Article

An Acoustic Analysis of Student-Produced Speech in Speed Reading Using a Teleprompter at Al Azhar 3 Senior High School Bandar Lampung

Hamelia Qomara Dewi, *Susanto, Deri Sis Nanda[abc] (ID)

123Universitas Bandar Lampung, Indonesia

Corresponding Author: susanto@ubl.ac.id

A B S T R A C T

This study investigates the acoustic differences in student-produced voice during speed reading with and without a teleprompter in an English as a Foreign Language (EFL) context. While previous studies have widely explored technology-assisted pronunciation and fluency development, limited attention has been given to the pedagogical use of teleprompters and their effects on learners' speech production, particularly through acoustic analysis. The research aims to examine how teleprompter-assisted reading affects fluency, prosody, and pronunciation. A quasi-experimental quantitative design was conducted with 30 senior high school students who were members of the English Club at SMA Al Azhar 3 Bandar Lampung. Each participant performed three reading tasks: without a teleprompter, with a teleprompter at 1% speed, and with a teleprompter at 50% speed. Recordings were analyzed using Praat software to measure pitch, intensity, duration, and pronunciation errors. The findings showed no significant differences in pitch and intensity ($p > .05$). However, reading duration was significantly longer at 1% speed ($p < .05$), indicating more deliberate articulation. Descriptive results also revealed fewer pronunciation errors at 1% speed than at 50% speed. These findings suggest that adjusting teleprompter speed can optimize speech clarity, making teleprompters a valuable instructional scaffold for improving EFL learners' fluency and accuracy in public speaking training.

Keywords: *Teleprompter, Acoustic Analysis, Pronunciation Errors, Fluency, EFL Learners*

Check for updates

INTRODUCTION

Digital technologies have become an integral component of modern education, enhancing the quality, accessibility, and effectiveness of learning (Haleem et al., 2022). The present era is defined by unprecedented innovation and transformation in the field of communication technologies. (Montgomery & Shen, 2017). They significantly influence educational transformation, with schools' digital capacity strongly shaping successful implementation (Timotheou et al., 2023). Human life today appears inseparable from technology, which accelerates and simplifies work. Its presence in daily life provides convenience in nearly all activities, and in education it plays a particularly important role in facilitating instruction and motivating students. Recent discussions emphasize that technology is no longer an optional add-on but rather a primary driver of educational innovation, enabling individualized pathways and fostering active engagement (Budiarto et al., 2024; Granić, 2022).

In the field of language learning, the rapid adoption of mobile technology has significantly reshaped the ways English as a Foreign Language (EFL) learners engage in speaking practice. The incorporation of technology into EFL instruction provides various opportunities to increase learner engagement, facilitate language acquisition, and promote the development of key communicative skills (Napitupulu et al., 2025).

Despite this, many learners in Indonesia continue to face difficulties with fluency, prosody, and pronunciation, particularly in performance-based tasks such as news broadcasting and reporting (Darcy, 2016; Sun, 2023). At SMA Al Azhar 3 Bandar Lampung, members of the English Club show strong interest and talent in newscasting and public speaking yet often struggle with script memorization. Reliance on memorization leads to hesitation, breakdowns in fluency, and pronunciation errors, which in turn reduce clarity and communicative confidence during performance.

To address these challenges, educators have increasingly incorporated technological tools such as Computer-Assisted Pronunciation Training (CAPT) and Automatic Speech Recognition (ASR), and Text-to-Speech (TTS). These tools have been shown to improve accuracy and fluency in EFL contexts (Duong, 2022; Yi-Chao Jiang et al., n.d.; Zuriati & Persada Bunda, n.d.). Mobile-assisted learning more broadly has also been found to enhance pronunciation acquisition and learner motivation (Metruk, 2024)). Likewise, video recording tasks allow learners to monitor their own performance, further supporting speaking development. However, most previous studies emphasize feedback-based technologies (e.g., ASR, CAPT) or general mobile-assisted interventions rather than practical scaffolds designed for performance situations such as newscasting, where learners must balance reading fluency with accuracy in real time.

Building on this, the present study introduces the use of a teleprompter application, an underexplored tool in EFL contexts which presents scrolling text and reduces the working memory demand of memorization, thereby allowing learners to focus more on articulation and prosody (In'am & Alatas, 2023). To address these challenges, previous research has explored the use of visual text support and scripted reading aids in performance-based speaking tasks. Previous research indicates that the use of teleprompters can enhance students' oral performance in news-reading and public speaking activities by lowering cognitive load and enabling learners to concentrate more on delivery rather than on memorizing content (Rahmadilla & Dewi Utari, 2025.; Sumarna, n.d.). However, such studies have largely focused on general performance outcomes and have not been extensively examined in EFL instructional contexts. Moreover, mobile applications provide learners with easy access to a wide range of authentic materials and learning resources (Fouz-González, 2020), enabling language learning to extend beyond traditional classroom environments. Consequently, an increasing number of studies have investigated the potential role of mobile applications in supporting the development of language skills (Kukulska-Hulme & Viberg, 2018). However, despite the abundance of mobile applications designed to help learners enhance their pronunciation, empirical evidence regarding their learning outcomes remains limited (Lan, 2022). Mobile technology facilitates improved learning processes and knowledge acquisition among students (Criollo-C et al., 2021).

