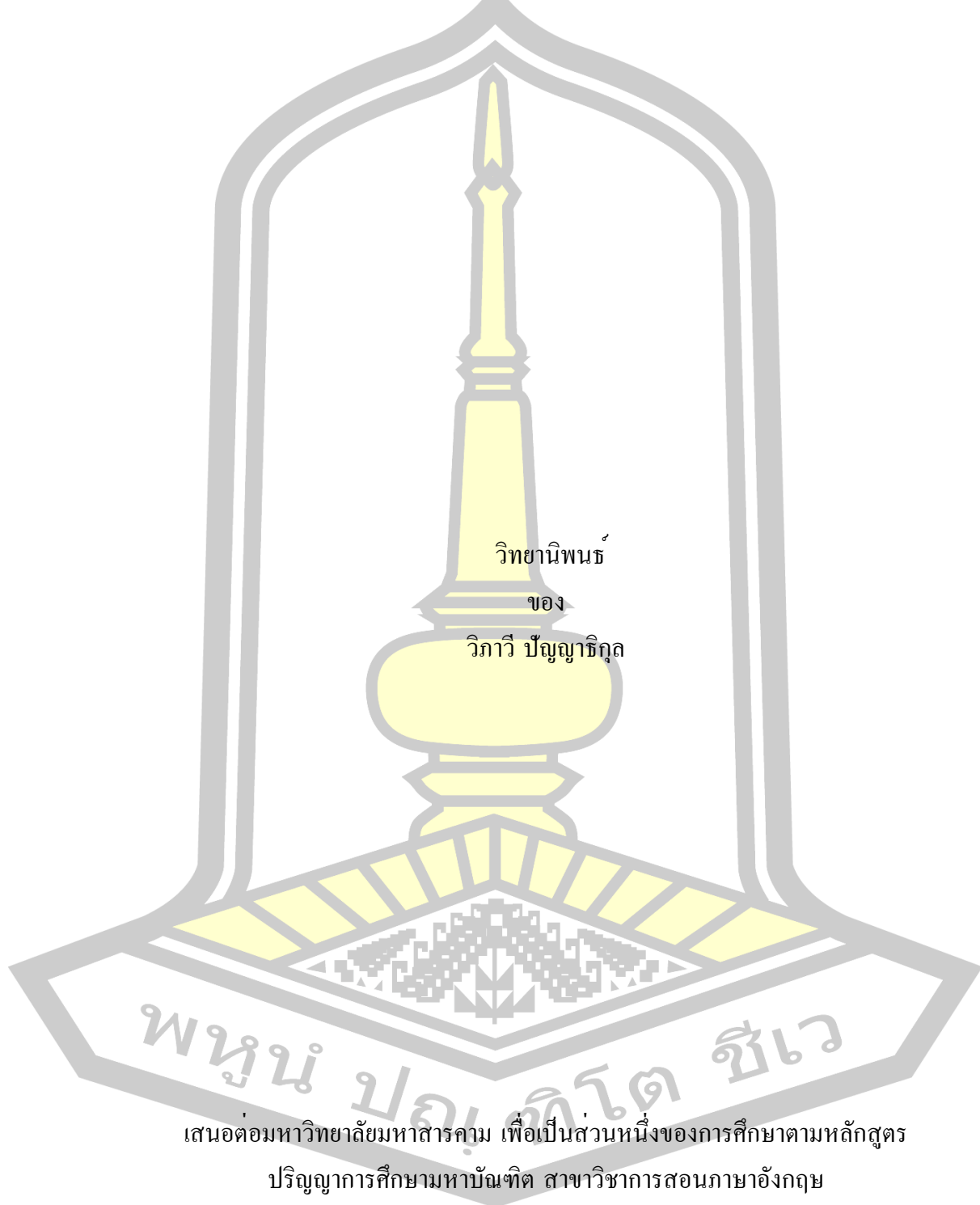Improving EFL Secondary Learners' Pronunciation through Multimodal Teaching

Wipavee Panyathikul

A Thesis Submitted in Partial Fulfillment of Requirements for

degree of Master of Education in English Language Teaching

July 2024

การพัฒนาการออกเสียงของนักเรียนชั้นมัธยมศึกษาตอนต้นที่เรียนภาษาอังกฤษเป็น
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for Master of Education (English Language Teaching)

July 2024

The examining committee has unanimously approved this Thesis, submitted by Miss Wipavee Panyathikul , as a partial fulfillment of the requirements for the Master of Education English Language Teaching at Mahasarakham University

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TITLE   Improving EFL Secondary Learners' Pronunciation through
            Multimodal Teaching

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ABSTRACT

This quasi-experimental study investigated the effect of multimodal teaching on EFL secondary learners' pronunciation. Moreover, their perception regarding the implementation of multimodal teaching was also explored. Selected from an intact class, the participants were 20 eight graders receiving a teaching method based on the analytic-linguistic approach through audiovisual media combined with hand gestures. The English pronunciation pretest and posttest were administered to collect the data before and after the treatment, which lasted 6 weeks. In addition, a perception questionnaire and a semi-structured interview were used to collect data pertaining to the participants' perception regarding the multimodal teaching method. The quantitative data were analyzed using descriptive and inferential statistics, including means, standard deviations, dependent and independent sample t-tests. The qualitative data were analyzed using thematic analysis. The results demonstrated that multimodal teaching utilizing audiovisual media combined with hand gestures significantly improved the participants' pronunciation. Moreover, the participants showed their perceptions about multimodal teaching at very high level. They perceived the benefits of multimodal teaching with regard to positive learning environment, emotional and functional benefits, and instructional advantages. In conclusion, this study suggests the positive outcomes of implementing multimodal teaching in improving EFL secondary learners' pronunciation. Finally, pedagogical implications and recommendations for future research are provided.

Keyword : Multimodal teaching, pronunciation, audiovisual media, gestures, explicit phonetic training, multimedia learning theory, EFL secondary learners

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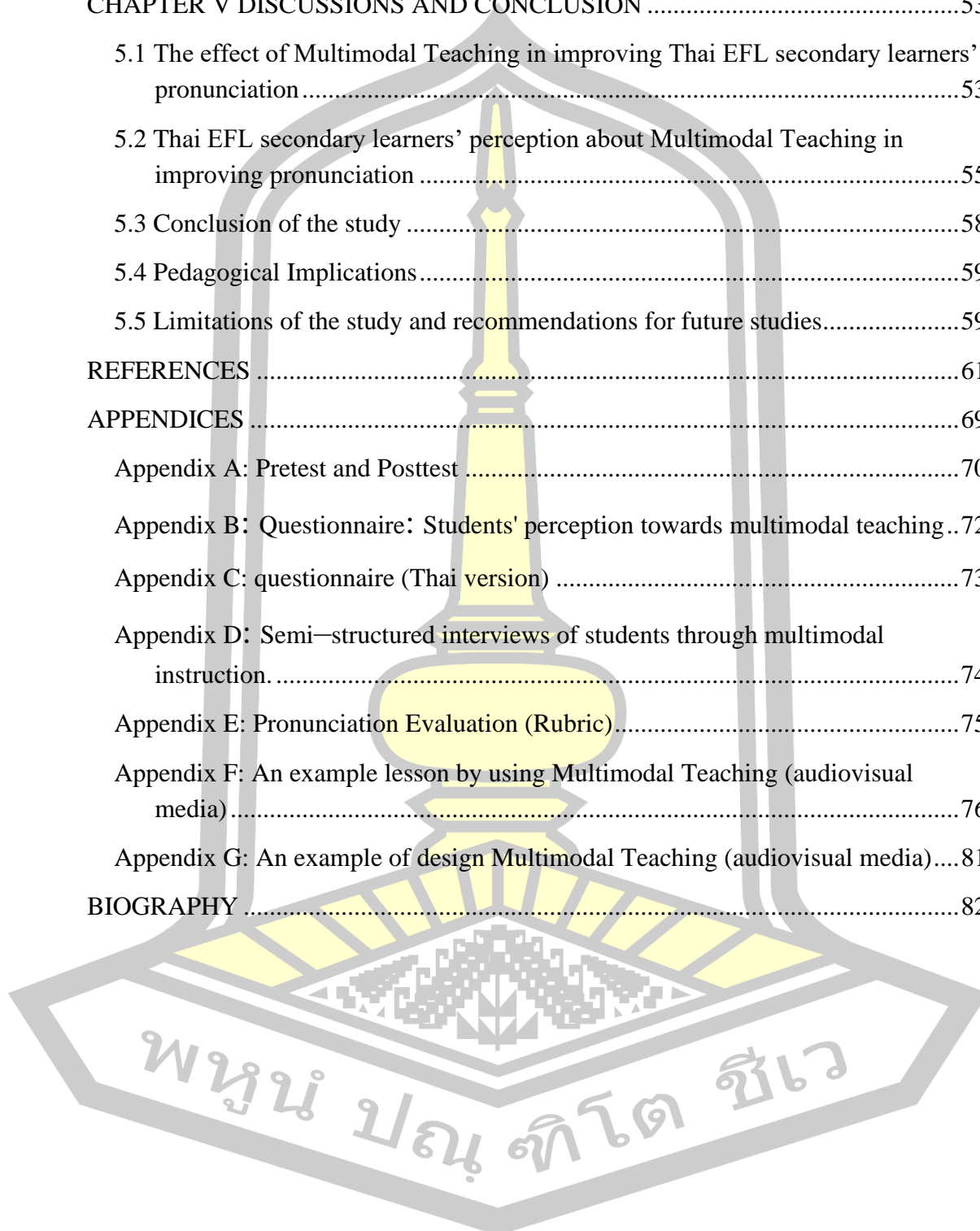
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CHAPTER I

INTRODUCTION

This chapter provides an overview of this study. The chapter begins with the background of the study, followed by the purposes of the study, the research questions, the significance of the study, and the scope of the study. Next, the key terms of this study are defined. Finally, an outline of this thesis proposal is provided.

