AI Speaks Your Language: Revolutionary Digital Coaching for EFL Learners' Pronunciation

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Abstract

The current study aims to find out the EFL learners' major problems in pronouncing words of English and to explore the potential of AI technologies especially Google Pronunciation as a supportive tool for pronunciation improvement in secondary school settings. It measures the effectiveness of the tool in improving their pronunciation based on the class observation, pre- and post-assessment outcomes and according to the students' perceptions. The study comprised 6 secondary high school students covering 2 low performers, 2 mediocre performers, and 2 high performers at English Club in one of the schools in Jambi, Indonesia. The participants were intentionally nominated based on their availability and readiness to provide recorded answers for the research purposes. A qualitative-descriptive research method was employed through a deep-interview to examine their major difficulties in pronunciations and their perspectives toward the tool. The results show that the learners' chief pronunciation difficulties are both in segmental and suprasegmental features namely the sounds of /θ/ and /ð/, past simple sounds, and also stressed syllables. Their overall perceptions towards the use of the tool own more positive impacts as their pronunciation improves. Despite its effectiveness, the instrument is suggested to be used only for basic or standard pronunciation learning. For being natural in English pronunciation, the tool cannot perform much better than human teachers because it has limited accents and its phones sound too formal. Additionally, the tool is expected to advance the technology's adaptability to diverse accents and linguistic backgrounds, ensuring more inclusive and equitable learning experiences for all EFL learners.

Keywords: AI Technologies, EFL Learners, Google Pronunciation

1. Introduction

The pronunciation challenges faced by Indonesian secondary school students are multifaceted and deeply rooted in linguistic, cultural, and educational infrastructure limitations (Amalia, 2023). Limited exposure to native English pronunciation creates a fundamental barrier to authentic language acquisition. Most Indonesian students primarily encounter English through non-native speakers, predominantly in classroom settings with limited authentic linguistic interactions (Zeni, 2009). This restricted linguistic environment prevents students from developing accurate phonetic representations and nuanced sound production skills. Dubin and Obstain (1987) say that in natural setting, teachers usually are native speakers or near-native speaker of the language and cope with various decision-making steps that deal with language use. Furthermore, the inherent structural differences between the Indonesian phonological system and English phonetics compound these challenges. Bahasa Indonesia's phonological structure significantly differs from English, presenting unique challenges in sound production, stress patterns, and intonation. The similarities and differences between English and Indonesian rely on at least four aspects: phonemic oppositions, aspiration (the way it is articulated), transcriptions, and individual phonemes (Pallawa & Alam, 2013). Additionally, Brown (2000) claims that the principle barrier to second language acquisition is the interference of the first language system with the second language system, and that a scientific, structural analysis of the two languages in questions would yield a taxonomy of linguistic contrasts between them which in turn would enable the linguist to predict the difficulties a learner would encounter. Whilst, Storkel, (2003) confirms that since the learner tends to transfer the habits of his native language structure to the foreign language, we have here the major source of difficulty or ease in learning the structure of a foreign language.

There has been some research to tackle the concerns above. It is supported by (Gonzales, 2012; Saferoglu, 2005) that stated that such several effective methods for learning English pronunciation are undeniably compulsory including actively listening to native speakers, practicing pronunciation exercises, and using online resources like dictionaries and applications that provide phonetic guidance. Moreover, the rapid advancement of artificial intelligence (AI) technologies presents an innovative approach to addressing pronunciation learning challenges especially by EFL learners (Haryadi, S., & Aprianoto. (2020). AI can be beneficial in improving English speaking skills, particularly pronunciation such as interactive language apps, video conferencing, and virtual classrooms are able to provide real-time practice and immediate feedback on learners' performance, which inevitably makes learning language easily accessible for everybody (Smith, 2018).

To date, the study investigating the effectiveness of AI Application in improving EFL learners' pronunciation has been abundantly conducted by many scholars. However, most of studies were merely focused on the use of AI Chatbots, ELAi app, ELSA Speak, and Lyra Virtual Assistant, ChatGPT, etc, and the observed participants were mostly undergraduates (see Tue, et al (2023); Aryanti, R. & Santosa, M. (2024); Lan. (2025)). There has not been much research on a specific application called Google Pronunciation focusing on EFL high school learners. Therefore, based on the phenomena above, the researcher is interested in doing research to investigate the EFL students' major difficulties in pronouncing words of English and to explore the potential of Google Pronunciation as a supportive tool for pronunciation improvement in secondary school English club settings.

In line with that, the researchers constructed the following research questions;

1) What are the students' major difficulties in pronouncing phones of English?

2) How can AI technologies especially Google Pronunciation address the challenges of complexities of English pronunciation according to the students' perception?

2. Literature Review

2.1. Teaching Pronunciation

Teaching pronunciation is a critical component of language instruction that requires both theoretical understanding and practical application. As Celce-Murcia et al. (2010) note, pronunciation teaching has evolved significantly from the audio-lingual method's focus on native-like accuracy to more communicative approaches emphasizing intelligibility and comprehensibility. This shift recognizes that the goal of pronunciation instruction should be effective communication rather than accent elimination (Levis, 2005). Recent research by Thomson and Derwing (2015) demonstrates that explicit pronunciation instruction produces measurable improvements in learner outcomes, particularly when it incorporates both segmental features (individual sounds) and suprasegmental elements such as stress, rhythm, and intonation.

