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| RESEARCH ARTICLE

Analysis of Phonological Errors Made by Grade 4 Learners with Communication Difficulties in Kieni East Sub-County

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| ABSTRACT
Inclusive education in Kenyan primary schools brings together learners with special needs and their peers without special needs in the mainstream classroom. Some learners in inclusive classrooms have challenges that hinder the acquisition of literacy skills. Official instruction in ESL in primary schools begins in Grade 4. Learners who fail to acquire basic language skills in Grade 4 will struggle to master ESL in the upper classes. Against this backdrop, this study set out to analyze the phonological errors made by Grade 4 learners of ESL in Kieni East Sub-County. The study adopted a descriptive research design. Seven primary schools in Kieni-East were randomly sampled, and 11 students with communication difficulties purposively sampled for data collection. The 11 learners were observed during an ESL listening and speaking lesson. The researcher turned Sony ICD-UX570 Digital Voice Recorder on and left it on the learner's desk for a 35-minute lesson. The study identified twenty-seven (27) words with phonological errors. The phonological errors were categorized into five classes such as cluster reduction **(**22%) followed by reduplication (19%), distortion (15%), deletion (15%), stopping (11%), backing (11%) and gliding (7%), respectively. The audio-recorded data was transcribed, and the correct forms provided in a table. Data was analyzed qualitatively using Error Analysis and Natural Phonology Theory to describe the phonological errors. The study found that Grade 4 learners with communication difficulties make phonological errors due to word complexities, biological disorders, and poor cognitive development. Further, the study established that inclusive schools do not have adequate assistive resources to instruct learners with communication difficulties. This study recommends that teachers should partner with speech therapists and language researchers to assist learners with communication needs. Further, EARC should equip all inclusive classrooms with assistive resources to address the needs of learners with communication needs.

| KEYWORDS

Phonological Errors, Error Analysis, Communication difficulties, Natural Phonology, speech disorder

| ARTICLE INFORMATION

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1. Introduction

Effective communication in any language requires accurate pronunciation, clarity of speech and an appropriate tone of voice. Any language user who is unable to pronounce certain words well makes it difficult for their audiences to understand what they are saying because mispronunciation affects the meaning of words. According to Tambyraja et al. (2020), the inability to perceive or produce certain sequences of speech sounds is a disorder that alters the meaning of utterances. This argument is buttressed by Hearnshaw et al. (2018), who observe that a speaker may fail to pronounce certain words correctly due to underlying neurological, sensory, or structural causes. In other instances, speech errors may be a result of diseases or conditions whose causes are not known. Wolk et al. (2016) point out that speech errors are common among children because they have not mastered the rules of the language, or they may have underlying conditions that inhibit proper enunciation of word segments. Children who mispronounce words because they have not mastered the rules of the language are not a cause for worry. However, when the errors are caused by communication difficulties, one should investigate the nature of the errors and propose methods of instructing the children.

Children with communication difficulties have a challenge in producing certain sounds, controlling the sounds produced, using the right form of language and producing the right rhythm of speech. In a language classroom, such children manifest certain characteristics such as little or incomprehensible speech (Njoroge & Nyakundi, 2023), difficulty in generating word segments and sentences (Dodd et al., 2018), difficulty in perceiving what others are saying (Critten et al., 2019) and difficulty in interacting with peers in a learning environment (Huseynova, 2021). Learners with communication difficulties need a great deal of attention because if their conditions are not remedied in time, they may be at risk of physical health problems and poor academic performance. According to Tambyraja et al. (2020), children with communication difficulties tend to isolate themselves hence withdrawing from classroom activities. Isolation and withdrawal imply that they miss out on instructional programs. It is against this backdrop that the present paper seeks to investigate the phonological errors made by learners with communication difficulties in Kieni East Sub-County in Nyeri County.