1.1 Background of the study

Pronunciation plays an important role in English speaking since it is an essential part of every speaker to speak with the correct pronunciation. English pronunciation is widely regarded as a challenging ability that requires a significant investment of time and effort in order to enable learners to make noticeable improvements (Aliaga García, 2007; Martínez-Flor et al., 2006; Pourhosein Gilakjani, 2016). Over the years, pronunciation has been defined by scholars in various ways. Cook (1996) defined pronunciation as the production of English sounds which involves repeating sounds and making corrections. Yates (2002) stated that pronunciation is the production of sounds that is used for making meaning. In addition, Paulston & Burder (1976) mentioned that pronunciation is the production of a sound system that does not interfere with communication either from the speakers' or the listeners' viewpoint. Pronunciation is the way of uttering a word in an accepted manner (Otlowski, 1998). Furthermore, Richard and Schmidt (2002) defined pronunciation as the method of producing certain sounds.

Pronunciation is regarded as an important element of communication because the way we speak conveys an important message to our listeners. Learners with correct pronunciation in English are more likely to be understood whereas learners with poor pronunciation may not be understood. We also often judge people by the way they speak, and so learners with poor pronunciation may be judged as incompetent, uneducated or lacking in knowledge. Therefore, many EFL learners find pronunciation one of the most difficult aspects of English to acquire, and need explicit help from the teacher (Morley 1994; Fraser 2000).

Some English teachers, however, often do not pay much attention to teaching English pronunciation, and there are some reasons for this argument. First of all, some

teachers do not have enough knowledge about teaching English pronunciation (Breitkreutz, Derwing, & Rossiter 2002; Fraser, 2000a; Macdonald, 2002). They insist that teaching English pronunciation instruction does not help improve their students because they have tried to teach English pronunciation several times and have not been successful (Fraser, 2000a). They also mention that pronunciation instruction is not appropriate, because it is purely a motor-skill (Brown, 1987) and its practice could not lead students to achieve the communicative competence of language (Morley, 1991). They also believe that it is not necessary to teach pronunciation and accurate pronunciation is not related to the identity and respect for the learners (Porter, 1999). However, many scholars have asserted that pronunciation can and should be taught and it is an important part of communication that has a key role in developing their communicative competence (Celce-Murcia, Brinton and Goodwin (1996); Derwing and Munro (2005); Fraser (2000a); Morley (1991); Pennington (1998); Pourhosein Gilakjani (2016b). Frasers (2000a) argues that English pronunciation is a cognitive skill that all persons can learn it if appropriate opportunities are given to them. Jenkins (2000), Deterding (2013), and Thir (2016) emphasize the importance of teaching pronunciation because poor pronunciation could lead to communication breakdowns or misunderstandings in EFL interactions which makes its instruction an important area to focus on. Hismanoglu (2006) says that pronunciation instruction plays an important role in oral communication, and pronunciation is an integral part of communicative competence.

In Thailand, pronunciation is considered a crucial aspect of the core curriculum for Thai EFL secondary learners. Based on the core curriculum for the eighth-grade students in Thai secondary schools, students are expected to be able to use language, tone of voice, gestures and manners appropriate to various persons and occasions by observing social manner of native speakers. However, the researcher has witnessed several pronunciation problems encountered by these students. For example, they cannot pronounce some English words accurately. They find it very difficult to pronounce the English final sounds, such as /t/, /d/, /id/ in regular verbs. When encountering some English words, such as *stopped, called or wanted,* they cannot differentiate the pronunciation rules. Moreover, Thai language lacks final consonant clusters and has a simpler syllable structure compared to English. This can lead to

difficulties in pronouncing English consonant clusters, including those found in regular past tense verbs with *ed* endings. Thai learners may struggle to accurately produce the final consonant sound in regular verbs. As a result, when secondary school students face challenges in articulating the *ed* sound in regular verbs, it can have profound effects on their language learning and communication aptitude. This difficulty often leads to obstacles in effective verbal interaction, as mispronouncing the ed ending can obscure the intended word, causing confusion or misinterpretation in academic and social settings. Additionally, mastery of verb tenses becomes problematic since accurate pronunciation of the ed ending is vital for discerning between past tense, past participle, and base forms of verbs. Consequently, students may struggle in constructing grammatically correct sentences and expressing themselves clearly in both spoken and written language. Moreover, this pronunciation hurdle may hinder participation in oral presentations and classroom discussions, limiting students' academic involvement and impeding their overall learning. Beyond academic contexts, persistent pronunciation difficulties can undermine students' confidence in their language skills and diminish their self-esteem, affecting their motivation to engage actively in language learning endeavors. To effectively address these issues, educators can deploy tailored interventions like pronunciation drills, personalized feedback, and immersive language experiences to assist students in overcoming pronunciation challenges and nurturing their overall language proficiency and confidence.

The aforementioned problems may be prevented or remedied by explicit phonetic instruction on phonemic distinction in L2 sounds. Phonetic training is one of the teaching methods which is frequently used to improve pronunciation. Phonetics is the study of human speech. Phonetic training emphasizes the differences between learners' first language (L1) and L2 phonological systems with regard to phonemic inventories, articulation of analogous phones, grapheme-phoneme correspondences and phonological processes. Phonetic training involves an emphasis on the phonetic parameters relevant to the segmental sounds (i.e., isolated consonants and vowels) which are illustrated with drawings (e.g., Clark, 1967) or animated diagrams of the vocal tract and waveforms and spectrograms produced with acoustical analysis software (e.g., Lord, 2005). Phonetics includes the study of how sounds are physically

produced (by positioning the mouth, lips and tongue), and how sounds are perceived by a listener. Phonetics can be compared to phonology, which is the study of the particular sound units (phonemes) of language. Phonetics training is as a crucial element of linguistic proficiency, serves as the foundational building block for language instruction and effective oral communication. It is the essential starting point for learning a language. The claim, which is widely recognized and well-founded, asserts that when it comes to acquiring a new language, a person typically requires a grasp of 10-90% of its grammar, just 1% of its vocabulary, whereas a near-complete mastery of phonetic knowledge, approximately 100%, is indispensable (Gimson & Cruttenden, 1994).

Given the benefits of phonetic training, many studies have been trying to examine whether explicit phonetic training would be effective in improving pronunciation of second language learners. Chung (2008), for example, compared explicit, implicit, and noticing instruction for improving Chinese learners' production of English word stress and found that all groups improved equally on the post test, but the explicit group was significantly better in the delayed posttest. Lord (2005) also concluded that explicit phonetic training can help second language learners improve their pronunciation of L2. In addition, a study by Saito (2013) obtained a result showing that explicit phonetic training is effective in enhancing pronunciation of ESL learners. This could be concluded that explicit instruction of a L2 target sound is more helpful in helping learners to improve pronunciation. Saito and Plonsky (2019) conclude that explicit pronunciation instruction at a controlled level allows teachers to explain detailed phonetic information, which enables learners to notice and practice the accurate production of segments, syllables, prosodic, and temporal features of speech in a careful manner.

Phonetic training encompasses various methods and approaches to teaching and improving pronunciation and speech skills, such as auditory training, articulatory training, acoustic training, visual feedback training, phonemic awareness training, computer-assisted pronunciation training (CAPT), multimodal training, shadowing, phonological awareness training, and interactive and communicative training. Among these teaching methods, multimodal training or multimodal teaching has been proved to enhance EFL learners' pronunciation. Jewitt (2008) mentioned that multimodal

teaching attends to meaning as it is made through the situated configurations across image, gesture, gaze, body posture, sound, writing, music, speech, and so on. From a multimodal perspective, image, action, and so forth are referred to as modes, as organized sets of semiotic resources for meaning-making. The assumption is that people process and perceive language information (phonetic, lexical and syntactic) in a multimodal fashion, that is, in daily conversations speakers are faced with visual information (e.g., the interlocutor's movements of the mouth, facial expressions, as well as body and hand movements). It has been noted that not only hearing people, but also people with auditory impairment benefit from multimodal input for language learning (Fort & Sebastian-Gallés, 2018).

As language instruction has evolved over time, phonetics training has naturally become an integral part of it. The conventional approach to phonetic training has typically revolved around teacher-centered, segmental phoneme training. However, since the 1990s, with the deepening exploration of how meaning is constructed in multimodal discourse and the advancement of information technology, the traditional phonetic training model has struggled to keep pace with the evolving language abilities required by society. People have gradually recognized the need to integrate established word-based methods of conveying meaning with other personalized approaches, such as visual cues, auditory elements, gestures, images, and actions Yongsheng Zhu (2008). multimodal teaching has been proved to play a significant role in improving pronunciation by engaging multiple sensory channels and teaching methods. Ganapathy & Seetharam (2016) stated that multimodal teaching enhanced pronunciation by combining visual, auditory, and kinesthetic elements, making it more engaging and learners are more likely to be motivated and focused when multiple senses are involved in the learning process. Moreover, Gick & Derrick (2009) argued that visual aids and diagrams can provide learners with a clear understanding of how to position their articulatory organs, like the tongue and lips, to produce specific sounds accurately. In addition, multimodal teaching that includes the International Phonetic Alphabet (IPA) helps learners develop phonetic awareness, allowing them to associate symbols with specific sounds as mentioned by Celce-Murcia, Brinton, & Goodwin (2010).

Multimodal teaching has been widely researched in various contexts of ELT. For example, Kozlowska (2015) used a holistic multimodal teaching to phonetic training of intermediate Polish learners of English. The results suggest that the holistic multimodal teaching to phonetic training which involves articulatory, auditory, cognitive, and multisensory activities is more effective than the traditional intuitive-imitative task. In Iran, Xodabande (2017) used telegram to improve learners' pronunciation at a language institute. The results exhibited that the use of social network telegram is a useful tool when teaching pronunciation in an EFL classroom. A study by Namaziandost, Esfahani, and Hashemifarnia (2018) investigated the effect of using authentic videos on prosodic ability, which included pause, juncture, intonation, pronunciation, and stress and found positive results. Carmen Benitez-Correa (2020) used multimodal teaching in her research and found students' improvement of past tense pronunciation of regular verbs through the use of Audacity. In addition, a study by Jingpeiyi (2021) suggested that multimodal teaching helps enhance undergraduate students' interest and self-directed learning in phonetics. Moreover, multimodal teaching accelerates students' progress in pronunciation learning, successfully arouses enthusiasm for pronunciation studies, and contributes to the ongoing enhancement of their English-speaking proficiency. Finally, Lingzhu (2022) investigated the application of multimodal teaching to oral English teaching in a senior high school and found that it can effectively improve the quality of teachers 'teaching and students' oral English proficiency.