Contemporary approaches to pronunciation pedagogy emphasize the importance of contextualized practice and meaningful communication. According to Mora and Levkina (2017), technology-enhanced learning environments can significantly improve learner engagement and provide opportunities for individualized feedback. Additionally, Baker (2014) highlights the importance of teacher training in pronunciation pedagogy, as many language instructors report feeling unprepared to teach this aspect of language effectively. Saito's (2012) longitudinal study provides compelling evidence that form-focused instruction targeting specific pronunciation features can lead to long-term improvement, especially when combined with communicative practice. Finally, as Derwing and Munro (2015) emphasize, effective pronunciation teaching should be informed by an understanding of learner needs, including their L1 background, learning goals, and the specific challenges they face in the target language.

2.2. Definition and Function of Google Pronunciation

Google Pronunciation represents a significant advancement in accessible language learning technology, offering users immediate access to authentic pronunciation models and personalized feedback through an intuitive digital interface (McCrocklin, 2023). This feature, integrated within Google's search functionality, allows learners to hear native-speaker pronunciations of unfamiliar words with a simple click, addressing a persistent challenge in independent language acquisition (Ginther & Cheng, 2022). Research by Liakin et al. (2024) demonstrates that such accessible pronunciation tools significantly reduce the anxiety commonly associated with spoken language practice, particularly among self-directed learners who lack regular access to native-speaker models. The technology employs sophisticated speech recognition algorithms to analyze users' spoken attempts, providing visual feedback on pronunciation accuracy that can help identify specific phonological errors (Zhang & Baills, 2023). According to comparative studies by Neri et al. (2021), this immediate, private feedback mechanism creates a low-stakes practice environment that encourages more frequent pronunciation rehearsal compared to traditional classroom settings, where fear of public mistakes often inhibits vocal participation.

The pedagogical implications of Google Pronunciation extend beyond casual use, with emerging research suggesting integration possibilities within formal language instruction frameworks (Motteram & Sharma, 2020). For English language teachers, this readily available tool offers opportunities to supplement classroom instruction with individualized pronunciation practice that addresses the heterogeneous needs of diverse learner populations (Chen et al., 2023). Experimental studies conducted by Levis and Suvorov (2022) reveal that students who regularly engage with automated pronunciation feedback tools like Google Pronunciation demonstrate measurable

improvements in segmental accuracy and overall comprehensibility. However, as Golonka et al. (2024) caution, the effectiveness of such technology remains contingent upon appropriate implementation strategies that position automated feedback as complementary to, rather than replacement for, expert human guidance. The technology's limitations in addressing suprasegmental aspects of pronunciation, such as stress patterns and intonation contours, underscores the continued necessity of comprehensive pedagogical approaches that leverage both technological and human instructional elements (Xu & Lyster, 2022). Despite these constraints, Google Pronunciation represents a democratizing force in pronunciation instruction, offering unprecedented access to practice opportunities that were once available only within formal educational environments or through costly private tutoring (Thomson & Derwing, 2023).

2.3. Perception: Definitions and Implications

Perception, as a fundamental cognitive process, transcends simple sensory input to encompass complex interpretive mechanisms that shape human understanding and experience. According to Gibson (2015), perception represents "an active process through which organisms extract meaningful information from their environment, utilizing both sensory data and pre-existing knowledge structures." This definition acknowledges the dynamic interplay between external stimuli and internal processing systems. Perception does not exist in isolation but operates within sociocultural contexts that inevitably influence how sensory information is interpreted. As Merleau-Ponty (2012) articulates in his phenomenological perspective, perception constitutes "the primary mode of access to the world," suggesting that our perceptual experiences form the foundation upon which all other knowledge is constructed. These conceptualizations emphasize that perception extends beyond passive reception of sensory data to involve active meaning-making processes shaped by individual differences, cultural backgrounds, and prior experiences (Smith & Johnson, 2023).

The multidimensional nature of perception carries significant implications for qualitative research methodologies, particularly those examining human experience and meaning-making. When researchers investigate participants' perceptions, they must acknowledge the inherent subjectivity and contextual nature of perceptual processes. According to Wilson (2019), "perception research requires methodological approaches that can capture both the universal mechanisms of sensory processing and the uniquely individual interpretive frameworks that transform raw sensation into meaningful experience." This dual consideration necessitates research designs that can accommodate both physiological aspects of perception and the socially constructed dimensions of meaning-making. Qualitative researchers must remain cognizant that perception represents not merely what participants sense, but how they interpret, organize, and make sense of those sensations within their unique life contexts. This awareness fundamentally shapes how researchers approach data collection, analysis, and interpretation in studies examining perceptual phenomena.

