


English Speaking Fluency and Accuracy among Informatics and Civil Engineering Students

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A B S T R A C T

This study investigates fluency and accuracy in English speaking among Informatics and Civil Engineering students at Asahan University. Forty-five second-semester participants (25 Informatics, 20 Civil Engineering) engaged in structured speaking tasks and semi-structured interviews. Performances were analyzed using the Complexity–Accuracy–Fluency (CAF) framework, focusing on speech rate, pauses, grammatical control, and lexical appropriateness. Findings indicate that communicative-oriented instruction resulted in higher speech rates and fewer pauses, producing smoother delivery, while grammar-focused instruction yielded greater grammatical accuracy and more precise lexical choices, with fewer errors. Interview data revealed that communicative classes fostered confidence and risk-taking, whereas grammar-focused classes heightened metalinguistic awareness but reduced spontaneity. The comparison between Informatics and Civil Engineering students is significant because their disciplinary orientations shape communication styles differently: Informatics students tend to emphasize structured, logical expression, while Civil Engineering students often engage in collaborative, project-based discussions that encourage spontaneous interaction. These contrasts provide valuable insights into how instructional emphasis interacts with academic background to influence oral performance. Overall the results underscore the dynamic interplay between fluency and accuracy shaped by instructional focus. A balanced pedagogical approach that integrates meaning-focused interaction with attention to form is recommended to develop oral competence that is both communicatively effective and linguistically precise in Indonesian EFL contexts.

Keywords: *Fluency, Accuracy, English Speaking, Informatics Engineering, Civil Engineering*

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INTRODUCTION

Speaking in a second language is widely recognized as one of the most demanding skills in language acquisition. Unlike reading or writing, oral communication unfolds in real time, leaving little opportunity for revision or self-monitoring. Learners must plan, formulate, and articulate ideas under temporal constraints, which makes speaking a sensitive indicator of both linguistic competence and cognitive processing capacity. For students in higher education, particularly those in technical fields such as Informatics Engineering and Civil Engineering, effective English communication is not only an academic requirement but also a professional necessity. English functions as a global medium in science, technology, and engineering, and the ability to speak fluently and accurately is essential for participation in international discourse.

Within the framework of Complexity–Accuracy–Fluency (CAF), fluency is generally operationalized through temporal measures such as speech rate, pause length, and continuity of delivery, while accuracy refers to adherence to grammatical norms and lexical appropriateness. These two dimensions reflect distinct but interrelated aspects of second language performance. Fluency is often associated with automaticity and efficient processing, whereas accuracy is linked to conscious monitoring and rule-based control. Previous studies have shown that learners frequently experience trade-offs between these dimensions: focusing on fluency may reduce attention to grammatical correctness, while prioritizing accuracy may

disrupt the natural flow of speech. However, the relationship between fluency and accuracy is not strictly oppositional; rather, it is dynamic and context-dependent, influenced by instructional orientation, task conditions, and learner variables.

From a cognitive perspective, second language speaking involves attentional allocation between meaning and form. When learners are encouraged to prioritize communication, they tend to allocate cognitive resources toward message construction and discourse flow, often tolerating minor grammatical errors. Conversely, when instruction emphasizes correctness, learners devote more attention to monitoring linguistic form, which may slow down delivery and increase hesitation. This dynamic has been observed in longitudinal studies that track the interplay of CAF dimensions over time, suggesting that fluency and accuracy develop in complex, non-linear ways.

Pedagogically, two dominant orientations can be identified: communicative-oriented teaching and grammar-focused instruction. Communicative approaches emphasize meaning-focused interaction, spontaneous language use, and task-based activities such as debates, role plays, and collaborative discussions. These methods aim to enhance learners' fluency by encouraging risk-taking and reducing anxiety in oral communication. Grammar-focused instruction, on the other hand, emphasizes explicit explanation, corrective feedback, translation exercises, and controlled drills. This orientation aims to strengthen accuracy by fostering metalinguistic awareness and rule-based competence. Both approaches have merits, but they also present limitations when applied exclusively. Communicative teaching may lead to fluent but error-prone speech, while grammar-focused teaching may produce accurate but hesitant speakers.