As previously discussed, multimodal teaching has been employed in diverse educational contexts and has proven its effectiveness. Previous research has highlighted its value in areas, such as using auditory elements for pronunciation improvement, leveraging authentic videos to enhance prosodic skills, employing multisensory techniques in pronunciation training, and applying multimodal teaching in oral English instruction. In Thailand, multimodal teaching has been utilized by many scholars to improve Thai EFL learners' language skills which include vocabulary learning and attitude of primary school students (Bansong, Poopatwiboon, and Sukying, 2023), students and teachers' views on multimodal teaching to English reading skill development of Thai university students (Phengsui and Suwanaruk, 2020), the roles of multimodal teaching in language skill improvement

(Sakulprasertsri, 2020) and multimodal teaching and learners' engagement (Hafner, 2014; Sakulprasertsri and Vibulphol, 2016; Sakulprasertsri, 2017). To the best of the researcher's knowledge, there seems to be no study which focused primarily on using multimodal teaching to improve Thai secondary school students' English pronunciation. In this study, the researcher intends to consistently engage with media that integrates various modes of expression, including audio, visual, and gestures. The goal is to compare different modalities, specifically audiovisual media and audiovisual media combined with hand gestures, with the aim of enhancing the pronunciation skills of secondary school students at an educational opportunity expansion school. Consequently, this study is designed to explore the students' perceptions of multimodal teaching in their English classroom. This study is expected to provide valuable insights into pronunciation teaching practices.

1.2 Purposes of the study

This study was designed for two major purposes. First, it was designed to study the effect of incorporating multimodal teaching to improve students' pronunciation of English sounds. Second, it was designed to explore students' perceptions of the implementation of multimodal teaching. These purposes led to two research questions

(1) To what extent does multimodal teaching affect the pronunciation of English sounds among EFL secondary school learners?

(2) What are the students' perceptions of multimodal teaching in their English classroom?

1.3 Scope of the study

This quasi-experimental research using one-group pretest-posttest research design explored the effect of multimodal teaching on the pronunciation of English regular verbs in the past tense, focusing specifically on the sounds /t/, /d/, and /id/, among Thai EFL secondary learners. It also delved into the students' perceptions regarding the implementation of multimodal teaching in their classroom setting. This research involved twenty eighth-grade students from an intact class within an educational opportunity expansion school located in a northeastern province of Thailand. Research tools included pretest and posttest assessments for pronunciation of the ed ending sound, a perception questionnaire, a rubric for pronunciation assessment, and a semi-structured interview. All participants received an instruction based on

multimodal teaching. The study was conducted over an eight-week period during the second semester of the academic year 2023.

1.4 Significance of the study

This research underscores the significance of pronunciation in English language learning and proposes the integration of multimodal teaching and phonetic training as an effective method for improving pronunciation among Thai EFL secondary school students, particularly focusing on the /ed/ ending sounds in regular verbs. It offers practical benefits for both teachers and students. For teachers, the study provides a guideline for integrating multimedia modes with explicit phonetic training to enhance English pronunciation instruction.

For students, it offers practical approaches to improving pronunciation through multimodal teaching and phonological transcription, addressing specific challenges like the pronunciation of ed ending sounds. The research demonstrates that multimodal teaching significantly enhances pronunciation learning, fosters student engagement, and improves focus during learning activities. It highlights the effectiveness of memory aids such as video clips, PowerPoints, and visual imagery in facilitating concept retention, as well as the usefulness of hand gestures in aiding sound distinction. Overall, the findings have implications for informing pedagogical strategies in EFL educational contexts and hold promise for both researchers and practitioners seeking to enhance English pronunciation instruction.

1.5 Definition of key terms

Multimodal teaching refers to teaching the pronunciation of regular verbs with -ed ending through phonetic training using various modes, such as visual, auditory, gestures.

Pronunciation refers to the students' ability to accurately pronounce English regular verbs in the past in *ed* with three different sounds, namely /t/, /d/, /id/.

Secondary school learners refer to 40 students of the seven and eight grades who learn English as a foreign language at an educational opportunity expansion school located in the northeastern part of Thailand.

Phonetic training refers to the use of the International Phonetic Alphabet (IPA), a system of symbols designed to represent the pronunciation of sounds. In this particular investigation, the IPA is utilized alongside multimodal teaching to assist secondary learners in enhancing their ability to pronounce inflectional -ed ending sounds. This approach integrates auditory and visual elements to create a more effective learning experience for students.

1.6 Structure of the Thesis

This proposal comprised three chapters.

Chapter One provided an overall introduction and overviewed of the research project.

Chapter Two presented a literature review of the multimodal teaching in improving English pronunciation to identified the gap in the research.

Chapter Three discussed the methodology employed in the current study. First, it described the research design, followed by the participants and setting, research instruments, data collection procedure, and data analysis. In addition, the study's treatment of ethical issues was considered in the ethical consideration section.

Chapter Four, the research findings are presented, encompassing both quantitative and qualitative data. The quantitative results indicate a notable enhancement in the pronunciation skills of Thai EFL secondary students through the utilization of multimodal teaching. Additionally, the chapter delves into the participants' perspectives regarding the effectiveness of multimodal teaching in improving pronunciation. Finally, the chapter concludes with a summary that highlights the key conclusions drawn from the study and their relevance to the broader objectives of the research.

Chapter Five provides conclusion of the study, implications of the study, limitations and recommendations for future research.

CHAPTER II

LITERATURE REVIEW

This chapter presents the theoretical framework underlying the study. Specifically, the chapter first discusses the concept of pronunciation, followed by the multimodal teaching. The chapter ends with a review of the existing literature in the global and local contexts.

2.1 Overview of Pronunciation

2.1.1 Definitions of Pronunciation

Pronunciation is one of the most crucial aspects of English, especially in oral communication as every sound, stress, pattern, and intonation may convey meaning. Non-native speakers of English need to be careful when pronouncing some words or sentences because poor pronunciation could lead to misunderstandings. Thus, correct pronunciation is necessary for effective communication.

Many scholars define pronunciation in various ways. Hornby (1995) defined pronunciation as the way in which a language is spoken, the way in which a word is pronounced, and the way a person speaks the words of language. Yates (2002) mentioned that pronunciation is the production of sounds that is used for making meaning. Paulston & Burder (1976) elaborated that pronunciation is the production of a sound system which does not interfere with communication either from the speakers' or the listeners' viewpoint. Moreover, Otlowski (1998) stated that pronunciation is the way of uttering a word in an accepted manner. Richard & Schmidt (2002) defined pronunciation as the method of producing certain sounds. From the definitions provided, it could be concluded that pronunciation is the production of sounds for making meaning which involves the effective production of a sound system in an appropriate manner.

2.1.2 Importance of Correct Pronunciation

Pronunciation involves the production of sounds in a language, playing a crucial role in language acquisition as it directly influences our ability to effectively communicate with others. In cases of inadequate pronunciation, despite having correct grammar and vocabulary, understanding may be challenging, leading to frustration and diminished confidence in speaking the language. According to Gilakjani (2012), correct

pronunciation instills significant confidence in the speaker. Improved pronunciation does not necessarily entail replicating the exact accent of a native speaker. The primary aim should be to acquire a pronunciation that is easily comprehensible to listeners, rather than striving to mimic a native speaker's accent. Huwingz (2004) stated that pronunciation holds significance in both speaking and listening during communication. Correct pronunciation is essential for speakers, while listeners must be capable of discerning speech by analyzing phonemes and the phonological system to ensure accurate interpretation. Hence, correctly articulating consonant and vowel sounds forms a fundamental aspect of pronunciation.

Having correct pronunciation benefits language learners. Firstly, it can enhance our confidence when speaking the language. Language learners with correct pronunciation are more likely to feel confident in their ability to communicate with others. This can lead them to a more profound language learning experience and can motivate them to continue learning. Moreover, correct pronunciation can improve their listening comprehension. If the sounds of a language are pronounced correctly, it is likely that the speaker and the hearer understand each other. This can lead them to fully engage in conversations and can improve their overall language learning progress. Finally, correct pronunciation helps us understand other people. With our correct pronunciation, native speakers are more likely to understand us. This can make it easier to build relationships with native speakers and can help us to integrate into the culture of the language we are learning.

2.1.3 Components of Pronunciation
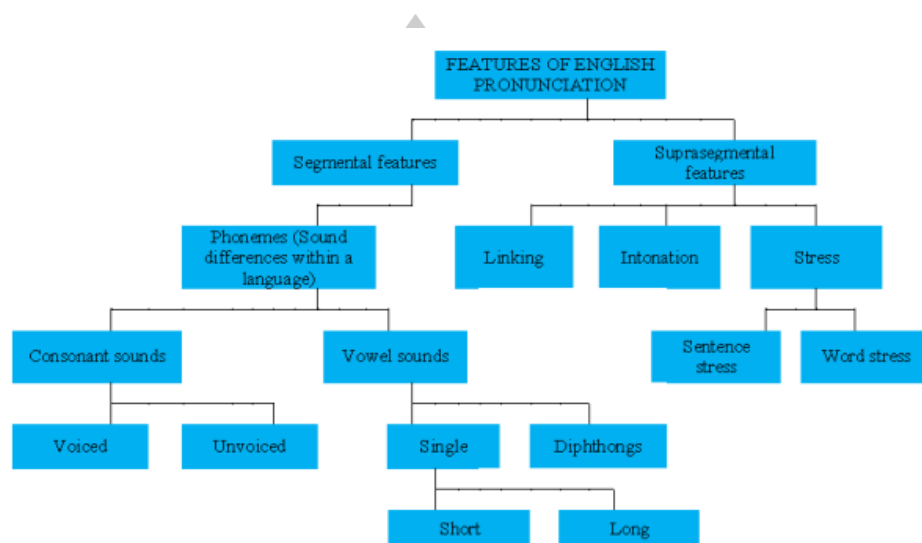
Figure 1. Features of English pronunciation according to Pourhosein (2012, p. 120).

