

The Implications of Using Praat for Intonation-based Pronunciation Assessment of EFL Teachers in Indonesian Classrooms (Implikasi Penggunaan Praat untuk Penilaian Sebutan Berasaskan Intonasi Guru EFL di Bilik Darjah di Indonesia)

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Received: 16 June 2025 / Accepted: 15 January 2026

ABSTRACT

The intonation-based pronunciation assessment in a classroom interaction context has not been investigated in detail in terms of mutual correlation, specifically among English as a Foreign Language (EFL) teachers. This type of investigation should achieve meaningful and impactful classroom interaction through intonation usage and support EFL teachers in appropriately conveying messages and enabling EFL students to respond effectively. However, investigations in this area remain limited, particularly in Indonesia. Therefore, this study aimed to investigate EFL teachers' pronunciation in depth during English-speaking instruction, focusing on intonation, cultural classroom interaction context, human interpretative involvement, and PRAAT analysis, as well as how teachers achieved meaningful and impactful English-speaking classroom interaction. Data were collected through observation using checklists and field notes, Stimulated Recall Interview (SRI), and PRAAT-based tonic movement measurements. The results showed that PRAAT-supported analysis highlighted areas for self-corrective work. EFL teachers implied specific meanings through falling (p), rising (r+), and falling-rising (r), all with an "above" tone. Furthermore, tone usage was influenced by cultural context, particularly rising-falling (p+) with an "above" tone, while EFL students predominantly responded with affirmative and confirmatory meanings using falling (p) intonation, reflecting classroom power relations in interaction. The results could serve as potential guidance for EFL teachers in conveying specific meanings and improving classroom interaction by assigning appropriate intonation patterns and intonation stress to foster classroom involvement. Improvement in intonation usage can be achieved through intensive PRAAT-based training. This study was limited by the sole focus on statement expressions in classroom interaction contexts.

Keywords: PRAAT; pronunciation assessment; discourse intonation; tonic movement; tone level tendency

ABSTRAK

Penilaian sebutan berasaskan intonasi dalam konteks interaksi bilik darjah masih belum dikaji secara mendalam dari segi korelasi bersama, khususnya di kalangan guru Bahasa Inggeris sebagai Bahasa Asing (EFL). Penyelidikan jenis ini bertujuan untuk mencapai interaksi bilik darjah yang bermakna dan berkesan melalui penggunaan intonasi, sambil menyokong guru EFL dalam menyampaikan mesej dengan tepat dan membolehkan pelajar EFL memberi respons yang sesuai. Namun, kajian dalam bidang ini masih terhad, terutamanya di Indonesia. Oleh itu, kajian ini bertujuan untuk meneliti sebutan guru EFL secara terperinci semasa pengajaran berbahasa Inggeris, dengan fokus kepada intonasi, konteks interaksi bilik darjah dari perspektif budaya, penglibatan interpretatif manusia, serta analisis menggunakan PRAAT. Kajian ini juga menilai bagaimana guru mencapai interaksi bilik darjah berbahasa Inggeris yang bermakna dan berimpak. Data dikumpul melalui pemerhatian menggunakan senarai semak dan nota lapangan, Temu Bual Ingatan Terangsang (Stimulated Recall Interview, SRI), serta pengukuran pergerakan tonik berasaskan PRAAT. Hasil kajian menunjukkan bahawa analisis berasaskan PRAAT menonjolkan aspek-aspek untuk pembedaan sendiri oleh guru. Guru EFL menyampaikan makna tertentu melalui intonasi menurun (p), menaik (r+), dan menurun-

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menaik (r), semuanya dengan nada “atas”. Penggunaan nada juga dipengaruhi oleh konteks budaya, terutamanya intonasi menaik-menurun (p+) dengan nada “atas”, manakala pelajar EFL secara dominan memberi respons dengan makna afirmatif dan pengesahan melalui intonasi menurun (p), mencerminkan hubungan kuasa dalam interaksi bilik darjah. Hasil kajian ini boleh dijadikan panduan kepada guru EFL dalam menyampaikan makna tertentu serta meningkatkan interaksi bilik darjah melalui penggunaan corak intonasi dan tekanan intonasi yang sesuai bagi menggalakkan penglibatan pelajar. Peningkatan penggunaan intonasi boleh dicapai melalui latihan intensif berasaskan PRAAT. Kajian ini terhad kepada fokus pada ekspresi kenyataan dalam konteks interaksi bilik darjah.

Kata Kunci: PRAAT; penilaian sebutan; intonasi wacana; pergerakan tonik; kecenderungan tahap nada

INTRODUCTION

PRAAT is Dutch for “talk” (Stanley & Lipani, 2019) and offers several benefits, including recording speech, detecting and diagnosing mispronunciations, and suggesting methods for correction (Agarwal & Chakraborty, 2019). In Asia, PRAAT has been widely used as self-generated visual feedback (Yan Jiang & Dorothy Chun, 2023). It has also been used as a pronunciation assessment tool to measure English diphthongs, with most English as a Foreign Language (EFL) students reporting satisfaction with PRAAT as a tool for pronunciation practice (Behr, 2022). Over the past several years, there has been a shifting landscape where PRAAT has emerged as a prominent pronunciation assessment tool among EFL students in classroom contexts, becoming enormously popular as a beneficial tool for pronunciation correction (de Jong et al., 2021; de Jong & Wempe, 2009; Osatananda & Thinchana, 2021).

Pronunciation assessment presents challenges and emerging opportunities in investigating intonation (Dorothy M. Chun, 2002), examining its meanings (Yan Jiang & Dorothy Chun, 2023), achieving meaningful impact in the form of action through language (Thornbury & Slade, 2006), and mutually interpreting intended meanings behind utterances with intelligibility (Dimova, 2018). This is because pronunciation constructs discourse in L2 performance and leads to interpretation of a stream of speech (Kang & Ginther, 2018). Accordingly, the target investigation should be the individual speaker, such as EFL teacher, to gain insight into how students’ pronunciation differs and to provide specific articulatory feedback through speech recognition (Van More & Suzuki, 2018). In addition, it is necessary to highlight pitch tracking by providing graphical representations of each utterance (Dorothy M. Chun, 2002) and to examine performance in the classroom interaction context (Wells, 2009), serving as a purposeful setting where EFL teachers teach and EFL students learn and practice the language.

Investigations on intonation-based pronunciation assessment have proposed integrating intonation features to support EFL students in recognizing levels of pronunciation acceptability (Fazyudi Ahmad Nadzri et al., 2022; Gorjian et al., 2013; Kevin, 2018; Wenge Yang & Xue Zhao, 2021; Yanfang Wang, 2019). However, comprehensive reviews of the availability of intonation-based pronunciation assessment have identified limitations in both theoretical scope and research participants. From a theoretical perspective, further discussion is needed on intonation within the classroom interaction context involving both EFL teachers and students (Wells, 2009) to achieve meaningful classroom contexts (Goh & Burns, 2012), accommodate power relations (Thornbury & Slade, 2006), and apply relevant theoretical frameworks (Brazil, 1997; Dorothy M. Chun, 2002).

