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Phonemic Error Analysis of a Tajikistan Student in Indonesian as a Foreign Language (BIPA) Learning at UIN Bandung

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ABSTRACT

Phonemic accuracy is a crucial aspect of Indonesian as a Foreign Language (BIPA) learning, yet foreign learners often experience persistent phonemic errors due to differences between their first language and Indonesian phonological systems. This study addresses the problem of phonemic errors produced by a Tajik student during BIPA learning, which may hinder intelligibility and effective communication. The objective of this research is to identify and analyze the types of phonemic errors and their phonological characteristics as manifested in the learner's spoken Indonesian. This study employs an applied qualitative case study approach focusing on a single Tajik learner enrolled in a BIPA program at UIN Bandung. Data were collected through classroom observation, teaching participation, interviews, and voice-note recordings via WhatsApp, which provided authentic speech data. The data were analyzed using phonemic and phonological analysis to identify systematic error patterns. The results reveal recurring phonemic errors, particularly vowel mispronunciation involving the phoneme /e/ and consonant epenthesis after velar nasals, such as /ŋg/. These errors indicate strong first-language phonological influence and incomplete phonemic acquisition in Indonesian. The findings highlight the importance of targeted phonological instruction in BIPA learning.

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1. INTRODUCTION

Phonemic accuracy is a fundamental component of second-language acquisition, particularly in Indonesian as a Foreign Language (BIPA) instruction. Inaccurate phoneme realization may reduce intelligibility and impede effective communication in academic and instructional contexts. Foreign learners often encounter phonemic difficulties due to differences between their first language phonological systems and Indonesian phonology,

especially when certain vowels or consonant clusters do not exist or function differently in their native languages [15], [16].

Previous studies on BIPA learners have identified various phonological and phonemic errors, such as vowel substitution, consonant insertion, and phonotactic deviations [1], [2]. Research has also shown that phonemic errors are strongly influenced by first-language interference and limited phonological awareness of the target language [3], [6]. Chaer emphasizes that phonemic errors should be understood as systematic deviations rather than random pronunciation mistakes, as they reflect the learner's internalized phonological system [1], [2]. However, most existing studies focus on learners from East Asian, Middle Eastern, or Southeast Asian backgrounds and are generally conducted using group-based analysis. Despite the growing body of research on BIPA phonology, there is a notable lack of in-depth phonemic analysis focusing on Central Asian learners, particularly Tajik students. Tajik, which belongs to the Indo-Iranian language family, has a phonological system that differs significantly from Indonesian, potentially leading to distinctive phonemic error patterns. This gap indicates the need for a focused investigation that examines phonemic errors as structured linguistic phenomena within a specific learner context.

To address this gap, the present study employs a qualitative case study to analyze phonemic errors made by a Tajik student during BIPA learning. The analysis is grounded in phonological theory, particularly in the discussion of vowel realization, consonant epenthesis, and first-language phonological transfer [6], [17]. By examining authentic spoken data, this study seeks to reveal recurring phonemic patterns and explain their underlying phonological causes. The objective of this study is to identify, classify, and analyze the phonemic errors produced by a Tajik learner in BIPA learning and to explain these errors from a phonological perspective. The findings are expected to contribute theoretically to phonemic studies in BIPA research and practically to the development of phonology-based instructional strategies for foreign learners of Indonesian, especially those from underrepresented linguistic backgrounds.

2. METHOD

This section presents a detailed explanation of the research design, data collection procedures, analysis techniques, and the study's validity and limitations. The purpose of this section is to enable other researchers to replicate or test the study under similar contexts. The research employs a qualitative case study approach, allowing an in-depth exploration of phonemic errors committed by a Tajik student during BIPA learning [3]. Data were collected through classroom observation, participation in teaching sessions, interviews, and supplementary assignments via WhatsApp, including voice recordings and videos, which provided authentic language samples [4]. Subsequently, the data were analyzed using a phonological framework, ensuring a systematic examination of pronunciation deviations and patterns relevant to Indonesian phonology.