Many modern teleprompters also provide integrated recording features, enabling learners to rehearse and simultaneously document their performances. Such a combination is particularly relevant for students preparing for public speaking competitions or extracurricular projects. Despite its potential, systematic empirical studies on teleprompter-assisted reading using acoustic measures remain limited.

Although acoustic analysis using software such as Praat has been widely employed to examine pronunciation accuracy and suprasegmental features in EFL oral production, including word stress, pitch, intensity, and temporal aspects of speech (Behr, 2022; Chung & Bidelman, 2022; Lopez et al., 2021), previous studies have primarily focused on general speaking performance or pronunciation outcomes rather than performance-oriented instructional scaffolds. Consequently, little research has examined whether teleprompter use—particularly at different scrolling speeds—affects EFL learners' speech production as reflected in acoustic parameters such as pitch, intensity, duration, and pronunciation errors. This study therefore seeks to extend prior findings on technology-assisted pronunciation training (Sun, 2023; Yi-Chao Jiang et al., n.d.) by shifting the focus from feedback-oriented tools to a scaffolding tool that directly alters the reading conditions of learners. The novelty of

this research lies in its empirical testing of teleprompter speed as an instructional variable, comparing no teleprompter, slow scrolling (1% speed) (≈120 words per minute), and fast scrolling (50% speed) (≈200 words per minute). By evaluating their effects on pitch, intensity, duration, and pronunciation errors through Praat-based analysis, this study offers one of the first systematic investigations into how teleprompter pacing influences EFL learners' speech production. Accordingly, the objectives of this research are twofold: first, to examine the acoustic differences in pitch, intensity, and duration across teleprompter conditions, and second, to analyze pronunciation error frequency under different teleprompter speed settings. The findings are expected to provide practical insights for integrating teleprompters into EFL speaking instruction, particularly in activities such as news broadcasting, reporting, and other scripted performance tasks in English extracurricular programs..

METHOD

This study employed a quantitative quasi-experimental design with a within-subjects repeated-measures structure to examine acoustic features of student voice production under three conditions: (1) without a teleprompter, (2) with a teleprompter at 1% speed (≈120 wpm), and (3) with a teleprompter at 50% speed (≈200 wpm). In this design, the same participants performed all experimental conditions, allowing for direct within-subject comparisons across teleprompter settings.

The scope of this research was limited to members of the English Club at SMA Al Azhar 3 Bandar Lampung, specifically the newscasting and reporting division. The objectives were to analyze (1) pitch, intensity, and duration across teleprompter conditions, and (2) pronunciation errors under different teleprompter speed settings.

The primary data consisted of audio recordings of students' speed-reading tasks. A condenser microphone was used to ensure clarity of recording, and an Android teleprompter application was employed with built-in adjustable speed settings. Acoustic parameters were extracted using Praat 6.x software, which provided measurements of pitch (Hz), intensity (dB), and duration (ms). Pronunciation errors were manually coded by comparing student output with the reference text. Acoustic analysis was conducted with Praat software (Boersma et al., 2014), which has been extensively employed in second language speech research (Behr, 2022; Chung & Bidelman, 2022). Measurements included pitch (Hz), intensity (dB), and duration (ms).

The research was conducted in a quiet classroom at SMA Al Azhar 3 Bandar Lampung to minimize background noise. Data were collected by instructing each of the 30 purposely selected participants (aged 15–17) to read a 124-word English news text entitled "Heavy Rain Occurs During the Dry Season in Lampung." Each participant performed the task three times according to the conditions described above. Recordings were saved in WAV format for acoustic analysis.

Operational research (procedure)

The procedure involved several stages:

Preparation of the news text and installation of the teleprompter application on an Android device.

Calibration of microphone and teleprompter speed settings.

Individual recording sessions for each student: first without a teleprompter, then with teleprompter 1% speed, and finally with teleprompter 50% speed.

Saving and organizing all recordings for analysis.

Technique of data analysis

Acoustic analysis was conducted using Praat software. For each recording, pitch, intensity, and duration were extracted. Descriptive statistics were used to identify trends in pronunciation errors. Repeated measures ANOVA were applied to determine whether significant differences existed across conditions for pitch, intensity, and duration. Error frequency counts were compared descriptively between conditions.

