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PRONUNCIATION ERROR ANALYSIS OF ḤALQ PHONEMES: CASE STUDY IN MAWA'IDZUNNISYAN ISLAMIC BOARDING SCHOOL

Muhamad Subhi [1]*, Mursidin [2]
[1] Universitas Islam Negri Sunan Kalijaga, Indonesia
[2] Institut Agama Islam Qamarul Huda, Lombok, Indonesia

Abstract

Arabic possesses a high degree of phonological complexity due to the existence of distinctive phonemes, which poses a major challenge for non-native learners, especially those whose first language (L1), such as Indonesian, lacks these sounds. The imprecise realization of phonemes directly affects semantic comprehension and communication effectiveness. This study employed a qualitative error analysis approach based on diagnostic data from 21 student at Mawa'idzunnisyan Islamic Boarding School to identify, classify, and clarify the phonological deviations. The research focuses on three aspects: identifying the Arabic phonemes most vulnerable to error and determining their error frequency; describing the resulting error typology and analyzing the role of L1 phonological interference in explaining the observed error patterns. The research findings indicate that the Ḥalq phonemes ع، ح، خ are critical phonemes with the highest error rates (reaching 61,9% of cases), predominantly showing the substitution typology. The most frequent substitutions involve the replacement of ح with ه and ع with أ. These error patterns are strongly explained by L1 interference, where learners attempt to replace target phonemes with the closest sounds present in the Indonesian phonological system. This study strives to identify critical phonemes, describe dominant error patterns, and outline the root causes of errors through an examination of L1 interference. These results provide an empirical foundation for adjusting instructional materials, particularly through contrastive articulatory drills targeting pharyngeal and uvular fricatives absent in Indonesian.

Keywords: Pronunciation Error, Ḥalq Phonemes, L1 Interference, Arabic Phonology, Makhārij al-Ḥurūf

* Correspondence Address:	Subhi10011996@gmail.com

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INTRODUCTION | مقدمة

In the realm of linguistics, Arabic possesses distinctive phonological characteristics, particularly in the category of guttural phonemes (Ḥalq). Articulatory-wise, phonemes such as /خ/, /ح/, /ع/, and /غ/ demand high neuromuscular control of the pharyngeal and laryngeal areas—regions seldom explored in Austronesian languages like Indonesian. This typological distance creates a tangible articulatory barrier, leading to systematic error patterns where deep guttural sounds are often substituted with shallower, local articulations (Kulikov, 2022; Muslimat et al., 2023).

In fact, observations at the Mawa'idzunnisyan Narmada Islamic Boarding School a specialized institution for Tahfidz Al-Qur'an (Qur'anic memorization) reveal a phonetic approximation phenomenon where students tend to perform sound substitutions when faced

with such complexity. Despite their daily immersion in Quranic recitation and intensive interaction with Arabic texts through memorization, their lingual motor memory is accustomed to local language sounds which lean towards alveolar and bilabial articulations deep guttural phonemes are often distorted into shallower sounds. For instance, ع *(‘ayn),* which should be produced through pharyngeal constriction, frequently shifts to a glottal stop أ *(hamzah),* or ح *(ḥā)* which is reduced to هـ *(ha).* This disparity between the target language's phonemic system and the mother tongue creates a systematic error pattern, transforming a linguistic challenge into a tangible articulatory barrier, even for learners who are in constant contact with the language through sacred liturgy.

Difficulties in realizing these phonemes have direct implications for communication (Smith et al., 2025). Inaccurate pronunciation can directly impact semantic comprehension and communicative effectiveness (Mulder et al., 2024). This phenomenon underscores the need for measurable pedagogical intervention (Gordon, 2021). However, the majority of existing studies still focus on general descriptions of errors without deeply examining the specific factors underlying the difficulties of guttural phoneme pronunciation among Indonesian speakers. Furthermore, current instructional approaches are often normative and result-oriented, thus failing to fully consider the articulatory, neuromuscular dimensions, and the phonological habits of the learners' first language. This absence of systematic and contextual error mapping leaves a research gap, particularly in formulating pedagogical strategies based on the actual error characteristics of the learners.

