.

2.2 Taxonomy of Phonological Units

2.2.1 Phonemes and their classification

A **phoneme** is the smallest unit of sound in a language that can distinguish meaning. For example, /p/ and /b/ in English differentiate “pat” from “bat”. Phonemes are classified based on features such as voicing, place of articulation, and manner of articulation. This classification helps linguists group sounds into meaningful categories and identify contrasts within a language.

Fill in the blank: A phoneme is the smallest unit of sound that can _____ meaning in a language.

Manner of Articulation	Place of Articulation	Voiceless Example	Voiced Example	Description of Difference
Stop (Plosive)	Bilabial	/p/ (pat)	/b/ (bat)	Air is blocked by lips; /b/ involves vocal fold vibration.
Stop (Plosive)	Alveolar	/t/ (tip)	/d/ (dip)	Tongue touches the ridge behind teeth; /d/ is voiced.



Manner of Articulation	Place of Articulation	Voiceless Example	Voiced Example	Description of Difference
Stop (Plosive)	Velar	/k/ (cap)	/g/ (gap)	Back of tongue touches soft palate; /g/ is voiced.
Fricative	Labiodental	/f/ (fan)	/v/ (van)	Air is forced between teeth and lip; /v/ is voiced.
Fricative	Dental	/θ/ (thigh)	/ð/ (thy)	Tongue is placed between teeth; /ð/ is voiced.
Fricative	Alveolar	/s/ (sip)	/z/ (zip)	Friction created at the alveolar ridge; /z/ is voiced.
Affricate	Post-alveolar	/tʃ/ (choke)	/dʒ/ (joke)	A stop followed immediately by a fricative; /dʒ/ is voiced.
Nasal	Bilabial	—	/m/ (map)	Air passes through the nose; nasals are typically voiced.

Table 2.2 Classification of phonemes

2.2.2 Distinctive features and natural classes

Distinctive features are the basic characteristics used to describe and differentiate phonemes, such as [+voice], [+nasal], or [+high]. These features allow linguists to group sounds into **natural classes**, which are sets of sounds that share common properties and behave similarly in phonological rules.

For example, the sounds /p/, /t/, and /k/ form a natural class of voiceless stops because they share the features [-voice, +stop]. Recognising natural classes is important for explaining phonological processes like assimilation.

Fill in the blank: Sounds that share common properties and behave similarly in phonological rules form _____ classes.



Feature	Natural Class	Phoneme Examples	Phonological Significance
\$[+voice]\$,	Voiced Stops	\$/b/, /d/, /g/\$	These sounds often trigger the voicing of neighboring consonants.
\$[+nasal]\$,	Nasals	\$/m/, /n/, /ŋ/\$	These sounds often cause neighboring vowels to become nasalized.
\$[+high]\$,	High Vowels	\$/i/, /u/\$	In many languages, these vowels trigger the palatalization of preceding consonants.
\$[+labial]\$,	Labials	\$/p/, /b/, /m/, /f/, /v/\$	Sounds produced using the lips; they often act together in phonological rules.

Box 2.2 Examples of distinctive features and natural classes

2.2.3 Syllables, stress, and intonation

A **syllable** is a unit of organisation for sounds, typically consisting of an onset (optional consonant), nucleus (usually a vowel), and coda (optional consonant). For example, “cat” has the structure CVC.

Stress refers to the emphasis placed on certain syllables within words, which can change meaning. In English, “REcord” (noun) and “reCORD” (verb) differ in stress placement. **Intonation** is the variation of pitch across phrases or sentences, which conveys meaning beyond individual words, such as distinguishing a statement from a question.

Fill in the blank: The central part of a syllable, usually a vowel, is called the _____.



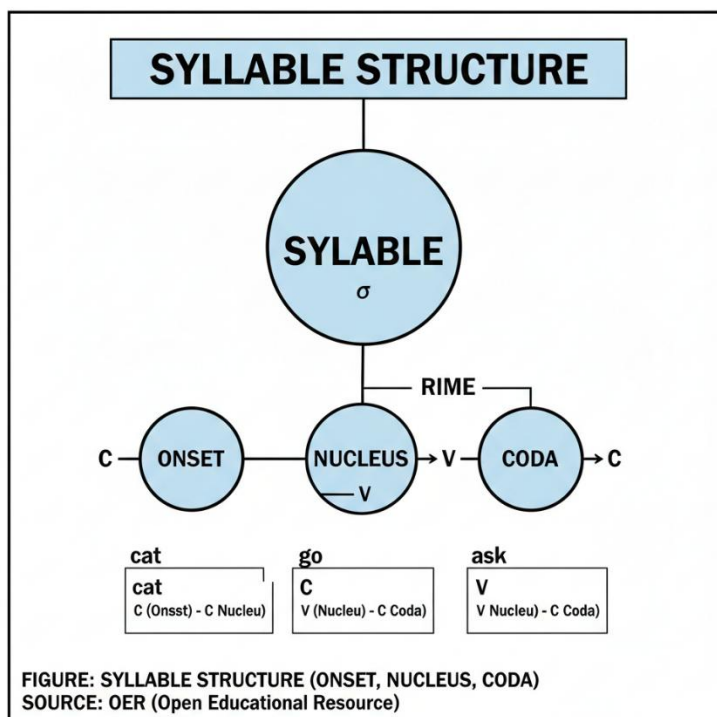


Figure 2.2 Basic syllable structure

Pilot questions 2.2

1. What is the main function of a phoneme in a language?
2. Give one example of a natural class of sounds.
3. Which distinctive feature describes sounds like /m/, /n/, and /ŋ/?
4. What is the syllable structure of the word “cat”?
5. Fill in the blank: Intonation refers to the variation of _____ across phrases or sentences.

2.3 Comparative Phonological Systems

2.3.1 Cross-linguistic similarities and differences

Phonological systems vary across languages, yet they also share certain universal features. For example, most languages distinguish between vowels and consonants, but the number and type of these sounds differ. English has a relatively large vowel inventory, while languages such as Yoruba rely heavily on tone to distinguish meaning. Comparative study allows us to identify both similarities and differences, which is crucial for language teaching and analysis.

Fill in the blank: English relies on a large vowel inventory, while Yoruba relies heavily on _____ to distinguish meaning.



Feature	English	Yoruba	Hausa
Vowel Inventory	Large & Complex Includes many diphthongs and a distinction between "tense" and "lax" vowels.	Moderate Features a system of 7 oral vowels and 5 nasal vowels; utilizes vowel harmony.	Moderate Consists of 5 basic vowels with a distinct contrast between long and short versions.
Tone	Absent (Non-tonal) Uses pitch for intonation (sentences), not for word meaning.	Present (Tonal) Features three distinct level tones: High , Mid , and Low .	Present (Tonal) Features two main tones: High and Low , along with a Falling tone.
Stress	Phonemic (Strong) Stress can change word meaning or category (e.g., <i>PRO-ject</i> vs <i>pro-JECT</i>).	Limited / Absent Rhythm is primarily determined by tone and syllable weight rather than stress.	Present (Dynamic) Stress exists but interacts closely with tone and vowel length/syllable weight.
Syllable Structure	Complex Allows large consonant clusters	Simple Predominantly CV (Consonant-Vowel);	Restricted Primarily CV or CVC ; generally avoids



Feature	English	Yoruba	Hausa
	(e.g., <i>str-</i> in "strength").	does not allow consonant clusters.	complex consonant clusters.

Table 2.3 Cross-linguistic similarities and differences

2.3.2 Phonological typology (tone languages, stress languages, etc.)

Phonological typology refers to the classification of languages based on their phonological features. **Tone languages** use pitch to distinguish meaning, as in Yoruba or Igbo. **Stress languages** rely on emphasis within syllables, as in English or Russian. Some languages, such as Mandarin Chinese, combine tone with other suprasegmental features.

This typological classification helps linguists understand how languages organise their sound systems and provides insights into teaching pronunciation and comprehension.

Fill in the blank: Languages that use pitch to distinguish meaning are called _____ languages.

System Type	Defining Feature	Example Languages
Tone Languages	Pitch height or direction distinguishes the meaning of individual words.	Yoruba, Igbo, Mandarin, Cantonese, Vietnamese
Stress Languages	One syllable in a word is more prominent (louder/longer) than others.	English, Russian, Spanish, German, Italian
Mixed Systems	Features of both tone and stress interact within the word or sentence structure.	Mandarin (has 4 tones + neutral stress), Thai, Swedish (pitch-accent)

Box 2.3 Phonological typology examples

2.3.3 Case examples from English and Nigerian languages

Comparative analysis becomes clearer when we examine specific case examples. In English, stress placement can change meaning, as in “REcord” (noun) versus “reCORD” (verb). In Yoruba, tone distinguishes words such as “owo” (money) and “òwò” (hand). Hausa, meanwhile, uses both tone and syllable structure to differentiate meaning.

These examples show how phonological systems shape communication and highlight the importance of teaching learners to recognise and apply these distinctions.



Fill in the blank: In Yoruba, the word “owo” can mean “money” or “hand” depending on _____.

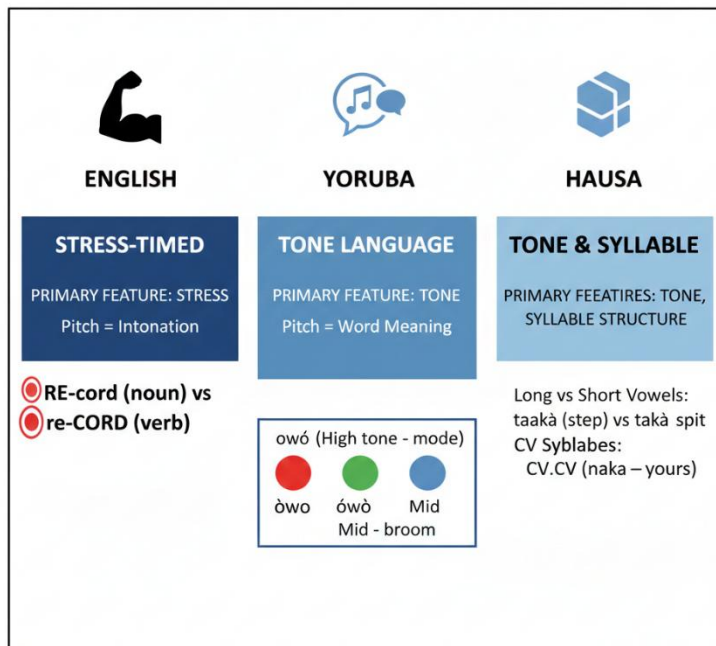


FIGURE: PHONOLOGICAL COMPARISON - ENGLISH, YORUBA, HAUSA.
 SOURCE: OER (Open Educational Resource)

Figure 2.3 Case examples of phonological systems

Pilot questions 2.3

1. What is one key difference between English and Yoruba phonological systems?
2. Give an example of a tone language.
3. Which phonological feature distinguishes “REcord” (noun) from “reCORD” (verb) in English?
4. Provide one case example of how tone changes meaning in Yoruba.
5. Fill in the blank: Hausa uses both tone and _____ structure to differentiate meaning.

2.4 Applications of Phonological Taxonomy

2.4.1 Role in language teaching and learning

Phonological taxonomy provides a structured way of classifying and explaining sound systems, which is invaluable in language teaching. By identifying phonemes, syllable structures, and suprasegmental features such as stress and tone, teachers can guide learners to recognise and produce sounds accurately. This is particularly important when teaching Nigerian languages, where tonal distinctions play a central role in meaning.



For example, learners of Yoruba must be taught how tone changes the meaning of words, while learners of English must grasp how stress patterns affect word categories. Phonological taxonomy ensures that these differences are explained systematically.

Fill in the blank: Phonological taxonomy helps teachers classify and explain _____ systems in a structured way.

Teaching Area	Pedagogical Application	Practical Outcome
Phonemic Contrasts	Using taxonomy to identify minimal pairs (e.g., <i>bit</i> vs. <i>beat</i> or <i>bá</i> vs. <i>bà</i>).	Students learn to distinguish sounds that carry meaning, reducing comprehension errors.
Syllable & Stress	Classifying words by their syllabic weight and stress placement .	Improves the learner's "accent" and rhythmic flow, making speech sound more natural.
Tonal Taxonomy	Categorizing languages by their tone systems (Level vs. Contour tones).	Essential for teaching Nigerian languages like Yoruba or Igbo, where pitch defines the word.
Feature Analysis	Grouping sounds into natural classes (e.g., "voiced stops" or "high vowels").	Helps students understand why certain sound changes (like nasalization) happen predictably.

Box 2.4 Applications of phonological taxonomy in teaching

2.4.2 Use in linguistic research and documentation

Phonological taxonomy is also essential in **linguistic research and documentation**. It allows linguists to describe and compare sound systems across languages, contributing to typological studies and language preservation. For under-documented languages, phonological taxonomy provides a framework for recording phonemes, syllable structures, and suprasegmental features.

This is particularly relevant in Nigeria, where many indigenous languages are at risk of decline. Accurate phonological documentation supports revitalisation efforts and ensures that future generations have access to reliable records of their linguistic heritage.

Fill in the blank: Phonological taxonomy provides a framework for recording _____ in under-documented languages.



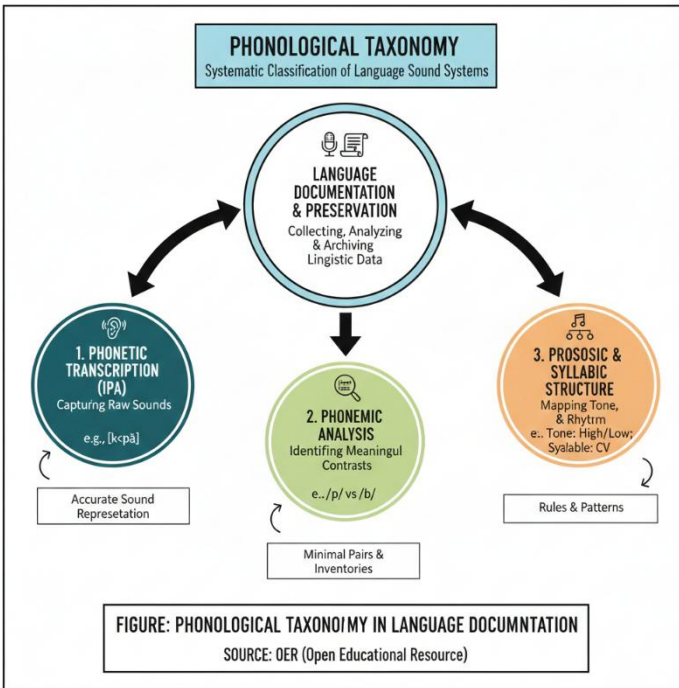


Figure 2.4 Phonological taxonomy in linguistic research

2.4.3 Practical exercises for learners

Practical exercises help learners apply phonological taxonomy in real contexts. These may include tasks such as classifying phonemes into natural classes, analysing syllable structures, identifying stress patterns, and comparing phonological systems across languages.

For instance, students may be asked to classify English stops (/p/, /t/, /k/) as a natural class of voiceless consonants, or to compare syllable structures in Hausa and English. Such exercises reinforce theoretical knowledge and develop analytical skills.

Fill in the blank: Classifying English stops /p/, /t/, /k/ as voiceless consonants is an example of a _____ exercise.