FINDINGS AND DISCUSSION

Findings

This study analyzed three acoustic parameters pitch, intensity, and duration produced by participants under three different conditions: without using a teleprompter (WT), using a teleprompter at 1% scrolling speed (T1), and using a teleprompter at 50% scrolling speed (T50). Note on speeds. Throughout the results, teleprompter speeds are reported both as app % and approximate real reading rates to give contextual meaning: T1 = 1% ≈ 120 words per minute (wpm); T50 = 50% ≈ 200 wpm. The data shows noticeable variations across the conditions, particularly in terms of pitch and intensity. The summary of the acoustic analysis results is presented in Table 1 below.

The use of table, graphic, image or picture (if any), the format is TMR 10, Capitalized each words, as follow :

Table 1. Mean and Standard Deviation (SD) of pitch, intensity, and duration across three different reading conditions.

Variable	WT	T1	T50
Pitch	Mean: 227 (SD: 51)	Mean: 215 (SD: 30)	Mean: 210 (SD: 33)
Intensity	Mean: 63 (SD: 5)	Mean: 66 (SD: 0,7)	Mean: 65 (SD: 0,04)
Duration	Mean: 3 sec (SD: 1)	Mean: 3 sec (SD: 1)	Mean: 3 sec (SD: 0,4)

Figure 1. Comparison of Pitch, Intensity, and Duration Across Three Different Reading Conditions.

In terms of pitch, the results show a decrease in the average fundamental frequency from WT to T1 and T50. The highest pitch was found in the WT condition, with a mean of 227 Hz and a standard deviation of 51. When using the teleprompter at 1% speed, the pitch decreased to 215 Hz (SD 30) and further dropped slightly to 210 Hz (SD 33) at 50% speed. This downward trend suggests that the use of a teleprompter helps participants to speak in a calmer and more controlled tone, likely due to more stable reading rhythm provided by the visual aid.

For the intensity variable, an increase in vocal loudness was observed when participants used the teleprompter. The average intensity rose from 63 dB (WT) to 66 dB (T1),

then slightly decreased to 65 dB (T50). More notably, the standard deviations in T1 and T50 were significantly smaller (0.7 and 0.04, respectively) compared to WT (5). This indicates that the use of a teleprompter not only enhances vocal intensity but also promotes consistency across participants.

Regarding duration, there was no substantial change in the average reading time across the three conditions—all recorded at approximately 3 seconds. However, the standard deviation showed a significant drop in T50 (0.4) compared to WT and T1 (both 1), indicating that reading duration became more consistent when participants used the teleprompter at a 50% speed. This suggests that the teleprompter provided a more uniform pace for reading aloud.

In conclusion, the findings suggest that using a teleprompter, particularly at a moderate speed such as 50%, positively affects the acoustic features of voice. It helps participants produce a lower pitch, stronger and more stable intensity, and consistent reading duration. These results highlight the potential of teleprompters as useful tools in enhancing speaking performance, especially in educational contexts involving public speaking or newscasting   activities.

To determine whether the observed differences across the three reading conditions (without teleprompter [WT], teleprompter 1% [T1], and teleprompter 50% [T50]) were statistically significant, a repeated measures ANOVA were conducted on four dependent variables: pitch, intensity, duration, and pronunciation errors.

Results of Repeated Measures ANOVA.

To examine the statistical significance of differences across the three reading conditions—without teleprompter (WT), teleprompter at 1% speed (T1), and teleprompter at 50% speed (T50)—a repeated measures ANOVA was performed on four dependent variables: pitch, intensity, duration, and pronunciation errors.

Table 2 Descriptive statistics and ANOVA results for Pitch

	Sum of Squares	*df*	*Mean Square*	*F*	*Sig*
Between Groups	537.615	2	268.807	.112	.849
Within Groups	207969.222	87	2390.451		
Total	208506.837	89			

In Table 2, the results revealed that differences in pitch across conditions were not statistically significant, $F (2, 87) = 0.112$, $p = 0.849$, $\eta^2 p < .01$. Although the descriptive means indicated a slight decrease from WT (227 Hz) to T1 (215 Hz) and T50 (210 Hz), this variation did not reach statistical significance. This suggests that teleprompter-assisted reading did not exert a consistent influence on the fundamental frequency (F0) of students' voices.

Table 3. Descriptive statistics and ANOVA results for Intensity

	Sum of Squares	*df*	*Mean Square*	*F*	*Sig*
Between Groups	15.579	2	7.789	.240	.787
Within Groups	2817.957	87	32.390		
Total	2833.536	89			

The *intensity* parameter (measured in dB) was analyzed to evaluate students' vocal loudness and amplitude control while reading in different conditions. Intensity is closely related to prosodic emphasis and clarity of articulation.