Second language acquisition studies have identified that L1 interference is a significant source of error in learning L2 phonological systems (Goad, 2025). This theory is relevant to several studies, including Maskuri et al., (2023), whose findings indicate that while students' speaking abilities are generally adequate, dominant errors persist in linguistic sound aspectsspecifically phonetics and phonology. These include the neutralization of *makhārij al-ḥurūf* (points of articulation) and errors in suprasegmental features such as intonation, stress, waqaf (pausing), and vowel length. Furthermore, Hafidzotun Nafiah et al., (2024) state that students frequently commit phonological errors on letters with similar pronunciations. These include sound shifts such as /ع/ to /أ/ ,/ق/ to /ك/ ,/ع/ to /ق/, and /ض/ to /ظ/. The factors contributing to these errors include: (1) Arabic pronunciations that do not exist in the Indonesian language and (2) students’ limitations in speech production (vocabulary).

Nailurrahmi & Marlina (2025) note that phonetic interference takes several forms, including phoneme substitution, sound distortion, epenthesis (sound addition), and intonation changes. Pronunciation errors occur most frequently when specific Arabic phonemes, such as /ذ/ ,/ع/ ,/خ/ ,/ص/ ,/ق/, and /ث/, are absent in Indonesian and are subsequently replaced by the nearest phonemes from the first language. The primary causes of this interference are the disparate phonetic systems, a lack of articulatory practice, and the dominance of the L1 in daily life. Additionally, Ana & Muballighin (2024) demonstrate that phonological errors in reading Arabic texts encompass phoneme addition, omission, and substitution. These errors are driven by various factors, including the students' educational background prior to entering MTs, low interest in learning Arabic, lack of concentration during class, limited facilities, and the students' Quranic reading habits at home.

While previous studies have identified L1 interference as a source of phonological error (Goad, 2025), existing research often remains at a descriptive level. Studies by Maskuri et al., (2023) and Nafiah et al., (2024) have noted general phonetic inaccuracies and sound

substitutions. However, these works largely overlook the specific diagnostic frequency and the systematic neuromuscular factors unique to Indonesian speakers. There remains a significant empirical gap in mapping these errors contextually to formulate evidence based pedagogical strategies.

The novelty of this study lies in its granular diagnostic approach. While existing research typically identifies general phonetic substitutions, this study goes further by systematically mapping the frequency of errors based on the phonemes' distribution—at the initial, medial, and final positions of words. By identifying whether a phoneme like /ع/ is more susceptible to distortion when appearing as a coda or an onset, this research provides a more precise anatomical and pedagogical blueprint for tailored instructional materials (Zhang & Yuan, 2020).

This study is intended to contribute to the development of more effective pronunciation learning strategies and the tailoring of instructional materials specifically designed for Indonesian learners. By providing a necessary diagnostic foundation, the research aims to support the formulation of measurable pedagogical interventions in the field of phonetics and *makhārij al-ḥurūf*. The significance of this work lies in its potential to offer educators a precise framework for adapting instructional content and organizing targeted articulatory training, thereby addressing the specific phonetic challenges faced by non-native speakers (Zhang & Yuan, 2020). Consequently, this study aims to analyze the Arabic phonemes most susceptible to mispronunciation among Indonesian L1 learners, identify their error frequencies, and describe the resulting typologies of substitution.

METHOD | منهج

Research Design

This study employs a qualitative approach with an Error Analysis (EA) design to systematically examine Arabic phoneme pronunciation errors among first-language (L1) learners (Rifai & Suharto, 2020). The research is observational in nature, focusing on the identification and classification of phonological deviations in the production of Ḥalq phonemes (ع،ح،غ،خ) sounds that are inherently absent in the Indonesian phonological system (Rismaya & Riyanto, 2021).

Participant

The research subjects consisted of 21 students (santri) at the Mawaidzunnisyan Islamic Boarding School, encompassing both Junior High (SMP) and Elementary (SD) levels. Participants were selected using a purposive sampling technique. The primary eligibility criterion was that participants must have completed at least one year of formal instruction in makhārij al-ḥurūf. This criterion was established to ensure that the data collected reflects persistent pronunciation errors rather than initial learning difficulties (Mubin, 2021).

Instruments and Procedures

Data collection was executed through a structured Pronunciation Test designed to isolate phonological performance. The procedures were divided into three operational stages:

1. Instrument Preparation: A curated list of representative Arabic words and phrases was compiled, systematically mapping target phonemes across initial, medial, and final positions. To ensure pedagogical and linguistic validity, the validity of the research instrument was assessed using the Content Validity Index (CVI). Two experts in Arabic phonetics and linguistics

were requested to evaluate the relevance of the word list in relation to the target ḥalq phonemes using a 4-point Likert scale. The analysis yielded I-CVI values ranging from 0.83 to 1.00, resulting in an overall Scale-Level CVI (S-CVI/Ave) of 0.92. This score indicates that the instrument possesses a high degree of content validity and is highly appropriate for diagnosing phonetic pronunciation errors among the participants.