Figure 1 Features of English pronunciation according to Pourhoscin (2012, p3 120)

Pronunciation comprises two important components, namely segmental and suprasegmental features. Speech features can have an important impact on the sound quality. Ladefoged and Johnson (2012) identified two distinct categories of speech characteristics we will encounter in our oral speaking:

a) Segmental features refer to the phonetic elements that make up the individual sounds in a language. A segmental feature system includes vowels, consonants, clusters, and diphthongs. The categorization is predicated upon the disparities in the functions of utterances and their modes of generation. The term segmental involves the discrete sound units that are organized in a linear sequence. Segmental characteristics include both vowels and consonants.

1) Vowels

O'Connor (1980) mentioned that vowels are produced when voiced air passes through various configurations of the oral cavity, with the variations in mouth shape being a result of varying positions of the tongue and lips. Wahyukti (2008) elaborated that there are two distinct categories of vowels, namely pure vowels, and diphthongs. Wahyukti (2008:56) explained that pure vowels encompass which can be divided either as long vowels or short vowels. Wahyukti (2008) mentioned that long vowels

are differentiated by the existence of a length mark, which can take the form of two dots or a colon. In English, there are five long vowels.

1. /i:/ = f<u>ee</u>l

2. /a:/ = g<u>ar</u>den

3. /u:/ = tr<u>ue</u>

4. /ɔ :/ = <u>a</u>ll

5. /ɜ :/ = d<u>ir</u>ty

There are six short vowels in English, and those are:

1. /I/ = kill

2. /ə/ = <u>a</u>bout

3. /o/ = st<u>o</u>p

4. /ʌ / = en<u>ough</u>

5. /u/ = p<u>u</u>sh

2) Consonants

Consonants are produced when there are some obstructions made by two articulators against the out-going air somewhere in the mouth cavity (Wahyukti, 2008: 72). O‟Connor (1980) emphasized the importance of consonants in a word. First, consonants make English pronunciation more understandable. Second, consonants are typically produced when there is an interference between a vocal organ and the air stream. Ramelan (1985) suggested six types of consonants which are plosive, fricative, affricative, nasal, lateral and glide consonants.

    a. Plosive consonants

A plosive consonant is produced when there is a complete obstruction somewhere along the speech tract. Then, the air is suddenly released so that an explosive sound is heard (Ramelan, 1985:102). The sounds that are classified as plosive consonants are:

1. /p/ = <u>p</u>en

2. /t/ = tell

3. /k/ = s<u>k</u>y

4. /b/ = <u>b</u>ack

5. /d/ = <u>d</u>ay

6. /g/ = <u>g</u>oal

b. Fricative consonants

A fricative consonant is produced when the outgoing air meets with a narrowing of the air passage and the obstruction of outgoing air is said to be partial (Ramelan, 1985:119). The sounds that are classified as fricative consonants are:

1. /f/ = <u>f</u>uture

2. /v/ = li<u>v</u>e

3. /Ɵ/ = <u>th</u>irty

4. /ð/ = wi<u>th</u>out

5. /s/ = <u>s</u>ize

6. /z/ = <u>z</u>ero

7. /ʃ/ = <u>sh</u>ake

8. /ʒ/ = televi<u>sion</u>

9. /h/ = <u>h</u>old

c. Affricative consonant

An affricative is a kind of plosive. It is produced when the outgoing air meets with a complete obstruction somewhere in the mouth. However, the stoppage in a stop is suddenly released (Ramelan, 1985:139). In English, there are only two affricatives produced at the same point of articulation; one is sound /dʒ/ and the other is sound /tʃ/.

d. Nasal consonant

A nasal consonant is produced when the velum is lowered so that the outgoing air is free to pass through the nasal cavity (Ramelan, 1985:143). The sounds that are classified as nasal consonant include:

/m/ = <u>m</u>an

/n/ = <u>n</u>ame

/ŋ/ = si<u>ng</u>

e. Lateral consonant

A lateral consonant is produced by raising the tip of the tongue against the roof of the mouth so that the airstream flows past one or both sides of the tongue. (Ramelan, 1985:148). Lateral consonant can be found in almost any languages. However, English has two kinds of lateral consonants, which are usually termed as clear (l) and dark /ɫ/.

A clear /l/-sound is a lateral sound in which the main body of the tongue is sloping downward, whereas a dark /ɫ/ sound is a lateral sound in which the main body of the tongue is raised. For instance, in the word "look", the /l/ sound is heard clearer than in the word "middle". So, the /l/ sound in the word

"look" is named clear /l/, and in the word "middle" is named dark /ɫ/.

f. Glide consonants

Glide consonants occur on the border line between vowels and consonants. However, because of lack of stress and weakness of breath force, it will be more appropriate to classify glide sounds among consonants. The sounds that are classified as glide consonants are /y/ and /w/ sounds (Ramelan, 1985:151).

Voicing

Voice consonants are produced when the vocal cords are stretched tight so that vibration occurs during the pronunciation of a sound. The sounds that are classified as voiced include /b/, /d/, /g/, /v/, / ð /, /z/, /ʒ /, /dʒ /, /m/, /n/, /ŋ/, /l/, /r/

Voiceless consonants are produced without vibration of the vocal cords. Voiceless consonants include /p/, /t/, /k/, /f/, /ɵ/, /s/, /ʃ/, /tʃ/

2.1.4 Teaching Pronunciation

Teaching pronunciation has a significant impact on the interpretation of utterances, particularly conveyed through both segmental and suprasegmental features. Goodwin (2001) asserts that teaching pronunciation facilitates students' comprehension and understanding, creating meaningful connections, and improving their spoken communication skills. In second or foreign language education, teaching accurate

pronunciation holds significant importance as it serves to avoid misinterpretations and improve overall linguistic competence. In language teaching, pronunciation instruction has traditionally relied on three primary approaches:

1. **The intuitive-imitative approach** involves encouraging students to listen to and imitate the rhythms and sounds of the target language without explicit explanations.

2. **The analytic-linguistic approach** provides students with explicit explanations about pronunciation, including articulatory details, phonemic charts, explanations of prosody's form and function, and minimal pair drills.

3. **The integrative approach** involves developing discourse, sociolinguistic understanding, and strategic competence. This teaching approach employs meaningful task-based activities which are generally used to help students focus more on suprasegmental features rather than isolated phonemes and words (Celce-Murcia, Briton & Goodwin, 1996; Hashemian & Fadaei, 2011; Hismanoglu & Hismanoglu, 2010; Saito & Saito, 2016).

This study was employed the analytic- linguistic approach with explicit explanations of articulatory description combined with phonemic charts, explanations of prosody's form and function, and minimal pair drills as a teaching strategy to help students differentiate rules of the English regular verbs with -ed ending, leading to the ability to pronounce these English verbs correctly.

2.1.5 Phonetic Training

Phonetics plays a pivotal role in linguistic proficiency, serving as the cornerstone for language instruction and effective oral communication. According to Gimson & Cruttenden (1994), mastering phonetic knowledge is deemed essential, with near-complete mastery required for language acquisition. As such, the significance of phonetic training prompts language teachers to reconsider their pronunciation teaching methods. Over time, phonetics teaching has become an integral aspect of language instruction. Traditionally, phonetic training centered on teacher-led, segmental phoneme instruction. However, since the 1990s, with the exploration of multimodal discourse construction and advancements in technology, traditional phonetic training has struggled to keep pace with evolving societal language demands. Recognizing this, language teachers increasingly advocate for integrating established

word-based methods with personalized approaches, incorporating visual cues, auditory elements, gestures, images, and actions into their teaching methodologies (Yongsheng Zhu, 2008).

2.1.5.1 Types of Phonetic Training

Many scholars and educators have used various methods of phonetic training to teach and improve pronunciation and speaking skills. Some prominent types of phonetic training methods include: Auditory Training, Articulatory Training, Acoustic Training, Visual Feeback Training, Phonemic Awareness Training, Computer-Assisted Pronunciation Training (CAPT), Multimodal Training, Shadowing, Phonological Awareness Training, Interactive and Communicative Training.

      1. Auditory training: Carmen Benitez-Correa (2020) state that teaching method which focuses on developing the learners' ability to perceive and differentiate speech sounds accurately by listening to and practicing the sounds of the target language. This teaching method helps learners improve their auditory discrimination skills.

      2. Articulatory training or articulatory phonetics highlights the physical aspects of speech production. This type of phonetic training involves teaching learners how to correctly produce and articulate the sounds of a language by focusing on tongue placement, lip rounding, and airflow, among other factors as mention by Xi (2023).

      3. Acoustic training or acoustic phonetics emphasizes the study of the acoustic properties of speech sounds. This approach is typically used to teach learners to understand and manipulate acoustic features of speech, such as pitch, intensity, and duration.

      4. Visual feedback training employs technology to provide learners with real-time visual representations of their speech which helps them see and correct their pronunciation errors.

      5. Phonemic awareness training highlights the importance of developing learners' awareness of the phonemes or distinctive speech sounds of a language. It serves as a strong foundation for young children to build their knowledge about reading and writing.

6. Computer-assisted pronunciation training (CAPT) utilizes computer-based programs and applications that provide interactive and personalized pronunciation training for language learners. CAPT often includes the use of speech recognition software and visual aids to help learners improve their pronunciation.

7. Multimodal training emphasizes the combination of multiple sensory modes, namely visual, auditory, and kinesthetic methods, to enhance their learning experience. This type of training may include the use of videos, images, and physical gestures to improve pronunciation.

8. Shadowing is a teaching method that allows learners to mimic the way native speakers speak. They may mimic their rhythm, intonation, and pronunciation. Shadowing helps improve their fluency and prosody.

9. Phonological awareness training focuses on developing learners' understanding of the sound structure of language, including syllables, rhymes, and phonemic segmentation. It is typically used with first graders and learners with language disorders.

10. Interactive and communicative training involves practicing pronunciation within real communicative contexts, such as interviews and role-play. Learners improve their pronunciation while actively engaged with using the language for real purposes.

These phonetic training methods cater to the diverse needs of learners and are designed to improve their pronunciation and overall communication skills in different languages. The choice of method depends on the specific goals and preferences of the learner and the expertise of the teacher. This study adopted multimodal training and IPA to improve inflectional -ed ending sounds of secondary learners.