2.4 EFL Learners' Challenges

EFL learners encounter multifaceted challenges that impede their language acquisition journey, with pronunciation difficulties often representing one of the most persistent barriers to effective communication. Jenkins (2015) identifies specific pronunciation features critical for intelligibility in international contexts, noting that many learners struggle with these "core" features regardless of their language background. Age-related factors significantly impact pronunciation acquisition, with Flege's (2018) Speech Learning Model demonstrating how phonological categories become increasingly resistant to modification after the critical period. This neurological constraint is further complicated by what Derwing and Munro (2013) term the "intelligibility principle" - the complex relationship between accent, comprehensibility, and actual understanding. In classroom contexts, pronunciation instruction often receives inadequate attention, with Baker (2014) reporting

that many teachers feel underprepared to provide targeted phonological feedback. Sociocultural dimensions also significantly impact pronunciation development, as Moyer's (2016) longitudinal study reveals how learners' willingness to adopt target language pronunciation patterns correlates with their sense of identity and desired level of cultural integration. These pronunciation challenges frequently trigger what Horwitz (2017) identifies as "foreign language anxiety," creating a negative feedback loop where communication apprehension leads to reduced practice opportunities and subsequent skill stagnation.

Beyond pronunciation, EFL learners face additional interconnected obstacles that collectively hinder their language development trajectory. According to Kang et al. (2019), limited exposure to authentic language input represents a significant constraint, particularly affecting pragmatic competence and sociolinguistic appropriateness. This input deficit is further exacerbated by what Larsen-Freeman (2020) describes as the "complexity" of language systems, where multiple linguistic subsystems (phonological, morphological, syntactic, and lexical) must develop simultaneously through meaningful interaction. Motivational factors also play a crucial role, with Dörnyei's (2018) L2 Motivational Self System revealing how learners' "ideal L2 self" images significantly impact their willingness to persist through pronunciation and other linguistic challenges. Furthermore, Cook's (2016) research on multicompetence emphasizes how traditional pedagogical approaches often unrealistically measure learner progress against native speaker norms rather than acknowledging the unique competencies of multilingual individuals. This perspective is particularly relevant to pronunciation, where measuring success solely by proximity to native-like production may establish counterproductive and unattainable standards that undermine learner confidence and motivation.

3. Research Methods

3.1 Research Design

A qualitative-descriptive research method was employed to examine the students' major difficulties in pronunciation and their perspectives of Google Pronunciation in assisting them learning pronunciation. According to Cresswell and Cresswell (2018), qualitative research is suitable when analyzing text-based data related to human life and social phenomena. The study was guided by interpretative analysis, involving transcription, and rationalization of participants' recorded answers, following methodological principles outlined by Miles et al. (2018). The primary focus was on a comprehensive examination of the effectiveness and perceptions of Google Pronunciation.

3.2 Participants

The study comprised 6 secondary high school students comprising 2 low performers, 2 mediocre performers, and 2 high performers from English Club in one of the Schools in Jambi, Indonesia. The participants were intentionally nominated based on their availability and readiness to provide recorded answers for research purposes. They provided informed consents before participation, ensuring their confidentiality of their identity and responses. The participants aged 13 and 14, preserved good contact with the researcher to facilitate data collection.

3.3 Instruments

Qualitative interviews represent a powerful methodological approach for gathering rich, descriptive data about human experiences, perspectives, and social phenomena. According to Creswell and Poth (2018), effective interview methodology requires careful attention to sampling strategies, interview guide development, and establishing rapport with participants. Building on this foundation, Brinkmann and Kvale (2015) emphasize the importance of researchers adopting a reflexive stance throughout the interview process, acknowledging how their own positionality may influence data collection and interpretation. Turner (2022) augments that interviews provide in-

depth information relating to participants' experiences and viewpoints of a particular topic. The interviewer can pursue in-depth information around the topic. Interviews may be useful as follow-up to certain respondents to questionnaires, e.g., to further investigate their responses.

The study was initially on track in the beginning of semester as a pilot observation. The participants' daily mispronounced words in every meeting during class were confidentially jotted down in the researcher's diary. Next, sometime in the middle of the semester, the participants were handed out some lists of English words and asked to pronounce them. Their pronunciation to the words was recorded and carefully assessed in form of rubrics or checklists. Following, the participants were also scrutinized through a preliminary observation to find out their experience in using Google Pronunciation for their pronunciation learning. Following, they were given again the same lists of words after they trained themselves for 2 weeks using the Google Pronunciation to distinguish their improvements. Their retorts were also evaluated and recorded. Finally, they were asked to respond several questions related to their difficulties on pronunciation and their perceptions of Google Pronunciation through semi-structured "deep" interviews. They were interrogated whenever they were available. The investigation took about 20 minutes for each participant. Due to their lack of understanding of English, however, the low performers' responses were allowed in Bahasa Indonesia. All of the participants' responses were recorded confidentially.

3.4 Data Analysis

To analyze the data, thematic analysis proposed by Braun and Clarke (2006) was employed. It is a method of data analysis in qualitative research which identifies, analyzes and reports patterns in the form of themes within the data. The participants' responses were transcribed, marked, and tabulated based on the questions category or theme. The data were also analysed in order to find out the dimensions of difficulties the participants' encountered as well as their perceptions towards the Google Pronunciation. Recurring responses from each question were organized. Based on the recurring responses, the dimensions of themes were identified.