Regarding participants, both EFL teachers and students in classroom settings should be included to address issues related to the implications of intonation-based pronunciation assessment. This inclusion would allow for discussion of meanings and their implications in classroom interaction contexts, with the objective of achieving meaningful and impactful

interaction. Therefore, this study aimed to investigate EFL teachers' pronunciation in depth during English-speaking instruction, focusing on intonation, cultural classroom interaction context, human involvement and PRAAT analysis, as well as how teachers achieved meaningful and impactful English-speaking teaching interaction. This study was limited by its sole focus on statement expressions in intonation discourse in classroom contexts. Therefore, future investigations could incorporate a wider range of expressions with more sophisticated intonation discourse (Wells, 2009) and include more participants, specifically from countries with EFL teaching contexts, to enable cross-country comparisons.

LITERATURE REVIEW

THE IMPLICATIONS OF PRAAT ON INTONATION-BASED PRONUNCIATION ASSESSMENT

This chapter reviews pronunciation-based assessment through intonation and PRAAT in the context of discourse intonation, including its development and previous investigations.

Developments in intonation-based pronunciation assessment using PRAAT have led to a wider range of delivery mechanisms, moving toward a more “one-size-fits-all” model (Derwing & Munro, 2015; Pennington & Rogerson-Revell, 2019). However, this model often takes precedence over pedagogy, resulting in resources that offer a limited range of activity types (e.g., minimal pair discrimination) and restricted feedback (e.g., “correct” or “incorrect”). The novelty of “drag-and-drop” or “odd-one-out” activities can quickly diminish unless supported by pedagogically sound feedback or support. There are clear affordances in using PRAAT for assessing intonation-based pronunciation, such as opportunities for instantaneous responses, exposure to a wide range of target-language speech, and facilitation of individualized learning (Boersma & Weenink, 2014; Lieshout, 2017; Maryn, 2017; Stanley & Lipani, 2019; Styler, 2023; Wenge Yang & Xue Zhao, 2021). Therefore, a possible solution is to design the implications of PRAAT on intonation-based pronunciation assessment for EFL teachers (Brown & Abeywickrama, 2018) through accurate and reliable methods (Kang & Ginther, 2018), complemented by human involvement (Dimova, 2018; Harding, 2018; Isaacs & Harding, 2017).

Intonation-based pronunciation assessment comprises a series of speaking tasks used to rate and compare pronunciation of L2 speakers against L1 norms, focusing on both segmental and suprasegmental features (Dorothy M. Chun, 2002; Kallio et al., 2023) of the target language (Goh & Burns, 2012; Wells, 2009). The use of intonation-based pronunciation assessment shows considerable promise for addressing a range of linguistic features (Table 1) as a conscious effort to adapt intonation patterns, enabling EFL teachers to convey messages appropriately and EFL students to respond effectively (Goh & Burns, 2012).

TABLE 1. The Core of Speaking Skill

Core Skill	Specific Skill
Pronunciation Produce the sounds of the target language at the segmental and suprasegmental levels	<ul style="list-style-type: none">• Articulate the vowels and consonants and blended sounds of English clearly• Assign word stress in prominent words to indicate meaning• Use different intonation patterns to communicate new and old information

Since intonation, as described in daily language use, relies on metrical representations of text, distinctions between stressed and unstressed syllables, and phrasal tunes represented by combinations of two discrete tones, namely high (H) and low (L), as well as pitch curves (Dorothy M. Chun, 2002), it can support EFL teachers and students to “see” the intonation patterns produced. This visual representation may be more effective than diacritics or descriptive labels such as “low rise” or “fall-rise” in helping students approximate target-language patterns. In addition, intonation contributes to intelligibility and conveys attitudinal meaning, making it highly valuable for discourse analysis (Goh & Burns, 2012; 2015). It consists of a relatively small but powerful set of categories linked to general meanings related to speaker involvement with discourse partner(s), particularly in tonic movements, namely (1) falling-rising or *referring* tone r, (2) falling or *proclaiming* tone p, (3) rising or marked version of the fall-rise, r+, (4) rising-falling or marked version of the fall, p+, and (5) low rising (Brazil, 1997). These are further complemented by tone levels such as “at” for indicating expectation, “above” for high expectation, and “below” for implying prerequisites (Dorothy M. Chun, 2002).

Intonation in context is referred to as discourse intonation. When applied to classroom interaction, it is viewed from the perspectives of both EFL teachers and students, where power relations exist and signal meanings are more elaborately realized through usage (Thornbury & Slade, 2006). Power relations between EFL teachers and students refer to an equal distribution of rights and duties in interaction, achieved by minimizing the manifestation of hierarchical differences such as status, age, and role. The most commonly elaborated signal meaning between EFL teachers and students through discourse intonation in classroom interaction is realized through statement expressions (Wells, 2009).

Intonation in classroom interaction conveys discourse-level meaning and is used to clarify meaning (Goh & Burns, 2012). This meaning can be modified through tonic movement, tone-level tendencies, and terminal pitch tendencies (Dorothy M. Chun, 2002). Tonic movements and their associated meanings in classroom interaction contexts (Table 2) have been proposed as analytical guidance for categorizing discourse intonation (Brazil, 1997; Dorothy M. Chun, 2002). However, these theories continue to develop, expand, and generate debate, specifically when applied classroom context. Once their premises are established, the insights generated become substantial, as evidenced by the results on intonation in contexts where L1 continues to serve as input for L2 production in interactions between EFL teachers and students (Harding, 2018; Thomson, 2018), specifically in Indonesian context. Therefore, pronunciation assessment has renewed its focus on intonation (Dorothy M. Chun, 2002), and viewing it as an integral component of the L2 speaking construct (Isaacs & Trofimovich, 2017). Assessment results can be categorized into two main criteria, 1) accepted tone, which includes default and alternative tonic movements, and (2) unaccepted tone, including tones considered accepted or unaccepted based on cultural context and mutual interaction in sociocultural knowledge (Table 2).