In Kenya, English is a compulsory language of instruction in both primary and secondary schools. According to Mose (2017, p. 215), English is officially used "as the language of instruction from grade four" to enable learners to acquire literacy skills that enable them to master competencies in speech and writing. The Kenyan government emphasizes the use of English in all schools because the language gives learners a chance to compete with other students on a global platform. Although basic education is inclusive in Kenya, it limits the progress of students who require special instruction. This is the point echoed by Piper et al. (2016), who contend that learners with communication difficulties find it difficult to cope with their peers in mainstream classrooms due to speech errors. Speech errors persist in primary schools because integrated classrooms lack assistive language devices such as "speech kits, audiometers, peg boards, soft boards, soft balls, and Snellen charts, among others (Emmy, 2020, p. 54). The Educational Assessment and Resource Centers (EARC) screen and place learners with various needs in inclusive classrooms; such students lack adequate materials to navigate challenges such as communication difficulties (Emmy, 2020).

There are various communication disorders that have been identified by EARC in Kenya. For instance, mixed receptive-expressive disorder is a condition which leads to delays in the development of speech (Kiogora, 2011). Second, expressive language disorder is another communication difficulty which occurs when a learner experiences developmental delays resulting in speech production problems (Rotich, 2020). Third, speech-sound disorder refers to "a combination of difficulties with perception, motor production, and/or the phonological representation of speech sounds and speech segments" (Rotich, 2020, p. 6). Learners in many schools also experience communication difficulty, referred to as fluency disorder or stuttering. Saad and Kamel (2019) define stuttering as a condition in which the flow of a speaker's speech is disrupted by the prolongation of repeated words, phrases and syllables. Another communication difficulty identified by EARC is social communication disorder which occurs when a learner makes an incoherent speech due to delayed brain development. Generally, communication difficulties result in phonological errors, which directly hinder verbal communication, social interaction, and academic performance of students. It is, therefore, important to investigate the phonological errors made by students with communication difficulties so that recommendations can be made to policy makers and education practitioners.

2. Literature Review

The influence of communication difficulties on language literacy in Kenya has attracted a lot of scholarly ink. For instance, Mandak and Light (2018) argue that people with communication difficulties experience challenges in producing words, sound segments or entire sentences. They broadly categorize communication difficulties into two classes: expressive and receptive disorders. On the one hand, expressive disorders involve difficulties in speaking, while receptive disorders involve challenges associated with undertaking the speech made by others. The study further argues that expressive orders include omission, fluency problems, deletion, distortion of sounds, devoicing and voicing, among others. The study by Mandak and Light (2018) indicates that communication difficulties result in various speech or phonological errors that require an urgent remedy from speech pathologists, language teachers, clinicians and researchers.

In their study on the effect of stuttering on speech development, Uicomb et al. (2020) observe that communication difficulties may result from neurobiological disorders which weaken phonological skills, thus resulting in various errors in articulation. The study mentions that many learners resort to other communication methods because of expressive challenges. Further, the study recommends "specific research on best practice assessment and intervention" for learners with specific communication challenges (p. 9). It is important to mention that communication difficulties such as stuttering are common among children. Unicomb et al. (2020) argue that phonological errors that occur beyond the expected age should be studied and measures taken to address them because they are evidence of speech disorders. Naturally, speech errors are expected to disappear by the age of three years (Dhanavendan & Raja, 2016). Grade 4 learners in Kenya are aged between 8 and 11 years. Instances of phonological errors among these learners imply that they have communication difficulties that should be investigated through scholarly lenses.

In another study, McLeod et al. (2017) investigate phonological errors made by children with communication difficulties. The study concentrates on speech sound disorder and points out that learners who are not identified and assisted in good time miss out on well-structured communication. The study also highlights some of the phonological errors, such as cluster reduction, fronting,

stopping, deletion, voicing, gliding and deaffrication, as major phonological errors evident in the speech of learners with communication difficulties. One recommendation of the study by McLeod et al. (2017) is that educators, therapists, clinicians and language researchers should join hands "to support children's speech, language, or literacy" (p. 30). Overall, phonological errors caused by communication difficulty should receive a great deal of attention because they affect attitudes towards speech, phonological processing, literacy and socialization in school.