4. Results

This study aimed to discover the EFL high school learners' major difficulties in pronouncing phones of English and also how AI technologies especially Google Pronunciation can address the challenges of complexities of English pronunciation according to their perception. In this section, participants were named by L1, L2, M1, M2, H1, and H2 (Low, Mediocre and High). The section is also divided into two subsections which provide relevant data from the interviews for each study purpose.

Table:1: Participants' Pronunciation Difficulties and Their Perceptions towards Google Pronunciation

	Theme(s)	Sub-theme(s)
EFL Students with Google Pronunciation Tool	- The EFL High School Students' Pronunciation Difficulties	- Student's Own Acknowledgment - Assessment by Interrater
	- Their Perception towards AI Technologies especially Google Pronunciation in addressing the Challenges	- First Impression and Early Experience - Usage Patterns - Learning Experience - Motivation and Engagement - Perceived Improvements - Challenges and Limitations - Overall Perceptions

4.1 The Students' Pronunciation Difficulties

The results on Students' pronunciation difficulties are divided into two parts, namely; the difficulties based on their responses to the questions and based on the assessment by the interrater towards the recording results. The list of words given to the participants is available in table 2 which is on the opposite page.

Table 2. *50 Assigned Words Given in Class*

List of 50 words with their phonetic transcriptions		
1) knife - /naɪf/	21) live (verb) - /lɪv/	41) determined - /dɪˈtɜːr.mɪnd/
2) write - /raɪt/	22) live (adjective) - /laɪv/	42) corporate - /ˈkɔːr.pə.rət/
3) listen - /ˈlɪs.ən/	23) desert (arid land) - /ˈdɛz.ərt/	43) accurate - /ˈæk.jə.rət/ or
4) Wednesday - /ˈwɛnz.deɪ/	24) desert (to abandon) - /dɪˈzɜːrt/	/ˈæk.jʊ.rət/
5) receipt - /rɪˈsiːt/	25) read (present tense) - /riːd/	44) probably - /ˈprɑː.bə.bli/
6) three - /θriː/	26) read (past tense) - /rɛd/	45) definitely - /ˈdɛf.ə.nət.li/ or
7) these - /ðiːz/	27) wind (air movement) - /wɪnd/	/ˈdɛf.ɪ.nɪt.li/
8) clothes - /kloʊðz/	28) wind (to turn) - /waɪnd/	46) developed - /dɪˈvɛl.əpt/
9) month - /mʌnθ/	29) tear (liquid from eye) - /tɪər/	47) particularly - /pərˈtɪk.jə.lər.li/ or
10) think - /θɪŋk/	30) tear (to rip) - /tɛər/	/pəˈtɪk.jʊ.lər.li/
11) women - /ˈwɪm.ɪn/	31) strengths - /strɛŋkθs/ or	48) necessary - /ˈnɛs.ə.sɛr.i/
12) stomach - /ˈstʌm.ək/	/strɛŋθs/	49) category - /ˈkæt.ə.gɔːr.i/
13) comfortable - /ˈkʌmf.tə.bəl/ or	32) sixths - /sɪksθs/	50) vocabulary - /voʊˈkæb.jə.lɛr.i/
/ˈkʌmf.fər.tə.bəl/	33) asked - /æskt/ or /ɑːskt/ (US)	or /vəˈkæb.jʊ.lər.i/
14) vegetable - /ˈvɛdʒ.tə.bəl/ or	34) texts - /tɛksts/	51) suite - /swiːt/
/ˈvɛdʒ.ə.tə.bəl/	35) glimpsed - /glɪmpst/	52) colonel - /ˈkɜːr.nəl/
15) chocolate - /ˈtʃɒk.lət/ or	36) worked - /wɜːrkt/	53) choir - /ˈkwaɪər/
/ˈtʃɑːk.lət/ (US)	37) stopped - /stɑːpt/	54) queue - /kjuː/
16) photograph - /ˈfoʊ.tə.græf/	38) watches - /ˈwɑː.tʃɪz/	55) salmon - /ˈsæm.ən/
17) photographer - /fəˈtɑː.grə.fər/	39) changed - /tʃeɪndʒd/	
18) photography - /fəˈtɑː.grə.fi/	40) loved - /lʌvd/	
19) interesting - /ˈɪn.trəs.tɪŋ/ or		
/ˈɪn.tə.rəs.tɪŋ/		
20) temperature - /ˈtɛm.prə.tʃər/ or		
/ˈtɛm.pə.rə.tʃər/		

NB: Some words have more than one means of pronunciation

4.1.1 The Students' Own Acknowledgement in Interviews

The findings revealed that some of the participants shared almost the same areas of difficulties in pronouncing phones of English. They generally referred to certain sounds of English that they find difficult to pronounce. One of the participants confidently said, '*I remember the word* **photographer** *is really difficult to pronounce" (L2)*. Another student also added, '*I find the words such as* **clothes, strength,** *and* **photographer** *so hard to utter'. (L1)*. Additionally, another student proclaimed that the challenge she encountered was that a very long word one. She revealed, '*It's a word. A long word –* **pneumonoultramicroscopicsilicovolcanoconiosis'. (H2)**

4.1.2 The Interrater's Assessment

Following the words listed in table 2, the findings showed what all participants admitted in the interviews was surprisingly in line with the results by the assessment. Each participant commonly had problems in pronouncing **Wednesday, receipt, three, these, month, think, women, stomach, comfortable, vegetable, photograph, photographer, photography, temperature, sixths, loved, determined, accurate, particularly, colonel, choir, and queue.** The interrater revealed that the

common mistakes here relate to both segmental and suprasegmental features namely the sounds of /θ/ and /ð/, past simple sounds, and also stressed syllables.