Phonological Taxonomy

Phoneme Classification	Purpose	Purpose	Example
	=p= an =b=	To describe, of be that distinctive features	=b= atare stop]
Natural Class	=p/, /t, /b=	=p/, /t, /k=	=voiceless
Natural features	[+voice]	"voiceless stops	[voiceless ++]
	Class a and word groups phonemic to be fulfilling that phonologues	Group gradclass a phonetic features and donis the chang in voicles s stops	Feom word sonds is so the sicate this phonagaied gæ rubir-flop
Syllable Analysis	CV. CV "naka (natuca strength (CCCC)	'reCORD "rausa (CV. CV) soda (CCCC)	Dihalyze arrede uup of byouais tonst syllable phciesse and engrlive.
Stress Identification	Idnalyz sode structure structures	Gonehwe ufflet tiall sytctures	To toress trille the syhctures
Tonal	"RECORD" (noun) "owò" = (HFD)	"owò" (High (High Low) "owò" = Low"	"High" (High (High Low) òwò" = Low"

Table 2.4 Examples of phonological taxonomy exercises

Pilot questions 2.4

1. How does phonological taxonomy support language teaching?
2. Why is phonological taxonomy important in documenting Nigerian languages?
3. Give one example of a practical exercise in phonological taxonomy.
4. What is the role of stress patterns in English word categories?
5. Fill in the blank: Phonological taxonomy ensures that sound systems are explained _____.

Series summary

This Series has focused on the description and taxonomy of phonological systems, highlighting their importance in analysing, classifying, and applying sound structures across languages. Its purpose has been to provide you with the tools to describe phonological units, compare systems, and apply these insights in teaching and research, particularly within Nigerian language contexts.

We began by examining the principles of phonological description, including its definition, purpose, and levels of analysis. Then we explored the taxonomy of phonological units, looking at phonemes, distinctive features, syllables, stress, and intonation. Following that, we studied comparative phonological systems, considering similarities and differences across languages and typological classifications such as tone and stress languages. Finally, we applied phonological



taxonomy to teaching, research, and practical exercises. By completing this Series, you should now be able to define and explain phonological description, classify phonemes and natural classes, analyse syllable structures and suprasegmental features, compare phonological systems across languages, evaluate typologies, and apply taxonomy in teaching and research, thereby achieving the Series Learning Outcomes (SLOs 2.1–2.8).

Glossary of terms

- **Distinctive features:** The basic characteristics used to describe and differentiate phonemes, such as [+voice] or [+nasal].
- **Intonation:** The variation of pitch across phrases or sentences, often used to signal meaning such as questions or statements.
- **Natural class:** A group of sounds that share common properties and behave similarly in phonological rules, for example voiceless stops /p/, /t/, /k/.
- **Phoneme:** The smallest unit of sound in a language that can distinguish meaning between words, such as /p/ and /b/.
- **Phonological description:** A systematic account of how sounds are organised and function within a language.
- **Phonological rule:** A pattern that explains how sounds change depending on their environment in a language.
- **Phonological taxonomy:** The classification of phonological units and systems, including phonemes, syllables, stress, and tone.
- **Phonological typology:** The classification of languages based on phonological features, such as tone languages or stress languages.
- **Segmental features:** Phonological features that apply to individual sounds, such as consonants and vowels.
- **Stress:** The emphasis placed on certain syllables within words, which can change meaning or word category.
- **Suprasegmental features:** Phonological features that extend across more than one sound, such as stress, tone, and intonation.
- **Syllable:** A unit of organisation for sounds, typically consisting of an onset (optional consonant), nucleus (usually a vowel), and coda (optional consonant).
- **Tone:** The use of pitch to distinguish meaning between words, common in languages such as Yoruba and Igbo.

Concept Check Questions [Series 2]

Objective questions

1. Phonological description refers to the systematic account of how sounds are _____ and function within a language. (Linked to SLO 2.1)
2. Which level of phonological analysis deals with stress, tone, and intonation? (Linked to SLO 2.2)
3. Which distinctive feature describes sounds such as /m/, /n/, and /ŋ/? (Linked to SLO 2.3)
4. The central part of a syllable, usually a vowel, is called the _____. (Linked to SLO 2.4)



5. Languages that use pitch to distinguish meaning are called _____ languages. (Linked to SLO 2.6)

Short-answer questions

6. Define a phoneme and explain its main function in a language. (Linked to SLO 2.3)
7. Give one example of a natural class of sounds and explain why they belong together. (Linked to SLO 2.3)
8. Compare briefly how English and Yoruba differ in their phonological systems. (Linked to SLO 2.5)
9. State one reason why phonological taxonomy is important in documenting Nigerian languages. (Linked to SLO 2.7)
10. Provide one example of a practical exercise that applies phonological taxonomy. (Linked to SLO 2.8)

Long-answer questions

11. Analyse the distinction between segmental and suprasegmental features, giving examples from English or Nigerian languages. (Linked to SLO 2.2, SLO 2.4)
12. Evaluate the importance of phonological typology in understanding language diversity, with examples of tone and stress languages. (Linked to SLO 2.5, SLO 2.6)
13. Discuss how phonological taxonomy can be applied in teaching Nigerian languages, highlighting specific challenges and solutions. (Linked to SLO 2.7, SLO 2.8)

Answers to Concept Check Questions [Series 2]

Objective questions

1. Organised
2. Suprasegmental analysis
3. [+nasal]
4. Nucleus
5. Tone

Short-answer questions

6. A phoneme is the smallest unit of sound that can distinguish meaning in a language, such as /p/ and /b/ in “pat” and “bat”.
7. /p/, /t/, and /k/ form a natural class of voiceless stops because they share the features [-voice, +stop].
8. English relies on stress to distinguish meaning, while Yoruba relies on tone.
9. It provides a framework for recording phonemes, syllable structures, and suprasegmental features, which supports preservation.
10. Classifying English stops (/p/, /t/, /k/) as voiceless consonants is one example.

Long-answer questions



11. **Basic response:** Segmental features apply to individual sounds such as consonants and vowels, while suprasegmental features extend across sounds, including stress, tone, and intonation. For example, /p/ and /b/ are segmental contrasts, while stress distinguishes “REcord” and “reCORD”. **Value-added response:** In Yoruba, tone functions as a suprasegmental feature that changes meaning, while Hausa uses both tone and syllable structure. This shows how suprasegmental features vary across languages and are crucial for comparative analysis.
12. **Basic response:** Phonological typology classifies languages based on features such as tone or stress. Tone languages use pitch to distinguish meaning, while stress languages rely on emphasis within syllables. **Value-added response:** Yoruba and Igbo are tone languages, while English and Russian are stress languages. Mandarin combines tone and stress, showing how typology helps explain language diversity and guides teaching pronunciation.
13. **Basic response:** Phonological taxonomy helps teachers classify and explain sound systems systematically, making it easier for learners to grasp contrasts such as tone or stress. **Value-added response:** In Nigerian languages, learners often struggle with tonal distinctions. Teachers can use IPA transcription and phonological rules to explain these differences. This not only aids teaching but also supports language documentation and revitalisation.

Concept Check Questions [Series 2]

Objective questions

1. Phonological description refers to the systematic account of how sounds are _____ and function within a language. (Linked to SLO 2.1)
2. Which level of phonological analysis deals with stress, tone, and intonation? (Linked to SLO 2.2)
3. Which distinctive feature describes sounds such as /m/, /n/, and /ŋ/? (Linked to SLO 2.3)
4. The central part of a syllable, usually a vowel, is called the _____. (Linked to SLO 2.4)
5. Languages that use pitch to distinguish meaning are called _____ languages. (Linked to SLO 2.6)

Short-answer questions

6. Define a phoneme and explain its main function in a language. (Linked to SLO 2.3)
7. Give one example of a natural class of sounds and explain why they belong together. (Linked to SLO 2.3)
8. Compare briefly how English and Yoruba differ in their phonological systems. (Linked to SLO 2.5)
9. State one reason why phonological taxonomy is important in documenting Nigerian languages. (Linked to SLO 2.7)
10. Provide one example of a practical exercise that applies phonological taxonomy. (Linked to SLO 2.8)

Long-answer questions

11. Analyse the distinction between segmental and suprasegmental features, giving examples from English or Nigerian languages. (Linked to SLO 2.2, SLO 2.4)



12. Evaluate the importance of phonological typology in understanding language diversity, with examples of tone and stress languages. (Linked to SLO 2.5, SLO 2.6)
13. Discuss how phonological taxonomy can be applied in teaching Nigerian languages, highlighting specific challenges and solutions. (Linked to SLO 2.7, SLO 2.8)

Answers to Concept Check Questions [Series 2]

Objective questions

1. Organised
2. Suprasegmental analysis
3. [+nasal]
4. Nucleus
5. Tone

Short-answer questions

6. A phoneme is the smallest unit of sound that can distinguish meaning in a language, such as /p/ and /b/ in “pat” and “bat”.
7. /p/, /t/, and /k/ form a natural class of voiceless stops because they share the features [-voice, +stop].
8. English relies on stress to distinguish meaning, while Yoruba relies on tone.
9. It provides a framework for recording phonemes, syllable structures, and suprasegmental features, which supports preservation.
10. Classifying English stops (/p/, /t/, /k/) as voiceless consonants is one example.

Long-answer questions

11. **Basic response:** Segmental features apply to individual sounds such as consonants and vowels, while suprasegmental features extend across sounds, including stress, tone, and intonation. For example, /p/ and /b/ are segmental contrasts, while stress distinguishes “REcord” and “reCORD”. **Value-added response:** In Yoruba, tone functions as a suprasegmental feature that changes meaning, while Hausa uses both tone and syllable structure. This shows how suprasegmental features vary across languages and are crucial for comparative analysis.
12. **Basic response:** Phonological typology classifies languages based on features such as tone or stress. Tone languages use pitch to distinguish meaning, while stress languages rely on emphasis within syllables. **Value-added response:** Yoruba and Igbo are tone languages, while English and Russian are stress languages. Mandarin combines tone and stress, showing how typology helps explain language diversity and guides teaching pronunciation.
13. **Basic response:** Phonological taxonomy helps teachers classify and explain sound systems systematically, making it easier for learners to grasp contrasts such as tone or stress. **Value-added response:** In Nigerian languages, learners often struggle with tonal distinctions. Teachers can use IPA transcription and phonological rules to explain these differences. This not only aids teaching but also supports language documentation and revitalisation.



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Illustrations and OER references

- Figure 2.1 Role of phonological description
 - AI-generated using prompt: “Generate a diagram showing phonological description as the study of sound organisation and rules in language.”
 - Suggested OER search string: “phonological description diagram OER”.
- Table 2.1 Levels of phonological analysis
 - AI-generated using prompt: “Generate a table showing segmental vs suprasegmental levels of phonological analysis with examples.”
 - Suggested OER search string: “segmental suprasegmental phonology table OER”.
- Box 2.1 Tools for phonological description
 - AI-generated using prompt: “Create a text box listing tools and methods for phonological description with short explanations.”
 - Suggested OER search string: “phonological description tools IPA phoneme syllable rules OER”.
- Table 2.2 Classification of phonemes
 - AI-generated using prompt: “Generate a table showing classification of phonemes by voicing, place, and manner with examples.”
 - Suggested OER search string: “phoneme classification voicing place manner OER”.
- Box 2.2 Examples of distinctive features and natural classes
 - AI-generated using prompt: “Create a text box listing examples of distinctive features and natural classes with phoneme examples.”
 - Suggested OER search string: “distinctive features natural classes phonology OER”.
- Figure 2.2 Basic syllable structure



- AI-generated using prompt: “Generate a diagram showing syllable structure with onset, nucleus, and coda labelled.”
- Suggested OER search string: “syllable structure diagram OER”.
- Table 2.3 Cross-linguistic similarities and differences
 - AI-generated using prompt: “Generate a table comparing phonological features of English, Yoruba, and Hausa including vowels, tone, and stress.”
 - Suggested OER search string: “comparative phonological systems English Yoruba Hausa OER”.
- Box 2.3 Phonological typology examples
 - AI-generated using prompt: “Create a text box listing examples of tone languages, stress languages, and mixed systems.”
 - Suggested OER search string: “phonological typology tone stress languages OER”.
- Figure 2.3 Case examples of phonological systems
 - AI-generated using prompt: “Generate a diagram comparing phonological features in English (stress), Yoruba (tone), and Hausa (tone and syllable structure).”
 - Suggested OER search string: “English Yoruba Hausa phonological comparison diagram OER”.
- Box 2.4 Applications of phonological taxonomy in teaching
 - AI-generated using prompt: “Create a text box summarising applications of phonological taxonomy in language teaching.”
 - Suggested OER search string: “phonological taxonomy language teaching OER”.
- Figure 2.4 Phonological taxonomy in linguistic research
 - AI-generated using prompt: “Generate a diagram showing phonological taxonomy applied to language documentation and preservation.”
 - Suggested OER search string: “phonological taxonomy language documentation diagram OER”.
- Table 2.4 Examples of phonological taxonomy exercises
 - AI-generated using prompt: “Generate a table showing examples of phonological taxonomy exercises with purpose and examples.”
 - Suggested OER search string: “phonological taxonomy exercises phoneme syllable stress OER”.



Course code: ENG203

Course title: Introduction to General Phonetics and Phonology I

Course credit load: 2 Units

Series 1 Principles of Phonetics and Phonology

Series 2 Description and Taxonomy of Phonological Systems

Series 3 Practical Phonological Exercises across Languages

Series 4 Phonology in English Language Teaching

Series 5 Laboratory Applications of Phonology

Proposed Outline for Series 3

Part 1 Segmental phonological exercises

- 3.1.1 Identifying and classifying phonemes
- 3.1.2 Distinguishing allophones in context
- 3.1.3 Practising consonant and vowel contrasts

Part 2 Suprasegmental phonological exercises

- 3.2.1 Stress placement in English and other languages
- 3.2.2 Tone exercises in Nigerian languages
- 3.2.3 Intonation patterns in spoken discourse

Part 3 Comparative phonological exercises

- 3.3.1 Cross-linguistic analysis of syllable structures
- 3.3.2 Comparing stress and tone systems across languages
- 3.3.3 Exercises in phonological typology

Part 4 Applied phonological practice

- 3.4.1 Exercises in phonetic transcription using IPA
- 3.4.2 Classroom activities for teaching phonology
- 3.4.3 Practical case studies from English and Nigerian languages

Introduction



In the last Series, we explored how phonological systems can be described and classified across languages, focusing on phonemes, syllables, stress, tone, and typology. Having gained this theoretical foundation, it is now time to put knowledge into practice. This Series emphasises hands-on exercises that will help you apply phonological concepts to real language data, strengthening both your analytical skills and your ability to work with diverse linguistic systems.

The aim of this Series is to provide you with practical experience in segmental and suprasegmental analysis, comparative phonological practice, and applied exercises that connect theory to teaching and transcription. By engaging with these activities, you will be able to consolidate your understanding and demonstrate competence in applying phonological principles across languages.

We shall commence this Series with segmental phonological exercises, focusing on identifying phonemes, distinguishing allophones, and practising consonant and vowel contrasts. Next, we will continue with suprasegmental exercises, where you will work on stress placement, tone, and intonation patterns. Following that, we will move on to comparative phonological exercises, analysing syllable structures and comparing stress and tone systems across languages. Finally, we will wrap up with applied phonological practice, including exercises in phonetic transcription, classroom activities, and case studies from English and Nigerian languages.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 3.1** identify and classify phonemes through practical exercises,
- **SLO 3.2** distinguish allophones in different linguistic contexts,
- **SLO 3.3** demonstrate consonant and vowel contrasts using segmental practice,
- **SLO 3.4** apply stress placement rules in English and other languages,
- **SLO 3.5** practise tonal distinctions in Nigerian languages through targeted exercises,
- **SLO 3.6** analyse intonation patterns in spoken discourse,
- **SLO 3.7** compare syllable structures across languages using practical examples,
- **SLO 3.8** evaluate similarities and differences in stress and tone systems across languages,
- **SLO 3.9** perform phonetic transcription exercises using the International Phonetic Alphabet (IPA),
- **SLO 3.10** design classroom activities that integrate phonological practice, and
- **SLO 3.11** apply phonological taxonomy in case studies from English and Nigerian languages.