2.1 Research Design

This study employed a qualitative approach using a case study design. The qualitative approach was selected because the research aims to explore and describe linguistic

phenomena in their natural context, particularly phonemic errors occurring in Indonesian speech production by a BIPA learner. Sugiyono states that qualitative research emphasizes meaning, context, and depth of understanding, with the researcher acting as the primary research instrument rather than focusing on statistical generalization [3]. A case study design was adopted because the research involved a single individual as the research subject. Yin argues that a case study is appropriate for investigating a phenomenon in depth within its real-life context, especially when the boundaries between the phenomenon and the context are not clearly defined [5]. Accordingly, this design allows for an intensive and context-specific examination of phonemic errors as an individual linguistic phenomenon, rather than assessing instructional effectiveness or producing generalizable findings.

2.2 Data Collection Techniques and Procedures

Data were collected using multiple qualitative methods to obtain rich, comprehensive information. These techniques included classroom observation, researcher participation in teaching activities, interviews, and spoken production tasks. Observations were conducted during instructional sessions to capture participants' speech production in an authentic learning environment. The researcher's direct involvement in teaching allowed continuous monitoring of phonemic error patterns over time. Interviews were conducted to gather information on participants' linguistic backgrounds and language-learning experiences. The primary data source consisted of voice note recordings and video assignments submitted via WhatsApp. These recordings were selected because they represent natural and repeated oral production, which is essential for accurate phonological analysis. Miles, Huberman, and Saldaña emphasize that employing multiple data sources in qualitative research enhances data depth and credibility [7].

2.3 Data Analysis Technique

Data analysis was conducted using a phonological analysis framework within a qualitative case study approach. The analysis did not aim to evaluate learning effectiveness but rather to identify, classify, and describe phonemic errors produced by the participant. The analytical process followed the interactive model proposed by Miles, Huberman, and Saldaña, which consists of data condensation, data display, and conclusion drawing [7]. The voice note recordings were transcribed both orthographically and phonetically. The transcriptions were then examined to identify recurring phonemic error patterns, which were subsequently classified and interpreted based on phonological theory and cross-linguistic sound system differences between the participant's first language and Indonesian.

2.4 Validity, Credibility, and Research Limitations

The validity and credibility of the findings were ensured through methodological and data source triangulation, including observations, interviews, and multiple spoken data sources. Sugiyono asserts that triangulation is a fundamental strategy for establishing trustworthiness in qualitative research [3]. Credibility was further strengthened through prolonged engagement and continuous researcher involvement in the learning context.

Creswell notes that sustained interaction with research participants enables deeper contextual understanding and reduces the risk of misinterpretation [8]. Additionally, the recorded speech data were repeatedly reviewed to ensure analytical consistency. Despite these efforts, this study has certain limitations. The research involved only one participant; therefore, the findings are not intended to be statistically generalizable. However, as emphasized by Yin, the primary purpose of a case study is to achieve analytical depth and contextual insight rather than broad generalization [5]. Consequently, these limitations do not diminish the scholarly value of the study, which seeks to provide an in-depth phonological account of an individual BIPA learner.

3. RESULTS AND DISCUSSION

3.1. Substitution of the Schwa Vowel /ə/ in Phonemic Realization

The analysis reveals that the most prominent phonological error made by the participant is the systematic substitution of the schwa/ə/ with the mid-front vowel /e/. As shown in Table 1, this substitution occurs consistently across different lexical items and appears in initial, medial, and final syllabic positions. This recurring pattern indicates that the error is not incidental but reflects an underlying phonological constraint in the learner's interlanguage system.