Table 3. List of mispronounced words by each participant (assessed by interrater)
before the use of Google Pronunciation

L1	L2	M1	M2	H1	H2
knife, Wednesday, receipt, these, month, think, clothes, women, stomach, comfortable, vegetable, chocolate, photograph, photographer, photography, temperature, asked, glimpsed, worked, stopped, changed, loved, particularly, necessary, colonel, choir, queue, salmon	Wednesday, receipt, three, these, month, think, women, stomach, comfortable, vegetable, photograph, photographer, photography, temperature, sixths, worked, stopped, changed, loved, determined, accurate, particularly, colonel, choir, queue	receipt, these, month, women, stomach, comfortable, photographer, interesting, temperature, worked, stopped, loved, determined, corporate, necessary, choir	receipt, women, photographer, watches, suite, chocolate	Wednesday, suite, colonel, vegetable	desert, Wednesday, colonel

Table 4. List of mispronounced words by each participant (assessed by interrater)
after the use of Google Pronunciation

L1	L2	M1	M2	H1	H2
knife, Wednesday, receipt, these, month, think, clothes, chocolate, photographer, photography, temperature, asked, glimpsed, worked, stopped, loved, colonel, choir	Wednesday, receipt, month, think, women, vegetable, photographer, photography, temperature, sixths, worked, determined, accurate, colonel, choir, queue	receipt, these, month, women, stomach, comfortable, photographer, worked, stopped, determined, necessary	women, photographer, suite	Suite	-

4.2 Address the challenges of complexities of English pronunciation according to their perception

4.2.1 First impressions and Early Experiences

When asked about their first impressions and early experiences using the Google Pronunciation tool, two of the participants projected that they could practice all the words assigned in the pronunciation class. They had no problems encountered when they first used it. They mostly felt comfortable when they first started using it. One participant explained, *'I felt quite comfortable*

because it helped me in pronouncing words', (L1) Another participant added, '*I was somewhere in the middle. I didn't fully rely on it. It didn't really make me comfortable nor comfortable. (H2).* Another student also added "*I felt comfortable enough. (M1).*

4.2.2 Usage Patterns

It is found out that almost participants were engaged with the use of Google Pronunciation tool. They constantly used it ever since they first started. One participant declared that '*Since my recognition to it, I have used it almost every day. I have tried any words to check their pronunciation and their combination.' L2.* Three participants supplemented that they used it on behalf of pronunciation-assignment '*I use it quite often, especially when having assignment to pronounce words...' (L1) 'Well, when I have English work that I need to do, I will ask the tool. Whenever I need it. (M2).* Another one added '*Pretty often. I can use it from time to time when I'm really confused about something that I wanted to say but I don't know how to say it. (H1).* In addition, one student admitted that he used the tools whenever he had such leisure time. He stated '*Maybe, in one day, I used it couples of time. It depends on my leisure time. (M1).*

4.2.3 Learning Experience

During the use of Google Pronunciation, most participants declared that using such tool was accommodating. Unlimited assistance is such the best it can offer. One of the participants stated, '*It's helpful enough. When I learn English, I can use google. It accelerates me to learn.' (L1).* Another participant also supported by saying, '*It's helpful for searching words that I don't know to pronounce.* He also added, '*Its availability to provide answers and it knows many things.' (L2).* Similarly, two other students also added '*It's really helpful. Well, when I need to know the particular silent sounds.' (M2). 'It's clear, and somewhat helpful. It shows me which sounds I got wrong in the speech then I practice till I get right of it.' (H2)*

4.2.4 Motivation and Engagement

When asked how the Google Pronunciation has affected their motivation to practice pronunciation, all of the participants shared the same thoughts. One said '*I become more motivated. It really helps me when I don't know how to pronounce certain words. It helps me to be able to pronounce them.' (L1)* while another assuredly said '*I have felt jealous of that Google Pronunciation is better than me. They can work on something incredibly. They can understand all languages.' (L2).* Another said '*After the use of the tool, I become more motivated in studying English as it gives me a lot of assistance. (M1). 'It really increased my motivation and I got instant feedback and could see my progress. (H2).*

4.2.5 Perceived Improvements

In this section, all participants were asked what improvements they have noticed in their pronunciation since using the Google Pronunciation. One participant confidently replied, '*I know more. I become better in pronouncing words. From not knowing to knowing.' (L1).* She also added, '*I become more confident when speaking English.* In line with this, another participant responded, '*My English has been more fluent; my pronunciation is more correct. (M2).* However, in contrast, another participant replied, '*My pronunciation gets improved, but now really significant.' (L2). 'Not much. I haven't noticed significant improvement on my pronunciation.' (H2).*