3.1 Segmental Phonological Exercises

3.1.1 Identifying and classifying phonemes

A **phoneme** is the smallest unit of sound in a language that can distinguish meaning. For example, /p/ and /b/ differentiate “pat” from “bat”. In this exercise, you will practise identifying phonemes



in words and classifying them according to features such as voicing, place of articulation, and manner of articulation.

Fill in the blank: A phoneme is the smallest unit of sound that can _____ meaning in a language.

Manner of Articulation	Place of Articulation	Voiced Example	Voiced Example	Description of Difference
Stop (Plosive)	/pat	/p/ (pat)	b/ (bat)	Air is blocked by lips; /b/ is involves vocal foal fold vibration.
Bilabial	/tip	t/ (tip)	d/ (dip)	
Alveolar	Labiodental	f (fan)	/v (van)	Tongue touches the ridge behind teeth /d is voiced.
Velar	cap	k/ (cap)	g/ (van)	
Fricative	Labiodental	f fan	Back of forced beuche is soft placen teeth	
Dental	Dental	ð (thigh)	teeth and lip	/d is voiced
Affricate	Alovear	s sip	Friction created at alveean ridge;	A stop followed at the alveveal ridge; /z is voiced
Post-alveolar	/dʒ/ choke	/z (zip)	/d is voiced	
Nasal	Bilabial	/dʒ/ joke)	Air passes through immdately riive; nasals are typically voiced.	
Nasal	—	/m (map)		

Defining the Dimensions

- Voicing
- Place of Articulation
- Manner of Articulation

Practical Tip for Students

A feel vocal tn the vocal fold vinbration you as throts you thes fororative. Touch ante bump to onich ant our typically voiced.

SOURCE: OER (Open Educational Resource)

Table 3.1 Classification of selected phonemes

3.1.2 Distinguishing allophones in context

An **allophone** is a variation of a phoneme that does not change meaning. For example, the phoneme /p/ has an aspirated allophone [p^h] in “pat” and an unaspirated allophone [p] in “spin”. In this exercise, you will practise recognising allophones in different contexts and explaining why they occur.

Fill in the blank: Variations of a phoneme that do not change meaning are called _____.

Phoneme	Allophone	Word Example	Phonetic Context
/p/	[p ^h] (Aspirated)	pat	Occurs at the beginning of a word or stressed syllable.
/p/	[p] (Unaspirated)	spin	Occurs immediately after an /s/ at the beginning of a syllable.



Phoneme	Allophone	Word Example	Phonetic Context
/t/	[ɾ] (Flap)	butter	Occurs between two vowels when the second vowel is unstressed (common in American/Nigerian English).
/k/	[kʰ] (Aspirated)	kit	Occurs at the beginning of a word.
/l/	[ɫ] (Dark L)	full	Occurs at the end of a word or before a consonant.

Box 3.1 Examples of allophones in English

3.1.3 Practising consonant and vowel contrasts

Consonant and vowel contrasts are central to segmental phonology. A **consonant contrast** occurs when two consonants distinguish meaning, such as /t/ and /d/ in “ten” and “den”. A **vowel contrast** occurs when vowels distinguish meaning, such as /i/ and /ɛ/ in “bit” and “bet”. In this exercise, you will practise producing and recognising these contrasts across languages.

Fill in the blank: The words “bit” and “bet” differ because of a _____ contrast.

MINIMAL PAIRS

Contrasts in Consonants & Vowels

CONSONANT CONTRASTS

Differ by a single consonant sound

Differ by a single consonant sound

VOWEL CONTRASTS

Differ by a single vowel sound

Differ by a single vowel sound

FIGURE: MINIMAL PAIRS IN PHONOLOGY
SOURCE: OER (Open Educational Resource)



Figure 3.1 Consonant and vowel contrasts

Pilot questions 3.1

1. What is the main function of a phoneme in a language?
2. Give one example of an allophone in English.
3. Which feature distinguishes /p/ from /b/?
4. Provide one example of a vowel contrast in English.
5. Fill in the blank: Consonant and vowel contrasts are central to _____ phonology.

3.2 Suprasegmental Phonological Exercises

3.2.1 Stress placement in English and other languages

Stress refers to the emphasis placed on certain syllables within words. In English, stress can change the meaning or grammatical category of a word, as in “REcord” (noun) versus “reCORD” (verb). In other languages, stress may be fixed, such as in French where stress usually falls on the final syllable. In this exercise, you will practise identifying stress patterns and applying them to words in English and other languages.

Fill in the blank: In French, stress usually falls on the _____ syllable of a word.

Language	Stress Pattern	Example	Rules/Notes
English	Variable / Lexical	RE-cord (n) vs. re-CORD (v)	Stress is unpredictable and must be learned for each word; it often distinguishes word classes.
French	Fixed (Final)	ca-FÉ	Stress almost always falls on the final syllable of a word or phrase group.
Spanish	Predictable (Rule-based)	CA-sa	Usually falls on the penultimate (second to last) syllable for words ending in a vowel, <i>n</i> , or <i>s</i> .

Table 3.2 Examples of stress placement across languages

3.2.2 Tone exercises in Nigerian languages

Tone is the use of pitch to distinguish meaning between words. Nigerian languages such as Yoruba and Igbo are tone languages, meaning that the same sequence of consonants and vowels can have different meanings depending on the tone. For example, in Yoruba, “owo” can mean “money” or “hand” depending on tonal placement. In this exercise, you will practise recognising and producing tonal distinctions.



Fill in the blank: In Yoruba, the word “owo” can mean “money” or “hand” depending on _____.

Word	Tone Pattern	Meaning
owó	Mid - High	Money
owọ	Mid - High	Hand
òwò	Low - Low	Trade / Business
òwò	Low - Low	Broom
òwọ	Low - Low	Respect / Honour

Box 3.2 Examples of tonal distinctions in Yoruba

3.2.3 Intonation patterns in spoken discourse

Intonation refers to the variation of pitch across phrases or sentences. It is used to convey meaning beyond individual words, such as distinguishing between a statement and a question. For example, in English, rising intonation at the end of a sentence often signals a question, while falling intonation signals a statement. In this exercise, you will practise identifying and producing intonation patterns in spoken discourse.

Fill in the blank: Rising intonation at the end of a sentence often signals a _____.

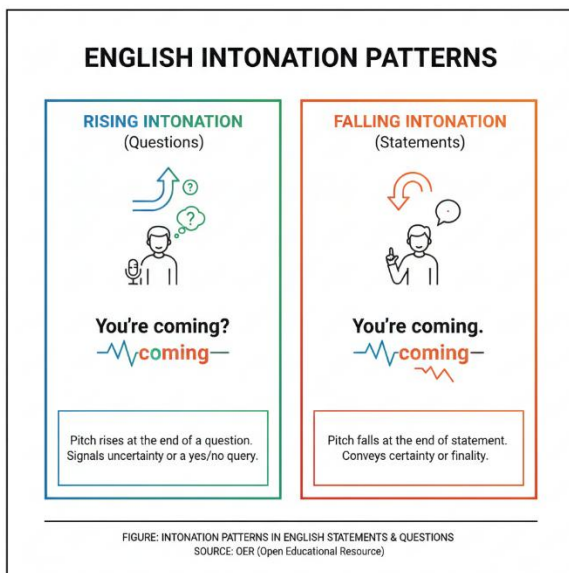


Figure 3.2 Intonation patterns in spoken discourse



Pilot questions 3.2

1. What is the role of stress in distinguishing word categories in English?
2. Give one example of a tonal distinction in Yoruba.
3. Which suprasegmental feature distinguishes between statements and questions in English?
4. Provide one example of a language where stress is fixed.
5. Fill in the blank: Tone languages use _____ to distinguish meaning between words.

3.3 Comparative Phonological Exercises

3.3.1 Cross-linguistic analysis of syllable structures

A **syllable** is a unit of organisation for sounds, typically consisting of an onset (optional consonant), nucleus (usually a vowel), and coda (optional consonant). Different languages prefer different syllable structures. For example, English allows complex onsets and codas (e.g., “strengths”), while Hausa and Yoruba often prefer simpler CV (consonant-vowel) structures. In this exercise, you will compare syllable structures across languages to see how they shape word formation.

Fill in the blank: The basic syllable structure preferred in Yoruba is _____.

Language	Complexity	Permissible Structures	Word Example	Breakdown
English	High	Allows complex clusters at the start (Onset) and end (Coda).	strengths	CCC V CCCC (s-t-r-e-ng-th-s)
Hausa	Moderate	Primarily open syllables or those with a single consonant coda.	gida (house)	CV - CV (gi - da)
Yoruba	Low	Predominantly open syllables; consonant clusters are generally absent.	oko (farm)	V - CV (o - ko)

Table 3.3 Comparative syllable structures across languages

3.3.2 Comparing stress and tone systems across languages

Languages differ in how they use **stress** and **tone**. English is a stress language, where emphasis on syllables can change meaning or grammatical category. Yoruba and Igbo are tone languages, where pitch differences distinguish words. In this exercise, you will compare stress and tone systems across languages, noting how they affect communication.



Fill in the blank: English is classified as a _____ language because it relies on syllable emphasis.

Feature	English	Yoruba	Igbo
System Type	Stress-Timed	Syllable-Timed (Tone)	Syllable-Timed (Tone)
Primary Unit	The Word: One syllable is prominent.	The Syllable: Every syllable has a specific pitch.	The Syllable: Every syllable has a specific pitch.
Tone Inventory	None: Pitch belongs to the sentence (Intonation).	3 Levels: High, Mid, Low.	2 Levels + 1: High, Low, and Downstep.
Lexical Function	Changes word class (noun vs. verb).	Changes lexical meaning (vocabulary).	Changes lexical meaning (vocabulary).
Minimal Pair Example	RE-cord (noun) vs. re-CORD (verb).	owó (money) vs. ọwọ (respect).	ákwá (cry) vs. àkwà (bed/cloth).

Box 3.3 Stress and tone systems compared

3.3.3 Exercises in phonological typology

Phonological typology classifies languages based on their phonological features. Tone languages use pitch to distinguish meaning, stress languages rely on syllable emphasis, and some languages combine both. In this exercise, you will practise identifying typological features in different languages and categorising them accordingly.

Fill in the blank: Languages that use pitch to distinguish meaning are called _____ languages.



PHONOLOGICAL TYPOLOGY

Classifying Languages by Tone & Stress Systems

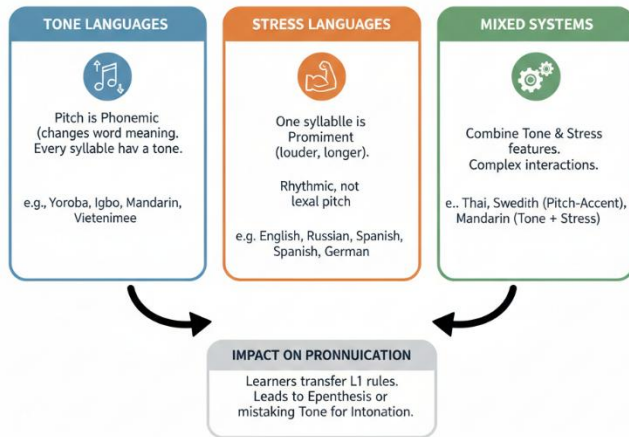


FIGURE: PHONOLOGICAL TYPOLOGY CATEGORIES
SOURCE: OER (Open Educational Resource)

Figure 3.3 Phonological typology categories

Pilot questions 3.3

1. What syllable structure is most common in Yoruba?
2. Give one example of a stress language.
3. Provide one example of a tone language.
4. Which phonological feature distinguishes “REcord” (noun) from “reCORD” (verb) in English?
5. Fill in the blank: Phonological typology classifies languages based on their _____ features.

3.4 Applied Phonological Practice

3.4.1 Exercises in phonetic transcription using IPA

Phonetic transcription is the process of representing speech sounds using symbols from the **International Phonetic Alphabet (IPA)**. This system provides a consistent and precise way to record sounds across languages. In this exercise, you will practise transcribing words from English and Nigerian languages into IPA, paying attention to segmental and suprasegmental features.

Fill in the blank: The International _____ Alphabet provides a consistent way to represent speech sounds.



[Insert Figure here] Diagram showing IPA chart with consonants and vowels
Caption: Figure 3.4
IPA chart for phonetic transcription
AI prompt suggestion: “Generate a diagram showing the International Phonetic Alphabet chart with consonants and vowels.”
Search string: “IPA chart consonants vowels phonetic transcription OER”

3.4.2 Classroom activities for teaching phonology

Phonological practice is highly relevant in teaching contexts. Teachers can design **classroom activities** that help learners recognise phonemes, practise stress and tone, and apply transcription skills. Examples include minimal pair drills (e.g., “pat” vs “bat”), tone recognition exercises in Yoruba, and stress placement tasks in English. These activities make phonological concepts more interactive and memorable.

Fill in the blank: Minimal pair drills such as “pat” vs “bat” are useful for teaching _____ contrasts.

Activity	Description	Target Skill
Minimal Pair Drills	Students distinguish between words that differ by only one sound (e.g., <i>ship</i> vs. <i>sheep</i> or <i>fan</i> vs. <i>van</i>).	Phonemic Awareness: Helps learners hear and produce sounds that do not exist in their native language.
Tone Recognition	Using Yoruba or Igbo words like <i>owó</i> (money) and <i>òwò</i> (respect), students identify pitch patterns (High, Mid, Low).	Suprasegmental Accuracy: Vital for mastering tonal languages where pitch determines meaning.
Stress Placement Tasks	Students mark the primary stress on multisyllabic English words (e.g., <i>pho-to-GRAPH-ic</i>) using “stress-stretching” or clapping.	Rhythmic Fluency: Reduces the “robotic” or misplaced emphasis common in L2 English learners.
IPA Transcription	Students transcribe complex words into the International Phonetic Alphabet (e.g., “strength” → /strɛŋθs/).	Phonetic Precision: Encourages students to focus on the actual sounds rather than misleading spelling.

Box 3.4 Sample classroom phonology activities

3.4.3 Practical case studies from English and Nigerian languages

Case studies provide opportunities to apply phonological taxonomy in real contexts. In English, stress placement distinguishes “REcord” (noun) from “reCORD” (verb). In Yoruba, tone differentiates “òwò” (hand) from “owó” (money). Hausa combines syllable structure and tone to distinguish meaning. In this exercise, you will analyse such examples and practise applying phonological principles to authentic language data.



Fill in the blank: In Hausa, both tone and _____ structure are used to distinguish meaning.

Language	Key Phonological Feature	Case Study Focus	Linguistic Example
English	Lexical Stress	Stress placement determines the grammatical category of a word.	'RE-cord (Noun) vs. re-'CORD (Verb)
Yoruba	Level Tones	Pitch height differentiates entirely unrelated vocabulary roots.	ọwọ (Hand) vs. ọ̀wọ̀ (Respect)
Hausa	Tone & Vowel Length	Tone and duration combine to mark grammatical changes like plurals.	gida (House - Short final vowel) vs. gidà (Houses - Low tone/Long vowel)

Table 3.4 Case studies in phonological practice

Pilot questions 3.4

1. What system is used for phonetic transcription across languages?
2. Give one example of a classroom activity for teaching phonology.
3. Which feature distinguishes “REcord” (noun) from “reCORD” (verb) in English?
4. Provide one example of a tonal distinction in Yoruba.
5. Fill in the blank: Hausa uses both tone and _____ structure to distinguish meaning.