In table 3, Similarly, intensity did not differ significantly across conditions, $F (2, 87) = 0.240$, $p = 0.787$, $\eta^2 p < .01$. Descriptive data showed a minor increase from WT (63 dB) to T1 (66 dB), followed by stabilization at T50 (65 dB). However, the overlap in variability indicates that these changes are within the range of normal individual differences rather than systematic effects of teleprompter use.

Table 4. Descriptive statistics and ANOVA results for Duration

An Acoustic Analysis of Student-Produced Speech in Speed Reading Using a Teleprompter at Al Azhar 3 Senior High School Bandar Lampung

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	39.639	2	19.820	9.746	.000
Within Groups	176.933	87	2.034		
Total	216.572	89			

Duration was measured to capture the total time students required to complete the reading in each condition. This parameter reflects overall fluency and speech rate.

Table 5. Descriptive statistics and Post Hoc Tests results for Duration

(I) Duration	(J) Duration	Mean Difference (I-J)	Std. Error	Sig	95% Confidence Interval	
					Lower Bound	Upper Bound
WT	T1	-1.21033*	.36821	.004	-2.0883	-.3323
	T50	.33467	.36821	.636	-.5433	1.2127
T1	WT	1.21033*	.36821	.004	.3323	2.0883
	T50	1.54500*	.36821	.000	.6670	2.4230
T50	WT	-.33467*	.36821	.636	-1.2127	.5433
	T1	-1.54500*	.36821	.000	-2.4230	-.6670

*. The mean difference is significant at the 0.05 level.

In table 4 and 5, in contrast a significant effect was found for duration, $F(2, 87) = 9.746, < .001$, $\eta^2 p = .18$. Post hoc comparisons using Tukey HSD revealed that duration in T1 was significantly longer than WT ($p = 0.004$) and significantly different from T50 ($p < 0.001$). However, the comparison between WT and T50 was not significant ($p = 0.636$). These findings suggest that slower teleprompter speed (1%) encouraged more careful articulation, leading to longer reading times, while faster speed (50%) reduced duration but at the cost of fluency and accuracy.

This section analyzed the total number of mispronounced words across different reading conditions. The aim was to compare how varying speeds, and the presence of a teleprompter affect pronunciation accuracy. This analysis plays a significant role in identifying trends and drawing conclusions about the impact of teleprompter usage on pronunciation skills. Below was a graph showing the total number of word errors.

Aggregate Pronunciation Errors

In this study, pronunciation errors were counted as total mispronunciations per condition, without further subdivision into segmental or suprasegmental categories. This decision was made because the primary focus of the research lies in acoustic phonetics (pitch, intensity, duration), not in detailed phonological categorization. The total error counts thus serve as a complementary measure to the acoustic analysis, providing an overview of overall accuracy. A more fine-grained classification of error types (e.g., consonant vs. vowel, stress, intonation) is recommended for future studies.

Table 6. Aggregate pronunciation errors by condition

Condition	Total Errors
WT	207
T1%	172
T50%	210

In table 6, it shows that students produced a total of 207 pronunciation errors without a teleprompter (WT), 172 errors with a slow teleprompter speed (T1 ≈ 120 wpm), and 210 errors with a fast teleprompter speed (T50 ≈ 200 wpm). Although the differences were not statistically significant (F(2, 87) = 0.719, p = .490), η²p = .02), descriptively the T1 condition showed the lowest error count, while the T50 condition produced the highest. This suggests that slower pacing may help reduce mistakes, whereas excessive speed tends to disrupt accuracy. In this study, errors were counted in total tokens without further classification into segmental or suprasegmental types, as the main focus was on acoustic phonetics (pitch, intensity, duration). The total error counts therefore serve as a complementary indicator of overall pronunciation accuracy. A more detailed phonological categorization (e.g., consonant vs. vowel errors, stress, intonation) is recommended for future research (Anggraeni, Susanto, & Nanda, 2024; Wijaya, Nanda, & Susanto, 2025; Susanto & Nanda, 2024).
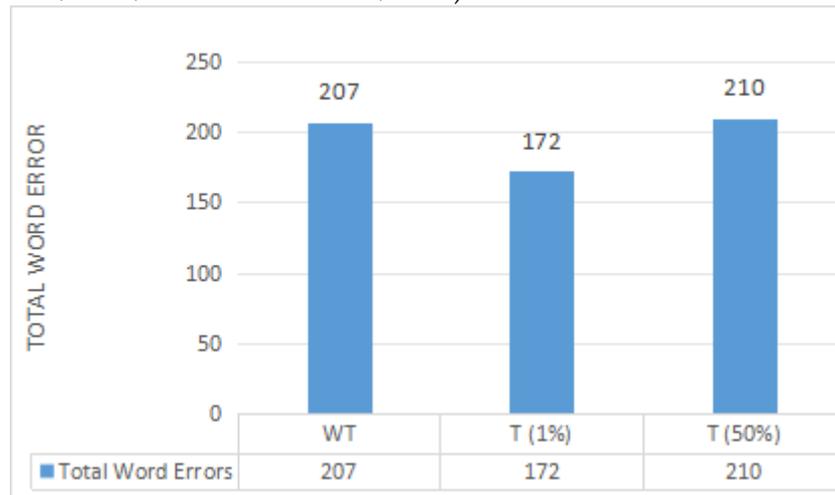