Kiogora (2021) undertakes a survey of the phonological errors made by learners with communication disorders such as autism and echolalia. The study identifies three main categories of communication disorders: expressive, receptive and mixed receptive-expressive disorders. The study argues that abnormal phonological features, repetitive speech, poor voice quality and unclear enunciation are some of the features characterizing the speech of learners with communication difficulties. Further, Kiogora (2021) posits that phonological errors require scholarly attention because they are the basis of all communication in all languages. They conclude that language educators and speech pathologists should combine efforts to come up with "strategies that might better meet these needs in the educational environment" (p. 373). To assist such learners, Kiogora (2021) argues that phonological errors should be described so that one may understand the neurodevelopmental disorders associated with the learners' speech.

3. Theoretical Framework

The present study combined two theories to analyze the phonological errors made by Grade 4 learners of ESL in Kieni East Sub-County. The two theories are Error Analysis and Natural Phonology Theory. According to Miccio and Scarpino (2008), the two theories are complementary in the identification and description of speech errors. Error Analysis Theory was proposed by Corder (1967) as a framework for identifying, describing, categorizing and providing interpretation of inappropriate language forms during second language acquisition. The theory seeks to describe improper language forms in both oral and written communication. Error Analysis of any language proceeds in three major steps. First, one gathers samples of oral or written communication. Second, the linguistic features are identified and categorized. Such features may include phonological mismatches, orthographic deviations, semantic errors, syntactic errors and morphological violations, among others (Plonsky et al., 2020). The final step, which is the ultimate goal of Error Analysis, involves an explanation of why the errors rise in the language of a speaker. The errors may be caused by intralingual interference, language impairment or interlingual interference (Puispita, 2019; Chaudhary & Al Zahrani, 2020; König et al., 2015).

Natural Phonology Theory is the second theory the study applied to investigate phonological errors made by Grade 4 learners with communication difficulties. This theory was proposed by Stampe (1969). The theory holds that proper language use may be inhibited by factors such as physiological problems and cognitive disabilities. Natural Phonology theory does not only describe the phonological discrepancies in a speaker's speech but goes a step further to investigate the phonological preferences of speakers with communication difficulties. This theory maintains that phonological errors may be caused by language complexity, physiological challenges, cognitive inhibitions and neurological factors. According to Donegan and Stampe (2009), Natural Phonology theory provides a comprehensive analysis of phonological errors because it describes emerging processes and makes recommendations for second language instruction.

4. Methodology

The study adopted a descriptive research design which presents a systematic description of data without manipulating it. According to Doyle et al. (2020), a descriptive research design analyzes features of the research phenomena and describes non-quantified topics to draw conclusions. The location of the study was in Kieni East Sub-County in Nyeri. This location was chosen because it falls within arid and semi-arid areas with many factors that hinder the acquisition of basic literacy in Nyeri County (Kibaara & Ndirangu, 2014; Kaberia, 2020). Out of the 45 primary schools in the sub-county, the study randomly sampled seven schools. From the sampled schools, the study used the EARC placement reports to identify learners with communication difficulties. The EARC screens children with learning disabilities and places them in inclusive classrooms after submitting their reports to the school administration. Grade 4 learners with communication difficulties were, therefore, purposively sampled for data collection. The study identified 11 students across the seven schools.

The study used Sony ICD-UX570 Digital Voice Recorder to record the speech of the identified children during an ESL lesson. A primary school ESL lesson takes 35 minutes. The recorder was placed on the desk of the learners with communication difficulties and turned on for 35 five minutes during a listening and speaking lesson. Besides recording the speech of the learners, the study also observed the students and made notes on the non-verbal behaviors such as hand flapping, gestures, body movement, fidgeting and repetitive behaviors that accompanied the speech of the learners. The collected phonological errors were transcribed, and their correct versions were provided in a table. The emerging patterns were then analyzed using Natural Phonology Theory and Error Analysis Theory.

5. Findings and Discussions

The study identified twenty seven (27) words with phonological errors from the speech of Grade 4 learners with communication difficulties in the sampled schools. The errors were identified based on the learners' inability to pronounce certain words well.