TABLE 2. Tone Meaning in Classroom Interaction Context of Statement Expressions

Tonic Movement	Tone Level Tendency	Tone Meaning
Falling-rising (r)	Above tone	Accepted tone, includes:
Falling (p)	Above tone (Signal contrastive) Below tone (Equivalent information)	Default tonic movement: falling (p) Alternative tonic movement: rising (r+), falling-rising (r)
Rising (r+)	Above tone and at tone	
Rising-falling (p+)	Below tone	Regardless accepted tone (default and alternative tonic movement), unaccepted tone.
Low rising	At tone	

RESEARCH GAP ON INTONATION-BASED PRONUNCIATION

The research experts compared previous studies conducted in China (Wenge Yang & Xue Zhao, 2021; Yan Jiang & Dorothy Chun, 2023; Zhongmin Li et al., 2020), focusing on measuring and evaluating intonation feedback, prosody, word stress, English discourse intonation, and phonological representations of intonation patterns, with studies conducted in Thailand, as reported by Behr (2022) and Osatananda & Thinchana (2021), emphasizing differences in phonetic stress that tended to be segmental. A key similarity across these studies was the use of PRAAT as a measurement tool. Both studies found that PRAAT could assist in identifying pronunciation errors, provide timely correction, improve pronunciation and intonation levels among target students, and PRAAT was as effective as the native speaker model for helping the students form the phonological representations of intonation patterns.

Kevin (2018) examined Georgian EFL speakers' understanding of speech, English word stress, and intonation through PRAAT-based training. The study showed an increased awareness of intonation, improved intelligibility of utterances, and improved English word stress. Similarly, Fazyudi Ahmad Nadzri et al. (2022) discussed insights into Malaysian English speakers' intonation practices aimed at avoiding miscommunication, while Gorjian et al. (2013) showed the accuracy of PRAAT-based practice in improving stress and intonation among EFL students, identifying PRAAT as a significant tool for accurately exploring English prosodic features. All of these studies reflected the importance of using appropriate intonation. However, none were conducted in classroom interaction contexts to examine the naturalness of interaction or to achieve meaningful and impactful English-speaking teaching interactions between EFL teachers and students through cultural classroom interaction contexts and classroom power relations, which are the primary aims of this current study.

METHOD

A qualitative method (Bogdan & Biklen, 2007; Creswell, 2013) was used to investigate EFL teachers' pronunciation in depth during English-speaking instruction, focusing on intonation, cultural classroom interaction context, human interpretative involvement, and PRAAT, and to examine how teachers achieved meaningful and impactful English-speaking teaching interaction. A case study design involving classroom observation was also adopted using checklists and field notes, as well as Stimulated Recall Interviews (SRI) for confirmation supported by PRAAT analysis. PRAAT (*phonetics by computer*), version 6.3.08, was used to assess and measure intonation quality in spoken utterances in relation to meaning and interactional context between EFL teachers and students.

The participants included eight EFL teachers (Table 3), identified using teacher pseudonyms (TP), each teaching in one class across eight classes in two public junior high schools in East Java, Indonesia. East Java is the second most populous province and has the second-largest number of junior high schools (<https://www.bps.go.id>). The schools are categorized among the top ten state schools in East Java, hold A-level accreditation (<https://ban-pdm.id>), and have students who have achieved both national and international awards. All participating EFL teachers have approximately 29 years of teaching experience based on their first year of teaching English. Participants are civil servant English teachers (<https://sscasn.bkn.go.id>), professionally certified English teachers (Republic of Indonesia Presidential Regulations, 2003, 2005), who hold

bachelor’s degrees in English education from credible universities, and are top graduates of Teacher Professional Education Program (PPG) (<https://ppg.kemdikbud.go.id>).

TABLE 3. Demographic Information of Teachers as Participants in the Research

Teacher Pseudonym	Gender	Teaching Experience	Teaching Grade	Status
Rina/ TP-1	Female	19-years	8 th grade	Certified English teacher
Roni/ TP-2	Male	3-years	7 th grade	Certified English teacher
Budi/ TP-3	Male	8-years	9 th grade	Certified English teacher
Betty/ TP-4	Female	28-years	9 th grade	Certified English teacher
Anita/ TP-5	Female	29-years	9 th grade	Certified English teacher
Amel/ TP-6	Female	13-years	8 th grade	Certified English teacher
Mitha/TP-7	Female	7-years	7 th grade	Certified English teacher
Marsya/TP-8	Female	3-years	8 th grade	Certified English teacher

This study was conducted in the context of a 16-week English course. English is a mandatory subject taught by EFL teachers to EFL students for one or two times per week, with each session lasting 45 minutes. Each EFL teacher was observed for 2 weeks across two phases of observation, each involving a different English-speaking lesson topic.

Data collection began with the distribution of consent forms, which were approved by all participating EFL teachers and school authorities. Subsequently, EFL teachers’ schedules at each school and English-speaking lesson plans were analyzed, identifying 2 relevant lesson topics for the observation phases (Table 4). Qualitative data collection focused on spectrogram-based tonic movements, pitch rises and falls in response to interactional meaning in classroom contexts between EFL teachers and EFL students, and the uttered words.

In the first phase of data collection, all EFL teachers were equipped with recording devices during English-speaking instruction to capture and identify specific utterances and words. Classroom observations were conducted concurrently, with field notes and checklists used to document interactions between EFL teachers and students, message delivery, and synchronization of verbal and contextual cues to provide a clear description of classroom interaction. The recorded audio data were later reviewed with EFL teachers to raise awareness of the utterances produced. This process involved immediate SRI conducted after teaching sessions (Mackey & Gass, 2022). Awareness confirmation was carried out to verify both EFL teachers’ and students’ recognition of their utterances, ensuring the authenticity of tonic movements. Subsequently, intonational tonic movements were interpreted to determine their meanings and impacts in classroom interaction contexts. This procedure was repeated in the second observation phase. After data collection, the data were coded and reduced based on classroom interactional context utterances produced by EFL teachers and students. Coding and classification were guided by participants’ activities in English-speaking classrooms. The most common interaction between EFL teachers and students through discourse intonation in classroom contexts occurs in the form of statement expressions (Wells, 2009). A total of 64 English statement utterances from the data were identified, then reduced from an initial mixture of English and Bahasa Indonesia utterances. These English statement expressions were distributed across all EFL teachers and reflected several choices of tonic movement. Finally, the tonic movements of utterances were analyzed using PRAAT to determine the meaning and impact of each utterance in English-speaking classroom interaction, including how these meanings were conveyed and interpreted.