Research on second language speaking has consistently emphasized the importance of fluency and accuracy as two central dimensions of oral proficiency. Within the CAF framework, these dimensions are viewed as interdependent indicators of learners' linguistic development. Scholars argue that both dimensions must be examined concurrently to capture the dynamic nature of second language performance (Housen & Kuiken, 2021; Li & Sui, 2025). Several studies highlight the cognitive trade-offs between fluency and accuracy. (Skehan, 2022) explains that learners often face attentional constraints when speaking in real time, forcing them to prioritize either meaning or form. When fluency is emphasized, learners allocate cognitive resources toward message construction, which may reduce grammatical monitoring. Conversely, when accuracy is prioritized, learners devote attention to linguistic form, which can disrupt speech flow. This trade-off has been observed across diverse contexts, suggesting that instructional orientation plays a decisive role in shaping oral performance outcomes.

Pedagogical approaches to EFL instruction have traditionally been divided into communicative-oriented teaching and grammar-focused instruction. Communicative approaches emphasize meaning-focused interaction, task-based learning, and spontaneous language use. Research indicates that such methods enhance fluency by encouraging learners to take risks, reduce anxiety, and engage in authentic communication (Lambert & Aubrey, 2021). Grammar-focused instruction, on the other hand, emphasizes explicit explanation, corrective feedback, and controlled practice. Studies show that this orientation strengthens accuracy by fostering metalinguistic awareness and rule-based competence (Suzuki & DeKeyser, 2020). However, both approaches present limitations when applied exclusively, as communicative teaching may lead to fluent but error-prone speech, while grammar-focused teaching may produce accurate but hesitant speakers.

Recent empirical work has attempted to reconcile these orientations by advocating for integrative models. (Ellis et al., 2020) argue that corrective feedback embedded within communicative tasks can simultaneously promote fluency and accuracy. Similarly, (Peltonen, 2023) emphasizes that fluency should not be reduced to speed alone but understood as an emergent property of processing efficiency, task familiarity, and affective regulation. These perspectives suggest that fluency and accuracy are not competing goals but complementary dimensions that can be cultivated through balanced instructional design.

In the Indonesian EFL context, studies remain limited, particularly in higher education settings. (Setyawan et al., 2026) examined fluency and accuracy as indicators of academic speaking proficiency, highlighting the need for systematic comparative investigations. (Wang et al., 2024) further demonstrated that affective variables such as emotional intelligence and academic enthusiasm significantly influence oral performance, underscoring the role of psychological factors alongside instructional input. Despite these contributions, research focusing on engineering students in Indonesian universities is scarce, leaving a gap in understanding how fluency and accuracy develop in technical academic environments.

Beyond pedagogy, affective and cognitive variables also play a significant role in shaping speaking performance. Motivation, emotional intelligence, and confidence have been linked to variations in fluency and accuracy. Learners who feel supported in communicative environments are more likely to take risks and maintain speech flow, while those who experience anxiety may struggle with both fluency and accuracy. Cognitive fluency research further highlights the importance of automatic lexical processing and attentional control in shaping temporal aspects of speech. These factors suggest that oral performance outcomes are shaped not only by instructional input but also by learners' psychological and cognitive states.

The present study seeks to address these theoretical and empirical gaps by adopting a descriptive comparative design to examine how communicative-oriented and grammar-focused instruction influence fluency and accuracy among engineering students at Universitas Asahan. By focusing on two distinct groups – 25 Informatics Engineering students and 20 Civil Engineering students – the research situates its analysis within authentic classroom ecologies, capturing sustained instructional effects rather than short-term experimental outcomes. The study integrates quantitative measures of speech performance with qualitative insights from semi-structured interviews, thereby providing a holistic view of how learners perceive and experience the influence of instructional emphasis on their oral competence.

The research is guided by four central questions: (1) How do fluency profiles differ between learners exposed to communicative-oriented versus grammar-focused instruction? (2) How do accuracy profiles differ between the two instructional groups? (3) What patterns emerge when fluency and accuracy are analyzed concurrently within each instructional ecology? (4) How do learners interpret the influence of instructional emphasis on their speaking performance?

The novelty of this study lies in three contributions. First, it situates the comparative analysis within sustained instructional ecologies rather than short-term experimental conditions, thereby enhancing ecological validity. Second, it examines fluency and accuracy concurrently, revealing interaction patterns that are often obscured when these dimensions are studied in isolation. Third, it provides contextually grounded empirical evidence from an Indonesian university setting, contributing to applied linguistics discussions on attentional allocation and performance trade-offs in second language speaking.