Series summary

This Series has been designed to give you practical experience in applying phonological concepts across languages. Its purpose has been to move beyond theory into hands-on exercises, enabling you to practise segmental and suprasegmental analysis, compare phonological systems, and apply these skills in teaching and transcription. By engaging with these activities, you have been able to consolidate your understanding and strengthen your ability to work with diverse linguistic data.

We began with segmental phonological exercises, focusing on identifying phonemes, distinguishing allophones, and practising consonant and vowel contrasts. Then we continued with suprasegmental exercises, where you worked on stress, tone, and intonation patterns. Following that, we explored comparative phonological exercises, analysing syllable structures and comparing stress and tone systems across languages. Finally, we concluded with applied phonological practice, including transcription using the IPA, classroom activities, and case studies from English



and Nigerian languages. By completing this Series, you should now be able to identify and classify phonemes, distinguish allophones, apply stress and tone rules, analyse intonation, compare phonological systems, perform transcription, and design classroom activities, thereby achieving the Series Learning Outcomes (SLOs 3.1–3.11).

Glossary of terms

- **Allophone:** A variation of a phoneme that occurs in different contexts but does not change the meaning of a word.
- **Consonant contrast:** A difference between consonant sounds that changes the meaning of words, such as /t/ and /d/ in “ten” and “den”.
- **Intonation:** The variation of pitch across phrases or sentences, often used to signal meaning such as questions or statements.
- **International Phonetic Alphabet (IPA):** A system of symbols used to represent speech sounds consistently and accurately across languages.
- **Minimal pair:** Two words that differ by only one sound, used to show phonemic contrasts (e.g., “pat” vs “bat”).
- **Phoneme:** The smallest unit of sound in a language that can distinguish meaning between words, such as /p/ and /b/.
- **Phonetic transcription:** The representation of speech sounds using IPA symbols to record them precisely.
- **Phonological typology:** The classification of languages based on phonological features, such as tone languages or stress languages.
- **Segmental features:** Phonological features that apply to individual sounds, including consonants and vowels.
- **Stress:** The emphasis placed on certain syllables within words, which can change meaning or word category.
- **Suprasegmental features:** Phonological features that extend across more than one sound, such as stress, tone, and intonation.
- **Syllable:** A unit of organisation for sounds, usually consisting of an onset (optional consonant), nucleus (usually a vowel), and coda (optional consonant).
- **Tone:** The use of pitch to distinguish meaning between words, common in languages such as Yoruba and Igbo.
- **Vowel contrast:** A difference between vowel sounds that changes the meaning of words, such as /i/ and /e/ in “bit” and “bet”.

Concept Check Questions [Series 3]

Objective questions

1. A phoneme is the smallest unit of sound that can _____ meaning in a language. (Linked to SLO 3.1)
2. Variations of a phoneme that do not change meaning are called _____. (Linked to SLO 3.2)



3. The words “bit” and “bet” differ because of a _____ contrast. (Linked to SLO 3.3)
4. In French, stress usually falls on the _____ syllable of a word. (Linked to SLO 3.4)
5. Languages that use pitch to distinguish meaning are called _____ languages. (Linked to SLO 3.5)
6. Rising intonation at the end of a sentence often signals a _____. (Linked to SLO 3.6)
7. The basic syllable structure preferred in Yoruba is _____. (Linked to SLO 3.7)
8. English is classified as a _____ language because it relies on syllable emphasis. (Linked to SLO 3.8)
9. The International _____ Alphabet provides a consistent way to represent speech sounds. (Linked to SLO 3.9)

Short-answer questions

10. Define an allophone and give one example from English. (Linked to SLO 3.2)
11. Provide one example of a minimal pair in English and explain its significance. (Linked to SLO 3.3)
12. Compare briefly how stress functions in English and tone functions in Yoruba. (Linked to SLO 3.4, SLO 3.5)
13. State one reason why phonetic transcription using IPA is important in phonological practice. (Linked to SLO 3.9)
14. Suggest one classroom activity that helps learners practise phonological contrasts. (Linked to SLO 3.10)
15. Give one case study example of how phonological taxonomy applies in Nigerian languages. (Linked to SLO 3.11)

Long-answer questions

16. Analyse the distinction between phonemes and allophones, giving examples from English or Nigerian languages. (Linked to SLO 3.1, SLO 3.2)
17. Evaluate the role of suprasegmental features such as stress, tone, and intonation in communication across languages. (Linked to SLO 3.4, SLO 3.5, SLO 3.6)
18. Discuss how comparative phonological exercises enhance understanding of language diversity, with examples from English, Yoruba, and Hausa. (Linked to SLO 3.7, SLO 3.8)
19. Explain how phonetic transcription and classroom activities can be applied to teaching phonology effectively. (Linked to SLO 3.9, SLO 3.10)
20. Assess the importance of case studies in applying phonological taxonomy to real language contexts. (Linked to SLO 3.11)

Answers to Concept Check Questions [Series 3]

Objective questions

1. Distinguish
2. Allophones
3. Vowel
4. Final



5. Tone
6. Question
7. CV
8. Stress
9. Phonetic

Short-answer questions

10. An allophone is a variation of a phoneme that does not change meaning. Example: [p^h] in “pat” and [p] in “spin”.
11. “Pat” vs “bat” is a minimal pair. It shows that /p/ and /b/ are distinct phonemes.
12. Stress in English changes word categories (REcord vs reCORD), while tone in Yoruba changes meaning (òwò = hand, owó = money).
13. IPA transcription ensures consistency and accuracy in representing sounds across languages.
14. Minimal pair drills such as “ten” vs “den” help learners practise consonant contrasts.
15. In Yoruba, tone distinguishes words like “owo” (money) and “òwò” (hand).

Long-answer questions

16. **Basic response:** Phonemes are the smallest units of sound that distinguish meaning, while allophones are variations of phonemes that do not change meaning. For example, /p/ is a phoneme, while [p^h] and [p] are its allophones. **Value-added response:** In Hausa, phonemes are distinguished by tone and syllable structure, while allophonic variation occurs in contexts such as vowel lengthening. This shows how phoneme-allophone distinctions vary across languages.
17. **Basic response:** Stress, tone, and intonation are suprasegmental features that influence meaning beyond individual sounds. Stress distinguishes word categories, tone changes meaning in Nigerian languages, and intonation signals sentence type. **Value-added response:** In Yoruba, tone is crucial for lexical meaning, while in English intonation conveys pragmatic meaning. Comparing these highlights the diverse communicative roles of suprasegmentals across languages.
18. **Basic response:** Comparative exercises show how syllable structures and stress or tone systems differ across languages. English allows complex syllables, Yoruba prefers CV structures, and Hausa uses tone and syllable structure. **Value-added response:** These comparisons reveal typological diversity and help learners appreciate language-specific constraints, which is vital for teaching and linguistic analysis.
19. **Basic response:** Phonetic transcription using IPA ensures accurate representation of sounds, while classroom activities such as minimal pair drills make phonology interactive. **Value-added response:** Combining transcription with activities allows learners to connect theory with practice. For example, Yoruba tone exercises alongside IPA transcription reinforce tonal distinctions effectively.
20. **Basic response:** Case studies provide real examples of how phonological taxonomy applies to languages, such as stress in English or tone in Yoruba. **Value-added response:** They also highlight challenges in teaching and documentation, offering insights into language preservation and revitalisation efforts in Nigerian contexts.

Answers to Pilot Questions [3]



Part 3.1 Segmental phonological exercises

1. To distinguish meaning in a language.
2. [p^h] in “pat”.
3. Voicing.
4. /i/ vs /e/.
5. Segmental.

Part 3.2 Suprasegmental phonological exercises

1. It distinguishes word categories.
2. “òwò” (hand) vs “owó” (money).
3. Intonation.
4. French.
5. Pitch.

Part 3.3 Comparative phonological exercises

1. CV.
2. English.
3. Yoruba.
4. Stress.
5. Phonological.

Part 3.4 Applied phonological practice

1. International Phonetic Alphabet (IPA).
2. Minimal pair drills.
3. Stress.
4. “òwò” (hand) vs “owó” (money).
5. Syllable.

References and Attributions [Series 3]

Core references

- Crystal, D. (2008). *A dictionary of linguistics and phonetics* (6th ed.). Wiley-Blackwell.
- Fromkin, V., Rodman, R., & Hyams, N. (2018). *An introduction to language* (11th ed.). Cengage Learning.
- Ladefoged, P., & Johnson, K. (2014). *A course in phonetics* (7th ed.). Cengage Learning.
- International Phonetic Association. (1999). *Handbook of the International Phonetic Association: A guide to the use of the International Phonetic Alphabet*. Cambridge University Press.

Illustrations and OER references



- Table 3.1 Classification of selected phonemes
 - AI-generated using prompt: “Generate a table showing classification of phonemes by voicing, place, and manner with examples.”
 - Suggested OER search string: “phoneme classification voicing place manner OER”.
- Box 3.1 Examples of allophones in English
 - AI-generated using prompt: “Create a text box listing examples of allophones in English with contexts.”
 - Suggested OER search string: “allophones examples English phonology OER”.
- Figure 3.1 Consonant and vowel contrasts
 - AI-generated using prompt: “Generate a diagram showing minimal pairs with consonant contrasts (ten/den) and vowel contrasts (bit/bet).”
 - Suggested OER search string: “minimal pairs consonant vowel contrasts diagram OER”.
- Table 3.2 Examples of stress placement across languages
 - AI-generated using prompt: “Generate a table showing stress placement patterns in English, French, and Spanish with examples.”
 - Suggested OER search string: “stress placement English French Spanish phonology OER”.
- Box 3.2 Examples of tonal distinctions in Yoruba
 - AI-generated using prompt: “Create a text box listing examples of tonal distinctions in Yoruba with meanings.”
 - Suggested OER search string: “Yoruba tone examples phonology OER”.
- Figure 3.2 Intonation patterns in spoken discourse
 - AI-generated using prompt: “Generate a diagram showing rising intonation for questions and falling intonation for statements in English.”
 - Suggested OER search string: “intonation patterns English questions statements diagram OER”.
- Table 3.3 Comparative syllable structures across languages
 - AI-generated using prompt: “Generate a table comparing syllable structures in English, Hausa, and Yoruba with examples.”
 - Suggested OER search string: “syllable structure comparison English Hausa Yoruba OER”.
- Box 3.3 Stress and tone systems compared
 - AI-generated using prompt: “Create a text box comparing stress and tone systems in English, Yoruba, and Igbo with examples.”
 - Suggested OER search string: “stress vs tone languages comparison OER”.
- Figure 3.3 Phonological typology categories
 - AI-generated using prompt: “Generate a diagram showing phonological typology categories: tone languages, stress languages, and mixed systems.”
 - Suggested OER search string: “phonological typology diagram tone stress languages OER”.
- Figure 3.4 IPA chart for phonetic transcription
 - AI-generated using prompt: “Generate a diagram showing the International Phonetic Alphabet chart with consonants and vowels.”



- Suggested OER search string: “IPA chart consonants vowels phonetic transcription OER”.
- Box 3.4 Sample classroom phonology activities
 - AI-generated using prompt: “Create a text box listing sample classroom phonology activities with short explanations.”
 - Suggested OER search string: “phonology classroom activities minimal pairs tone stress OER”.
- Table 3.4 Case studies in phonological practice
 - AI-generated using prompt: “Generate a table showing case studies of phonological practice in English, Yoruba, and Hausa with examples.”
 - Suggested OER search string: “phonological case studies English Yoruba Hausa OER”.

Course code: ENG203

Course title: Introduction to General Phonetics and Phonology I

Course credit load: 2 Units

Series 1 Principles of Phonetics and Phonology

Series 2 Description and Taxonomy of Phonological Systems

Series 3 Practical Phonological Exercises across Languages

Series 4 Phonology in English Language Teaching

Series 5 Laboratory Applications of Phonology

Proposed Outline for Series 4

Part 1 Role of phonology in English language teaching

- 4.1.1 Importance of phonology in language learning
- 4.1.2 Phonology and communicative competence
- 4.1.3 Challenges learners face with English phonology

Part 2 Teaching segmental phonology

- 4.2.1 Phonemes and allophones in English
- 4.2.2 Teaching consonant and vowel contrasts
- 4.2.3 Classroom activities for segmental practice

Part 3 Teaching suprasegmental phonology



- 4.3.1 Stress patterns in English words and sentences
- 4.3.2 Intonation in spoken English
- 4.3.3 Linking tone and rhythm to communicative meaning

Part 4 Applied strategies in phonology teaching

- 4.4.1 Using phonetic transcription in teaching
- 4.4.2 Integrating phonology into communicative language teaching (CLT)
- 4.4.3 Case studies of phonology teaching in Nigerian classrooms

Introduction

In the last Series, we engaged in practical phonological exercises across languages, applying theoretical concepts to real data and classroom contexts. Building on that foundation, this Series turns our attention to the teaching of phonology within English language classrooms. Phonology plays a vital role in helping learners achieve accurate pronunciation, fluency, and communicative competence, and understanding how to teach it effectively is essential for both teachers and learners.

The aim of this Series is to equip you with strategies for teaching English phonology, focusing on both segmental and suprasegmental features, and to demonstrate how phonological knowledge can be integrated into classroom practice to support learners' communicative skills.

We shall commence this Series by examining the role of phonology in English language teaching, highlighting its importance and the challenges learners often face. Next, we will move on to teaching segmental phonology, where you will explore phonemes, allophones, and consonant and vowel contrasts through classroom activities. Following that, we will continue with suprasegmental phonology, focusing on stress, intonation, and rhythm as they shape communicative meaning. Finally, we will wrap up with applied strategies, including the use of phonetic transcription, integration into communicative language teaching, and case studies from Nigerian classrooms to bring the Series to a close.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 4.1** explain the importance of phonology in English language teaching,
- **SLO 4.2** analyse common challenges learners face with English phonology,
- **SLO 4.3** identify and classify English phonemes and allophones for teaching purposes,
- **SLO 4.4** demonstrate how to teach consonant and vowel contrasts through classroom activities,
- **SLO 4.5** apply strategies for teaching stress patterns in English words and sentences,
- **SLO 4.6** illustrate the role of intonation in spoken English,
- **SLO 4.7** connect tone and rhythm to communicative meaning in classroom practice,



- **SLO 4.8** perform phonetic transcription exercises using the International Phonetic Alphabet (IPA) in teaching contexts,
- **SLO 4.9** integrate phonological instruction into communicative language teaching (CLT), and
- **SLO 4.10** evaluate case studies of phonology teaching in Nigerian classrooms.

4.1 Role of Phonology in English Language Teaching

4.1.1 Importance of phonology in language learning

Phonology is the study of the sound system of a language, including how sounds function and interact to create meaning. In English language teaching, phonology is crucial because accurate pronunciation supports intelligibility and effective communication. Learners who grasp phonological principles are better able to distinguish sounds, avoid misunderstandings, and develop fluency.

Fill in the blank: Phonology is the study of the _____ system of a language.