TABLE 4. The Distribution of Speaking Class Observation

Teacher's Pseudonym	Two-time Observation	English-Speaking Lesson Topic	Teaching Grade
Rina	Phase 1	The expression of using: there is	8 th grade
	Phase 2	The expression of using: there are	
Roni	Phase 1	The expression of using: there is	7 th grade
	Phase 2	The expression of using: there are	
Budi	Phase 1	Describing the folktale: Sangkuriang	9 th grade
	Phase 2	Describing a folktale: character and lesson from Sangkuriang	
Betty	Phase 1	The expression of past activity	9 th grade
	Phase 2	The expression of the continuous activity	
Anita	Phase 1	The expression of the duration of time (for)	9 th grade
	Phase 2	The expression of the duration of time (since)	
Amel	Phase 1	The expression of the duration of time (for)	8 th grade
	Phase 2	The expression of the duration of time (since)	
Mitha	Phase 1	The expression: the taste of the drink	7 th grade
	Phase 2	The expression: the texture of food	
Marsya	Phase 1	The expression: the taste of the drink	7 th grade
	Phase 2	The expression: the texture of food	

The next step focused on PRAAT results derived from the original audio recordings of EFL teachers and students. This process involved several sub-steps. First, all captured raw voice data were gathered in a suitable format (MP3). Second, the audio set was cleaned by eliminating extremely noisy audio through the application of filters. Third, some parts of the audio relevant to the English-speaking lesson topic in each phase were cut, and the main focus was only on the words uttered. Experienced lecturers and researchers (holding professor degrees) were engaged to give advisory comments on statement expression selection. Fourth, the audio recording selection was enlarged by clicking the view and edit buttons, then pressing the play button to hear the pitch of rises and falls to adapt intonation to tonic movement. Lastly, the dataset was ready to be analyzed by interpreting the interaction meaning context.

PRAAT data were analyzed based on the target language from the first and the second phase English-speaking lesson topic. The quality of EFL teachers' pronunciation and utterances was assessed by analyzing intonation patterns from PRAAT results and examining the classroom interaction context through the statement expressions (Wells, 2009), using a discourse intonation method (Brazil, 1997; Dorothy M. Chun, 2002). First, the data were transcribed phonetically and analyzed several times for a specific impression and consistent results. The data were selected based on the types of utterances produced by EFL teachers and students, specifically on statement expressions in the classroom interaction context. Second, the utterances that had been identified as statement expressions were put into PRAAT sequentially. Third, the pitch button was used to activate the utterances to determine intonation patterns, and PRAAT generated a spectrogram for each utterance. The spectrogram configuration was with a view range (Hz) 0.0 to 5000.0, window length (s) 0.005, and dynamic range (dB) 70.0. For example, the selected utterances in Figure 2 described that the pitch started relatively high and then moved downwards. Fourth, the spectrogram pattern was used to determine the intonation pattern for each utterance and directly sounded as falling-rising or *referring* tone (r), falling or *proclaiming* tone (p), rising or marked version of the fall-rise (r+), rising-falling or marked version of the fall (p+), low rising, and based on above, at and below tone, and interpreted (Brazil, 1997; Dorothy M. Chun, 2002).

The data were interpreted based on tonic movement of r, p, r+, p+, low rising, and tone level tendency. In terms of interpretation, the role of human participation was to give the essential implications, meaning, context, as well as impact on EFL teachers and students in the classroom,

and to determine the correctness of deciding the conformity between the intended usage of utterances and the actual articulation recorded from the spectrogram. The results that were implied from intonation, cultural classroom interaction context, and PRAAT and human participation in pronunciation assessment for EFL teachers and students were categorized into two. The categories were 1) accepted tone, including default and alternative tonic movement, and (2) unaccepted tone, including accepted tone based on cultural context and mutual interaction, and unaccepted tone based on cultural context and mutual interaction in sociocultural knowledge.

Credibility, transferability, dependability, and confirmability were considered to ensure trustworthiness (Ary et al., 2010). To triangulate the analyzed data, the results were compared independently by internationally experienced lecturers and researchers (holding professor degrees) to give advisory comments, justify the quality of data interpretation, and check interpretations in discussion. As focused on credibility, the interpreted data were given back to participants to enable evaluation based on words uttered in the classroom.

RESULT

PATTERN OF TONIC MOVEMENT ACROSS EFL TEACHERS AND EFL STUDENTS

This chapter delivers a pattern of tonic movement across EFL teachers and students from PRAAT results based on the selected statement expressions, and the example discourse intonation from the first and second phases of the English-speaking lesson topic. The list from PRAAT is comprehensively presented in Table 5.

TABLE 5. Pattern of Tonic Movement Across EFL Teachers and EFL Students

Teacher's Pseudonym	Selected Statement Expressions Discourse Intonation in the Classroom	PRAAT Results for EFL Teachers	PRAAT Results for EFL Students
Rina (TP-1)	The first speaking lesson topic: Yup, there is a girl with a head scarf there. (Rina/first-lt/Fr-3)	rising-falling (p+)	
	EFL students' response: (Repeated TP-1 pronunciation) There is a girl with a head-scarf. (Ri-ST-2/first-lt/Fr-2)		falling (p)
	The second speaking lesson topic: There are three girls in this row, they are Siti, Dayu, and Lina. Is that true, students? (Rina/second-lt/Fr-1)	falling (p)	
	EFL students' response: You are right, Bu. (Ri-ST-1/second-lt/Fr-1)		falling (p)
Roni (TP-2)	The first speaking lesson topic: Follow after me, students. "There is a bag on your (show student) table". (Roni/first-lt/Fr-2)	rising (r+)	
	EFL students' response: There is a bag on my table. (Ro-ST-1/first-lt/Fr-3)		falling (p)
	The second speaking lesson topic: There are books on the table (showing the books). (Roni/second-lt/Fr-3)	falling-rising (r)	
	EFL students' response: Yes, there are three books. (Ro-ST-1/second-lt/Fr-1)		falling (p)
Budi	The first speaking lesson topic:	falling (p)	