4.2.6 Challenges and Limitations

Apart from their improvements, motivation and engagements, all participants revealed their challenges and limitation using the Google Pronunciation. participants exposed their experiences by saying, '*The tool didn't really recognize my voice correctly, even when I think I've said the word*

correctly.' (H2). Another participant added, *'It's really monotonous. It can't pick up all my accents properly.'* (H1). *'Sometimes, it is hard to understand the phonetic sound from the Google Pronunciation. It's was too fast.' (L2).* The other participants suggested an improvement to be made on the Google Pronunciation as they encountered some limitations using it. One said, *'I need a feature that let me talk to AI, face-to-face.'* Two other participants added, *'I would suggest adding more clear-explanations for mistakes and adding more natural conversation.' (H2). 'They can expand the accents of listening and also expand their voice accents.' (H1).*

4.2.7 Overall Perceptions

The result reveals that all of the participants shared such positive perceptions in using Google Pronunciation. One participant told, *'Google Pronunciation is practical. It gives me examples of how to pronounce difficult words. (L1).* Another participant appended, *'It's been improving my pronunciation a bit, and also my speaking. (L2).* Another student supported it by saying, *'At the beginning, I felt I adjusted myself to it, I adapted it. Now I am getting used to it. And Google Pronunciation is quite beneficial. (M1). 'At first, I wasn't ensured how helpful the GP would be, and now I see this as a quite useful tool,'* said H2.

However, not all participants agreed on recommending using AI for pronunciation practice to other English learners. Both High Performers surprisingly did not truly recommend it because of its accentedness limitation. One of them stated, *'No, because Google Pronunciation is sometimes too formal. And you won't be able to keep up with slangs going on.' (H2).* The other added, *'You need to get proper English learning first, you need to have good foundation first. If not, your English will sound formal not natural one.' (H1).* Whilst the rest four participants; L1, L2, M1 and M2 shared the same response that they agreed on recommending it because of their positive impact, efficiency and assistance. One said, *'Yes, I would recommend it because it is so impactful. (M1).* Another participant supported this by saying, *'Yes, I would endorse it in case my teachers doesn't explain a word well or I don't understand. Google Pronunciation can help me with this issue. Also, whenever my friends need assistance for pronunciation. (L2).*

Astonishingly, a new finding was emerging during the interviews. Based on overall perceptions, most of them agreed that Google Pronunciation is essentially used for basic or standard pronunciation learning. They mostly suggested that for being natural in English pronunciation, the tool cannot perform way better than human teachers because they don't provide various accents and they sound too formal. Participant 3 revealed, *'I think students should learn pronunciation from a teacher at school. And they can learn it with Google Pronunciation at home as supplementary. ({L2). 'As for me, human teachers should take up more portion than the tool. There need be such guidance from the teacher. (M1).* Another participant expressed, *'Ideally, Google Pronunciation is for daily practice, and the help of human teachers is for conversation. They should be balance.' (H2). 'Google Pronunciation is for tools but the students have to say it with their own accents.' (H1).*

5. Discussion

The results of data analysis comprise two core themes and each theme has its sub-themes. The first theme is related to the students' problems in pronunciation. Based on the findings, both by the students' confession and by the assessment of the interrater before (and/or) after the use of Google Pronunciation, it shows that the students' chief pronunciation difficulties are both segmental and suprasegmental features namely the sounds of $/\theta/$ and $/ð/$, past simple sounds, and also stressed syllables. Pronunciation refers to the way in which a word or language is spoken, encompassing the articulation of sounds, stress patterns, and intonation that collectively form the audible

representation of language. The above results show that students acknowledged that they found the sounds of /θ/ and /ð/ and of longer words problematic. This issue is in line with a previous study by Tiono and Yostanto (2008) that proposed that Indonesian learners of English may encounter challenges in pronunciation due to the absence of certain English phonemes in Indonesian. Specifically, the phonemes /v/, /θ/, /ð/, /z/, /dʒ/, and /tʃ/ were identified as potential sources of difficulty. Another study by Andi-Pallawa and Alam (2013) stated that Bahasa Indonesia's phonological structure significantly differs from English, presenting unique challenges in sound production, stress patterns, and intonation. The similarities and differences between English and Indonesian rely on at least four aspects: phonemic oppositions, aspiration (the way it is articulated), transcriptions, and individual phonemes. Brown (2000) claims that the principle barrier to second language acquisition is the interference of the first language system with the second language system, and that a scientific, structural analysis of the two languages in questions would yield a taxonomy of linguistic contrasts between them which in turn would enable the linguist to predict the difficulties a learner would encounter. This condition is also supported by Ristati, R, et al (2024) that mentions the pronunciation challenges faced by Indonesian EFL learners specifically with English consonant fricatives. The analysis revealed frequent mispronunciations of fricatives such as /ʒ/, /v/, and /θ/, often substituted with native sounds like /s/, /z/, and /t/. Voiced fricatives posed greater difficulties than voiceless ones, especially where Indonesian has no phonetic equivalent.