2.1.6 Pronunciation Rules for the Simple Past Tense of Regular Verbs

With regard to the pronunciation rules for the -ed ending of regular verbs in the simple past, there is an agreement among authors (Celce-Murcia et al., 2010; Fraizer and Mills, 2015; Schoenberg, 2015). Based on their findings, the guidelines are three important rules for the simple past tense of English regular verbs:

Rule 1: If the base of the verb ends with a voiced sound, except for /d/, the -ed ending is pronounced as /d/. The /d/ combines with the preceding consonant and is not

regarded as an additional syllable. Voiced sounds, characterized by vocal cord vibration, include /b/, /v/, /g/, /z/, /j/, /ð/, /l/, /m/, /n/, /r/, and all vowels.

Rule 2: When the verb base ends with a voiceless sound, except for /t/, the -ed ending is pronounced as /t/. Similar to Rule 1, the /t/ combines with the preceding consonant and is not regarded as an extra syllable. Voiceless sounds encompass /p/, /f/, /k/, /s/, /ʃ/, /tʃ/, /ʧ/, and /θ/.

Rule 3: If the verb base ends with alveolars stop sound, the -ed ending is pronounced as /ɪd/ or /əd/ and is expressed as an additional syllable.

2.1.7 Assessing pronunciation

Pronunciation is associated with two types of testing. According to Lado (1961: 38-85), these types of testing are recognition and production tests.

A. The recognition tests

The recognition test emphasizes students' ability to analyze the pronunciation of words or sentences. This suggests that the recognition test is primarily concerned with the development of listening skills.

B. The production tests.

The production test emphasizes students' ability to practice the pronunciation of words or sentences. According to Lado (1961:83) explained that recognition tests simply assess the listening skill of students. In addition, students' pronunciation abilities can be assessed through production tests.

Besides this, Celce Mercia (1996) suggests the types of pronunciation assessment:

a. Diagnostic assessment

This type of assessment is used for screening and placement. It can also be used to assess listening discrimination and production.

b. Formal-oral proficiency testing instruments

These are standardized tests and they are typically used to evaluate overall speaking proficiency. (iBT, TOEFL, IELT, and ect.)

c. Ongoing evaluation and feedback

This type of assessment involves self-monitoring and correction, peer feedback, and teacher feedback and correction.

d. Classroom testing

This type of testing is concerned with tests of perception and/or production based on what has been learned in class.

In this study, the researcher was used a production test to evaluate student's pronunciation of the English regular verbs with -ed ending. A production test that the researcher was developed consist of 36 words with 21 real words and 15 nonsense words.

2.2 The Multimodal Teaching

2.2.1 Concept of the Multimodal Teaching

Multimodality has received continuous attention from scholars throughout the history of communication. Indeed, multimodality has been studied at least since the 4th century BC, when classical rhetoricians mentioned the importance of voice, gesture, and expressions in public speaking. However, the term was not defined until the 20th century. During this time, the advent of technology created many new modes of presentation. Since then, multimodality has become standard in the 21st century, applying to various network-based forms such as art, literature, social media and advertising. The singular mode, the term used to define the presentation of text on a page, has been replaced with more complex and integrated elements.

Multimodal teaching, often referred to as multimodal pedagogy, involves utilizing various modes of communication to enhance learners' learning experience. Many researchers have studied this concept over the years and suggested the underlying principles of Multimodal Teaching. Kress and van Leeuwen (2001) highlighted the importance of combining various modes of communication, including visual, auditory, gestural, and spatial, to convey information and facilitate learning. They emphasized the need to address learners' diverse learning styles and their preferred teaching styles. Moreover, Wouters and Vos (2015) emphasized the integration of multiple communication modes and technologies to improve teaching and learning, aiming to improve engagement, comprehension, and retention of information. Bezemer and Kress (2016) supported the use of multiple semiotic resources, such as written language, images, sound, and gesture, to support effective communication and learning in various educational contexts. Unsworth (2016) also highlighted how the utilization of various modes of communication, including reading, writing, speaking,

and listening, can enhance literacy skills and understanding. Walsh (2020) advocated multimodal teaching because it can engage students in learning experiences that involve a variety of modalities, both traditional (e.g., text, speech) and digital (e.g., multimedia and interactive technologies). This approach emphasizes the needs of learners in the digital age. Furthermore, Lustyantie & Arung (2020) mentioned that a meaningful interaction can be produced from a simple form of symbol, sign, or symbol, which is usually called an information channel (mode) that is visual, audio, or audio-visual.

2.2.2 Multimedia Learning Theory

Mayer (2002) describes multimedia learning as the utilization of both verbal and visual elements in the presentation of educational material. Moreno (2002) further explains that the cognitive theory of multimedia learning emphasizes that the integration of auditory narrative and graphical visuals enhances the formation of verbal and visual mental representations. These mental representations then interact with prior knowledge to generate new knowledge. In the field of multimedia learning, students engage in the process of establishing meaningful associations between verbal and visual features, thus facilitating a deeper level of understanding compared to the use of verbal or visual stimuli in isolation (Mayer, 2002). Mayer's Cognitive Theory of Multimedia Learning (2010) states that the purpose of multimedia teaching and learning enhances the construction of cohesive mental representations by students based on the materials presented. The theory aims to illustrate the effective organization of multimedia instructional practices through the integration of cognitive methods, with the purpose of promoting students' learning efficiency (Sorden, 2012).
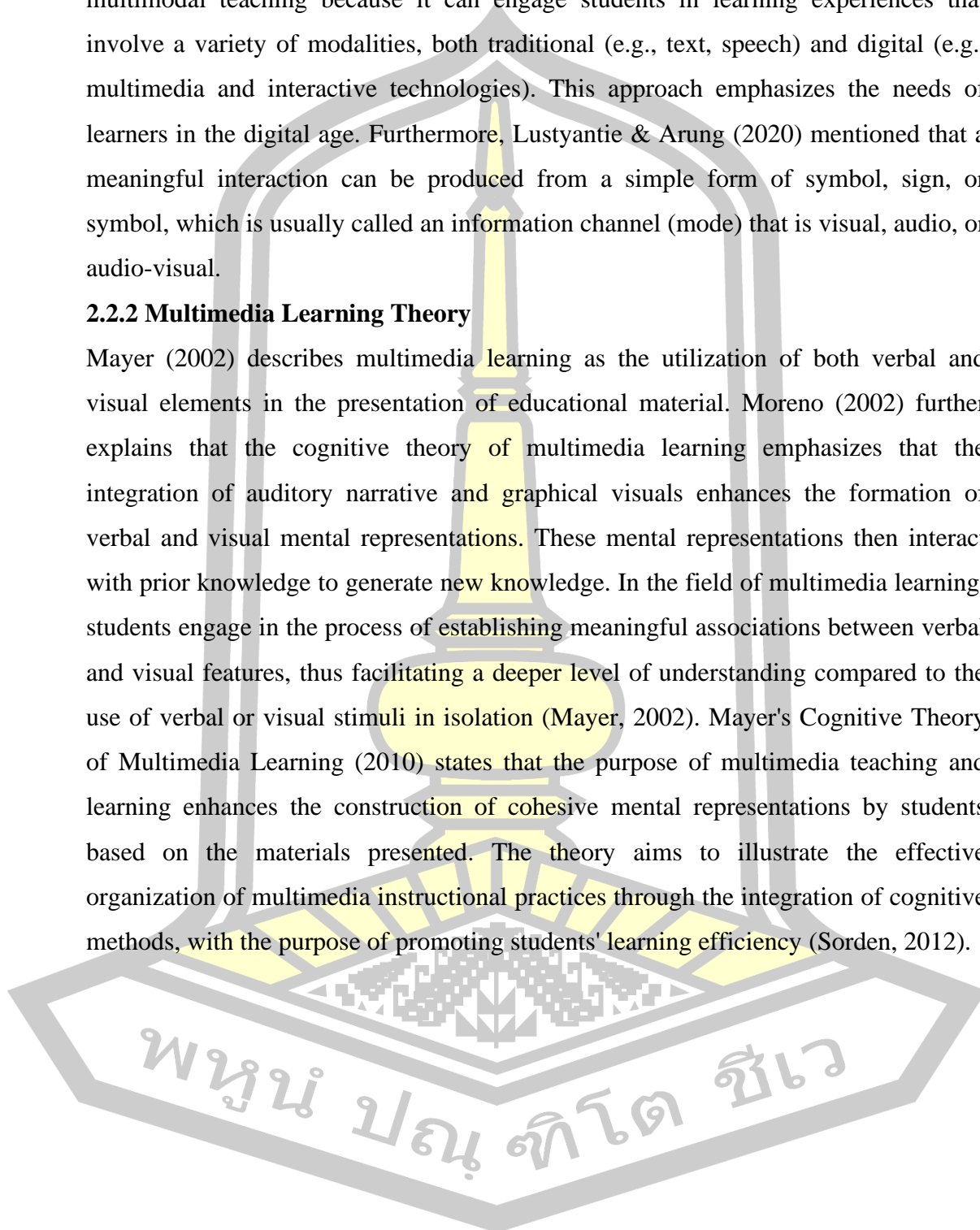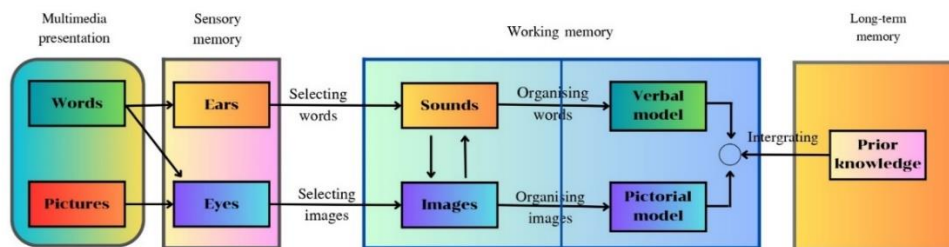
Mayer's Cognitive Theory of Multimedia Learning

Figure 2 Mayer's Cognitive of Multimedia Learning

The cognitive theory of multimedia learning highlights the existence of three memory stores, namely sensory memory, working memory, and long-term memory. Sensory memory enhances the perception of new data (Sweller, 2005a). Mayer (2005) explains that visual sensory memory retains visual element such as pictures and written texts in the form of visual images, while auditory sensory memory retains auditory element such as sounds and spoken words in the form of auditory images. Working memory is a cognitive construct that is associated with the conscious information processing (Sweller, 2005a). The cognitive process is concerned with the attentional mechanism that involves the selection and retrieval of data from the sensory memory, enhancing its subsequent processing and integration. Another cognitive structure that exists is long-term memory, which serves as a repository for our knowledge base involves the complete repository of information for an indeterminate duration. The recognition of information in long-term memory is contingent upon its transfer to working memory, as posited by Sorden (2012). Mayer's (2010) findings suggest that the capacity of working memory is limited to processing a limited number of stimuli simultaneously. Furthermore, the active processing assumption claims that students engage in the construction of knowledge by actively attending to pertinent information, organizing them into a coherent conceptual framework, and integrating them with their own knowledge.