(TP-3)	Okay, Sangkuriang always played with his very loyal dog, Tumang. What else, students? (Budi/first-lt/Fr-3) EFL students' response: Sangkuriang liked to hunt in the woods. (Budi-ST-1/first-lt/Fr-2) The second speaking lesson topic: Okay, Sangkuriang did not want to disappoint his mother. (Budi/second-lt/Fr-3) EFL students' response: Yes, he did, Bu. (Bu-ST-1/second-lt/Fr-3)	falling (p)
Bety (TP-4)	The first speaking lesson topic: Thank you, so you went to Udin's house last Sunday. (Bety/first-lt/Fr-4) EFL students' response: Yes, we did, Ma'am. (Be-ST-1/first-lt/Fr-2) The second speaking lesson topic: To give an example expression of the present continuous tense, look at Udin. Udin is reading a book, right? (Bety/second-lt/Fr-1) EFL students' response: Yes, Udin is reading a book. (Be-ST-1/second-lt/Fr-3)	falling-rising (r)
Anita (TP-5)	The first speaking lesson topic: Listen to me, we have been studying English for three years. (Anita/first-lt/Fr-2) EFL students' response: (Repeated TP-5 pronunciation) Ehm, we have been studying English for three years, Ma'am. (An-ST-2/first-lt/Fr-2) The second speaking lesson topic: In this football club. (Mention the name of another EFL student) Wildan has joined the football club since 2022. How about you? (Anita/second-lt/Fr-4) EFL students' response: Yes, Ma'am. I have joined a football club since 2022. (An-ST-1/second-lt/Fr-4)	rising-falling (p+)
Amel (TP-6)	The first speaking lesson topic: (show the number 30) I have watched TV for 30 minutes. (Amel/first-lt/Fr-3) EFL students' response: (Repeated TP-6 pronunciation) I have watched TV for 30 minutes. (Am-ST-1/first-lt/Fr-3) The second speaking lesson topic: Students, for example, I have taught English since 2015. Please, make your own words. (Amel/second-lt/Fr-3) EFL students' response: Yes, Ma'am. I have studied English since 2022. (Am-ST-3/second-lt/Fr-4)	falling (p)
Mitha (TP-7)	The first speaking lesson topic: (showed pictures of the drink and pointed to 1 picture) This is milk with sugar. The milk is sweet. (Mitha/first-lt/Fr-3) EFL students' response: (Repeated TP-7 pronunciation) The milk is sweet. (Mi-ST-2/first-lt/Fr-2) The second speaking lesson topic: (show pictures of food and point to 1 picture) The cake is soft. (Mitha/second-lt/Fr-5) EFL students' response:	falling (p)
		falling (p)

Marsya (TP-8)	(Repeated TP-7 pronunciation) The cake is soft. (Mi-ST-1/second-lt/Fr-6)	
	The first speaking lesson topic: (show the picture of salt) Salt is salty. (Marsya/first-lt/Fr-3)	rising-falling (p+)
	EFL students' response: (Repeated TP-8 pronunciation) Salt is salty. (Ma-ST-2/first-lt/Fr-3)	falling (p)
	The second speaking lesson topic: (show pictures of food and point to 1 picture) Ice cream is creamy. (Marsya/second-lt/Fr-2)	rising-falling (p+)
	EFL students' response: (Repeated TP-8 pronunciation) Ice cream is creamy. (Ma-ST-1/second-lt/Fr-2)	falling (p)

PATTERN OF TONIC MOVEMENT ACROSS EFL TEACHERS IN THE FIRST PHASE CASE
 ILLUSTRATION: RINA (TP-1)

TABLE 6. The First Phase Case Illustration Rina (TP-1)

Teacher's Pseudonym	Selected Statement Expressions Discourse Intonation in the Classroom	PRAAT Results
Rina (TP-1)	Yup, there is a girl with a head-scarf there. (Rina/first-lt/1)	rising-falling (p+)
	There is a boy with curly hair. (Rina/first-lt/2)	rising-falling (p+)
	There is a boy with a red cap. (Rina/first-lt/3)	rising-falling (p+)
	There is a teacher who is sitting on a chair. (Rina/first-lt/4)	falling (p)
	And there is a student beside her. (Rina/first-lt/5)	rising-falling (p+)

Excerpt 1: discourse intonation based on the first phase of English-speaking teaching context in the classroom (Rina/first-lt/1), as expressed by TP-1:

- TP-1 : Students, look around the school. What do you notice?
(Rina/first-lt/Fr-1)
- Student 1 : Our friends, Bu. (Ri-ST-1/first-lt/Fr-1)
- TP-1 : Do you see a girl over there (the teacher shows students the girl)?
(Rina/first-lt/Fr-2)
- Student 2 : I see clearly enough, Bu. (Ri-ST-2/first-lt/Fr-1)
- TP-1 : Yup, there is a girl with a head scarf there. (Rina/first-lt/Fr-3)
- Student 2 : (Repeated TP-1 pronunciation) There is a girl with a head scarf.
(Ri-ST-2/first-lt/Fr-2)

The observation from (Rina/first-lt/Fr-3) showed that PRAAT result was rising-falling (p+) in Figure 1. The classroom interaction meaning context proposed that TP-1 was signing extra new information to EFL students based on the English-speaking lesson topic on “the expression of using: there is” (Figure 1). While ST-2 (Ri-ST-2/first-lt/Fr-2) stated that the word pronounced from PRAAT result was falling (p). In a classroom interaction meaning context, ST-2 tried to affirm what TP-1 had explained. The observation captured that ST-2 merely repeated TP-1 utterances without addressing various responses. This was because TP-1 was strong enough in signing extra new information to EFL students, then there were no choices for EFL students except repeating utterances. For the determination of interaction meaning and impact, TP-1 rising-falling (p+) reflected the ideas of sharing extra knowledge in giving additional information about the English-speaking lesson topic and ST-2 falling (p) reflected an affirmation.

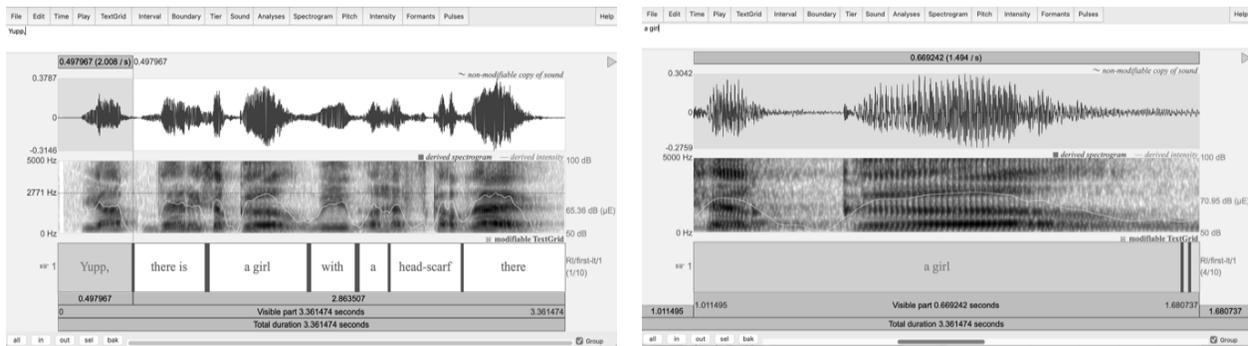


FIGURE 1. PRAAT Result from TP-1 (Rina/first-lt/Fr-3)

PATTERN OF TONIC MOVEMENT ACROSS EFL TEACHERS IN THE SECOND PHASE CASE
 ILLUSTRATION: RINA (TP-1)

TABLE 7. The Second Phase Case Illustration Rina (TP-1)