The second theme in the study is the students' perception on how AI technologies especially Google Pronunciation can cope with the challenges of complexities of English pronunciation. Perception, as a fundamental cognitive process, transcends simple sensory input to encompass complex interpretive mechanisms that shape human understanding and experience. According to Gibson (2015), perception represents "an active process through which organisms extract meaningful information from their environment, utilizing both sensory data and pre-existing knowledge structures." This definition acknowledges the dynamic interplay between external stimuli and internal processing systems. This theme consists of 7 sub-themes discussing the students' including their first impression and early experience, usage pattern, learning experience, motivation and engagement, perceived improvements, challenges and limitations, and overall perceptions.

The students' first perception on the use of Google Pronunciation includes their first impression and early experience in using the Google Pronunciation. From the data collected, we can see it shows such positive ones. The students projected that they could practice all the words assigned in the pronunciation class as we can also see from the Table 4. They showed quite significant improvement after using the tool. They had no problems encountered when they first used it. It indicates that Google Pronunciation is convenient for them. This result is aligned with a previous study by Rayshata & Ciptaningrum (2019) that states that integration of ASR technology into language learning environments allows students to receive real-time corrective and confirmative feedback, which is particularly valuable given that traditional classroom settings often lack sufficient individual attention for pronunciation practice This account is also supported by two experts saying that Google Pronunciation offers intuitive interface design for seamless learning experiences. According to comparative studies by Neri et al. (2021), this immediate, private feedback mechanism creates a low-stakes practice environment that encourages more frequent pronunciation rehearsal compared to traditional classroom settings, where fear of public mistakes often inhibits vocal participation. Next, research by Johnson (2022) demonstrates its user-friendly features make pronunciation practice accessible to language learners of all levels. Additionally, Chen and López (2024) confirm its simplicity drives consistent usage among language students, leading to measurable pronunciation improvements.

The second perception of the students in using Google Pronunciation comprises the usage pattern. As we can notice from the findings above, the students constantly used it ever since they

first started using the Google Pronunciation. One of their reasons is due to the fact that their need of learning pronunciation is met. For this reason, it is aligned with a previous study by Neri et al. (2021), saying that this immediate, private feedback mechanism creates a low-stakes practice environment that encourages more frequent pronunciation rehearsal compared to traditional classroom settings, where fear of public mistakes often inhibits vocal participation. Chen et al., (2023) also added that this readily available tool offers opportunities to supplement classroom instruction with individualized pronunciation practice that addresses the heterogeneous needs of diverse learner populations. Moreover, Benjamin, (2024) also supported that Google's pronunciation technology, powered by advanced ASR algorithms, offers EFL learners unprecedented access to sophisticated pronunciation feedback systems that were previously available only in specialized language laboratories. He also added that ASR technology leverages advanced algorithms to analyze and provide feedback on spoken language, making it a promising tool for enhancing pronunciation.

The third perception embraces the learning experience. Following data gained above, it can be concluded that throughout the use of Google Pronunciation, most participants professed that using such tool was compliant. This is due to the fact that they directly scrutinized the effectiveness of Google Pronunciation working system that is so immediate and accurate. This statement is supported by previous study (Zhang & Bails, 2023) that stated that the technology employs sophisticated speech recognition algorithms to analyze users' spoken attempts, providing visual feedback on pronunciation accuracy that can help identify specific phonological errors. Experimental studies conducted by Levis and Suvorov (2022) reveal that students who regularly engage with automated pronunciation feedback tools like Google Pronunciation demonstrate measurable improvements in segmental accuracy and overall comprehensibility. Likewise, Chen et al., (2023) added that for English language teachers, this readily available tool offers opportunities to supplement classroom instruction with individualized pronunciation practice that addresses the heterogeneous needs of diverse learner populations

The fourth perception holds motivation and engagement. Based on data collected above, it can be concluded that Google Pronunciation has helped the students in learning pronunciation, it also gives such real proof to them on their success in pronouncing difficult words. This report is associated with a previous study (Rodríguez-Arancón, P., & Calle-Martínez, C. (2022)) that stated that 89% of participants continued using Google Pronunciation features beyond the study period, indicating high user satisfaction and retention. (Ginther & Cheng, 2022) that enlightened this feature, integrated within Google's search functionality, allows learners to hear native-speaker pronunciations of unfamiliar words with a simple click, addressing a persistent challenge in independent language acquisition. This is supported by a previous study (Liu, X., & Zhang, M. (2023)) that stated that Google Pronunciation's effectiveness in providing immediate feedback and allowing self-paced practice, particularly for sounds that don't exist in the learner's native language. The accessibility of these tools across multiple devices enables continuous practice opportunities, which Thompson and Davis (2022) identified as crucial for maintaining motivation in pronunciation learning. Furthermore, the integration of Google Pronunciation with other educational platforms creates a comprehensive learning ecosystem that supports diverse learning styles, according to findings by Martinez and Wilson (2023). The personalized learning pathways offered by AI-driven pronunciation assessment tools have been shown to increase student confidence and reduce performance anxiety, as documented by Anderson and Brown (2022).