In Indonesian phonology, the schwa /ə/ is characterized by a centralized tongue position, reduced articulatory energy, and relatively weak perceptual salience. Due to these characteristics, the schwa is particularly vulnerable to substitution by more salient vowels, especially among second language learners. In the word memecahkan /mə.mə.ca.hkan/, both schwa vowels in the initial syllables are realized as /e/, resulting in memecehkan /me.me.ceh.kan/. This substitution represents a complete change in vowel quality rather than a minor phonetic variation, thereby constituting a phonemic error.

A similar pattern is observed in the word berselisih /bər.sə.li.sih/, which is realized as berselesih /bər.se.le.sih/. The schwa vowels occurring in both the prefix ber- and the medial syllable are consistently replaced by /e/. The occurrence of the same substitution across different morphological boundaries suggests that the error is not influenced by morphological structure but instead reflects a broader difficulty in distinguishing and producing the schwa vowel. The substitution of schwa is also evident in the loanword transfer /trans.fər/, which is produced as transefer /tran.se.fer/. The schwa in the final syllable is replaced by /e/, indicating that schwa substitution persists even in word-final positions. This finding supports the view that the learner perceives schwa as an unstable or weak vowel and is therefore replaced by a vowel with greater articulatory clarity.

Further evidence of this pattern is found in the pronunciation of elang /ə.laŋ/ and keledai /kə.lə.dai/, both of which are realized with /e/ in place of schwa. Although the orthographic form remains unchanged, the phonemic contrast between /ə/ and /e/ is neutralized in the learner's speech. Since Indonesian distinguishes these two vowels phonemically, such substitutions are linguistically significant and affect phonological accuracy. From a theoretical perspective, this phenomenon can be explained through phonological interference and the Speech Learning Model, which posits that second language learners tend to assimilate unfamiliar sounds into the closest existing categories of

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their first language. When a target sound is perceived as similar but not identical to an existing sound, learners often fail to establish a new phonemic category, resulting in systematic mispronunciation. In this case, the schwa is perceived as equivalent to /e/, leading to consistent substitution.

Additionally, markedness theory suggests that learners prefer less marked and more perceptually salient sounds, further explaining the dominance of /e/ over /ə/ in the learner's production. Overall, the findings in this subsection demonstrate that the substitution of the schwa vowel constitutes a systematic and phonemic-level error rather than a performance-based mistake. This pattern reflects incomplete acquisition of the Indonesian vowel system and highlights the learner's difficulty in producing reduced central vowels accurately.

Table 1. Substitution of the Schwa Vowel /ə/ in Learner Speech

No	Target Word	Phonemic Transcription	Learner Realization	Phonemic Realization	Type of Phonological Error
1	memecahkan	/mə.mə.ca.hkan/	memecehkan	/me.me.ceh.kan/	/ə/ → /e/ substitution
2	berselisih	/bər.sə.li.sih/	berselesih	/bər.se.le.sih/	/ə/ → /e/ substitution
3	transfer	/trans.fər/	transefer	/tran.se.fer/	/ə/ → /e/ substitution
4	elang	/ə.laŋ/	elang	/e.laŋ/	/ə/ → /e/ substitution
5	keledai	/kə.lə.dai/	keledai	/ke.le.dai/	/ə/ → /e/ substitution

3.2 Consonant Epenthesis of /g/ after the Velar Nasal /ŋ/

Consonant epenthesis is a phonological process involving the insertion of an additional consonant that is not present in the target phonemic form. In phonological studies, epenthesis commonly occurs as an articulatory strategy employed by second language learners to facilitate pronunciation or to adjust the phonotactic structure of the target language to the sound system of their first language. Unlike substitution or deletion, epenthesis results in the addition of a segment, thereby altering the syllabic structure and phonemic realization of a word.