Teacher's Pseudonym	Selected Statement Expressions Discourse Intonation in The Classroom	PRAAT Results
Rina (TP-1)	There are three girls, in this row, they are Siti, Dayu and Lina. (Rina/second-lt/1)	falling (p)
	There are two girls with white head-scarf. (Rina/second-lt/2)	falling (p)
	There are three boys, they are Udin, Beni, and Edo. (Rina/second-lt/3)	falling (p)
	There are two boys with red caps. (Rina/second-lt/4)	falling (p)
	There are many trees beside the class. (Rina/second-lt/5)	rising-falling (p+)

Excerpt 2: discourse intonation based on the second phase of English-speaking teaching context in the classroom (Rina/second-lt/1), as expressed by TP-1:

- TP-1 : (There are 4 rows in each classroom, TP-1 pointed to 1 row among 4).
 There are three girls in this row, they are Siti, Dayu and Lina. Is that true students?. (Rina/second-lt/Fr-1)
- Student 1 : You are right, Bu. (Ri-ST-1/second-lt/Fr-1)
- Student 2 : There are three girls, they are Siti, Dayu and Lina. (Ri-ST-2/second-lt/Fr-1)

The observation from (Rina/second-lt/Fr-1) showed that PRAAT result was falling (p) in Figure 2. The classroom interaction meaning context proposed that TP-1 was expecting an affirmative answer from EFL students. Therefore, TP-1 tried to intensify greater certainty and assertiveness in utterances to EFL students. ST-2 (Ri-ST-2/second-lt/Fr-1) stated that the word pronounced from PRAAT result was falling (p). In a classroom interaction context, ST-2 seemed to make the affirmation as part of the best way to respond. For the determination of interaction meaning and impact, TP-1 falling (p) expected an affirmative answer and ST-2 falling (p) reflected an affirmative response.

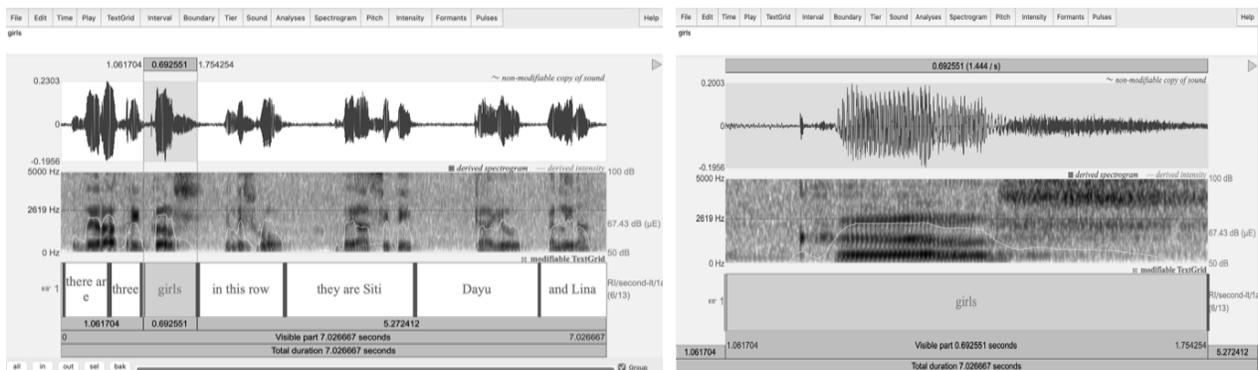


FIGURE 2. PRAAT Result from TP-1 (Rina/Second-lt/Fr-1)

PATTERN OF TONIC MOVEMENT ACROSS EFL TEACHERS IN THE FIRST PHASE CASE
 ILLUSTRATION: BETY (TP-4)

TABLE 8. The First Phase Case Illustration Bety (TP-4)

Teacher's Pseudonym	Selected Statement Expressions Discourse Intonation in the Classroom	PRAAT Results
Bety (TP-4)	Thank you, so you went to Udin's house last Sunday. (Bety/first-lt/1)	rising-falling (p+)
	Good, they played football is correct. (Bety/first-lt/2)	rising-falling (p+)
	They watched TV. (Bety/first-lt/3)	falling (p)
	They studied English. (Bety/first-lt/4)	rising-falling (p+)

Excerpt 3: discourse intonation based on the first phase of English-speaking teaching context in the classroom (Bety/first-lt/4), as expressed by TP-4:

- TP-4 : (TP-4 asked EFL students to submit their homework. It was to make a conversation between 2 or 3 EFL students about a past activity).
 Students, submit your homework, please!. (Bety/first-lt/Fr-1)
- Student 1 : (Without saying a word, EFL students submitted their homework).
- TP-4 : Thank you. (Bety/first-lt/Fr-2)
 (While checking EFL students' homework, TP-4 called students to practice the dialogue).
 Faris, Ikhwan and Hendra, come forward please. (Bety/first-lt/Fr-3)
- Student 2 : (EFL students practiced the dialogue).
 What did you do last Sunday?.. (Be-ST-2/first-lt/Fr-1)
- Student 1 : We went to Udin's house last Sunday. (Be-ST-1/first-lt/Fr-1)
 (Udin is one of their classmates).
- TP-4 : (TP-4 interrupted).
 Thank you, so you went to Udin's house last Sunday.
 (Bety/first-lt/Fr-4)
- Student 1 : (smiling at TP-4).
 Yes, we did, Ma'am. (Be-ST-1/first-lt/Fr-2)
- TP-4 : Please, continue the dialogue. (Bety/first-lt/Fr-4)

The observation from (Bety/first-lt/Fr-4) showed that PRAAT result was rising-falling (p+) in Figure 3. The classroom interaction meaning context proposed that TP-4 stated a desire for participation to be more deeply engaged in the activities and conversations carried out by EFL students. TP-4's interruption of the conversation suggested a close relationship between TP-4 and EFL students. Meanwhile, for ST-1 (Be-ST-1/first-lt/Fr-2), as captured in the observation, ST-1 smilingly affirmed what TP-4 stated.

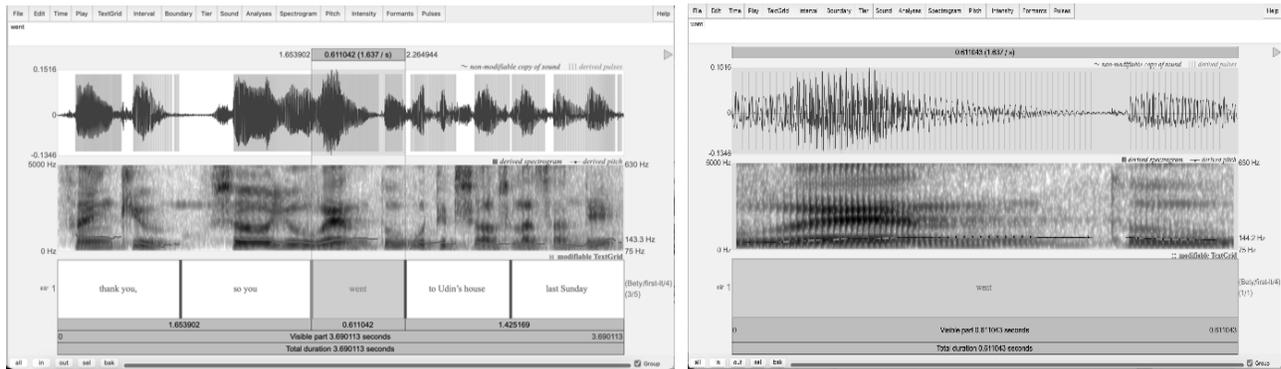


FIGURE 3. PRAAT Result from TP-4 (Bety/first-lt/Fr-4)