In conclusion, the combination of audio and visual elements in multimedia learning has the potential to offer significant advantages by alleviating cognitive load on working memory. Sorden (2005) argued that the integration of visual images (nonverbal) accompanied by narration or audio (verbal and auditory) can enhance learning outcomes. Using the combination of voice narration and visual graphics effectively provides capitals for verbal and nonverbal working memories by engaging both the aural and visual sensory channels in a balanced manner, thus preventing overload on either channel. In the context of providing narration or audio with visual stimuli, it is observed that the information can be processed through two different channels. Kalyuga (2000) supported the utilization of many media to improve the working memory's ability to process information. As a consequence, learners show their improved learning outcomes when visual graphics are combined with spoken language rather than written language.

2.2.3 Roles of Multimodal Teaching in Pronunciation Improvement

Multimodal teaching plays an important role in enhance pronunciation by engaging multiple sensory channels and teaching methods. Ganapathy & Seetharam (2016) stated that multimodal teaching promotes learning engagement by combining visual, auditory, and kinesthetic materials, making pronunciation lessons more engaging. Therefore, learners are more likely to be motivated and focused when multiple senses are included in the learning process. Moreover, Gick & Derrick (2009) emphasized that when presenting articulation integrating visual aids and diagrams can provide learners with a clear concept of how to position their tongue and lips, to produce specific sounds accurately. Providing audio materials of native speakers can also benefit learners in developing their auditory discrimination skills, leading them to be able to distinguish subtle differences in pronunciation as mentioned by (Major, Fitzmaurice, Bunta, & Balasubramanian, 2002). Celce-Murcia, Brinton, & Goodwin (2010) claimed that multimodal teaching which includes the International Phonetic Alphabet (IPA) helps learners develop their phonetic awareness, allowing them to see the relationship between symbols and specific sounds. Chun (2006) explored multimodal materials, like multimedia content and speech recognition software, and found that these materials exposed learners to authentic pronunciation and real-world language use, bridging the gap between classroom learning and practical application.

Wells (2012) stated that the multisensory nature of multimodal teaching can enhance learners' long-term retention of pronunciation skills, as they create lasting sensory and motor connections. Finally, Hardison (2003) combined speaking and listening in multimodal teaching and found that it helped learners connect the dots between sound production and sound perception.

2.2.4 Benefits of Multimodal Teaching

Previous research has proved the effectiveness of multimodal teaching in language learning. Firstly, the use of multimodal teaching can engage all students in the learning process, as each student has their own preferred learning style at some point during the lesson. Previous research also has suggested that multimodal teaching has a positive relationship with student motivation (Falk-Ross & Evans, 2014; Fang, 2015; Ganapathy & Seetharam, 2016; Varaporn & Sitthitikul, 2019b). There is empirical evidence showcasing that student motivation is positively correlated with their engagement in classes that utilize various teaching modalities. In addition, multimodal teaching has been found to significantly affect student motivation in both reading (Ueai-Chimplee, 2007) and writing (Darrington & Dousay, 2014; Lee, 2014).

Utilizing multimodal teaching helps teachers and educators in facilitating various visual and non-visual, digital and non-digital activities. Moreover, integrating technology into the learning process has the potential to improve students' skills, namely innovation, leadership, discipline, intelligence, critical thinking, and collaborative problem-solving within a digital learning environment (Beetham & Sharpe, 2013). Bao (2017) explained that using multimodality in the classroom creates a welcoming and engaging atmosphere, boosting students' motivation to read and enhancing their confidence in acquiring the English language. Additionally, a study by Ganapathy and Seetharam (2016) found that multimodal teaching techniques effectively encouraged active student participation, thereby promoting their motivation levels and fostering a self-directed learning environment. Saz, Rodríguez, Lleida, Rodríguez an (2016) claimed that combining multimodal teaching with the novel advances of speech technologies in their speaking class enhanced pronunciation training in Second Language (L2) teaching.

2.2.5 Disadvantages of Multimodal Teaching

Although multimodal teaching benefits language learning and teaching in a various way, multimodal teaching has its own disadvantages. The first disadvantage involves complexity and cognitive load. Some scholars claim that the use of multiple modes can increase cognitive load, especially for learners who may have difficulty processing information presented in various formats simultaneously. This could potentially hinder their learning outcomes. The second advantage is concerned with its accessibility. Some learners, especially those with disabilities may face challenges in accessing certain modes of communication. For example, learners with hearing impairments may not be able to access video contents while learners with visual impairment may struggle to access text. The third disadvantage is about technology barriers. Successful implementation of multimodal teaching often relies on technology. However, not all students, school or educational institutions may have access to the necessary technological resources. The next problem concerns pedagogical challenges. Some teachers and educators may find it difficult to design multimodal teaching to foster students' learning experience because utilizing different modes of communication may require careful planning and consideration of their contribution to the learning objectives. The fifth disadvantage involves evaluation and assessment difficulties. Assessing students' learning outcomes based on a combination of various modes of communication can be more challenging than traditional assessments. The next issue concerns cultural and linguistic variability. Multimodal materials may not always be culturally or linguistically inclusive. Learners of different cultures may interpret images, symbols, or non-verbal cues in different ways, leading to misunderstandings or biases. The last issue involves resource intensiveness. Creating high-quality multimodal materials requires time, expertise, and technology. Not all educators or institutions may have the resources to develop and maintain such materials.

2.2.6 Previous Research

Several studies have been conducted to investigate the effect of multimodal teaching on EFL learners' pronunciation skill. This section provides an overview of prior research into multimodal teaching and EFL learners' pronunciation skill in various contexts.

A study of Syzpyra-Kozlowska (2015) employed a holistic multimodal approach to pronunciation training. The study involved two groups of intermediate learners from Polish secondary schools. This study indicated not only the method's effectiveness but also its higher engagement level, as evidenced by a post-test questionnaire survey. Jingpeiyi (2021) employed phonetics learning through multimodal teaching to investigate student enthusiasm and autonomy. Moreover, this research utilized diverse training tools to improve phonetic information retention. The findings indicated that multimodal teaching has a significant impact on their pronunciation learning. The students also showed their interest in the phonetics learning through multimodal teaching. This approach was proved beneficial for freshmen during second language acquisition. Another study by Carmen Benitez-Correa (2020) used multimodal teaching to improve 30 Ecuadorian university students' pronunciation of regular verbs through the use of audacity coach. The results suggested that audacity is an effective tool that not only improves learners' pronunciation, but also favors the practice of English language in a free and relaxed environment. In Bagdad, Sidgi and Shaari (2017) assessed the effectiveness of Automatic Speech Recognition (ASR) in teaching pronunciation to ESL learners. Utilizing Eyespeak software, the study indicated students' positive perceptions of ASR as a valuable pronunciation learning tool. In Iran, Xodabande (2017) demonstrated the importance of telegrams in improving learners' pronunciation at a language institute. The results suggested that the use of social network telegram is a useful tool when teaching pronunciation in an EFL classroom. Wardani (2021) investigated how EFL young learners could develop English skills using digital video as a multimodal tool in online learning. The study with primary school students in Muhammadiyah 24 Surabaya revealed that digital videos effectively facilitated story writing and presentation, suggesting that multimodal methods enhance motivation and competence in the teaching and learning process. The integration of videos in English classrooms has been advantageous for pronunciation. Namaziandost, Esfahani, and Hashemifarnia (2018) studied the effect of using authentic videos on prosodic ability, which included pause, juncture, intonation, pronunciation, and stress and found positive results. Recently, Lingzhu (2022) investigated the application of multimodal teaching mode to oral English

teaching in senior high school. It was found that it can effectively improve the quality of teachers' teaching and students' oral English proficiency.

Previous research has also highlighted the importance of combining multimodal teaching and hand gestures. For example, Li (2016) utilized audio-visual training among a group of Mandarin speakers who had difficulty differentiating the English /θ/–/s/ and /ð/–/z/. The participants undertook a nine-session audio-visual training programmed in which they were trained with audio-visual materials that demonstrated the articulatory gestures of the target sounds. The participants showed significant improvement in the accurate perception and production of the two contrasts both during and by the end of the training programmed. Nakatsukasa (2019) investigated gestures during corrective feedback, finding limited impact on regular past tense acquisition. In addition, audio, visual, and gesture can also be incorporated to improve pronunciation. Xi, Li, Baills & Prieto (2020) utilized hand gestures to facilitate fifteen Catalan students' acquisition of new phonemic contrasts. It was found that they help enhance the students' acquisition of new phonemic contrasts when they are appropriately used. Zheng, Hirata, and Kelly (2018) investigated the impact of metaphoric actions—head nods and hand gestures—in producing Mandarin tones for first language (L1) and second language (L2) speakers. In 2 experiments, the participants imitated videos of Mandarin tones produced under 3 conditions: (a) speech alone, (b) speech + head nods, and (c) speech + hand gestures. The results suggested that metaphoric bodily actions do not influence the lowest levels of L1 speech production in a tonal language and may play a very modest role during preliminary L2 learning. Hoetjes, Maastricht, and Heijden (2019) investigated whether training with gestures benefits L2 phoneme acquisition from both a production and perception perspective of Dutch learners. The results suggested that in general, gestural training benefits L2 phoneme acquisition, but different gestures benefit the acquisition of different phonemes, possibly depending on their complexity. Xi (2023) assessed the potential benefits of incorporating hand gestures in a multimodal phonetic training approach. Specifically, this study evaluated the role of congruency between different modalities by selecting hand gestures that represent target phonetic information in both the acoustic (Study 1) and articulatory (Studies 2 and 3) domains. The results suggested that hand gestures could facilitate the

production of L2 consonants when they appropriately match the target acoustic feature. The findings contribute to the understanding of embodied learning in the context of L2 segment learning. Furthermore, they enhance the multimodal enrichment framework (Mathias & von Kriegstein, 2023) by emphasizing the importance of the between-modality congruence for successful multimodal integration, and expand the understanding of how humans can optimally learn from multiple modalities that are available to them.