The results of the analysis indicate that the participant consistently produces epenthesis of the consonant /g/ following the velar nasal phoneme /ŋ/. This pattern occurs across several Indonesian lexical items and results in the realization of the consonant cluster /ŋg/, which is not phonologically required in standard Indonesian. In Indonesian phonology, the velar nasal /ŋ/ can occur independently without the accompaniment of a voiced velar stop. Therefore, the insertion of /g/ after /ŋ/ cannot be regarded as an acceptable phonetic variation but must be classified as a phonemic-level error. This phenomenon is clearly observed in the word menganyam /mə.ŋa.ɲam/, which is realized as mengganyam /mə.ŋga.ɲam/, as well as in mengalungkan /mə.ŋa.luŋ.kan/, which is produced as menggalungkan /mə.ŋga.luŋ.kan/. Similar patterns are also found in mendongak /mən.do.ŋak/, realized as mendonggak /mən.do.ŋgak/, and tersengat /tər.sə.ŋat/, which is pronounced as tersenggat /tər.sə.ŋgat/. Although the orthographic form of tersenggol

remains unchanged, phonetic examination reveals a reinforced realization of the velar nasal, resulting in a /ŋg/ cluster.

From an articulatory perspective, the epenthesis of /g/ after /ŋ/ can be explained by the shared place of articulation of the two sounds, both of which are produced at the velum. The insertion of the voiced velar stop /g/ serves as an articulatory support to stabilize the production of the nasal sound, which the learner may perceive as difficult to articulate independently. From the standpoint of second-language phonological acquisition, this error reflects phonological interference from the first language, in which learners transfer familiar sound patterns into the target language. Furthermore, markedness theory suggests that learners tend to modify less stable or less familiar phonological structures by adding segments that conform more closely to their existing phonological system. Overall, the consonant epenthesis of /g/ following the velar nasal /ŋ/ observed in this study represents a systematic and recurring phonological error. This pattern indicates the participant's limited mastery of the distribution and realization of velar nasals in Indonesian and highlights the ongoing process of phonological adaptation in second language acquisition.

Table 2. Consonant epenthesis of /g/ after the Velar Nasal /ŋ/

Target Word	Phonemic Transcription	Learner Realization	Phonemic Realization	Type of Phonological Error
menganyam	/mə.ŋa.ɲam/	mengganyam	/mə.ŋga.ɲam/	Epenthesis of /g/
mengalungkan	/mə.ŋa.luŋ.kan/	menggalungkan	/mə.ŋga.luŋ.kan/	Epenthesis of /g/
mendongak	/mən.do.ŋak/	mendonggak	/mən.do.ŋgak/	Epenthesis of /g/
tersengat	/tər.sə.ŋat/	tersenggat	/tər.sə.ŋgat/	Epenthesis of /g/
tersenggol	/tər.sə.ŋgol/	tersenggol	/tər.sə.ŋgol/	Reinforcement of /ŋ/ → /ŋg/

3.3 Phonemic Errors in Reading Aloud

This subsection presents a detailed analysis of phonemic errors identified during learners' reading-aloud activities. The errors discussed here are classified as phonemic errors because they involve substitutions, insertions, and neutralizations of phonemes that potentially alter meaning. From a phonological perspective, such errors indicate incomplete mastery of the Indonesian phonemic system, particularly in relation to vowel reduction and nasal stop sequencing. The findings reveal that learners consistently experience difficulty in realizing the schwa phoneme /ə/, especially in unstressed syllables. In several instances, the schwa is replaced by the mid-front vowel /e/, resulting in phonemic substitution. For example, the target word memecahkan /mə.mə.ca.hkan/ is realized as memecehkan /me.me.ceh.kan/. This substitution reflects a failure to maintain the phonemic contrast between /ə/ and /e/, a contrast that is phonemic in Indonesian and therefore meaning-distinguishing. Similar patterns occur in berselisih, transfer, elang, and keledai, where the schwa phoneme is either substituted or not realized appropriately.