DISCUSSION

EFL TEACHERS' CLASSROOM INTERACTION MEANING CONTEXT

This chapter discusses the interpretation of EFL teachers' classroom interaction meaning context, new implications for EFL teachers of intonation perspective in Indonesian context, EFL students' classroom interaction feedback, and the pedagogical implications for EFL teachers and EFL students.

TABLE 9. PRAAT Results on Statement Expressions Discourse Intonation in the Classroom

Teacher's Pseudonym	Tonic Movement Phases 1 and 2	Tone Level Tendency	Tone meaning	The Implications Results in Categorization
TP-1	Phase 1: rising-falling (p+)	Above	Tone level tendency should be on "below" tone.	Accepted tone based on cultural context and mutual interaction
TP-2	Phase 2: falling (p)	Above	Default tonic movement:	Accepted tone
	Phase 1: rising (r+)	Above	Alternative tonic movement	Accepted tone
TP-3	Phase 2: falling-rising (r)	Above	Alternative tonic movement	Accepted tone
	Phase 1: falling (p)	Above	Alternative tonic movement	Accepted tone
TP-4	Phase 2: falling-rising (r)	Above	Alternative tonic movement	Accepted tone
	Phase 1: rising-falling (p+)	Above	Tone level tendency should be on "below" tone.	Accepted tone based on cultural context and mutual interaction
	Phase 2: falling (p)	Above	Default tonic movement	Accepted tone

TP-5	Phases 1 and 2: falling (p)	Above	Default tonic movement	Accepted tone
TP-6	Phases 1 and 2: falling (p)	Above	Default tonic movement	Accepted tone
TP-7	Phases 1 and 2: rising-falling (p+)	Above	Tone level tendency should be on “below” tone.	Accepted tone based on cultural context and mutual interaction
TP-8	Phase 1 and 2: rising-falling (p+)	Above	Tone level tendency should be on “below” tone.	Accepted tone based on cultural context and mutual interaction

Based on Tables 5 and 9, TP-1 used rising-falling (p+) and falling (p). TP-1 (Rina/first-lt/Fr-3) signalled an extra measure of participation as a part of EFL teacher and students’ activities in the classroom interaction context (Excerpt 1). Furthermore, TP-1 (Rina/second-lt/Fr-1) provided common ground on sharing extra knowledge about giving an additional English-speaking lesson topic to EFL students. This was an indication for drawing the meaning in a classroom context that intonation stress was used to show greater certainty and assertiveness to EFL students by expecting a direct and affirmative response (Excerpt 2). Both fragments of words were pronounced at the “above” tone level tendency. According to Table 2, rising-falling (p+) tonic movement was categorized regardless of default and alternative tonic movement. However, the result was an accepted tone based on cultural context and mutual interaction (Excerpt 1) because the classroom interaction context between EFL teachers’ and students’ communication was built well. Potentially meaningful choices were provided regarding the high expectation from TP-1 to influence certain behavior in EFL students (Dorothy M. Chun, 2002).

The contextual meaning in phase 1 was that TP-1 tried to convey a minimal force of the idea of the subject lesson. Interaction in the classroom was impacted because there was a power relation or position in the teaching and learning process (Thornbury & Slade, 2006). The power relation referred to societal factors such as status, age, and role between EFL teachers and students. In addition, EFL teachers have more knowledge in a classroom interaction context. From Excerpt 1, it seemed that TP-1 wanted to emphasize “*I am a teacher and my position of power is higher than that of the students*”. The observation showed that EFL students provided repeated responses from EFL teachers. At the same time, the meaning contained is true due to the concept of rising-falling (p+) intonation, which tends to be used for signalling an extra measure of participation (Brazil, 1997). Furthermore, the word “girl” in (RI/first-lt/Fr-3) and (Rina/second-lt/Fr-1) represented the most striking features in the stressed words. In phase 2, there was an interaction on signing the information from EFL teachers about the lesson topic that was conveyed. TP-1 falling (p) expected an affirmative answer and ST-2 falling (p) reflected an affirmative response.

The valuable idea was that TP-1 applied two different tonic movements, namely rising-falling (p+) and falling (p). Both were categorized into accepted tones based on cultural context and mutual interaction, and default tonic movement with “above” tone level tendencies.

The PRAAT results from TP-2 were rising (r+) and falling-rising (r), as shown in Tables 5 and 8. This showed that TP-2 reflected the confirmation request from EFL students in the classroom context, used the referred information, and intensified the words with specific implied meanings. Based on phases 1 and 2, both rising (r+) and falling-rising (r) were categorized into alternative tonic movements. To strengthen this interpretation, the words “bag” (Roni/first-lt/Fr-2) and “books” (Roni/second-lt/Fr-3) were closely related to the classroom setting with “above” tone level tendency.

TP-3 applied both falling (p) in phase 1 and falling-rising (r) in phase 2 (Tables 5 and 8). These showed great certainty and assertiveness in referring to someone as a signal to elaborate. TP-3 delivered statement expressions to proclaim to EFL students about the existence of Sangkuriang with specific activities (Tables 5 and 8) in (Budi/first-lt/Fr-3) and (Budi-ST-1/first-lt/Fr-2). The words “Sangkuriang”, “did not”, and “disappoint” were reflected at the “above” tone level tendency by EFL teachers to express contrast and high expectations of a response from EFL students. The valuable idea was that TP-3 applied two different tonic movements, and both were categorized into default and alternative tonic movements.

The words uttered by TP-4 were rising-falling (p+) and falling (p) (Tables 5 and 9). In phase 1, rising-falling (p+) showed an exaggerated participation in the classroom interaction context, specifically in the word usage of “went” (Bety/first-lt/Fr-4) with “above” in tone level tendency. Rising-falling (p+) was categorized as an accepted tone based on cultural context and mutual interaction between EFL teachers and students (Be-ST-1/first-lt/Fr-2). TP-4 delivered rising-falling (p+) in a classroom interaction context, with the purpose that engagement with EFL students was important to gain closeness among students. As captured in the observation, building a positive classroom interaction context with EFL students can provide and generate meaningful and impactful classroom interactions in a relaxing learning atmosphere. In phase 2, falling (p) implied the meaning of asking for confirmation from EFL students about certain responses as a key to starting a new English-speaking lesson topic with “above” in tone level tendency. This was a good start to gain meaningful and impactful classroom interaction (Bety/second-lt/Fr-1).