Figure 2. Total word errors while reading without a Teleprompter (WT), with a Teleprompter at 1%, and with a Teleprompter at 50%.

Figure 2 shows the total number of word errors in each reading condition: without a teleprompter, with a teleprompter at 1% speed, and with a teleprompter at 50% speed. The data shows that the fewest errors occurred when using the teleprompter at 1% speed, with a total of 172 mispronounced words. Meanwhile, reading without a teleprompter resulted in 207 mispronounced words, and reading with the teleprompter at 50% speed resulted in 210 errors. Although there is a slight difference between reading with and without a teleprompter, the highest number of errors occurred when using the teleprompter at 50% speed. This suggests that while the teleprompter can assist with reading, higher speeds may increase pronunciation errors. On the other hand, using the teleprompter at 1% speed proved effective in reducing errors, helping participants read more fluently and accurately.

Table 8. Descriptive statistics and ANOVA results for Pronunciation Errors

	Sum of Squares	*df*	*Mean Square*	*f*	*Sig*
Between Groups	33.756	2	16.878	.719	.490
Within Groups	2042.033	87	23.472		
Total	2075,789	89			

In addition to acoustic parameters, pronunciation errors were analyzed to evaluate the accuracy of students' articulation. Errors were counted for each condition and included both segmental (phoneme misarticulation) and suprasegmental (intonation and stress) mistakes. As presented in Table 8, A one-way repeated measures ANOVA was employed to determine whether the differences in pronunciation errors among the three conditions were statistically significant. The analysis yielded F(2, 87) = 0.719, p = .490, η²p =.02 which indicates that the differences were not statistically significant. Although the descriptive statistics suggested fewer errors in the T1 condition (172) compared to WT (207) and more errors in T50 (210), the

lack of statistical significance implies that these variations may reflect normal performance variability rather than systematic effects of teleprompter pacing. Nevertheless, the numerical trend supports the pedagogical interpretation that controlled teleprompter speed (T1) may ease cognitive load and improve pronunciation accuracy, while excessive speed (T50) may disrupt fluency and lead to more articulation errors.

To complement the group analysis, an individual case (Student Hn) was examined as a unique case to illustrate individual variability. Hn was tested under the three reading conditions: without a teleprompter (WT), with a teleprompter at 1% speed (T1 ≈ 120 wpm), and with a teleprompter at 50% speed (T50 ≈ 200 wpm). The acoustic features measured included pitch, intensity, and duration across 10 sentences per condition. The results are summarized in Table 8.

Table 9. Average Acoustic Values of Student Hn Across Three Reading Conditions

Condition	Pitch	Intensity	Duration
WT	199,995	74,68	2,98
T1%	201,855	74,67	4,29
T50%	203,96	73,69	3,125

Unlike the aggregate data, which showed a decrease in pitch when students used a teleprompter, Hn demonstrated a gradual increase in pitch across conditions (199.99 Hz → 201.85 Hz → 203.96 Hz). This divergence suggests that Hn adapted differently, possibly relying on increased vocal tension or pitch elevation as a personal strategy to maintain fluency. Therefore, Hn's performance should not be viewed as representative of the group, but rather as an individual variation that highlights the range of student responses.

In terms of duration, Hn produced the longest reading time in the T1 condition (50.8s) compared to WT (73.3s) and T50 (59.0s). This mirrors the group-level finding that slower teleprompter speed encouraged more deliberate articulation. However, unlike the group trend, which showed reduced pitch under teleprompter conditions, Hn's pitch pattern increased, reinforcing the idea that individual learners may employ different vocal adjustments when adapting to pacing demands.

Intensity for Hn remained relatively stable across conditions (74.68 dB in WT, 74.67 dB in T1, and 73.69 dB in T50), indicating that teleprompter pacing influenced timing and pitch more than loudness in this particular case.

Overall, Hn represents a unique case that deviates from the aggregate pattern, offering insights into how individual learners may develop alternative strategies under varying teleprompter speeds. This highlights the importance of examining both group data and individual trajectories to fully understand the pedagogical implications of teleprompter-assisted reading.