From the perspective of phonological theory, the schwa is considered a weak vowel with low perceptual salience, making it highly susceptible to substitution in second language acquisition (Ladefoged & Johnson). Katamba also emphasizes that reduced vowels often pose difficulties for learners because their distribution is governed more by phonological rules than by orthographic representation. This explains why learners tend to rely on spelling

when reading aloud, producing /e/ instead of /ə/. In addition to vowel substitution, the data also show a recurring pattern of consonant epenthesis, particularly the insertion of the velar stop phoneme /g/ following the velar nasal /ŋ/. This phenomenon appears in words such as menganyam, mengalungkan, mendongak, and tersengat, which are realized as mengganyam, menggalungkan, mendonggak, and tersenggat. Phonemically, this process results in the formation of the consonant cluster /ŋg/, which is not present in the target forms. According to phonological markedness theory, epenthesis serves as a repair strategy to address articulatory or perceptual difficulties (Archangeli). In the context of reading aloud, learners appear to insert /g/ to strengthen the articulation of the velar nasal /ŋ/, which may be perceived as unstable when occurring between vowels or morpheme boundaries. From an interlanguage perspective, this insertion reflects systematic restructuring rather than random error, supporting Selinker's view that learner language operates according to its own internal phonological rules.

Importantly, all errors presented in this subsection occur at the phonemic level, as they involve changes to contrastive sound units rather than merely phonetic variation. The substitution of /ə/ with /e/ and the insertion of /g/ after /ŋ/ both result in altered phonemic representations, which may lead to misunderstanding or deviation from standard Indonesian pronunciation. Therefore, these findings strongly justify categorizing the observed reading difficulties as phonemic errors, ensuring conceptual alignment between the data analysis and the research title.

Table 3. Phonemic Errors Identified in Reading Aloud

No.	Target Word	Target Phonemic Form	Learner's Realization	Realized Phonemic Form	Phonemic Error Type
1	memecahkan	/mə.mə.ca.hkan/	memecehkan	/me.me.ceh.kan/	Schwa substitution (/ə/ → /e/)
2	berselisih	/bər.sə.li.sih/	berselesih	/bər.se.le.sih/	Neutralization of /ə/–/e/
3	transfer	/trans.fər/	transefer	/tran.se.fer/	Schwa substitution
4	elang	/ə.laŋ/	elang	/e.laŋ/	Failure to realize initial /ə/
5	keledai	/kə.lə.dai/	keledai	/ke.le.dai/	Recurrent schwa substitution
6	menganyam	/mə.ŋa.ɲam/	mengganyam	/mə.ŋga.ɲam/	Consonant epenthesis (/g/)
7	mengalungkan	/mə.ŋa.luŋ.kan/	menggalungkan	/mə.ŋga.luŋ.kan/	Velar stop insertion
8	mendongak	/mən.do.ŋak/	mendonggak	/mən.do.ŋgak/	Epenthesis after /ŋ/
9	tersengat	/tər.sə.ŋat/	tersenggat	/tər.sə.ŋgat/	Phonemic insertion

3.4 Discussion

The findings of this study indicate that Tajikistani learners in BIPA learning experience systematic phonemic errors, particularly vowel substitution and consonant epenthesis. These findings demonstrate that the learner has not fully acquired the Indonesian phonological system and continues to rely on the phonological patterns of the first language during speech production. In BIPA learning, phonemic accuracy plays a crucial role because phonological deviations may reduce intelligibility and disrupt communicative effectiveness

among foreign learners. Recent studies in second language phonology emphasize that phonemic errors are strongly influenced by cross-linguistic transfer and incomplete phonological acquisition among learners of a target language.