According to Gregg and Yairi (2012), any systematic deviation from the phonological system of a language is considered a phonological error. The study identified six major categories of phonological errors. These include reduplication, addition, sound distortion, deletion, substitution and consonant cluster reduction. Each of the six categories is discussed below.

a) Consonant Cluster Reduction Errors

Consonant cluster reduction is the deletion, simplification or reduction of one or more two consonants from words that contain consonant clusters. According to McLeod et al. (2017), consonant cluster reduction involves the simplification of consonants in the same sequence in the segment of a word. For instance, the pronunciation of "**sp**lash" as "**p**lash" is an example of cluster reduction (McLeod et al., 2017, p. 33). Cluster reduction occurs in three positions of a word: initial, medial and final positions. The study also noted that cluster reduction was either partial or total. The table below shows the cluster reduction errors identified in the study.

Table 1: Consonant Cluster Reduction Errors

S/No	Word	Cluster reduction	Transcription
1	Tree	ree	/riː/
2	Subject	suject	/sʌdʒɛt/
3	Please	ease	/iːz/
4	Basket	baket	/ˈbɑːkɪt/
5	Friend	fend	/fɛnd/
6	Grow	oh	/əʊ/

The words in the above table are phonological errors within the category of consonant cluster reduction. In the instantiations (1) and (5), the words 'tree' and 'friend' have undergone partial cluster reduction at the initial position to form /riː/ and /fɛnd/, respectively. In (2) and (4), the learners have reduced the medial consonant clusters in the words 'subject' and 'basket' to /sʌdʒɛt/ and /ˈbɑːkɪt/ respectively. Besides undergoing medial cluster reduction, the word 'subject' has also undergone consonant cluster reduction at the final position of the word. The instantiations in (3) and (6) are phonological errors that have undergone full consonant cluster reduction. The words 'please' and 'grow' have the consonant clusters 'pl' and 'gr' completely deleted to form /iːz/ and /əʊ/ in the speech of the learners.

From the observation notes taken during the 35 minutes lesson, it was noted that learners who made consonant reduction errors manifested certain behaviors. First, they did not open their mouths fully in order to pronounce the words. According to Latif and Ali (2016), the cause of cluster reduction as a phonological error can be traced to oral motor disorders that prevent the speaker from fully opening their mouths to articulate certain sounds. The argument of Latif and Ali (2016) mirrors the observation of Keshavarz (2017), who contends that weak coordination of the muscles in the jaw, tongue, lips and mouth often results in phonological errors such as consonant cluster reduction. It was also observed that the learners' speech was characterized by repetition, hesitation and tension while speaking.

b) Substitution of Sounds

As a phonological error, the substitution of sounds refers to the replacement of one sound with another. Hardin-Jones and Chapman (2018) posit that substitution involves the replacement of a sound with another that is not related to it in terms of place and manner of articulation. The study identified four categories of substitution as a phonological error in the speech of Grade 4 learners with communication difficulties.

(i) Stopping

Stopping is a phonological error in which a speaker replaces a sound with a plosive sound or a stop. Examples of plosive sounds include /p/, /k/, /d/, and /b/. Liu and Chien (2020) observe that stopping is a common phonological error among children aged between three and five years. However, instances of stopping among older children are evidence of communication difficulties among such learners. The study identified 3 words with stopping errors, as shown in the table below.

Table 2: Stopping Errors

S/No	Word	Correct Form	Stopping Error	Transcription
1	Soup	/suːp/	Toup	/tuːp/
2	Vest	/vɛst/	Best	/bɛst/
3	Shoe	/ʃuː/	Do	/duː/

The instantiations (1)- (3) are phonological errors because they have undergone stopping. The sounds /s/, /v/ and /ʃ/ are all fricatives. In the pronunciation, they have been replaced with plosives such as /t/, /b/ and /d/, respectively. Substitution of the above words renders them meaningless because the pronunciation has been altered.

(ii) Gliding Errors

Gliding is another substitution error identified in the study. By definition, gliding is the process of replacing a consonant sound with a glide (w or y). According to Kirk and Vigeland (2015), language users with communication difficulties often replace certain sounds with /j/ or /w/ to simplify their speech. The table below shows two instantiations of gliding collected in the study.

Table 3: Gliding Errors

S/No	Word	Correct Form	Glided Form	Transcription
1	Rabbit	/ˈrabɪt/	Wabit	/ˈwabɪt/
2	Lake	/leɪk/	Yake	/jeɪk/

The two instantiations above are phonological errors because the words 'rabbit' and 'lake' have undergone gliding. The alveolar trill /r/ and the alveolar lateral /l/ have been replaced with the glides /w/ and /j/, respectively. Mispronunciation of the two words renders them meaningless.