Pronunciation Errors in Student Hn

In addition to acoustic patterns, Hn's pronunciation errors were analyzed across the three reading conditions. Table 9 summarizes the mispronounced words, their incorrect phonetic realizations, and the expected correct forms.

Table 9. Pronunciation Errors of Student Hn Across Conditions.

Condition	Words Error	Phonetics Incorrect → Correct	Total Errors
WT	Explained Affect Cloud	/ɛkˈspleɪnɛd/ → /ɪkˈspleɪnd/ /ɛˈfɛkt/ → /əˈfɛkt/ /kuk/ → /klaʊd/	3
T1%	Explained Caused Affect Cloud	/ɛkˈspleɪnɛd/ → /ɪkˈspleɪnd/ /koz/ → /kɔːzd/ /ɛˈfɛkt/ → /əˈfɛkt/ /kuk/ → /klaʊd/	6

	Waters	/ˈwɛtərz/→/ˈwɔːtərz/	
	Urges	/ɑrdʒəz/ → /ɜːrdʒɪz/	
T50%	Explained	/ɛkˈspleɪnɛd/ → /ɪkˈspleɪnd/	6
	During	/dʊrɪŋ/→/ˈdjʊərɪŋ/	
	Caused	/kus/→/ kɔːzd /	
	Affect	/ɛˈfɛkt/→/əˈfɛkt/	
	Supported	/suˈpɔrted/→/səˈpɔːrtɪd/	
	Urges	/urgəz/→/ɜːrdʒɪz/	

Unlike the aggregate group results, where error counts decreased in the T1 condition, Hn's errors actually increased from 3 (WT) to 6 in both T1 and T50. This indicates that Hn represents a unique case where teleprompter pacing did not facilitate accuracy. The types of errors ranged from segmental misarticulations (e.g., mispronunciation of diphthongs and consonant clusters) to suprasegmental errors (stress and intonation). A specific example is shown in Figure 3, where the word *Cloud* was mispronounced as */kuk/* instead of */klaʊd/*. Such errors suggest interference from L1 phonology and difficulty maintaining target diphthongs under different pacing conditions.
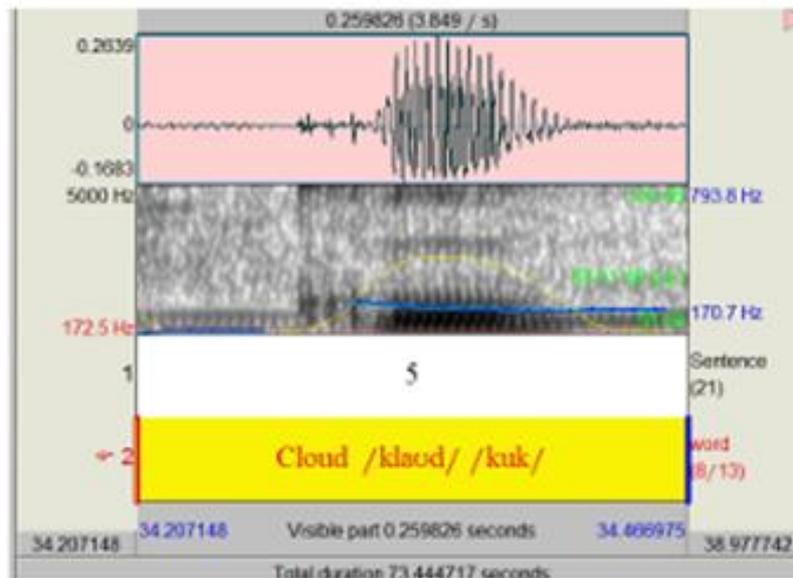

Figure 3. The word *Cloud* was mispronounced as */kuk/* instead of */klaʊd/*.

Taken together, Hn's data demonstrates that not all learners benefit equally from teleprompter support. While group data indicated reduced errors at the T1 condition, Hn exhibited more mispronunciations and a distinct acoustic pattern, highlighting the importance of recognizing individual variability in speech production. Hn's case emphasizes that teleprompters may support some learners but can also introduce challenges for others, depending on their phonological strategies and pacing adaptation.

Discussion

These findings indicate that teleprompter speed primarily influences articulation clarity and pronunciation accuracy rather than prosodic elements such as pitch and intensity. Longer duration at slow speed reflects more deliberate articulation, consistent with Cognitive Load Theory (Sweller, 1994)], which states that external scaffolds reduce cognitive load, allowing learners to focus on articulation. Conversely, the higher number of errors at the 50% teleprompter speed demonstrates increased processing demands that reduce accuracy, supporting Automatization Theory (Segalowitz, 2010)].