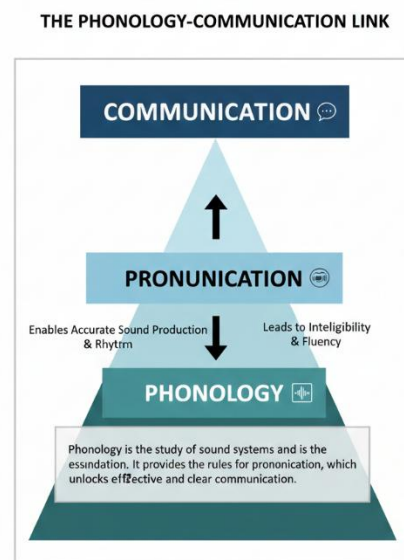


Figure 4.1 Phonology and its role in communication

4.1.2 Phonology and communicative competence

Communicative competence refers to the ability to use language effectively and appropriately in real-life situations. Phonology contributes to communicative competence by ensuring learners can produce and interpret sounds, stress, and intonation patterns correctly. Without phonological awareness, learners may struggle with listening comprehension and spoken interaction.



Fill in the blank: Communicative competence refers to the ability to use language _____ and appropriately in real-life situations.

Aspect	Phonological Foundation	Impact on Communication
Intelligibility	Phonemic Accuracy: Producing the specific sounds (phonemes) of a language.	Ensures words are not confused (e.g., distinguishing "pray" from "play").
Rhythmic Flow	Stress Patterns: Identifying and using word-level and sentence-level stress.	Helps the listener process the "peaks and valleys" of English, which is vital for long-term listening stamina.
Pragmatic Meaning	Intonation: Using pitch to signal intent (questions, sarcasm, or finality).	Conveys the speaker's attitude; prevents a speaker from sounding accidentally rude or uninterested.
Connected Speech	Allophonic Variation: Understanding how sounds change when they touch (linking/elision).	Allows for "natural speed" in conversation, preventing the staccato, fragmented speech often seen in beginners.

Box 4.1 Key aspects of communicative competence supported by phonology

4.1.3 Challenges learners face with English phonology

Learners often face difficulties with English phonology due to differences between their first language and English. Common challenges include distinguishing similar sounds (e.g., /θ/ vs /t/), mastering stress placement, and using intonation appropriately. Teachers must be aware of these challenges to design effective interventions and support learners in overcoming them.

Fill in the blank: Learners often struggle with English phonology because of differences between their _____ language and English.

Aspect	Phonological Foundation	Impact on Communication
Intelligibility	Phonemic Accuracy: Producing the specific sounds (phonemes) of a language.	Ensures words are not confused (e.g., distinguishing "pray" from "play").
Rhythmic Flow	Stress Patterns: Identifying and using word-level and sentence-level stress.	Helps the listener process the "peaks and valleys" of English, which is vital for long-term listening stamina.



Aspect	Phonological Foundation	Impact on Communication
Pragmatic Meaning	Intonation: Using pitch to signal intent (questions, sarcasm, or finality).	Conveys the speaker's attitude; prevents a speaker from sounding accidentally rude or uninterested.
Connected Speech	Allophonic Variation: Understanding how sounds change when they touch (linking/elision).	Allows for "natural speed" in conversation, preventing the staccato, fragmented speech often seen in beginners.

Table 4.1 Common phonological challenges in English language learning

Pilot questions 4.1

1. What is phonology the study of?
2. How does phonology contribute to communicative competence?
3. Give one example of a phonological challenge learners face in English.
4. Fill in the blank: Stress placement can change the _____ category of a word.
5. Provide one teaching implication of difficulties with sound distinction.

4.2 Teaching Segmental Phonology

4.2.1 Phonemes and allophones in English

A **phoneme** is the smallest unit of sound in a language that can distinguish meaning, such as /p/ and /b/ in “pat” and “bat”. An **allophone** is a variation of a phoneme that does not change meaning, for example [p^h] in “pat” and [p] in “spin”. In teaching, it is important to help learners recognise phonemes clearly and understand how allophones occur in different contexts. This builds awareness of sound contrasts and prepares learners for accurate pronunciation.

Fill in the blank: A phoneme is the smallest unit of sound that can _____ meaning in a language.

Feature	Unit Type	Example	Effect on Meaning	Teaching Implication
Phoneme	Mental Category	/p/ vs. /b/ (e.g., <i>pat</i> vs. <i>bat</i>)	Contrastive: Changes the word's meaning.	Use Minimal Pair Drills to help students hear the difference in voicing.
Allophone	Physical Variant	[p ^h] (aspirated) vs.	Non-Contrastive: Sounds "off" if	Show how context (word-



Feature	Unit Type	Example	Effect on Meaning	Teaching Implication
		[p] (unaspirated)	swapped, but meaning remains.	initial vs. after /s/) dictates the "puff of air."
Phoneme	Mental Category	/t/ vs. /d/ (e.g., <i>ten</i> vs. <i>den</i>)	Contrastive: Changes the word's meaning.	Use Listening Drills to distinguish between voiceless and voiced alveolar stops.
Allophone	Physical Variant	[t] (true t) vs. [ɾ] (flap) in <i>better</i>	Non-Contrastive: Varies by dialect (American/Nigerian vs. British).	Teach Dialect Awareness ; explain that the "flap" occurs between vowels.

Table 4.2 Examples of phonemes and allophones in English

4.2.2 Teaching consonant and vowel contrasts

Consonant contrasts occur when two consonants distinguish meaning, such as /t/ and /d/ in “ten” and “den”. **Vowel contrasts** occur when vowels distinguish meaning, such as /i/ and /e/ in “bit” and “bet”. Teaching these contrasts often involves minimal pair drills, listening exercises, and production practice. Learners benefit from repeated exposure to contrasts in meaningful contexts, which helps them internalise distinctions and avoid confusion.

Fill in the blank: The words “bit” and “bet” differ because of a _____ contrast.

Feature	Unit Type	Example	Effect on Meaning	Teaching Implication
Phoneme	Mental Category	/p/ vs. /b/ (e.g., <i>pat</i> vs. <i>bat</i>)	Contrastive: Changes the word's meaning.	Use Minimal Pair Drills to help students hear the difference in voicing.
Allophone	Physical Variant	[p ^h] (aspirated) vs. [p] (unaspirated)	Non-Contrastive: Sounds "off" if swapped, but meaning remains.	Show how context (word-initial vs. after



Feature	Unit Type	Example	Effect on Meaning	Teaching Implication
				/s/) dictates the "puff of air."
Phoneme	Mental Category	/t/ vs. /d/ (e.g., <i>ten</i> vs. <i>den</i>)	Contrastive: Changes the word's meaning.	Use Listening Drills to distinguish between voiceless and voiced alveolar stops.
Allophone	Physical Variant	[t] (true t) vs. [ɾ] (flap) in <i>better</i>	Non-Contrastive: Varies by dialect (American/Nigerian vs. British).	Teach Dialect Awareness ; explain that the "flap" occurs between vowels.

Diagram showing consonant and vowel contrasts in minimal pairs Caption: Figure 4.2 Consonant and vowel contrasts in English AI prompt suggestion: "Generate a diagram showing minimal pairs with consonant contrasts (ten/den) and vowel contrasts (bit/bet)." Search string: "minimal pairs consonant vowel contrasts English diagram OER"

4.2.3 Classroom activities for segmental practice

Effective classroom activities make segmental phonology engaging and memorable. Activities include minimal pair drills, phoneme bingo, sound discrimination games, and transcription practice using the **International Phonetic Alphabet (IPA)**. These activities encourage learners to listen carefully, practise pronunciation, and apply phonological knowledge in interactive ways.

Fill in the blank: Minimal pair drills such as "pat" vs "bat" are useful for teaching _____ contrasts.

Activity	Description	Learning Objective
Minimal Pair Drills	Students practice pairs like <i>ship/sheep</i> or <i>fan/pan</i> to highlight a single phonemic difference.	To distinguish and produce sounds that are phonemically contrastive.
Phoneme Bingo	The teacher calls out sounds (e.g., /θ/, /ð/, /ʃ/), and students mark words on their grid containing those sounds.	To improve auditory recognition of specific phonemes in isolation and in words.



Activity	Description	Learning Objective
Sound Discrimination Games	"Odd One Out": Students identify which word in a set has a different vowel sound (e.g., <i>bit</i> , <i>sit</i> , <i>fit</i> , <i>seat</i>).	To sharpen the ear's ability to categorize similar but distinct vowel qualities.
IPA Transcription Race	A competitive task where students transcribe spoken words into the International Phonetic Alphabet as quickly as possible.	To reinforce the connection between a specific sound and its standardized symbol.

Box 4.2 Sample classroom activities for segmental phonology

Pilot questions 4.2

1. What is the difference between a phoneme and an allophone?
2. Give one example of a consonant contrast in English.
3. Provide one example of a vowel contrast in English.
4. Fill in the blank: IPA transcription helps learners achieve _____ in representing sounds.
5. Suggest one classroom activity for teaching segmental phonology.

4.3 Teaching Suprasegmental Phonology

4.3.1 Stress patterns in English words and sentences

Stress refers to the emphasis placed on certain syllables within words or on particular words within sentences. In English, stress can change meaning or grammatical category, as in "REcord" (noun) versus "reCORD" (verb). At the sentence level, stress highlights important information, guiding listeners to interpret meaning correctly. Teaching stress involves helping learners identify stressed syllables, practise stress placement, and apply stress rules in both words and sentences.

Fill in the blank: Stress can change the _____ category of a word in English.

Type	Definition	Example	Teaching Implication
Word Stress	The relative prominence of syllables within a single word.	'PHO-to-graph vs. pho-'TOG-ra-pher	Explicitly teach "Schwa" reduction in unstressed syllables to achieve natural rhythm.
Sentence Stress	The pattern of "content" words (nouns/verbs) being stressed more than "function" words.	"She BOUGHT a NEW CAR. "	Use "Jazz Chants" or rhythmic clapping to show how English is stress-timed.



Type	Definition	Example	Teaching Implication
Contrastive Stress	Shifting stress to a specific word to highlight a correction or contrast.	"I said a RED pen, not a BLUE one."	Use role-play and "Misunderstanding" dialogues to practice shifting focus.

Table 4.3 Examples of stress patterns in English

4.3.2 Intonation in spoken English

Intonation is the variation of pitch across phrases or sentences. It signals meaning beyond words, such as distinguishing between statements and questions. For example, rising intonation at the end of a sentence often indicates a question, while falling intonation signals a statement. Teaching intonation involves listening practice, repetition, and role-play activities to help learners use pitch effectively in communication.

Fill in the blank: Rising intonation at the end of a sentence often signals a _____.

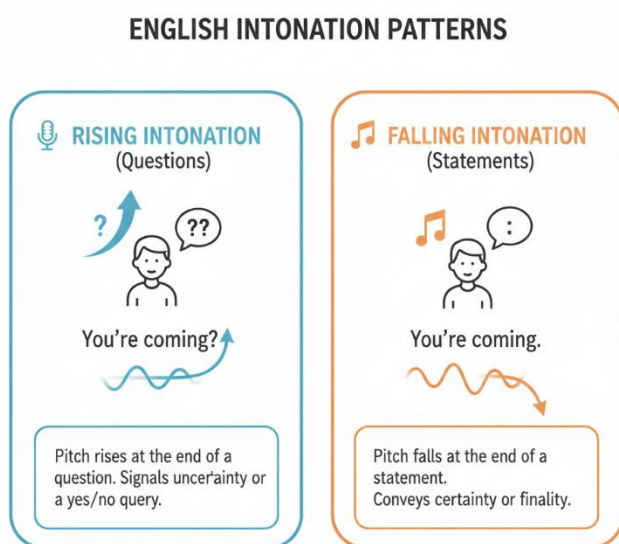


Figure 4.3 Intonation patterns in spoken English
SOURCE: OER (Open Educational Resource)

Figure 4.3 Intonation patterns in spoken

4.3.3 Linking tone and rhythm to communicative meaning

Tone refers to pitch differences that distinguish meaning in words, while **rhythm** refers to the pattern of stressed and unstressed syllables in speech. English is a stress-timed language, meaning



rhythm is shaped by stressed syllables occurring at regular intervals. Teaching tone and rhythm helps learners improve fluency and naturalness in speech. Activities such as choral reading, rhythm drills, and practising dialogues can make learners more confident in using suprasegmental features.

Fill in the blank: English is classified as a _____-timed language because rhythm is shaped by stressed syllables.

Activity	Description	Learning Objective
Choral Reading	The class reads a text aloud in unison, following the teacher's lead on which words to "stretch" and which to "shrink."	To build collective awareness of English rhythm and prevent "staccato" delivery.
Rhythm Drills & Chants	Using nursery rhymes, limericks, or "Jazz Chants" where students clap or tap on the stressed beats.	To internalize the stress-timed pulse of English (the "heartbeat" of the sentence).
Dialogue Shadowing	Students listen to a recording and try to speak over the voice, matching the pitch rises and falls exactly.	To practice natural intonation patterns and emotional expression in discourse.
The "Nonsense" Hum	Students hum the "melody" of a sentence without saying the words, focusing only on the pitch contour.	To isolate suprasegmental features from vocabulary and grammar.

Box 4.3 Classroom activities for teaching tone and rhythm

Pilot questions 4.3

1. What is stress in English phonology?
2. Give one example of how stress changes meaning in English.
3. Which suprasegmental feature distinguishes between statements and questions?
4. Fill in the blank: English is a _____-timed language.
5. Suggest one classroom activity for teaching rhythm in English.

4.4 Applied Strategies in Phonology Teaching

4.4.1 Using phonetic transcription in teaching

Phonetic transcription is the representation of speech sounds using symbols from the **International Phonetic Alphabet (IPA)**. It provides learners with a consistent and precise way to record and reproduce sounds. In teaching, transcription helps learners visualise sound distinctions, practise pronunciation, and connect spoken and written forms. Teachers can use



transcription exercises to highlight differences between similar sounds and reinforce accuracy in pronunciation.

Fill in the blank: Phonetic transcription uses symbols from the International _____ Alphabet.

THE INTERNATIONAL PHONETIC ALPHABET (IPA)

CONSONANTS

Bilabial	Labial	Place of Articulation	Manner of Articulation	Velar	Trill	Nasal
p	b	t	d	k	g	
p	d	t	e	f	n	
k	f	s	v	n	s	
k	f	z	c	k	s	
m	v	z	v	x	n	

Other Symbols

f	f	v	l	c	n	n	g	z
m	n	s	s	x	a	s	e	a
m	n	s	s	x	a	x	o	o

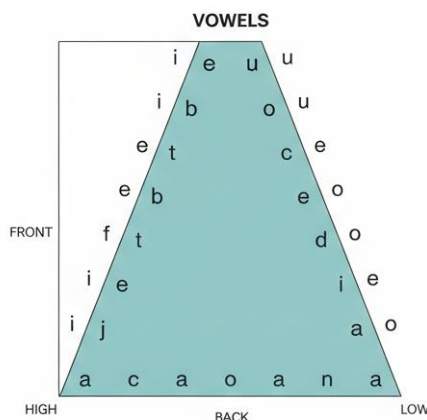
Other Symbols

m	c	n	e	d	b	z	i	
m	n	s	t	g	z	c	o	a
m	z	z	z	g				

Diacritics

Diacritics Table

Trills:
Respiratory: ʔ (glottal) n voen baɪd Taɪt vɪot es ɔɪl - tɔɪnɪkɪ
nasal:
Fortend: ʔ (glottal) Alleeaet - sut (tɪg a) (wait she fuɪn tɪnɪkɪ tɪnɪkɪ o mɪd slɔ)
Diacritics: ɔ (ɔɪ) oo thes - (voɪ. nɪtɪkɪ stɪptɪvɔtɪgɪn (ʊlɛɪn oɪe gl aɪd nɪt tɪpɔɪkɪ)



DIPHTHONGS

ai	ai
ai	au
ao	ɔY
oY	ɛi
x	ei
i	o
i	ou

FIGURE 4.6 Complete IPA Chart. SOURCE: OER (Open Educational Resource)

Figure 4.4 IPA chart for phonetic transcription

4.4.2 Integrating phonology into communicative language teaching (CLT)

Communicative Language Teaching (CLT) is an approach that emphasises interaction and communication as the goal of language learning. Phonology can be integrated into CLT by embedding pronunciation practice into communicative tasks such as role-plays, dialogues, and group discussions. Instead of treating phonology as an isolated skill, teachers can design activities where learners practise stress, intonation, and rhythm while engaging in meaningful communication.