In summary, multimodal teaching has been proved across different contexts and methods to enhance EFL learners' pronunciation skill. Previous studies suggest that the use of multimodal teaching with media promotes EFL learners' English pronunciation at secondary and university levels. However, previous studies also indicate the importance of combining audiovisual media and hand gestures to help improve students' pronunciation of some problematic sounds. In Thailand, previous research used multimodal teaching as a teaching strategy to enhance Thai EFL leaners' motivation (Falk-Ross & Evans, 2014; Fang, 2015; Ganapathy & Seetharam 2016; Varaporn & Sitthitikul, 2019b; Jingpeiyi, 2021,), engagement with classroom learning (Hafner, 2014; Sakulprasertsri and Vibulphol, 2016; Sakulprasertsri, 2017), vocabulary knowledge (Bansong, Poopatwiboon, and Sukying, 2023), and grammar and reading (Phengsui and Suwanaruk, 2020, Carmen Benitez-Correa, 2020). Little attention has been paid to investigating the effect of multimodal teaching on pronunciation of Thai secondary students. Therefore, this study was set out to bridge these gaps by utilizing multimodal teaching to improve pronunciation of Thai secondary school students. The purpose of this research was to examine the impact of different modalities, specifically audiovisual media combined with hand gestures, with the aim of enhancing the pronunciation of Thai secondary school students at an educational opportunity expansion school located in the northeastern part of Thailand, where students had difficulty pronouncing some English regular verbs with -ed ending. Furthermore, this study was designed to explore the students' perceptions of multimodalities implemented in their English classroom. This study was expected to provide valuable insights into pronunciation teaching practices.

2.3 Chapter summary

The chapter reviews existing literature on multimodal teaching, its theoretical underpinning and its roles in pronunciation improvement. Previous studies highlight the effect of multimodal teaching on EFL learners' pronunciation skill in various settings and educational levels. However, little research has focused on improving pronunciation of secondary school learners through multimodal teaching combined with phonetic training in the Thai context. Therefore, the current study will further investigate the effect of multimodal teaching and different modalities on secondary learners' pronunciation. It also seeks to explore the students' perception toward multimodal teaching.

CHAPTER III
RESEARCH METHODS

This study investigated the use of multimodal teaching to improve pronunciation of Thai secondary school learners. This chapter described the research paradigm/methodology, participants and setting, research instruments, data collection procedure and data analysis.

3.1 Research Paradigm/Design

Using a mixed methods research design, this study combined both quantitative and qualitative research methods in a single study to understand a research problem. According to Creswell and Plano Clark (2011), mixed-methods research has its own philosophical assumptions and methods of inquiry. As a methodology, it incorporates philosophical assumptions to guide the collection and analysis of data from multiple sources within a single study. This design offers several benefits for addressing complex research issues by integrating philosophical frameworks of both post-positivism and interpretivism (Fetters, 2016), interweaving qualitative and quantitative data to provide meaningful explanations. It also provides a logical foundation, methodological flexibility, and an in-depth understanding of smaller cases (Maxwell, 2016). In essence, mixed methods enable researchers to answer research questions with sufficient depth and breadth (Enosh, Tzafrir, & Stolovy, 2014) and help generalize findings and implications to the entire population.

This study also employed a one-group pretest-posttest design. The one-group pretest-posttest design is a type of quasi-experiment in which the outcome of interest is measured twice: once before and once after exposing a non-random group of participants to a specific intervention or treatment. This design has three major characteristics: the group of participants who receive the intervention is selected in a non-random way, classifying it as a quasi-experimental design; there is no control group to compare the outcome against; and the effect of the intervention is measured by comparing the pre- and post-intervention measurements, with the null hypothesis being that the intervention has no effect, meaning the two measurements are equal.

Furthermore, this study investigated the effect of multimodal teaching on pronunciation of English regular verbs with -ed ending among Thai EFL secondary

school learners. Moreover, the study explored the students' perceptions regarding the implementation of multimodal teaching in their English classroom. Data collection involved administering pronunciation pre-test and post-test to the students and a perception questionnaire to obtain quantitative data. Additionally, qualitative data was obtained through a semi-structured interview, ensuring a more profound insight into the topic. This combination of testing, questionnaires and interviews ensured a thorough comprehension of the topic under investigation.

Groups of Participants	Pronunciation pretest	Types of treatment	Pronunciation posttest	Perception questionnaire	Semi-structured interview
N=20	✓	18 hours of Multimodal Teaching	✓	✓	✓

3.2 Participants and Setting

The participants of this study were twenty Thai EFL secondary school learners. They were male (N=10) and female (N=10) and aged between 14 and 15. They were member of an intact class at an educational opportunity expansion school located in the northeastern part of Thailand. The participants receiving an instruction using multimodal teaching. Their overall English proficiency level was at beginner level as indicated by their English proficiency test score from the previous semester. All participants were Thai native speakers who had learned English as a foreign language (EFL) for eight years. They had studied English for 3 hours a week in the Fundamental English class which the researcher was teaching in the second semester of the academic year 2023. In this subject, the students were expected to be able to compare and explain similarities and differences between pronunciation of a variety of sentences and words. However, the students still encountered many pronunciation problems of the English sounds. For example, they found it difficult to pronounce "ed" at the end of English regular verbs for example: *called*, *stopped*, *needed*. Thus, this research was set out in order to improve their pronunciation of these problematic sounds.

3.3 Research Instruments

Four instruments were employed to collect data: a pronunciation pretest and posttest, a perception questionnaire, a pronunciation scoring rubric and a semi- structured interview. The description of these research instrument is as follows:

3.3.1 Pronunciation of ed ending Pretest and Posttest

Two sets of pretest and posttest assessments were created to evaluate students' pronunciation of the -ed ending in English regular verbs (/t/, /d/, /id/). Each test included thirty-six regular verbs in their past tense forms, drawn from the students' textbook. The tests comprised two tasks focused on English regular verbs with the "ed" ending: the first task involved twenty-one real words with 13 voiced and 8 voiceless consonant sounds, excluding /ð/, /Ө/, and /ʒ/; the second task consisted of fifteen nonsense words, divided into three groups of five each (/t/, /d/, and /id/), aimed at prompting students to distinguish real words and practice reading words containing the learned sounds. After developing the two comparable tests, three experts in ELT were invited to determine reliability and validity of the tests. Then, the tests were used with other thirty students whose characteristics were similar to the participants in the main stage. Next, the tests were revised for the actual use in the main stage. Test 1 was used as a pronunciation pretest whereas Test 2 was used as a pronunciation posttest.

The range of scores below was used to determine the levels of the participants' pronunciation achievement from sample random as high, mid and low:

Scores	Levels
25-36	high
13-24	mid
0-12	low

3.3.2 Perception Questionnaire

Using a 5- point Likert scale, a perception questionnaire with fifteen items was developed to investigate the participants' perception of multimodal teaching. A 5-point Likert scale is a psychometric response method where respondents can easily answer questions and state their level of agreement in five points. The 5-point Likert scale consisted of the below points – (1) Strongly Disagree; (2) Disagree; (3) Neither

Agree nor Disagree; (4) Agree; (5) Strongly Agree. The questionnaire consisted of fifteen questions which asked the participants in the experimental group about their perception toward multimodal teaching in their English classroom. The questionnaire was in Thai and translated into English to avoid language barrier issues in answering. Three experts in English Language Teaching were invited to determine IOC of the questionnaires. Table 2 indicates the range of scores developed by Sözen (2019) which was used to determine the levels of the participants' perception toward multimodal teaching incorporated in their classroom.

Table 1 Scoring range of Likert scale of the survey developed by Sözen (2019)

Likert scale	score	Mean score	Levels
Strongly Disagree	1	1.00-1.80	Very low
Disagree	2	1.81-2.60	Low
Neither/Nor agree	3	2.61-3.40	Moderate
Agree	4	3.41-4.20	High
Strongly Agree	5	4.21-5.00	Very high

3.3.3 Pronunciation Evaluation (Rubric)

The participants' pronunciation of regular verbs (/t/, /d/, /id/) was assessed using the pronunciation rubric created by the researcher. The scores were dichotomous: (1) if the target word was correctly pronounced, the last syllable of /ed/ending sound; (0) if it was incorrectly pronounced the last syllable of /ed/ending sound. Three teachers who taught the same course were asked to rate students' pronunciation to ensure interrater reliability.

No.	Aspect	Score	Pronunciation Features
1.	Pronunciation	0	incorrectly pronounced *Example*: The word "walked" if the student pronounced [ˈwɑkd], [ˈwɑkəd], [ˈwɑkdəd], [ˈwɑktəd], [ˈwɑktɪd], [ˈwɑkdɪd], [ˈwɑkɪd] and other except [ˈwɑkt]
		1	*correctly pronounced* *Example: The word "walked" if the student pronounced the ending sound /t/ correctly.*

3.3.4 Semi-structured Interview

Six students—three with low scores and three with high scores—were intentionally chosen from the experimental group to participate in a semi-structured interview. This interview aimed to gather their perceptions of the multimodal teaching approach that incorporated audiovisual media and hand gestures. The following sample questions were used as a guideline to elicit the interviewees' answers:

1) Please describe your English pronunciation before taking this course.

2) Please describe your English pronunciation after taking this course.

3) What do you think about the audio input the teacher employed in this course?

4) What do you think about the visual input the teacher employed in this course?

5) What do you think about the hand gesture the teacher employed in this course?

The interview session lasted 10 minutes. After the interview, all the data gathered from the interview was transcribed immediately. All the transcriptions were coded systemically in order to find the answer to RQ2.

3.4 Data Collection Procedure

The participants were taught using multimodal teaching. The teaching procedures were based on the PPP model. The participants received teaching instruction on the topic of inflectional -ed ending sounds in the Fundamental English class for six weeks, which was 18 hours in total. The learning contents of each hour are described in Table 3.