Compared to previous studies, these results align (Chung & Bidelman, 2022)], who reported that prosodic measures such as duration strongly predict fluency and comprehension. Similarly, emphasized that technological tools can enhance pronunciation clarity, although their effectiveness depends on task design (Sun, 2023). Unlike (In'am & Alatas, 2023)], who focused on teleprompter use in news reading without acoustic analysis,

this study provides quantitative evidence of how teleprompter speed influences measurable acoustic features in an English as a Foreign Language (EFL) classroom context. The findings also extend those of (Yi-Chao Jiang et al., n.d.) who showed that technology-assisted pronunciation tools improve speech complexity, by demonstrating how teleprompter use can modulate acoustic clarity.

Individual variability also emerged in the data. For instance, one participant (Student Hn) showed distinct performance differences across conditions, producing more stable pitch at slower speeds but struggling with accuracy at higher speeds. This highlights that while group-level trends are apparent, learner responses to teleprompter settings may vary depending on their proficiency and familiarity with speed reading.

The novelty of this research lies in its empirical testing of teleprompter speed, specifically ≈120 wpm and ≈200 wpm through acoustic analysis of pitch, intensity, duration, and pronunciation errors. This addresses a gap identified in the introduction, as previous studies have not examined the linguistic impact of teleprompter use in EFL contexts. Practically, the findings suggest that teachers can integrate teleprompter applications into speaking practice. Slow speeds can train accuracy and articulation, while fast speeds can be used to enhance fluency under time constraints. Thus, teleprompters can serve as pedagogical tools to balance clarity and fluency in EFL public speaking training.

CONCLUSIONS

This study examined the effects of teleprompter-assisted speed reading on the acoustic features of EFL learners' speech. Overall, the findings indicate that teleprompter speed influences articulation clarity and pronunciation accuracy more strongly than core prosodic features such as pitch and intensity. Slower teleprompter pacing supported more controlled and deliberate speech production, whereas faster pacing tended to increase processing demands that affected speech accuracy. These results underscore the importance of considering teleprompter speed when integrating technology into EFL speaking practice. From a pedagogical perspective, the study highlights the potential of teleprompter applications as instructional scaffolds in performance-based speaking activities. By adjusting scrolling speed, teachers can strategically balance accuracy-oriented practice and fluency development in public speaking and news-reading tasks. Future research may explore additional acoustic dimensions, such as formant patterns and voice quality, as well as learners' affective responses to teleprompter use in diverse instructional contexts.

ACKNOWLEDGEMENTS

REFERENCES

Anggraeni, S., Susanto, S., & Nanda, D. S. (2024). Praat-based analysis of phonological patterns in pitch, intensity and duration of students' news reading at SMAN 1 Semaka. *International Journal of Education, Vocational and Social Science, 3*(03), 279–298. https://doi.org/10.63922/ijevss.v3i03.1117

Copyright (c) 2026 Hamelia Qomara Dewi, et al.

An Acoustic Analysis of Student-Produced Speech in Speed Reading Using a Teleprompter at Al Azhar 3 Senior High School Bandar Lampung

Behr, N. S. (2022). English Diphthong Characteristics Produced by Thai EFL Learners: Individual Practice Using PRAAT. In *Computer Assisted Language Learning Electronic Journal (CALL-EJ)* (Vol. 23, Issue 1).

Boersma, P., Weenink, D. J. M., & Van Heuven, V. (2014). *PRAAT, a system for doing phonetics by computer Speak and unSpeak with PRAAT RAAT*. https://www.researchgate.net/publication/208032992

Budiarto, M. K., Gunarhadi, G., & Rahman, A. (2024). Technology in education through mobile learning application (MLA) and its impact on learning outcomes: Literature review. *Journal of Education and Learning*, *18*(2), 413–420. https://doi.org/10.11591/edulearn.v18i2.20976

Chung, W.-L., & Bidelman, G. M. (2022). Acoustic Features of Oral Reading Prosody and the Relation With Reading Fluency and Reading Comprehension in Taiwanese Children. *Journal of Speech, Language, and Hearing Research*, *65*(1), 334–343. https://doi.org/10.1044/2021_JSLHR-21-00252

Criollo-C, S., Guerrero-Arias, A., Jaramillo-Alcázar, Á., & Luján-Mora, S. (2021). Mobile learning technologies for education: Benefits and pending issues. *Applied Sciences (Switzerland)*, *11*(9). https://doi.org/10.3390/app11094111

Darcy, I. (2016). Review of Derwing & Munro (2015): Pronunciation Fundamentals. Evidence-based perspectives for L2 teaching and research. *Journal of Second Language Pronunciation*, *2*(2), 285–288. https://doi.org/10.1075/jslp.2.2.09dar

Duong, T. Van. (2022). The Effects of using Online Text-To Speech Tools on EFL Students' Perceptions in Learning Pronunciation. *International Journal of Science and Management Studies (IJSMS)*, 270–276. https://doi.org/10.51386/25815946/ijsms-v5i4p129