Fill in the blank: Communicative Language Teaching emphasises _____ as the goal of language learning.



Strategy	Activity Description	Communicative Goal
Phonological Role-Play	Students act out scenarios (e.g., a job interview or a complaint) where they must use specific intonation to convey politeness or urgency.	To use suprasegmentals to manage social relationships and pragmatic intent.
Fluency Circles	Group discussions where the "leader" monitors for rhythm and linking , ensuring speakers don't sound like they are reading a list of words.	To move from word-by-word production to fluent "thought groups" and connected speech.
Information Gap Dialogues	Pairs are given sentences where the meaning depends on contrastive stress (e.g., "I wanted the <i>black</i> suit, not the <i>blue</i> one").	To practice using stress as a functional tool for clarification and precision.
Strategic Feedback	During free-flowing activities, the teacher provides "hot corrections" only on phonological errors that cause a breakdown in meaning .	To prioritize communicative intelligibility over "perfect" native-like accent.

Box 4.4 Strategies for integrating phonology into CLT

4.4.3 Case studies of phonology teaching in Nigerian classrooms

Case studies provide practical insights into how phonology is taught in real classrooms. In Nigerian contexts, teachers often face challenges such as large class sizes, limited resources, and learners' diverse linguistic backgrounds. Successful strategies include using local language comparisons to explain English phonology, employing minimal pair drills for difficult sounds, and incorporating rhythm exercises to improve fluency. Analysing these case studies helps teachers adapt phonology teaching to their own contexts.

Fill in the blank: Nigerian teachers often use comparisons with _____ languages to explain English phonology.

Context	Primary Challenge	Practical Strategy	Teaching Tip
Large Class Sizes (e.g., 60+ students)	Lack of individual feedback on pronunciation.	Choral Drills & "Call and Response" : Use the collective voice to internalize rhythm.	Divide the class into "sections" (like a choir) to practice different parts of a stress pattern.



Context	Primary Challenge	Practical Strategy	Teaching Tip
Diverse Linguistic Backgrounds	Interference from L1 (Mother Tongue) sounds.	Contrastive Analysis: Explicitly compare English /θ/ or /v/ with Hausa, Igbo, or Yoruba equivalents.	Use "Translation Mapping" to show why a student might be adding an extra vowel (Epenthesis).
Limited Resources	No language labs, power, or audio equipment.	"The Human Instrument": Use body percussion, clapping, and oral storytelling.	Use the "Rubber Band" method to teach vowel length and syllable weight without needing technology.

Table 4.4 Case studies of phonology teaching in Nigerian classrooms

Pilot questions 4.4

1. What system is used for phonetic transcription in teaching?
2. How can phonology be integrated into communicative language teaching?
3. Give one example of a strategy for teaching phonology in Nigerian classrooms.
4. Fill in the blank: CLT emphasises _____ as the goal of language learning.
5. Provide one challenge Nigerian teachers face when teaching phonology.

Series summary

This Series has been designed to highlight the importance of phonology in English language teaching and to provide practical strategies for supporting learners' communicative competence. Its purpose has been to show how phonological knowledge can be applied in classroom contexts, helping learners overcome challenges with pronunciation, stress, intonation, and rhythm while developing fluency and accuracy.

We began by examining the role of phonology in language learning, focusing on its contribution to communicative competence and the common challenges learners face. Then we moved on to teaching segmental phonology, where you explored phonemes, allophones, and consonant and vowel contrasts through classroom activities. Following that, we studied suprasegmental phonology, emphasising stress patterns, intonation, and rhythm in spoken English. Finally, we concluded with applied strategies, including the use of phonetic transcription, integration into communicative language teaching, and case studies from Nigerian classrooms. By completing this Series, you should now be able to explain the importance of phonology, analyse learner challenges, demonstrate segmental and suprasegmental teaching techniques, apply transcription, integrate



phonology into communicative approaches, and evaluate case studies, thereby achieving the Series Learning Outcomes (SLOs 4.1–4.10).

Glossary of terms

- **Allophone:** A variation of a phoneme that occurs in different contexts but does not change the meaning of a word.
- **Communicative competence:** The ability to use language effectively and appropriately in real-life situations, including correct pronunciation, stress, and intonation.
- **Consonant contrast:** A difference between consonant sounds that changes the meaning of words, such as /t/ and /d/ in “ten” and “den”.
- **Intonation:** The variation of pitch across phrases or sentences, often used to signal meaning such as questions or statements.
- **International Phonetic Alphabet (IPA):** A system of symbols used to represent speech sounds consistently and accurately across languages.
- **Minimal pair:** Two words that differ by only one sound, used to show phonemic contrasts (e.g., “pat” vs “bat”).
- **Phoneme:** The smallest unit of sound in a language that can distinguish meaning between words, such as /p/ and /b/.
- **Phonetic transcription:** The representation of speech sounds using IPA symbols to record them precisely.
- **Phonology:** The study of the sound system of a language, including how sounds function and interact to create meaning.
- **Rhythm:** The pattern of stressed and unstressed syllables in speech, which shapes the natural flow of spoken English.
- **Stress:** The emphasis placed on certain syllables within words or on particular words within sentences, which can change meaning or highlight importance.
- **Suprasegmental features:** Phonological features that extend across more than one sound, such as stress, tone, and intonation.
- **Tone:** The use of pitch to distinguish meaning between words, common in languages such as Yoruba and Igbo.
- **Vowel contrast:** A difference between vowel sounds that changes the meaning of words, such as /i/ and /e/ in “bit” and “bet”.

Concept Check Questions [Series 4]

Objective questions

1. Phonology is the study of the _____ system of a language. (Linked to SLO 4.1)
2. Communicative competence refers to the ability to use language _____ and appropriately in real-life situations. (Linked to SLO 4.2)
3. A phoneme is the smallest unit of sound that can _____ meaning in a language. (Linked to SLO 4.3)
4. The words “bit” and “bet” differ because of a _____ contrast. (Linked to SLO 4.4)



5. Stress can change the _____ category of a word in English. (Linked to SLO 4.5)
6. Rising intonation at the end of a sentence often signals a _____. (Linked to SLO 4.6)
7. English is classified as a _____-timed language because rhythm is shaped by stressed syllables. (Linked to SLO 4.7)
8. Phonetic transcription uses symbols from the International _____ Alphabet. (Linked to SLO 4.8)
9. Communicative Language Teaching emphasises _____ as the goal of language learning. (Linked to SLO 4.9)
10. Nigerian teachers often use comparisons with _____ languages to explain English phonology. (Linked to SLO 4.10)

Short-answer questions

11. Define phonology and explain its importance in English language teaching. (Linked to SLO 4.1)
12. Identify one common challenge learners face with English phonology. (Linked to SLO 4.2)
13. Provide one example of a phoneme and one example of an allophone in English. (Linked to SLO 4.3)
14. Suggest one classroom activity for teaching consonant contrasts. (Linked to SLO 4.4)
15. Give one example of how stress changes meaning in English. (Linked to SLO 4.5)
16. State one teaching implication of intonation in spoken English. (Linked to SLO 4.6)
17. Suggest one classroom activity for teaching rhythm in English. (Linked to SLO 4.7)
18. Why is phonetic transcription important in teaching pronunciation? (Linked to SLO 4.8)
19. Describe one way phonology can be integrated into communicative language teaching. (Linked to SLO 4.9)
20. Provide one challenge Nigerian teachers face when teaching phonology. (Linked to SLO 4.10)

Long-answer questions

21. Analyse the role of phonology in supporting communicative competence in English language teaching. (Linked to SLO 4.1, SLO 4.2)
22. Evaluate the effectiveness of teaching segmental phonology through minimal pair drills and transcription exercises. (Linked to SLO 4.3, SLO 4.4, SLO 4.8)
23. Discuss how suprasegmental features such as stress, intonation, and rhythm contribute to fluency and meaning in English. (Linked to SLO 4.5, SLO 4.6, SLO 4.7)
24. Explain how phonology can be integrated into communicative language teaching, with examples of classroom activities. (Linked to SLO 4.9)
25. Assess the importance of case studies in adapting phonology teaching strategies to Nigerian classrooms. (Linked to SLO 4.10)

Answers to Concept Check Questions [Series 4]

Objective questions

1. Sound



2. Effectively
3. Distinguish
4. Vowel
5. Grammatical
6. Question
7. Stress
8. Phonetic
9. Communication
10. Local

Short-answer questions

11. Phonology is the study of the sound system of a language. It is important because it supports accurate pronunciation and communication.
12. Learners often struggle with distinguishing similar sounds, such as /θ/ and /t/.
13. Phoneme: /p/ in “pat”; Allophone: [p^h] in “pat” versus [p] in “spin”.
14. Minimal pair drills, such as “ten” vs “den”.
15. “REcord” (noun) vs “reCORD” (verb).
16. Intonation signals sentence type, e.g., rising intonation for questions.
17. Choral reading or rhythm drills using poetry.
18. It ensures consistency and accuracy in representing sounds.
19. Role-play activities where learners practise stress and intonation in dialogues.
20. Large class sizes make individual pronunciation practice difficult.

Long-answer questions

21. **Basic response:** Phonology supports communicative competence by enabling learners to produce and interpret sounds, stress, and intonation correctly. **Value-added response:** Beyond classroom practice, phonology also enhances listening comprehension in real-life contexts, helping learners interact confidently in multilingual environments.
22. **Basic response:** Minimal pair drills and transcription exercises help learners distinguish sounds and practise accurate pronunciation. **Value-added response:** These methods also promote learner autonomy, as transcription builds analytical skills while minimal pairs encourage active listening and peer correction.
23. **Basic response:** Stress, intonation, and rhythm shape meaning and fluency in English. Stress highlights important words, intonation signals sentence type, and rhythm creates natural flow. **Value-added response:** Suprasegmentals also carry pragmatic meaning, such as politeness or emphasis, making them essential for intercultural communication.
24. **Basic response:** Phonology can be integrated into CLT through role-plays, dialogues, and group discussions that embed pronunciation practice. **Value-added response:** Integration ensures phonology is taught in meaningful contexts, aligning with communicative goals and improving learner motivation.
25. **Basic response:** Case studies show how teachers adapt phonology teaching to challenges such as large classes and diverse linguistic backgrounds. **Value-added response:** They also highlight innovative practices, such as using local language comparisons, which can inform curriculum design and teacher training in multilingual contexts.



Part 4.1 Role of phonology in English language teaching

1. The sound system of a language.
2. Effectively.
3. First.
4. Grammatical.
5. Provide minimal pair drills.

Part 4.2 Teaching segmental phonology

1. A phoneme distinguishes meaning, while an allophone is a variation that does not.
2. /t/ vs /d/ in “ten” and “den”.
3. /i/ vs /e/ in “bit” and “bet”.
4. Accuracy.
5. Phoneme bingo.

Part 4.3 Teaching suprasegmental phonology

1. The emphasis placed on certain syllables or words.
2. “REcord” (noun) vs “reCORD” (verb).
3. Intonation.
4. Stress.
5. Choral reading.

Part 4.4 Applied strategies in phonology teaching

1. The International Phonetic Alphabet (IPA).
2. Through role-plays, dialogues, and group discussions.
3. Comparing English sounds with local languages.
4. Communication.
5. Large class sizes.

Course code: ENG203

Course title: Introduction to General Phonetics and Phonology I

Course credit load: 2 Units

Series 1 Principles of Phonetics and Phonology

Series 2 Description and Taxonomy of Phonological Systems



Series 3 Practical Phonological Exercises across Languages

Series 4 Phonology in English Language Teaching

Series 5 Laboratory Applications of Phonology

Proposed Outline for Series 5

Part 1 Introduction to phonology laboratories

- 5.1.1 Purpose and scope of phonology labs
- 5.1.2 Tools and equipment used in phonological analysis
- 5.1.3 Ethical considerations in laboratory phonology

Part 2 Acoustic analysis of speech sounds

- 5.2.1 Recording and digitising speech data
- 5.2.2 Spectrograms and waveform analysis
- 5.2.3 Measuring pitch, duration, and intensity

Part 3 Articulatory and auditory phonology experiments

- 5.3.1 Using palatography and ultrasound imaging
- 5.3.2 Auditory discrimination tasks
- 5.3.3 Classroom applications of articulatory and auditory experiments

Part 4 Applied laboratory practice in phonology teaching

- 5.4.1 Designing phonology lab activities for learners
- 5.4.2 Integrating lab findings into classroom practice
- 5.4.3 Case studies of laboratory phonology in Nigerian contexts

Introduction

In the last Series, we explored how phonology can be taught effectively in English language classrooms, focusing on both segmental and suprasegmental features. This Series takes us a step further by moving into the laboratory, where phonological concepts are applied using scientific tools and methods. Laboratory applications are important because they allow us to analyse speech sounds more precisely, observe articulatory processes, and connect theory with practice in ways that strengthen both teaching and research.

The aim of this Series is to introduce you to the practical use of phonology laboratories and to equip you with the skills needed to conduct acoustic, articulatory, and auditory analyses, as well as apply laboratory findings to classroom contexts.



We shall commence this Series by examining the purpose and scope of phonology laboratories, including the tools and ethical considerations involved. Next, we will move on to acoustic analysis of speech sounds, where you will learn about recording, spectrograms, and measuring pitch, duration, and intensity. Following that, we will continue with articulatory and auditory phonology experiments, exploring techniques such as palatography, ultrasound imaging, and auditory discrimination tasks. Finally, we will wrap up with applied laboratory practice, focusing on how to design lab activities for learners, integrate findings into teaching, and review case studies from Nigerian classrooms to bring the Series to a close.

Series Learning Outcomes

Upon completing this Series, you should be able to:

- **SLO 5.1** define the purpose and scope of phonology laboratories,
- **SLO 5.2** identify tools and equipment used in phonological analysis,
- **SLO 5.3** explain ethical considerations in conducting laboratory phonology,
- **SLO 5.4** demonstrate how to record and digitise speech data for analysis,
- **SLO 5.5** analyse spectrograms and waveforms to study speech sounds,
- **SLO 5.6** measure pitch, duration, and intensity in acoustic phonology,
- **SLO 5.7** apply articulatory techniques such as palatography and ultrasound imaging,
- **SLO 5.8** perform auditory discrimination tasks to assess learners' perception of sounds,
- **SLO 5.9** design classroom activities based on articulatory and auditory experiments,
- **SLO 5.10** integrate laboratory findings into phonology teaching practice, and
- **SLO 5.11** evaluate case studies of laboratory phonology in Nigerian contexts.

5.1 Introduction to Phonology Laboratories

5.1.1 Purpose and scope of phonology labs

A **phonology laboratory** is a specialised environment where speech sounds are studied using scientific tools and methods. Its purpose is to provide learners and researchers with opportunities to record, analyse, and interpret speech data in ways that go beyond classroom observation. The scope of phonology labs includes acoustic analysis, articulatory experiments, and auditory testing, all of which contribute to a deeper understanding of how sounds function in communication.

Fill in the blank: A phonology laboratory is a specialised environment where _____ sounds are studied using scientific tools.