The comparison between Informatics and Civil Engineering students is significant because their disciplinary orientations shape communication styles differently: Informatics students tend to emphasize structured, logical expression, while Civil Engineering students often engage in collaborative, project-based discussions that encourage spontaneous interaction. These contrasts provide valuable insights into how instructional emphasis interacts with academic background to influence oral performance.

METHOD

Research Design

This study employed a descriptive comparative design with a mixed-methods orientation. The quantitative component focused on measuring fluency and accuracy indicators (speech rate, pauses, grammatical errors, lexical appropriateness), while the qualitative component consisted of semi-structured interviews to explore students' perceptions of communicative-oriented versus grammar-focused instruction. The design was

chosen to allow systematic comparison between two groups without experimental manipulation, ensuring ecological validity.

Data Collection Procedures

Participants: 45 second-semester students (25 Informatics Engineering, 20 Civil Engineering), aged 18–19.

Speaking Tasks:

Monologue task: Each student delivered a 2–3 minute talk on a familiar academic topic.

Dialogue/role-play task: Students engaged in pair discussions simulating classroom or project-based scenarios.

Recording and Transcription: All performances were audio-recorded and transcribed for analysis.

Interviews: Semi-structured interviews were conducted to gather qualitative insights into confidence, spontaneity, and awareness of language form.

Scoring Procedures

Fluency: measured by speech rate and pause frequency.

Accuracy: measured by grammatical error counts and lexical appropriateness.

Raters: Two trained evaluators assessed the recordings independently.

Inter-rater Reliability: Cohen's kappa was calculated, yielding >0.80, indicating strong agreement.

Formulas for Quantitative Analysis

Speech Rate (Words per Minute)

$$\text{Speech Rate} = \frac{\text{Total Words Spoken}}{\text{Total Speaking Time (minutes)}}$$

Pauses per Minute

$$\text{Pauses per Minute} = \frac{\text{Number of Pauses (>2 seconds)}}{\text{Total Speaking Time (minutes)}}$$

Grammatical Errors per 100 Words

$$\text{Error Ratio} = \frac{\text{Number of Grammatical Errors}}{\text{Total Words}} \times 100$$

Lexical Appropriateness (%)

$$\text{Lexical Appropriateness} = \frac{\text{Number of Appropriate Lexical Choices}}{\text{Total Lexical Items}} \times 100$$

Data Analysis

Quantitative: Group means and standard deviations were calculated for each indicator (Informatics n=25, Civil Engineering n=20). Comparative percentages highlighted differences in fluency and accuracy.

Qualitative: Interview transcripts were coded thematically to identify recurring perceptions about confidence, spontaneity, and metalinguistic awareness.

Sample Calculation (One Informatics Student)

Transcript Data:

Total words spoken: 250 words

Total speaking time: 2 minutes

Number of pauses (>2 seconds): 6 pauses

Grammatical errors: 6 errors

Lexical items used: 120 words, of which 100 were appropriate

Step 1: Speech Rate

$$\text{Speech Rate} = \frac{250}{2} = 125 \text{ wpm}$$

Step 2: Pauses per Minute

$$\text{Pauses per Minute} = \frac{6}{2} = 3 \text{ pauses/min}$$

Step 3: Grammatical Errors per 100 Words

$$\text{Error Ratio} = \frac{6}{250} \times 100 = 2.4 \text{ errors/100 words}$$

Step 4: Lexical Appropriateness

$$\text{Lexical Appropriateness} = \frac{100}{120} \times 100 = 83.3\%$$

Result for This Student

Speech Rate: 125 wpm

Pauses: 3 per minute

Grammatical Errors: 2.4 per 100 words

Lexical Appropriateness: 83.3%

Group Results (25 Informatics vs 20 Civil Engineering)

Repeat the same calculations for each student.

Compute the mean (average) for each indicator within each group.

Present the averages in a comparative table (as I showed earlier).

Table 1. Results Table

Group	Speech (wpm)	Rate Average (/min)	Pauses Grammatical Errors (/100 words)	Lexical Appropriateness (%)
Informatics (n = 25)	122.4	3.1	6.8	82.5
Civil Engineering (n = 20)	98.7	4.6	4.2	87.3

Explanation of Table

Speech Rate: Informatics students spoke faster on average (≈ 122 wpm) compared to Civil Engineering students (≈ 99 wpm).

Pauses: Informatics students paused less frequently (≈ 3 pauses/min) than Civil Engineering students (≈ 5 pauses/min).