Fouz-González, J. (2020). *Using apps for pronunciation training: An empirical evaluation of the English File Pronunciation app*. 24, 62–85. https://doi.org/10125/44709

Granić, A. (2022). Educational Technology Adoption: A systematic review. *Education and Information Technologies*, *27*(7), 9725–9744. https://doi.org/10.1007/s10639-022-10951-7

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, *3*, 275–285. https://doi.org/10.1016/j.susoc.2022.05.004

In'am, & Alatas, M. A. (2023). Media Elegant Teleprompter sebagai Alternatif Media Pembelajaran Membaca Teks Berita Siswa Kls VIII MTs Nurul Yaqin Proppo. *GHANCARAN: Jurnal Pendidikan Bahasa Dan Sastra Indonesia*. https://doi.org/10.19105/ghancaran.vi.11743

Kukulska-Hulme, A., & Viberg, O. (2018). Mobile collaborative language learning: State of the art. *British Journal of Educational Technology*, *49*(2), 207–218. https://doi.org/10.1111/bjet.12580

Lan, E.-M. (2022). A comparative study of computer and mobile-assisted pronunciation training: The case of university students in Taiwan. *Education and Information Technologies*, *27*(2), 1559–1583. https://doi.org/10.1007/s10639-021-10647-4

Lopez, J. I., Becerra, A. P., & Ramirez-Avila, M. R. (2021). EFL Speaking Fluency through Authentic Oral Production. *Journal of Foreign Language Teaching and Learning*, *6*(1). https://doi.org/10.18196/ftl.v6i1.10175

Metruk, R. (2024). Mobile-assisted language learning and pronunciation instruction: A systematic literature review. *Education and Information Technologies*, *29*(13), 16255–16282. https://doi.org/10.1007/s10639-024-12453-0

Montgomery, M., & Shen, J. (2017). Direct address and television news-reading: Discourse, technology and changing cultural form in Chinese and western TV news. *Discourse, Context & Media*, *17*, 30–41. https://doi.org/10.1016/j.dcm.2017.03.004

Napitupulu, M. H., Wisrance, M. W., & Semiun, T. T. (2025). The Impact of Technology-Based Teaching Methods on English Speaking Skills in Rural Secondary Schools. *Jo-ELT (Journal of English Language Teaching) Fakultas Pendidikan Bahasa & Seni Prodi Pendidikan Bahasa Inggris IKIP*, *12*(1), 271. https://doi.org/10.33394/jo-elt.v12i1.15388

Rahmadilla, F., & Dewi Utari, E. (n.d.). *The Effect Of Using Teleprompter Applications On The Public Speaking Skills Of Office Administration Students*.

Sumarna, D. (n.d.). *Keefektifan Media Teleprompter Dalam Pembelajaran Membacakan Teks Berita Terhadap Siswa Kelas Viii Smp Negeri 5 Bandung*. http://id.wikipedia.org/wiki/Teleprompter.

Sun, W. (2023). The impact of automatic speech recognition technology on second language pronunciation and speaking skills of EFL learners: a mixed methods investigation. *Frontiers in Psychology*, 14. https://doi.org/10.3389/fpsyg.2023.1210187

Susanto, S., & Nanda, D. S. (2024). Harmonizing sound and script: Integrating phonetic symbols within the lexical approach to improve EFL listening skill. *English Review: Journal of English Education, 12*(1), 177–192. https://doi.org/10.25134/erjee.v12i1.9224

Timotheou, S., Miliou, O., Dimitriadis, Y., Sobrino, S. V., Giannoutsou, N., Cachia, R., Monés, A. M., & Ioannou, A. (2023). Impacts of digital technologies on education and factors influencing schools' digital capacity and transformation: A literature review. *Education and Information Technologies*, *28*(6), 6695–6726. https://doi.org/10.1007/s10639-022-11431-8

Wijaya, K. A., Nanda, D. S., & Susanto, S. (2025). Utilizing flashcards to identify phonological errors and enhance learning engagement among students with intellectual disabilities. *Journal of English Language & Culture, 15*(2). http://dx.doi.org/10.30813/jelc.v15i2.8139

Yi-Chao Jiang, M., Siu-Yung Jong, M., Wing-Fat Lau, W., Chai, C.-S., & Wu, N. (n.d.). Using automatic speech recognition technology to enhance EFL learners' oral language complexity in a flipped classroom. In *Australasian Journal of Educational Technology* (Vol. 2021, Issue 2).

Zuriati, D., & Persada Bunda, S. (n.d.). *J-SHMIC : Journal of English for Academic Implementing Speech-Texter Application to Improve EFL Learners' Fricative Pronunciation*. https://journal.uir.ac.id/index.php/jshmic