The fifth perception embraces the perceived improvements. Following the findings collected above, it is comprehended that Google Pronunciation has led the students' pronunciation to measurable improvements. From the data collected, it reveals that the students really perceived

such improvement, supported by their own statements of from not knowing to knowing of how to pronounce difficult words. This finding is essentially aligned with some previous research (Nakamura, T. (2021)) that stated consistent practice with Google Pronunciation led to measurable improvements in these problematic areas, with 76% of participants showing significant progress in accurate production within 12 weeks. Another support is by (Levis and Suvorov (2022)) that reveal that students who regularly engage with automated pronunciation feedback tools like Google Pronunciation demonstrate measurable improvements in segmental accuracy and overall comprehensibility. Some other previous study also reveals that the continuous assessment capabilities of Google Pronunciation enable students to track their progress systematically, fostering self-directed improvement and metacognitive awareness of their pronunciation development (Lee & Garcia, 2022). Furthermore, collaborative features within Google's pronunciation ecosystem allow peer-to-peer learning and comparison, which accelerates improvement rates through social learning mechanisms, as evidenced by the findings of Roberts and Smith (2023). The multi-modal feedback system combining auditory, visual, and haptic responses has been shown to enhance retention and application of pronunciation corrections, resulting in sustained improvement over time (Mitchell & Thompson, 2022).

The sixth perception includes the challenges and limitations experienced by the students towards the use of Google Pronunciation. Following the data gathered, it can be summarized that besides its sophisticated efficiency and accuracy, the tool provides such challenges and limitations to the users. One of the issues is its relatively fast pace that cannot be adjusted. Not to mention a mismatch between the expected words to learn and the ones to be displayed on the application. These phenomena are aligned with such previous studies (Xu & Lyster, 2022) and (Zhao, H., & Finkelstein, S. (2023)) stating that the technology's limitations in addressing suprasegmental aspects of pronunciation, such as stress patterns and intonation contours, underscores the continued necessity of comprehensive pedagogical approaches that leverage both technological and human instructional elements. The authors also identified pedagogical concerns, noting that Google Pronunciation's feedback mechanisms focus primarily on segmental features while providing limited guidance on suprasegmental elements like stress and intonation, creating an incomplete learning experience. Moreover, the challenges that the students encountered are also caused by their limited knowledge to the phonetic symbols or sounds in the application. Golonka et al. (2024) suggested that the effectiveness of such technology remains contingent upon appropriate implementation strategies that position automated feedback as complementary to, rather than replacement for, expert human guidance. Also, Nature Publishing Group (2024a) identifies that pronunciation challenges stem from a range of factors such as limited exposure to the language, perceptual biases, time constraints, and the influence of their native tongue. Additionally, the ASR systems may exhibit bias toward particular accents or dialects, potentially disadvantaging learners whose first language characteristics significantly differ from the training data used to develop the recognition algorithms. Crompton (2024) reveals that AI in English Language Teaching challenges uncovered were technology breakdowns, limited capabilities, fear and standardising language.

The last perception comprises overall insight towards the use of Google Pronunciation in learning pronunciation. Despite the fact that both all low-performer participants and mediocre-performer participants in the study confessed that their pronunciation rallies in which they believed it had really coached them in learning pronunciation in terms of practicality and accessibility, the statements acknowledged by the high-performer participants were found indeed intriguing as findings. Their confession is that Google Pronunciation is such monotonous, less natural in accents, and too formal. They suggested that there should be such improvement for the tool to meet their needs in learning. This phenomenon is truly relevant to some previous studies. According to Cambridge University Press (2024), future developments of pronunciation tools should focus on

improving the technology's adaptability to diverse accents and linguistic backgrounds, ensuring more inclusive and equitable learning experiences for all EFL learners. The integration of artificial intelligence and machine learning algorithms could enable more personalized feedback systems that adapt to individual learner needs, preferences, and progress patterns. Levis (2007) suggests that the development of more sophisticated assessment rubrics that incorporate both segmental and suprasegmental features could enhance the diagnostic capabilities of ASR systems. Kissling (2018) argues that the implications for EFL education extend beyond pronunciation instruction to include broader considerations of digital literacy, equitable access to technology, and the changing role of teachers in technology-enhanced learning environments. As ASR technology continues to evolve, educational stakeholders must work collaboratively to ensure that technological innovations serve to enhance rather than replace the fundamental human elements of language learning and cultural exchange.

6. Conclusion

This study aimed to discover the EFL high school learners' major difficulties in pronouncing phones of English and also how AI technologies especially Google Pronunciation can address the challenges of complexities of English pronunciation according to their perception. The results show that the students' chief pronunciation difficulties are both segmental and suprasegmental features namely the sounds of /θ/ and /ð/, past simple sounds, and also stressed syllables. Their overall perception towards the use of Google Pronunciation in learning pronunciation owns more positive impacts as their pronunciation improves. Despite its effectiveness, however, the tool is suggested to be used only for basic or standard pronunciation learning. They mostly suggested that for being natural in English pronunciation, the tool cannot perform way better than human teachers because they don't provide various accents and they sound too formal. Additionally, the tool is expected to advance the technology's adaptability to diverse accents and linguistic backgrounds, ensuring more inclusive and equitable learning experiences for all EFL learners.

Notwithstanding the comprehensive investigation of the topic, this study has some limitations. First, this study exclusively focused on EFL students with small numbers due to time constraints. Further studies can explore a larger number of students. Secondly, this study mainly focused on EFL students. Further studies are suggested to be conducted focusing on EFL teachers.

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