One of the most dominant errors identified in this study is the substitution of the schwa vowel /ə/ with the front vowel /e/, as observed in the pronunciation of memecahkan as memecehkan. This finding is consistent with the study conducted by Daniel Recasens, who explains that schwa vowels possess weak perceptual prominence and centralized articulation, making them highly vulnerable to variation and substitution among second-language learners [9]. Recasens further argues that central vowels are acoustically less salient than peripheral vowels, resulting in frequent misperception and inaccurate production by language learners. Similarly, recent phonological research by Tracey M. Derwing and Murray J. Munro highlights that vowel contrasts involving reduced vowels often become problematic for second-language learners because these sounds are difficult to distinguish perceptually [10]. Therefore, the learner's tendency to replace /ə/ with /e/ in this study reflects incomplete phonemic acquisition and phonological adaptation toward more familiar vowel categories.

From the perspective of second language acquisition, these phonemic deviations can also be interpreted as manifestations of interlanguage phonology. Nick C. Ellis and Stefanie Wulff explain that learners tend to simplify unfamiliar phonological structures by adapting them to the sound inventory of their first language. This process often results in systematic substitutions rather than random pronunciation mistakes. In the context of this study, the recurrent realization of /ə/ as /e/ demonstrates that the learner attempts to approximate unfamiliar Indonesian vowel distinctions using the closest phonological equivalent available in the native language system.

In addition to vowel substitution, this study also reveals consonant epenthesis, particularly the insertion of /g/ after the velar nasal /ŋ/, resulting in pronunciations such as mengganyam, menggalungkan, and mendonggak. Contemporary phonological theory views epenthesis as a repair strategy employed when learners encounter unfamiliar phonotactic structures. Martin Haspelmath explains that epenthesis frequently occurs because language learners perceive certain sound sequences as incomplete or difficult to articulate. Furthermore, recent studies in second-language pronunciation research indicate that learners often reinforce nasal consonants through the addition of homorganic stops to increase articulatory stability. This phenomenon is particularly common among learners whose first-language phonological systems differ significantly from the target language.

The findings of this study also support recent BIPA research emphasizing that foreign learners frequently experience difficulties in mastering Indonesian phonemic contrasts, especially vowels and nasal consonants. A study by Marlene Saito demonstrates that explicit phonological instruction and pronunciation-focused training are essential in helping second-language learners improve phonemic accuracy[13]. Therefore, the phonemic deviations identified in this study suggest that BIPA instruction should provide greater emphasis on phonological awareness, articulatory explanation, and repeated pronunciation practice to reduce systematic phonemic errors among learners.

Overall, the phonemic errors identified in this study involve both vowel substitution and consonant epenthesis occurring at the phonemic level. These errors directly influence intelligibility and reflect an evolving interlanguage phonological system. The findings confirm that phonemic analysis remains highly relevant in BIPA studies because deviations in phoneme production may significantly affect communication accuracy and language comprehension among foreign learners.

4. CONCLUSION

This study examined phonemic errors produced by a Tajik student in Indonesian as a Foreign Language (BIPA) learning through a qualitative case study approach. The findings indicate that the learner consistently exhibited systematic phonemic deviations, particularly in vowel realization and consonant epenthesis, reflecting the influence of the first-language phonological system and incomplete phonemic acquisition in Indonesian. These errors are not random pronunciation mistakes but structured phonemic patterns shaped by cross-linguistic interference.

The implications of this research are twofold. Theoretically, the study contributes to BIPA phonological research by providing an in-depth phonemic analysis of an underrepresented learner population, namely Central Asian learners. Practically, the findings highlight the importance of explicit phonemic instruction and targeted pronunciation training in BIPA programs, especially for learners whose first language differs significantly from Indonesian phonology. This research is limited to a single participant and focuses exclusively on phonemic errors in spoken Indonesian, which restricts the generalizability of the findings. Therefore, the results should be interpreted within the specific context of the case study.

Future research is encouraged to involve a larger number of participants from diverse linguistic backgrounds and to integrate acoustic or experimental phonetic analysis to complement phonemic interpretation. This study contributes to the broader public by raising awareness of the phonological challenges faced by foreign learners of Indonesian and supporting the development of more inclusive and effective BIPA instructional practices.

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