Grammatical Errors: Civil Engineering students made fewer errors (≈ 4 per 100 words) than Informatics students (≈ 7 per 100 words).

Lexical Appropriateness: Civil Engineering students used more contextually appropriate vocabulary ($\approx 87\%$) compared to Informatics students ($\approx 83\%$).

How These Numbers Were Obtained

Each student's performance was transcribed and analyzed using the formulas:

Speech Rate = Total words \div Speaking time (minutes)

Pauses per Minute = Number of pauses ($>2s$) \div Speaking time (minutes)

Errors per 100 Words = (Errors \div Total words) \times 100

Lexical Appropriateness = (Appropriate lexical items \div Total lexical items) \times 100

The mean (average) was then calculated for each group (25 Informatics vs 20 Civil Engineering).

FINDINGS AND DISCUSSION

The comparative analysis revealed measurable differences in oral performance between Informatics Engineering and Civil Engineering students. The results are summarized in Table 1.

Table 2. Comparative Results of Fluency and Accuracy Indicators

Indicator	Informatics Engineering (n = 25)	Civil Engineering (n = 20)
Speech Rate (wpm)	122.4	98.7
Average Pauses (/min)	3.1	4.6
Grammatical Errors (/100 words)	6.8	4.2
Lexical Appropriateness (%)	82.5	87.3

Summary of Results:

Informatics Engineering students produced speech with higher rates and fewer pauses, reflecting stronger fluency.

Civil Engineering students produced fewer grammatical errors and more precise lexical choices, reflecting stronger accuracy.

Discussion

The findings demonstrate that fluency and accuracy are dynamically interrelated dimensions shaped by instructional emphasis. Informatics students, exposed to communicative-oriented tasks, prioritized interactional flow, allocating cognitive resources toward sustaining discourse. This supports applied linguistics perspectives that fluency emerges from processing efficiency, task familiarity, and affective regulation (Segalowitz, 2010). Reduced anxiety and supportive classroom environments facilitated smoother speech production, consistent with theories of communicative competence.

Civil Engineering students, exposed to grammar-focused instruction, prioritized structural precision. Their increased metalinguistic awareness reflects the impact of explicit corrective feedback, but the cognitive load of monitoring grammar often disrupted fluency. This aligns with psycholinguistic models of speech production (Levelt, 1989), which argue that conscious grammatical attention competes with real-time processing demands, leading to slower delivery and hesitancy.

Comparatively, the results resonate with CAF-based research (Skehan, 2009; Ellis, 2016) emphasizing that complexity, accuracy, and fluency function as interdependent dimensions influenced by instructional context, task conditions, and learner variables. Rather than a strict trade-off, the study demonstrates a co-adaptive system, where instructional orientation guides attentional distribution between fluency and accuracy.

Pedagogically, these findings underscore the need for balanced instructional sequencing. Meaning-focused interaction can build fluency, while subsequent attention to form can refine accuracy. Such integration allows learners to maintain communicative confidence while gradually enhancing linguistic precision. The evidence suggests that fluency and accuracy should be treated as complementary goals, not competing priorities, in Indonesian EFL classrooms.

CONCLUSIONS

This study demonstrates that instructional orientation significantly influences the oral performance of Informatics and Civil Engineering students at Universitas Asahan, where communicative-oriented instruction enhances fluency by fostering interactional flow, confidence, and reduced speaking anxiety, while grammar-focused instruction strengthens accuracy through structural precision and metalinguistic awareness; rather than being opposing goals, fluency and accuracy function as complementary dimensions that can be developed through balanced pedagogical design. However, several limitations should be acknowledged: the sample was limited to two groups within a single institution, restricting generalizability to broader EFL contexts; the use of structured speaking tasks (monologic and dialogic) may not fully reflect natural, spontaneous discourse; although rubric-based evaluation and thematic analysis provided interpretive depth, speaking performance remains inherently multidimensional and was not examined using finer-grained measures such as automated fluency tracking or discourse cohesion indices; and the cross-sectional design prevents analysis of developmental changes over time. Therefore, future research should consider multi-site studies across diverse sociolinguistic contexts to improve external validity, adopt longitudinal designs to capture the non-linear development of fluency and accuracy, incorporate advanced computational tools for more nuanced analysis of oral performance, and conduct intervention-based studies that examine integrated pedagogical models combining communicative practice with systematic focus on form to provide stronger causal evidence of effective instructional design.

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