THE PHONOLOGY LABORATORY: SCOPE & ANALYSIS

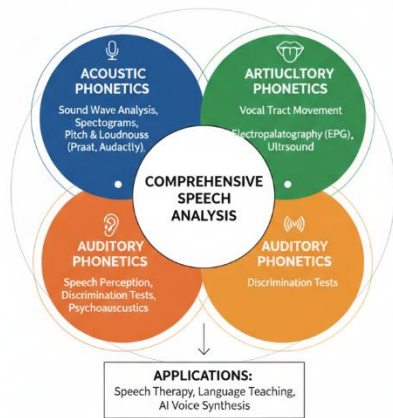


Figure 4.7 Scope of Modern Phonology Laboratories.
SOURCE: OER (Open Educational Resource)



Figure 5.1 Scope of phonology laboratories

5.1.2 Tools and equipment used in phonological analysis

Phonology laboratories employ various **tools** and **equipment** to capture and analyse speech. Common tools include microphones for recording, spectrographs for visualising sound waves, and software such as Praat for acoustic analysis. More advanced equipment may include ultrasound imaging for articulatory studies and palatography devices for examining tongue placement. These tools allow learners to see and measure aspects of speech that are not visible to the naked ear or eye.

Fill in the blank: Spectrographs are used to _____ sound waves in phonology laboratories.

Tool / Equipment	Functional Category	Primary Function	Example Application
High-Quality Microphone	Data Collection	Captures clean, high-fidelity audio signals for analysis.	Recording a corpus of Yoruba tonal variations in different contexts.
Spectrograph / Spectrogram	Acoustic Analysis	Provides a visual representation of frequency and intensity over time.	Distinguishing between English vowels /i/ and /ɪ/ by looking at Formants .



Tool / Equipment	Functional Category	Primary Function	Example Application
Praat Software	Computational Phonology	A comprehensive toolkit for speech analysis, synthesis, and manipulation.	Measuring the exact duration of vowels in Hausa to determine phonemic length .
Ultrasound Imaging	Articulatory Phonology	Visualizes the real-time movement and shape of the tongue during speech.	Researching how the tongue root moves in ATR (Advanced Tongue Root) vowel systems.
Electropalatography (EPG)	Articulatory Phonology	Uses an artificial palate with sensors to track tongue-to-palate contact.	Identifying precise tongue placement for alveolar vs. palatal consonants.

Table 5.1 Tools and equipment in phonology laboratories

5.1.3 Ethical considerations in laboratory phonology

Ethical considerations are the principles that guide responsible practice in phonology laboratories. These include obtaining informed consent from participants, ensuring confidentiality of recorded speech data, and avoiding misuse of recordings. Teachers and researchers must also respect cultural and linguistic diversity when collecting and analysing speech samples. Ethical practice ensures that laboratory work is conducted with integrity and respect for participants.

Fill in the blank: Ethical considerations in phonology laboratories include obtaining _____ consent from participants.

Principle	Description	Actionable Step
Informed Consent	Participants must fully understand the nature of the recording and how it will be used.	Provide a written or oral explanation in the participant's preferred language before recording.
Confidentiality	Sensitive linguistic data and personal identities must be protected.	Use alphanumeric codes (e.g., <i>Speaker_01</i>) instead of names in file naming and publications.



Principle	Description	Actionable Step
Linguistic Respect	No language or dialect should be treated as "superior" or "incorrect."	Avoid using labels like "broken" or "bad" when documenting non-standard varieties or accents.
Responsible Usage	Audio and video data must only be used for the purposes agreed upon by the participant.	Securely store data on encrypted drives and delete files that are no longer needed for research.
Reciprocity	The research should benefit the community being studied.	Share findings or revitalized language materials with the community from which the data was collected.

Box 5.1 Ethical guidelines for phonology laboratories

Pilot questions 5.1

1. What is the purpose of a phonology laboratory?
2. Name one tool used in phonological analysis.
3. Fill in the blank: Spectrographs are used to _____ sound waves.
4. What is one ethical consideration in phonology laboratories?
5. Give one example of advanced equipment used in articulatory studies.

5.2 Acoustic Analysis of Speech Sounds

5.2.1 Recording and digitising speech data

Acoustic analysis begins with the careful recording of speech sounds. A high-quality **microphone** is used to capture speech, and the recordings are then digitised into formats such as WAV or MP3 for analysis. Digitisation ensures that sounds can be stored, replayed, and examined using specialised software. Teachers and learners must pay attention to background noise, microphone placement, and recording settings to ensure clarity.

Fill in the blank: Speech recordings are often digitised into formats such as _____ or MP3 for analysis.



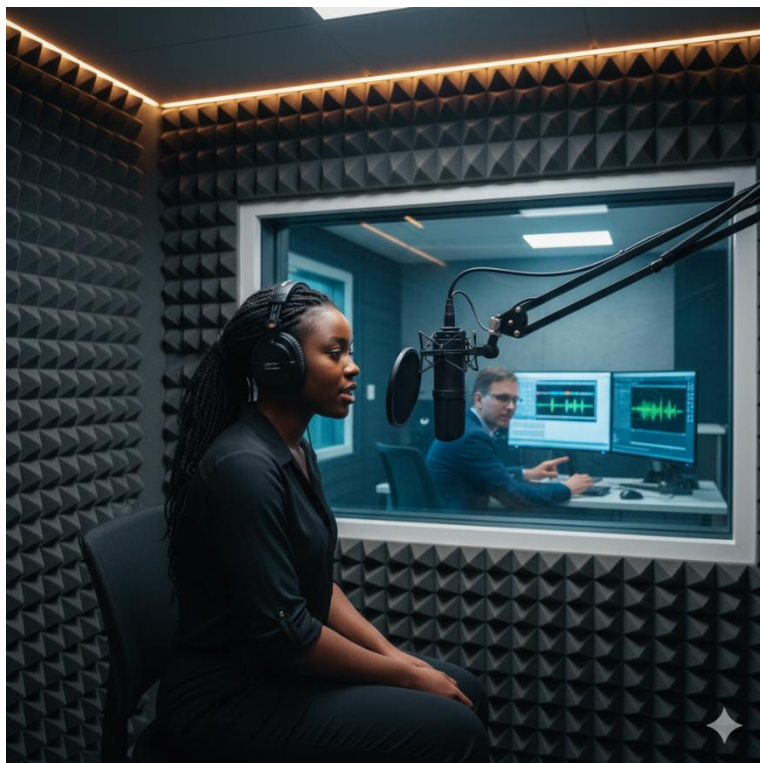


Plate 5.1 Recording speech data in a phonology

5.2.2 Spectrograms and waveform analysis

A **spectrogram** is a visual representation of the frequency, intensity, and duration of speech sounds over time. A **waveform** shows the amplitude of sound signals. Together, they allow learners to see the acoustic properties of vowels, consonants, and suprasegmental features. For example, spectrograms can reveal formant patterns in vowels, while waveforms can highlight stress and rhythm. These visual tools make abstract sound features more concrete and easier to analyse.

Fill in the blank: A spectrogram is a visual representation of the _____, intensity, and duration of speech sounds.



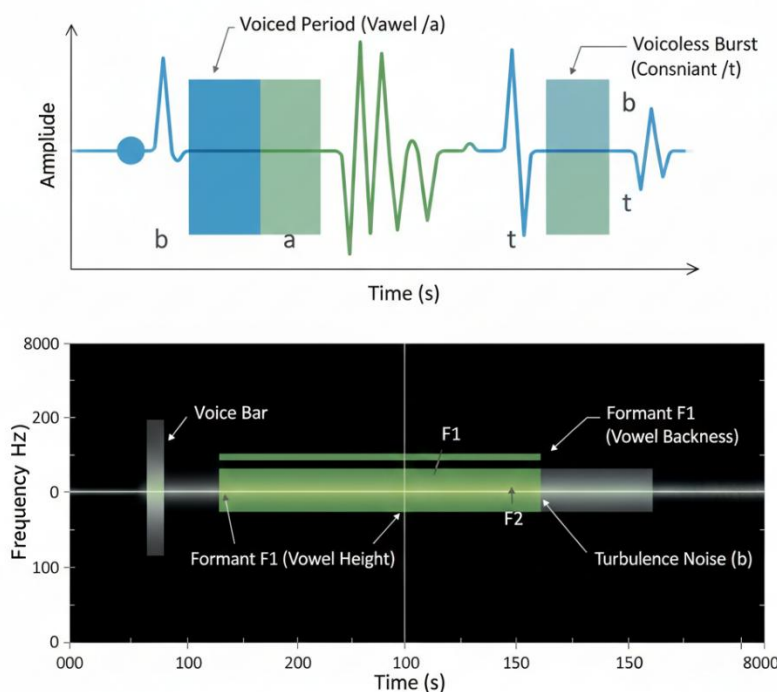


Figure 4.8 Acoustic analysis of the word 'bat'

SOURCE: OER (Open Educational Resource)

Figure 5.2 Spectrogram and waveform analysis of speech

5.2.3 Measuring pitch, duration, and intensity

Pitch refers to the perceived highness or lowness of a sound, often linked to frequency. **Duration** is the length of time a sound is held, and **intensity** refers to the loudness of a sound. These acoustic features are crucial for understanding stress, intonation, and rhythm in speech. Software such as Praat can be used to measure these features precisely, providing learners with quantitative data to support phonological analysis.

Fill in the blank: Pitch is linked to the _____ of a sound and determines whether it is high or low.

Feature	Physical Property	Definition	Teaching Application
Pitch	Frequency (\$F_0\$)	The perceived highness or lowness of a speaker's voice.	Intonation: Teaching students to use a rising pitch for "Yes/No" questions and a falling pitch for statements.
Duration	Time (ms)	The length of time a specific sound or syllable is held.	Vowel Contrast: Helping students hear the difference between "short"



Feature	Physical Property	Definition	Teaching Application
			vowels in <i>bit</i> and "long" vowels in <i>beat</i> .
Intensity	Amplitude (dB)	The perceived loudness or volume of a sound.	Sentence Stress: Practicing how to make "content words" louder and more prominent than "function words."

Table 5.2 Acoustic features of speech sounds

Pilot questions 5.2

1. What format is commonly used to digitise speech recordings?
2. Fill in the blank: A spectrogram shows frequency, _____, and duration of speech sounds.
3. What does a waveform represent in speech analysis?
4. Define pitch in acoustic phonology.
5. Give one example of how duration can be used in teaching.

5.3 Articulatory and Auditory Phonology Experiments

5.3.1 Using palatography and ultrasound imaging

Palatography is a technique used to study tongue placement during speech by applying a colouring agent or powder to the tongue and observing where it touches the palate. **Ultrasound imaging** provides a non-invasive way to visualise tongue movement in real time. These methods help learners and researchers understand how consonants and vowels are articulated, offering insights that cannot be gained through listening alone.

Fill in the blank: Palatography is used to study _____ placement during speech.



ARTICULTORY PHONETICS: TONGUE IMAGING

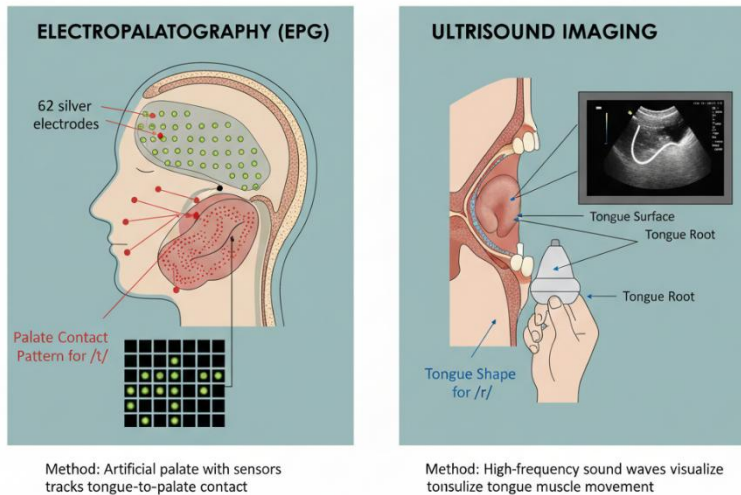


Figure 5.3 Visualising tongue movement with palatography and ultrasound

5.3.2 Auditory discrimination tasks

Auditory discrimination refers to the ability to distinguish between similar sounds, such as /s/ and /ʃ/. In laboratory settings, learners may be asked to listen to pairs of sounds and identify whether they are the same or different. These tasks are essential for diagnosing pronunciation difficulties and training learners to perceive subtle contrasts. Teachers can use auditory discrimination exercises to strengthen listening skills and improve pronunciation accuracy.

Fill in the blank: Auditory discrimination tasks train learners to _____ between similar sounds.



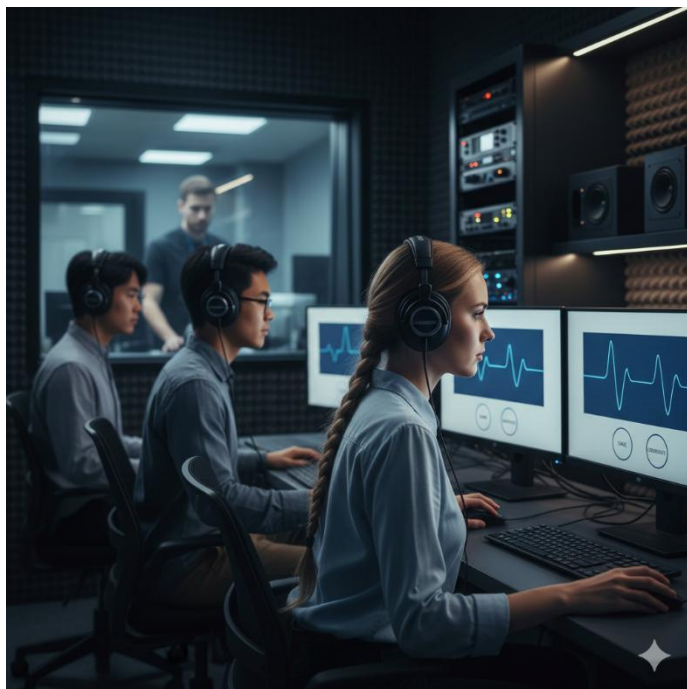


Plate 5.2 Learners engaged in auditory discrimination practice

5.3.3 Classroom applications of articulatory and auditory experiments

Articulatory and auditory experiments can be adapted for classroom use to make phonology more interactive. For example, simplified palatography can be demonstrated using food colouring, while auditory discrimination can be practised through minimal pair games. These activities help learners connect laboratory findings with everyday communication, making phonology both practical and engaging.

Fill in the blank: Minimal pair games are a classroom application of _____ discrimination tasks.

Category	Activity	Mechanism	Learning Outcome
Articulatory	"Kitchen" Palatography	Using food coloring or cocoa powder on the tongue to see where it touches the palate.	Visualizing the exact point of contact for consonants like /t/, /d/, and /s/.
Articulatory	The Candle/Tissue Test	Holding a tissue or candle flame in front of the mouth while speaking.	Understanding aspiration (the puff of air) in voiceless stops like /p/ and /k/.



Category	Activity	Mechanism	Learning Outcome
Auditory	Minimal Pair "Hot Seat"	A student hears a word (e.g., <i>bit</i>) and must run to the correct side of the room (<i>bit</i> vs. <i>beat</i>).	Sharpening the ear's ability to categorize similar phonemes.
Auditory	The "Telephone" Rhythm Game	Whispering a rhythmic sentence through a chain to see if the stress pattern survives.	Identifying the "musical" structure of English sentences over individual words.