(iii) Backing

Backing is a phonological error involving the replacement of a frontal sound with one that is produced at the back of the mouth. For instance, when the sounds /d/ and /s/ are replaced with /t/ or /d/, they are said to have undergone fronting. According to Harrington et al. (2016), backing is a phonological disorder that arises when a speaker has problems with mouth coordination or throat airways, thus making communication difficult. The table below shows the backing errors collected in the study.

Table 4: Words with backing Errors

S/No	Word	Correct Form	Backing Error	Transcription
1	Dog	/dɒg/	Gog	/gɒg/
2	Van	/van/	Kan	/kan/
3	Boy	/bɔɪ/	Goy	/gɔɪ/

The words in the table above have undergone backing. The words 'dog', 'van' and 'boy' all contain sounds that are produced in front of the mouth. The replacement of the initial consonants with /k/ and /g/ renders the words erroneous; hence one is unable to understand the meaning of the words.

c) Phonological Distortion

Phonological distortion is a speech error whereby a speaker alters a sound and misrepresents it in a manner that makes it difficult to predict the phonological patterns. Dodd et al. (2018) point out that phonological distortion is common among children aged below five years. However, distortion is considered a serious speech error associated with communication difficulty if it arises among older children. Phonological distortion is difficult to predict because each speaker distorts the sounds based on the severity of their communication disorder. Table 5 below shows the phonological distortion errors collected in the study.

Table 5: Phonological Distortion Errors

S/No	Word	Correct Form	Distorted Form	Transcription
1	This	/ðɪs/	Thith	/ðɪð/
2	School	/skuːl/	coo	/kuː/
3	Inside	/ɪnsʌɪd/	misiad	/msɪʌd/
4	Bottle	/ˈbɒtl/	bo	/bɔː/

The four words in the table above are instances of phonological distortion. The distorted forms do not communicate because the sounds have been altered. The /s/ consonant in (1) has been altered to /ð/ hence creating a new word that doesn't communicate meaning. In (2), the consonant cluster /sk/ has been reduced to /k/, and the final lateral sound /l/ is deleted. In (3), the consonant /m/ has been added to the word, and the diphthong has been changed from /ʌɪ/ to /ɪʌ/. In (4), the word 'bottle' has been altered by deleting the segment '-ttle' to form a word that does not communicate.

d) Deletion

As a phonological error, deletion refers to the omission or elision of a syllable, consonant or vowel from the pronunciation of a word. According to Sharifi (2015), children who are in the early stages of language acquisition may delete word segments because their brains have not developed well to perceive some sources. The argument of Sharifi (2015) is echoed by Diani and Azwandi (2021), who observe that children with communication difficulties simplify certain word segments by omitting particular sounds to make communication easier. Three categories of deletion errors were identified in this study. These include consonant deletion, weak syllable deletion and vowel deletion, as indicated in Table 6 below.

Table 6: Deletion Errors

S/No	Word	Correct Form	Distorted Form	Transcription
1	Money	/ˈmʌni/	aney	/ʌni/
2	Cat	/kæt/	Ca	/kæ/
3	Banana	/bəˈnɑːnə/	-nana	/ˈnɑːnə/
4	Book	/bʊk/	bk	/bk/

The four words in the table above are instances of deletion. In (1) and (2), the words have undergone consonant deletion. Consonant deletion is the omission of a consonant sound either at the beginning or at the end of a word. Sharifi (2015) observes that children omit both consonants and vowels due to poor phonemic awareness. By rendering the words 'money' and 'cat' as 'aney' and 'ca', respectively, the learners have created new word forms that do not communicate. In (3), the word 'banana' has undergone weak cluster deletion to form 'nana'. Phonologically, a syllable is weak if it contains vowels such as /ə/ (schwa), /i/, /u/ and syllabic consonants such as /m/, /, ŋ/, /l/, and /n/ (Fudge, 2015). The first syllable, 'banana', is, therefore, a weak syllable because it contains the /ə/ sound. By deleting the syllable, the new word 'nana' becomes meaningless. Instantiation (4) has undergone vowel deletion. The vowel /ʊ/ has been omitted from the pronunciation. Many vowels are deleted from word segments because they are either short or due to speech disorders (Bernstein-Ratner, 2021).