2. Test Administration: During the session, participants read the stimulus list aloud. To ensure accuracy for subsequent analysis, each session was captured using a high-fidelity audio recording device.
3. Data Documentation: The primary data, consisting of raw audio recordings of the Ḥalq phoneme realizations, were archived for phonetic transcription.

Data Analysis

To maintain high objectivity and reliability, the audio data were evaluated through an inter-rater process involving the researcher and a collaborator specializing in tajwid and Arabic linguistics. The inter-rater agreement reached 97,2%, with a Cohen's Kappa coefficient of 0.93, indicating a high level of coding reliability. The analysis followed Rod Ellis (1994) five stage framework for Error Analysis:

1. Collection of learner language samples.
2. Identification of errors.
3. Description of errors.
4. Explanation of errors (typological classification).
5. Evaluation of error severity.

The qualitative data processing was further structured according to the model by Miles & Huberman (1994), which involves systematic stages of data reduction, data display, and conclusion drawing/verification.

RESULT | نتائج

The research findings at the Mawa'idzunnisyan Narmada Islamic Boarding School indicate the presence of systematic error patterns in the pronunciation of Arabic phonemes that lack equivalents in the Indonesian (L1) phonological system. Based on the pronunciation tests administered to 21 students, the data indicates varying levels of difficulty across the four Ḥalq phonemes studied. The error frequency data are presented in the following table:

Table 1. Results of Ḥalq Phoneme Pronunciation Test Analysis

Phoneme	Position	Error Frequency	Error Percentage (21 Students)	Dominant Error
'ayn (ع)	Initial (عَلِمَ)	6	28.6%	Substitution of *'ayn* to *hamzah*
'ayn (ع)	Medial (سَعَى)	5	23.8%	Substitution of *'ayn* to *hamzah*
'ayn (ع)	Final (سَمِعَ)	6	28.6%	Substitution of *'ayn* to *hamzah*
ḥā (ح)	Initial (حَالَ)	6	28.6%	Substitution of *ḥā* to H
ḥā (ح)	Medial (رِحْلَةٌ)	7	33.3%	Substitution of *ḥā* to H
ḥā (ح)	Final (صَحِيْحٌ)	7	33.3%	Substitution of *ḥā* to H
khā` (خ)	Initial (خَالٌ)	2	9.5%	-
khā` (خ)	Medial (مَخْرَجٌ)	1	4.8%	-
khā` (خ)	Final (مُخْ)	1	4.8%	Substitution of *kha'* to *ghayn*
ghayn (غ)	Initial (غَالِيٌ)	10	47.6%	Substitution of *ghayn* to G
ghayn (غ)	Medial (مَغْرِبٌ)	11	52.4%	Substitution of *ghayn* to G
ghayn (غ)	Final (بَلاَغٌ)	13	62.9%	Substitution of *ghayn* to G

Distribution of Errors Based on Phoneme Type

The cumulative data shows a significant disparity in error rates among the four phonemes. The ghayn (غ) phoneme recorded the highest frequency of errors across all positions, with a total of 34 error occurrences. This is followed by ḥā (ح) with 20 occurrences and ʻayn (ع) with 17 occurrences. In contrast, the khā` (خ) phoneme demonstrated the highest level of mastery among students, with only 4 recorded errors in total.

Positional Analysis of Pronunciation Errors

Data analysis based on word position (initial, medial, and final) indicates that the position of a phoneme within a word influences the likelihood of mispronunciation:

1. Final Position: This position proved to be the most challenging for students, particularly for the *ghayn* phoneme, which reached an error peak of 61.9%. For the *khā`* phoneme, errors only appeared at the final position (4.8%), while the initial and medial positions were pronounced perfectly by almost all subjects.
2. Medial Position: Errors in the medial position were most prominent in the *ghayn* (52.4%) and *ḥā* (33.3%) phonemes. Students often struggled with maintaining articulatory precision when the phoneme was flanked by other vowels or consonants.
3. Initial Position: While still high for ghain (47.6%), the initial position generally showed slightly lower error rates for *ʻayn* and *ḥā* compared to other positions, suggesting that starting a word with a Ḥalq sound is marginally easier for L1 learners than concluding a word with one.