TP-5 and TP-6 showed the tone of falling (p) in phases 1 and 2 based on the English-speaking lesson topic (Tables 5 and 8). As a default tone, it reflected that the use of expressions of since and for from TP-5 and TP-6 showed finality information to EFL students. The importance of the information had been supported by the “above” tone level tendency to generate a fixed signal of finality information. The classroom interaction context was meaningful and impactful because there was an important role from TP-5 (Anita/second-lt/Fr-4) and TP-6 (Amel/second-lt/Fr-3) to ensure the English-speaking material was well received by EFL students.

TP-7 (Mitha/first-lt/Fr-3) and TP-8 (Marsya/first-lt/Fr-3) (Tables 5 and 9) showed the same tone usage of rising-falling (p+) in phases 1 and 2. Based on the observation and intonation tonic movement, the meaningful interaction was to show greater certainty and assertiveness to EFL students by sharing extra knowledge about the English-speaking lesson topic. The interaction that was built between both participants generated a meaningful and impactful interaction because there was positive feedback between EFL teachers and students (Table 2). The message conveyed by EFL teachers reached EFL students even though rising-falling (p+) was not in default and an alternative tone.

Based on the discussion, adapting intonation patterns to support EFL teachers acceptably conveyed the message, and EFL students' response to the message (Goh & Burns, 2012) through integration with the L2 speaking construct (Isaacs & Trofimovich, 2017) in the classroom interaction context (Wells, 2009) was important. The intonation-based pronunciation from all EFL teachers and students in correspondence with PRAAT results showed essential implications towards meaningful and impactful classroom interaction context, and was based on the attached roles. This is proof that PRAAT records speech, detects and diagnoses mispronunciations, and suggests a method for carrying out corrections (Agarwal & Chakraborty, 2019). According to the results, PRAAT-supported analysis highlighted areas for self-corrective work and the essential implications that EFL teachers and students determined the correctness of the conformity between the intended usage of utterances and the actual articulation recording from the spectrogram. This

was proven that the results could serve as potential guidance for EFL teachers in conveying meanings and improving classroom interaction through the use of accepted tone in default and alternative tonic movement, and accepted tone based on cultural context and mutual interaction (Brazil, 1997; Dorothy M. Chun, 2002). The results showed that the tonic movements used by EFL teachers and students were categorized into two distributions as presented in Table 10.

TABLE 10. The Summary Distribution Categories of Discourse Intonation Based on Statement Expressions

Tonic Movement Phases 1 And 2	Tone Level Tendency	The Implications Results in Categorization
Default tone: Falling (p): twenty-eight times	Above	Accepted intonation tone implication
Alternative tone: Rising (r+): five times Falling-rising (r): eight times Rising-falling (p+): twenty-three times	Above	Accepted tone based on cultural context and mutual interaction

NEW IMPLICATIONS FOR EFL TEACHERS OF INTONATION PERSPECTIVE IN THE INDONESIAN CONTEXT

There were no PRAAT results regardless of default and alternative tonic movement. Rising-falling (p+) tonic movement with “above” tone level tendency was in this category. By considering cultural context and mutual interaction with proper intonation, EFL teachers achieved meaningful and impactful interaction in the English-speaking classroom.

EFL STUDENTS’ CLASSROOM INTERACTION FEEDBACK

In the classroom interaction context, falling (p) tonic movement was mostly applied by EFL students (Table 5), showing two points of view. First, regarding the power relation in Indonesian classroom interaction context, EFL teachers appeared to have a high-power relation compared to EFL students (Thornbury & Slade, 2006). The social and societal factors decide that one person has more power or is ‘more important’ (or more knowledgeable, wiser, richer, etc.) than another. Therefore, the falling (p) tonic movement is a choice to reflect confirmation from EFL students to teachers. Second, in the entire classroom interaction, EFL students were found to affirm any situation. EFL students merely affirm the answer and assert the response to EFL teachers, showing the role and status of speakers. The classroom interaction was made more meaningful and impactful by applying the tonic movement of falling-rising (r) and rising (r+) with proper specific meaning.

THE PEDAGOGICAL IMPLICATIONS TO EFL TEACHERS AND EFL STUDENTS

The fundamental component of the implications is better pronunciation assessment, specifically including the usage of PRAAT technology and human participation. PRAAT is the best way to correct tonic movement (Agarwal & Chakraborty, 2019), while tonic movement and tone-level tendency can be modified. There are two pedagogical implications. First, PRAAT results for EFL teachers contribute to self-corrective production on tonic movement and tone level tendency, which is a new priority deserving great focus. Additionally, the proper usage of discourse

intonation played some successful and important aspects of the fundamental component in conveying thoughts, old information, and new information delivery. Second, PRAAT results for EFL students provide opportunities to comprehend better communication interaction in the classroom.

CONCLUSION

In conclusion, EFL teachers in Indonesia faced a barrier to pronunciation assessment, specifically regarding how to use proper intonation to provide meaningful and impactful interpretation in the classroom interaction context. The most pressing barriers were tonic movement and tone-level tendency, which included the appropriate time for EFL teachers to utter the proper falling-rising (r), falling (p), rising (r+), rising-falling (p+), and low rising with above, at, and below tones. PRAAT-supported analysis highlighted areas for self-corrective work. The results of human participation were used to classify group levels of acceptance into accepted intonation tone implication (default and alternative) and accepted tone based on cultural context and mutual interaction. The implied specific meanings impacted the classroom interaction context as follows: (1) there was a common ground on sharing extra knowledge about the English-speaking lesson topic with EFL students by assigning proper intonation. (2) Intonation stress was used to show greater certainty and assertiveness to EFL students by expecting a direct and affirmative response. (3) By signing the information with proper intonation, EFL teachers generated a clear and related context in the classroom interaction. (4) The interactions built by EFL teachers produced meaningful and impactful interactions through classroom engagement.

As a suggestion, there should be an improvement in evaluating the utterances of EFL teachers in the classroom by conducting intensive improvement training and practices using PRAAT. This study aimed to bring discourse intonation and tonic movement into classroom-based pronunciation assessment and explore the interaction of PRAAT-supported analysis with local classroom power relations and cultural norms.

ACKNOWLEDGEMENT

The authors are grateful for the financial support received through the BPI (Indonesian Education Scholarship), PPAPT (Center for Higher Education Funding and Assessment), and LPDP (Indonesian Endowment Fund for Education).

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