e) Syllable Reduplication Errors

Syllable reduplication is the last category of phonological errors identified in this study. Syllable reduplication is a phonological error involving the repetition of the first syllable of a word instead of pronouncing the entire word. Children who reduplicate syllables use them as substitutes for the words. The researchers observed that the learners who reduplicated syllables struggled to articulate their sounds. The learners struggled to open their mouths as they pronounced the words. Five (5) instances of syllable reduplication were identified in the study, as shown in the table below.

Table 7: Syllable Reduplication Errors

S/No	Word	Correct Form	Reduplicated Form	Transcription
1	Water	/ˈwɔːtə/	Wawa	/ˈwɔwɔ/
2	Biscuit	/ˈbɪskɪt/	Bibi	/ˈbɪbɪ/
3	Bottle	/ˈbɒtl/	Bobo	/ˈbɒbɒ/
4	Yoghurt	/ˈjɒgət/	Yoyo	/ˈjɒjɒ/
5	Mother	/ˈmʌðə/	mama	/ˈmʌmʌ/

The five words in Table 7 above are instances of syllable reduplication. The first syllables have been repeated in an attempt to pronounce the words that seemed to be complex for learners with communication difficulties. The syllables /wɔ/, /bɪ/, /bɒ/, /jɒ/, and /mʌ/ have been repeated in the pronunciations to create new words. All the pronunciations are phonological errors.

6. Summary of the Phonological Errors

The figure below shows a summary of the frequencies of the phonological errors in the study. The figure shows that the most frequent phonological errors are substitution (30%) followed by cluster reduction (22%), syllable reduplication (18%), distortion (15%) and deletion (15%), respectively.

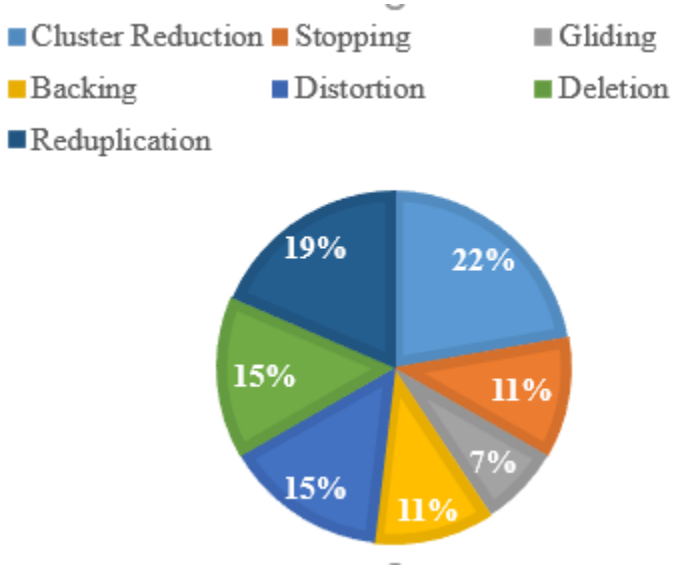

Figure 1: Summary of the Phonological Errors

7. Conclusion

This study makes certain conclusions based on the findings. First, the study concludes that learners with communication difficulties make phonological errors due to cognitive inhibitions, phonetic complexity, physiological challenges and biological problems. Second, learners with communication difficulties simplify speech through processes such as deletion, syllable reduplication, cluster reduction, substitution and distortion. Third, Error Analysis and Natural Phonology Theory are complementary theories that provide a comprehensive analysis of the phonological errors made in the speech of learners with communication difficulties. The study recommends that more studies should be undertaken in Kenyan primary schools to provide a comprehensive analysis of the communication challenges. Also, the Educational Assessment and Resource Centers (EARC) should equip inclusive classrooms with assistive resources for language instruction. Examples of assistive language resources include audiometers, speech kits, peg boards, soft boards, and Snellen charts, among others. Finally, teachers of learners with communication difficulties should partner with speech therapists to mitigate the communication challenges experienced by the learners.

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