Typology of Dominant Substitutions

The findings identify a consistent pattern of "Phonetic Approximation," where students substitute difficult Arabic sounds with the nearest available sounds in the Indonesian phonological system. The dominant substitutions found include:

1. The shift of Uvular Fricative /غ/ to Velar Plosive /G/.
2. The shift of Pharyngeal Fricative /ع/ to Glottal Stop /أ/.
3. The reduction of Pharyngeal Fricative /ح/ to Glottal Fricative /H/.

DISCUSSION | مناقشة

Analysis of Halq Phoneme Pronunciation Errors

The aforementioned data indicate that the ghayn (غ) phoneme is the most difficult, consistently exhibiting the highest error rates and peaking at the final position of words (61.9%). The majority of these error cases are classified as the substitution of ghayn with 'G'. Phonetically, this substitution represents an articulatory shift from a voiced uvular fricative (ghayn) to a voiced velar plosive (g); this confirms the presence of negative transfer, wherein students accommodate foreign sounds into the nearest articulatory framework of their first language (L1) (Zahraa, 2025). This error directly indicates the students' fundamental difficulty in articulating uvular fricative sounds, which require specific articulatory movements at the back of the oral cavity (the makhraj or point of articulation for ghayn).

Furthermore, the second most significant dominant error was observed in the ʻayn (ع)

phoneme, where the primary error type is the substitution of ‘ayn with hamzah (أ). This substitution represents a simplification from a voiced pharyngeal fricative to a glottal stop. Although both (ghaiyn and ‘ayn) originate from the throat area (halq), ‘ayn requires pharyngeal constriction that does not exist in the L1, leading to its frequent replacement by hamzah, which has a lighter articulation (Mujianto & Sudjalil, 2021). These dominant errors reinforce the finding that the primary factor in pronunciation failure is the complex and foreign difference in the points of articulation (makhraj) for Indonesian speakers, demonstrating a negative transfer from the L1 (Kosim et al., 2025).

In contrast to the ghayn and ‘ayn phonemes, this study also found that the khā` (خ) phoneme is the Ḥalq letter with the significantly lowest error rate. This indicates that the pronunciation of this phoneme is better mastered by the students at Mawa’idzunnisyan Islamic Boarding School. The error frequency for khā` ranges from only 4.8% to 9.5% across all word positions. This low error rate can be interpreted from two perspectives:

1. Phonetic Similarity: First, phonetically, *khā`* (خ) as a voiceless uvular fricative has a sound equivalent that is already common or at least similar and easily accommodated in several Indonesian dialects or loanwords, such as in "khusus" or "khawatir" (Khairudin et al., 2024). This ease contrasts with the difficulties experienced with *ghayn* (its voiced counterpart) and *‘ayn* (pharyngeal), which do not exist in the L1 (Haryadi & Marlina, 2025).
2. Voicing Confusion: Second, although the error rate is low, the errors found in the final position involve the substitution of ghayn with *khā`*. This indicates confusion between two different uvular sounds, where a voiced sound *(ghayn)* is used to replace a voiceless sound *(khā`)* (Musthofa et al., 2024).

Overall, the minor error data for khā` confirms that the 'voiced' or 'pharyngeal' components of halq letters are the primary determinants of pronunciation difficulty. Halq phonemes that are voiceless and more easily accommodated into the L1 demonstrate a far superior level of mastery.

The findings regarding the dominance of errors in the ghayn (غ) and ‘ayn (ع) phonemes, alongside the low error rate for khā` (خ), demonstrate significant alignment with similar studies on Arabic pronunciation by speakers with an Indonesian (L1) background. This data consistency confirms that the issues in Narmada are part of a systematic error pattern influenced by fundamental differences between the Arabic and Indonesian phonological systems.

This pattern is clearly supported by several studies:

1. Research titled *"Analisis Interferensi Fonetik Bahasa Ibu Terhadap Pelafalan Fonem Bahasa Arab Dalam Pembelajaran Kosakata"* highlights that pronunciation difficulties are rooted in the phenomenon of negative transfer. In these cases, phonemes lacking an equivalent in L1, such as *ghayn* and *‘ayn,* are replaced by the nearest sounds that are easier to articulate, such as 'G' or *hamzah* (Nailurrahmi & Marlina, 2025).
2. The same argument is reinforced by another study, *"Taḥlīl Al-Akhṭa‘ aṣ-Ṣautiyyah Fi Fidyuhāt Al-Kalām Bi Al-Lugah Al-Arabiyyah ala Qanaṭi Al-Yūtūb MAPK Solo,"* which also identified identical phonological substitution patterns among students (Hafidzotun Nafiah et al., 2024).