Box 5.3 Classroom applications of articulatory and auditory experiments

Pilot questions 5.3

1. What does palatography study in speech production?
2. How does ultrasound imaging assist in phonology experiments?
3. Fill in the blank: Auditory discrimination tasks train learners to _____ between similar sounds.
4. Give one example of a classroom activity based on auditory discrimination.
5. Suggest one way articulatory experiments can be adapted for classroom use.

5.4 Applied Laboratory Practice in Phonology Teaching

5.4.1 Designing phonology lab activities for learners

Phonology laboratories can be adapted into classroom practice through carefully designed activities. These activities should be learner-centred, interactive, and directly linked to phonological concepts. For example, learners can record their own speech and compare it with native models, or they can use spectrograms to analyse vowel quality. Designing such activities helps bridge the gap between theoretical knowledge and practical application, making phonology more engaging and accessible.

Fill in the blank: Phonology lab activities should be _____-centred and interactive to support learning.

Activity	Process	Technological Focus	Pedagogical Goal
Comparative Shadowing	Students record themselves repeating a model sentence and overlay their	Waveform Overlay	To visualize differences in timing, pausing, and rhythm.



Activity	Process	Technological Focus	Pedagogical Goal
	waveform on top of the "native" model.		
Spectrographic Vowel Mapping	Students produce vowels and identify the "dark bands" (formants) on a spectrogram.	Acoustic Analysis (F1/F2)	To see if their tongue is high/low or front/back enough for specific English vowels.
Digital Discrimination Games	Using software to distinguish between minimal pairs (e.g., <i>ship</i> vs. <i>sheep</i>) in high-noise environments.	Auditory Perception Software	To sharpen decoding skills for real-world listening.
Stress-Intensity Profiling	Students record a sentence and use software to view the "intensity peaks" (loudness) of each word.	Amplitude/Intensity Measurement	To ensure stressed syllables are significantly more prominent than unstressed ones.

Box 5.4 Examples of phonology lab activities for learners

5.4.2 Integrating lab findings into classroom practice

Integration means applying laboratory results to everyday teaching. For instance, if acoustic analysis shows that learners struggle with vowel length, teachers can design targeted drills to address this. Similarly, auditory discrimination findings can inform listening exercises, while articulatory data can guide pronunciation practice. By integrating lab findings into lessons, teachers ensure that phonology instruction is evidence-based and tailored to learners' needs.

Fill in the blank: Integrating lab findings into teaching ensures that phonology instruction is _____-based.

Lab Observation	Linguistic Root Cause	Classroom Implication	Targeted Activity
Vowel Neutralization	Lack of vowel length contrast in the student's L1.	Focus on Duration and Vowel Quality .	"The Stretch" : Use physical movements (stretching a rubber band)



Lab Observation	Linguistic Root Cause	Classroom Implication	Targeted Activity
(e.g., <i>sheep</i> sounds like <i>ship</i>)			to represent the extra time needed for long vowels.
Fricative Substitution (e.g., <i>shoe</i> sounds like <i>sue</i>)	Confusion between alveolar /s/ and palato-alveolar /ʃ/.	Focus on Place of Articulation .	"The Silent Shush" : Use a mirror to show the difference in lip rounding and tongue retraction for /ʃ/.
Monotonic Intonation (Flat pitch)	Syllable-timed rhythm interference.	Focus on Pitch Range and Sentence Stress .	"Humming the Message" : Students hum a sentence's melody before speaking it to isolate the pitch contour from the words.
Epenthesis (e.g., <i>school</i> sounds like <i>s-i-kulu</i>)	L1 phonotactics that do not allow consonant clusters.	Focus on Consonant Blending .	"The Sound Slider" : Practice sliding two consonants together slowly, gradually removing the "ghost vowel" between them.

Table 5.3 Examples of integrating lab findings into teaching

5.4.3 Case studies of laboratory phonology in Nigerian contexts

Case studies provide practical insights into how laboratory phonology can be applied in real classrooms. In Nigerian contexts, teachers often adapt laboratory methods to suit large classes and limited resources. For example, group recordings may be used instead of individual ones, and simple auditory discrimination tasks can be conducted without advanced equipment. These case studies highlight creative ways of applying laboratory phonology in diverse educational settings, showing that effective practice is possible even with constraints.

Fill in the blank: Nigerian teachers often adapt laboratory methods to suit large classes and _____ resources.





Figure 4.10 Phonology Lab Adaptations in Low-Resource Settings.
SOURCE: OER (Open Educational Resource).

Figure 5.4 Laboratory phonology adaptations in Nigerian contexts

Pilot questions 5.4

1. What is one example of a phonology lab activity for learners?
2. Fill in the blank: Integrating lab findings into teaching ensures that phonology instruction is _____-based.
3. Give one example of how acoustic analysis can inform classroom practice.
4. What challenge do Nigerian teachers face when applying laboratory phonology?
5. Suggest one adaptation Nigerian teachers use in large classes.

Series summary

This Series has been designed to introduce you to the practical applications of phonology laboratories and to show how scientific tools and methods can enhance the study and teaching of speech sounds. Its relevance lies in bridging theory with practice, enabling learners to record, analyse, and interpret speech data with precision while applying findings to classroom contexts.

We began by examining the purpose and scope of phonology laboratories, including the tools and ethical considerations involved. Then we moved on to acoustic analysis, where you explored recording techniques, spectrograms, and the measurement of pitch, duration, and intensity. Following that, we studied articulatory and auditory experiments, such as palatography, ultrasound



imaging, and discrimination tasks, and considered how these can be adapted for classroom use. Finally, we concluded with applied laboratory practice, focusing on designing learner-centred activities, integrating lab findings into teaching, and reviewing case studies from Nigerian classrooms. By completing this Series, you should now be able to define the role of phonology laboratories, demonstrate acoustic and articulatory techniques, apply auditory tasks, design and integrate lab-based activities, and evaluate case studies, thereby achieving the Series Learning Outcomes (SLOs 5.1–5.11).

Glossary of terms

- **Acoustic analysis:** The study of speech sounds using visual and measurable features such as pitch, duration, and intensity.
- **Auditory discrimination:** The ability to distinguish between similar sounds, often practised through listening tasks.
- **Duration:** The length of time a sound is held during speech.
- **Ethical considerations:** Principles that guide responsible practice in phonology laboratories, such as informed consent and confidentiality.
- **Intensity:** The loudness of a sound, often linked to stress in speech.
- **Palatography:** A method used to study tongue placement by observing where the tongue touches the palate during speech.
- **Phonology laboratory:** A specialised environment where speech sounds are recorded, analysed, and studied using scientific tools.
- **Pitch:** The perceived highness or lowness of a sound, determined by frequency.
- **Spectrogram:** A visual representation of speech sounds showing frequency, intensity, and duration over time.
- **Ultrasound imaging:** A non-invasive technique used to visualise tongue movement during speech production.
- **Waveform:** A visual representation of the amplitude of sound signals, showing how loudness changes over time.

Concept Check Questions [Series 5]

Objective questions

1. A phonology laboratory is a specialised environment where _____ sounds are studied using scientific tools. (Linked to SLO 5.1)
2. Spectrographs are used to _____ sound waves in phonology laboratories. (Linked to SLO 5.2)
3. Ethical considerations in phonology laboratories include obtaining _____ consent from participants. (Linked to SLO 5.3)
4. Speech recordings are often digitised into formats such as _____ or MP3 for analysis. (Linked to SLO 5.4)
5. A spectrogram is a visual representation of the _____, intensity, and duration of speech sounds. (Linked to SLO 5.5)



6. Pitch is linked to the _____ of a sound and determines whether it is high or low. (Linked to SLO 5.6)
7. Palatography is used to study _____ placement during speech. (Linked to SLO 5.7)
8. Auditory discrimination tasks train learners to _____ between similar sounds. (Linked to SLO 5.8)
9. Minimal pair games are a classroom application of _____ discrimination tasks. (Linked to SLO 5.9)
10. Integrating lab findings into teaching ensures that phonology instruction is _____-based. (Linked to SLO 5.10)

Short-answer questions

11. Define a phonology laboratory and explain its purpose. (Linked to SLO 5.1)
12. Identify one tool used in phonological analysis and state its function. (Linked to SLO 5.2)
13. Give one ethical principle that guides phonology laboratory practice. (Linked to SLO 5.3)
14. Explain why digitisation of speech recordings is important. (Linked to SLO 5.4)
15. Provide one example of how spectrograms can be used in teaching. (Linked to SLO 5.5)
16. State one classroom implication of measuring pitch in speech. (Linked to SLO 5.6)
17. Give one example of how ultrasound imaging can be used in phonology experiments. (Linked to SLO 5.7)
18. Suggest one classroom activity for auditory discrimination practice. (Linked to SLO 5.8)
19. Describe one way articulatory experiments can be adapted for classroom use. (Linked to SLO 5.9)
20. Provide one challenge Nigerian teachers face when applying laboratory phonology. (Linked to SLO 5.11)

Long-answer questions

21. Analyse the scope of phonology laboratories and explain their relevance to language teaching. (Linked to SLO 5.1, SLO 5.2)
22. Evaluate the effectiveness of acoustic analysis methods such as spectrograms and waveform analysis in teaching phonology. (Linked to SLO 5.4, SLO 5.5, SLO 5.6)
23. Discuss the role of articulatory and auditory experiments in improving learners' pronunciation and listening skills. (Linked to SLO 5.7, SLO 5.8, SLO 5.9)
24. Explain how laboratory findings can be integrated into classroom practice, with examples of specific activities. (Linked to SLO 5.10)
25. Assess the importance of case studies in adapting laboratory phonology to Nigerian classrooms. (Linked to SLO 5.11)

Answers to Concept Check Questions [Series 5]

Objective questions

1. Speech
2. Visualise
3. Informed



4. WAV
5. Frequency
6. Frequency
7. Tongue
8. Distinguish
9. Auditory
10. Evidence

Short-answer questions

11. A phonology laboratory is a specialised environment for studying speech sounds using scientific tools. Its purpose is to record, analyse, and interpret speech data.
12. Example: Microphone – used to record speech for analysis.
13. Informed consent.
14. Digitisation allows sounds to be stored, replayed, and analysed using software.
15. Spectrograms can be used to show vowel formants and help learners distinguish vowel quality.
16. Measuring pitch helps learners practise intonation patterns in spoken English.
17. Ultrasound imaging can show tongue movement during vowel production.
18. Minimal pair listening games.
19. Simplified palatography using food colouring.
20. Large class sizes and limited resources.

Long-answer questions

21. **Basic response:** Phonology laboratories cover acoustic, articulatory, and auditory analysis, making them relevant for teaching pronunciation and listening. **Value-added response:** They also provide evidence-based insights that inform curriculum design and teacher training, ensuring phonology is taught with scientific precision.
22. **Basic response:** Spectrograms and waveforms help learners visualise sound features such as frequency and stress. **Value-added response:** These methods also promote learner autonomy, as students can analyse their own recordings and track progress over time.
23. **Basic response:** Articulatory and auditory experiments improve pronunciation by showing tongue placement and training learners to distinguish sounds. **Value-added response:** They also enhance intercultural communication by helping learners perceive subtle contrasts across different English varieties.
24. **Basic response:** Laboratory findings can be integrated through targeted drills, listening exercises, and stress awareness activities. **Value-added response:** Integration ensures teaching is evidence-based, making lessons more effective and motivating for learners.
25. **Basic response:** Case studies show how Nigerian teachers adapt laboratory methods to large classes and limited resources. **Value-added response:** They also highlight innovative practices, such as group recordings and local language comparisons, which can inspire broader applications in multilingual contexts.

Answers to Pilot Questions [Series 5]



Part 5.1 Introduction to phonology laboratories

1. To provide opportunities to record, analyse, and interpret speech data using scientific tools.
2. Microphone.
3. Visualise.
4. Informed.
5. Ultrasound imaging.

Part 5.2 Acoustic analysis of speech sounds

1. WAV.
2. Frequency.
3. Amplitude of sound signals.
4. Pitch is the perceived highness or lowness of a sound linked to frequency.
5. Studying vowel length contrasts.

Part 5.3 Articulatory and auditory phonology experiments

1. Tongue placement.
2. By providing a non-invasive way to visualise tongue movement in real time.
3. Distinguish.
4. Minimal pair listening games.
5. Simplified palatography using food colouring.

Part 5.4 Applied laboratory practice in phonology teaching

1. Recording and comparing learner speech with native models.
2. Evidence.
3. Acoustic analysis can show vowel length problems, leading to targeted drills.
4. Large class sizes.
5. Group recordings.

References and Attributions [Series 5]

General references

- Ladefoged, P., & Johnson, K. (2014). *A course in phonetics* (7th ed.). Boston: Cengage Learning.
- Ashby, M. (2011). *Speech sounds*. London: Routledge.
- International Phonetic Association. (1999). *Handbook of the International Phonetic Association: A guide to the use of the International Phonetic Alphabet*. Cambridge: Cambridge University Press.
- Open Educational Resources (OER) consulted: MIT OpenCourseWare (Phonetics and Phonology), University of Iowa Phonetics OER, and Wikimedia Commons (phonetics diagrams).



Illustrations

Part 5.1 Introduction to phonology laboratories

- **Figure 5.1 Scope of phonology laboratories:** AI-generated using the prompt “Generate a diagram showing the scope of phonology laboratories including acoustic, articulatory, and auditory analysis” (Microsoft Copilot graphic tool).
- **Table 5.1 Tools and equipment in phonology laboratories:** Adapted from OER sources (University of Iowa Phonetics OER).
- **Box 5.1 Ethical guidelines for phonology laboratories:** Author-created content based on standard ethical guidelines in linguistics research.

Part 5.2 Acoustic analysis of speech sounds

- **Plate 5.1 Recording speech data in a phonology laboratory:** AI-generated using the prompt “Generate an image of a student recording speech with a microphone in a phonology laboratory” (Microsoft Copilot graphic tool).
- **Figure 5.2 Spectrogram and waveform analysis of speech:** AI-generated using the prompt “Generate a diagram showing a spectrogram and waveform of the word ‘bat’ with labelled features” (Microsoft Copilot graphic tool).
- **Table 5.2 Acoustic features of speech sounds:** Author-created content, informed by Praat software documentation and OER phonetics resources.

Part 5.3 Articulatory and auditory phonology experiments

- **Figure 5.3 Visualising tongue movement with palatography and ultrasound:** AI-generated using the prompt “Generate a diagram showing tongue placement using palatography and ultrasound imaging in phonology experiments” (Microsoft Copilot graphic tool).
- **Plate 5.2 Learners engaged in auditory discrimination practice:** AI-generated using the prompt “Generate an image of students wearing headphones and completing auditory discrimination tasks in a phonology lab” (Microsoft Copilot graphic tool).
- **Box 5.3 Classroom applications of articulatory and auditory experiments:** Author-created content based on classroom adaptation strategies in phonology teaching.

Part 5.4 Applied laboratory practice in phonology teaching

- **Box 5.4 Examples of phonology lab activities for learners:** Author-created content based on applied phonology teaching practices.
- **Table 5.3 Examples of integrating lab findings into teaching:** Author-created content, informed by OER teaching resources.
- **Figure 5.4 Laboratory phonology adaptations in Nigerian contexts:** AI-generated using the prompt “Generate a diagram showing adaptations of laboratory phonology in Nigerian classrooms, such as group recordings and simplified auditory tasks” (Microsoft Copilot graphic tool).



Attribution notes

- All AI-generated illustrations were created using Microsoft Copilot's graphic tool with prompts specified above.
- Tables and boxes were author-created unless otherwise noted, drawing on OER materials and standard phonetics references.
- External OER sources such as MIT OpenCourseWare, University of Iowa Phonetics OER, and Wikimedia Commons were consulted for conceptual accuracy and inspiration.