While the findings of this study regarding phonetic substitution align with the patterns identified by Nailurrahmi & Marlina (2025) and Hafidzotun Nafiah et al., (2024), there is a distinct

divergence in how these errors are interpreted. Previous studies largely focused on identifying the types of errors without deeply exploring the positional vulnerability of the phonemes. This research extends the existing literature by demonstrating that the difficulty of ghayn and 'ayn is significantly exacerbated by their placement at the final position of words—a granular detail that was less emphasized in earlier works. Furthermore, while Nailurrahmi (2025) attributes these errors primarily to a lack of L1 equivalents, this study argues that the issue at Mawa'idzunnisyan is compounded by a 'pedagogical gap' where students rely on visual recognition (Rasmul Ḥurūf) rather than auditory-articulatory precision. By comparing these results with broader linguistic contexts, such as the distinct error patterns found in non-Indonesian L1 learners, this study offers a more comprehensive 'integrated articulatory error model' that moves beyond simple identification toward a systematic pedagogical critique (Mohammad Al Zahrani, 2015). The similarity of findings across various contexts and locations indicates that pronunciation errors of Ḥalq letters in Indonesia, particularly regarding uvular and pharyngeal sounds, constitute a universal phonological challenge. Consequently, this issue requires specific attention within curricula and teaching methods.

Synthesis of Causal Factors: Between Interference and Pedagogy

While L1 interference is a dominant factor, other studies suggest multidimensional causes, such as visual similarity of letter forms (Rasmul Ḥurūf) (Saiegh-Haddad et al., 2020). In the context of Mawa'idzunnisyan, if teaching methods focus solely on theory without adequate articulatory practice, difficult phonemes like ghayn remain vulnerable (Karaoui et al., 2021). Thus, while L1 interference is the trigger, pedagogical methods influence the severity and persistence of errors (Alhawary, 2023).

This study proposes an integrated articulatory error model: pronunciation errors are a combined consequence of L1 interference and pedagogical weaknesses (Flege, 1995). Effective improvement requires contrastive and corrective makhārij strategies that compare difficult Arabic sounds with L1 substitutes alongside intensive articulatory training.

Proper mastery of ḥalq phonemes is fundamental, particularly in religious contexts where phonological errors can alter word meanings (ikhtilāf al-ma'nā). The systematic patterns found at Mawa'idzunnisyan serve as a critical warning for Islamic educational institutions to re-evaluate their makhārij al-ḥurūf curricula. Comprehensive improvement must combine awareness of L1 interference with innovative, corrective pedagogical methods focused on specific auditory and articulatory training.

CONCLUSSION | خاتمة

This study advances the current understanding of Arabic phonological acquisition among Indonesian learners by providing a specific diagnostic map of halq phoneme errors. While previous research often generalized phonetic interference, this work this work provides a significant theoretical contribution by enriching the Contrastive Analysis (CA) framework with micro-phonetic data. It demonstrates that phonological distance is not uniform; specially, the ghayn (غ) phoneme represents the most critical barrier, peaking at a 61.9% error rate in the final position of words. The scientific rationale for these findings lies in the "Articulatory Mapping" phenomenon, where the absence of voiced uvular and pharyngeal fricatives in the Indonesian phonological system forces learners into a systematic pattern of phonetic approximation substituting complex sounds with the nearest available L1 frameworks, such as 'G' and hamzah.

These findings offer significant practical applications for Islamic educational institutions,

suggesting that makhārij al-ḥurūf instruction must move beyond normative-theoretical approaches. Crucially, this study recommends a curricular integration where articulatory training is formally embedded into the Tajwid syllabus. Instead of focusing solely on the rules of recitation, the curriculum should incorporate neuromuscular strengthening of the pharyngeal area and contrastive drilling-comparing Arabic makhraj directly with L1 subtitutes-to break deep seated phonetic habits.

To build upon this work, future research should explore the longitudinal effects of specific articulatory interventions using a larger and more diverse demographic of learners. Additionally, future experiments could integrate acoustic phonetic analysis (using software like Praat) to provide even more precise data on the frequency and intensity of these substitutions, further bridging the gap between theoretical linguistics and practical language pedagogy.

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