Table 2 The learning contents during the teaching process

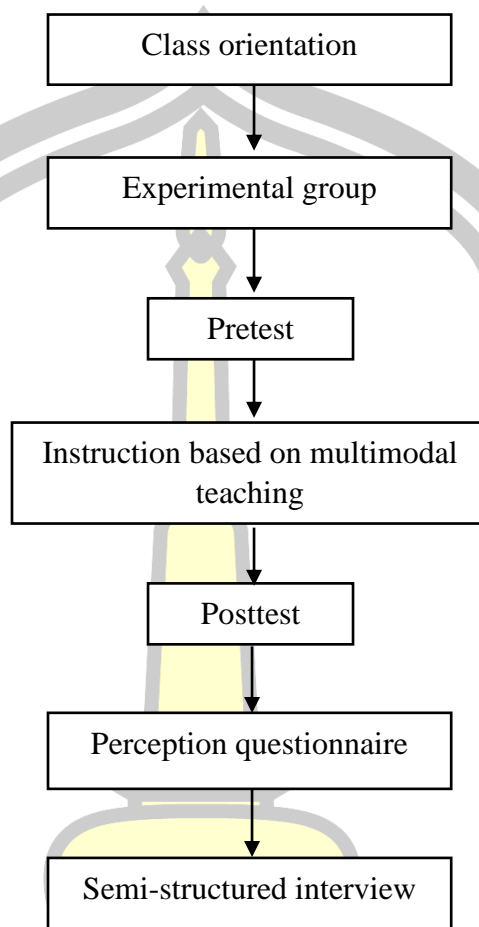| Time	Contents
Week 1	1st hour: An overview of components of pronunciation; segmental features of both consonants and vowels 2nd hour: The articulatory system of segmental features (consonants) 3rd hour: The articulatory system of segmental features (vowels)
Week 2	4th hour: The articulatory system of segmental features (consonants) 5th- 6th hour: The articulatory system of voice consonants
Week 3	7th-8th hour: The articulatory system of voiceless consonants 9th hour: Revision of the articulatory system of voiced and voiceless consonants
Week 4	10th hour: Rules of ending - ed of verbs 11th hour: Rules of ending - ed of verbs specific on adding -ed ending voiced consonants 12th hour: Rules of ending - ed of verbs specific on adding -ed ending voiceless consonants
Week 5	13th hour: Rules of pronouncing regular verbs /t/, /d/, /id/ sounds 14th hour: Rules of pronouncing regular verbs /t/ sounds 15th hour: Rules of pronouncing regular verbs /d/ sounds
Week 6	16th hour: Rules of pronouncing regular verbs /id/ sounds 17th hour: Integration of phonetics, rules of adding -ed and rules of pronouncing regular verbs 18th hour: Revision of pronouncing regular verbs /t/, /d/, /id/ sounds

The pronunciation instruction was detailed in Table 3 below.

Table 3 Teaching Procedure

Stage	Activities	Materials
Warm-up **(2 min)**	The teacher welcomes the students and prompts them to glance at the screen to speculate about the day's lesson. Following this, the instructor proceeds to introduce the topic. Additionally, the teacher may prepare supplementary materials to engage the students further, tailored to various subjects.	
Presentation **(15 min)**	- The teacher presents the picture with colors and sound as a video on the screen and tells the students to look at it which are consonants and vowels in IPA. The students were seen mouth shapes in each consonant and they saw how to produce the differences of voice and voiceless as well - The teacher has the students look at the slide shown, turn on the pronunciation sound, and then lets them pronounce after that. - The students pronounce the alphabets and they know the correct sound in English which had 26 alphabets and 44 sounds. This stage the teacher could check the accuracy.	- power point presentation - Speaker - Projector monitor - Laptop
Practice **(20 min)**	- The teacher comes up with another presentation comprising the unfamiliar consonants with some similarity in mouth shape with combined hand gesture for practicing and clearly understand the differences between voice and voiceless sound. - The students must practice to pronounce each consonant by the activities which were minimal pair, odd one out - The teacher guides the students when needed.	- power point presentation - Speaker - Projector monitor - Laptop
Production **(10)**	- The students complete the different task based on each topic.	- google form task
Wrap-up **(3)**	- The students are asked to pronounce the consonants they have learned and prepare to pronounce for the teacher in the additional time outside the class.	

The data was collected in the following procedure (Figure 3)

Figure 3 Data collection procedure

Stage 1: The participants were given an orientation about the research project. They were informed about the purposes of the study and types of participation. Moreover, they were given a consent form.

Stage 2: The participants were asked to take a pronunciation pretest of 36 items to determine their pronunciation regarding both the regular verbs in isolation and recorded it. Each word took 30 seconds and if the students did not know the word they could skip and read the next word. This stage demonstrated their previous knowledge about the rules for pronouncing the -ed sounds of those verbs.

Stage 3: During the regular class within 8 weeks, the teacher as the researcher in this study taught by using multimodal teaching via audiovisual media and hand gestures for three hours per week.

Stage 4: At the end of week 7, the participants were asked to take the pronunciation posttest.

Stage 5: The students were asked to complete a perception questionnaire about the implementation of multimodal teaching in their English class.

Stage 6: Finally, in week 8 the researcher interviewed six students purposively selected from the experimental group to gain their in-depth perception of the implementation of multimodal teaching in their English class.

The following are examples of multimodal teaching incorporating audiovisual media combined with hand gestures:
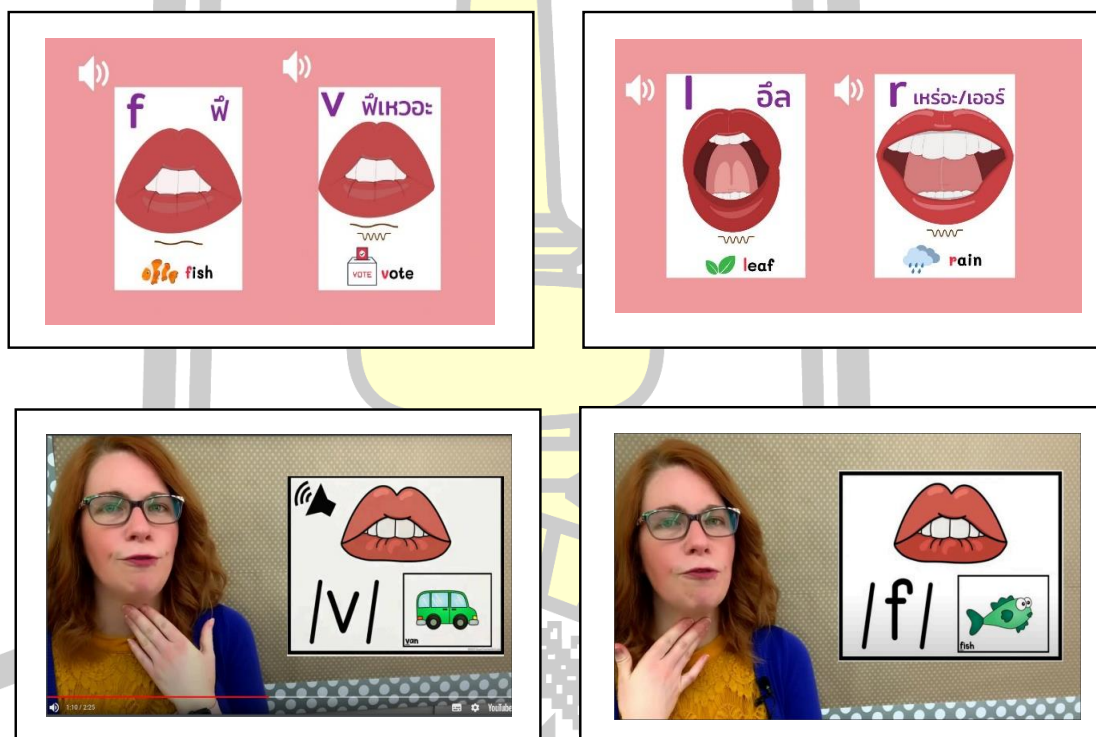
Figure 4 The following are examples of multimodal teaching incorporating audiovisual media combined with hand gestures:

3.5 Establishing the reliability and validity of the instruments

The reliability and validity of the instruments were assessed using the Index of Item-Objective Congruence (IOC) system. Three ELT experts who were university

lecturers were asked to rate the congruence between objectives and items in the perception questionnaire. These ratings were then used to calculate the IOC as follows:

+1 means   a test item is considered congruent with the objectives

0 means   a test item is considered neutral in terms of whether

it is congruent with the object

-1 means   a test item is deemed not congruent with the objective

The IOC (Index of Item-Objective Congruence) was then used to measure the consistency of each item.

$$10C = \sum R / N$$

IOC   means   the index of congruence

R   means   the overall score from the experts

N   means   experts

The reliability of the instruments was measured via a pilot study with 20 grade eight students from another private school. These students shared similar characteristics in terms of educational background. These students pilot study students had to complete a 15-items questionnaire. The results were analyzed using the Cronbach alpha coefficient; Cronbach's alpha is a measure of internal consistency or reliability, that is, how closely related a set of items are as a group.

3.6 Data Analysis

Statistical analyses were conducted to address the research questions. A paired samples t-test was utilized to compare pretest and posttest means within groups and the perception questionnaire was analyzed using percentages, means, and standard deviations, based on participant ratings of agreement and disagreement with each item. Finally, thematic analysis was applied to transcriptions of semi-structured interviews. Thematic analysis involves identifying patterns in the meaning of qualitative data to uncover themes. To ensure reliability, another coder, extensively trained in the evaluation process, cross-checked the thematic analysis. This method facilitated the identification of themes from the core of the data, ensuring that the researcher's systematic examination of the data aligned with its inherent content.

3.7 Ethical Considerations

In this research, the well-being of all participants took precedence to guarantee a risk-free data collection process. The researcher was dedicated to maintaining the utmost standards of privacy and confidentiality throughout the study. Prior to the commencement of the study, detailed information about the research will be communicated to all participants. The researcher was committed to strictly adhering to confidentiality protocols, ensuring that the identities of participants remain undisclosed. No participant names were documented, and instead, coded numbers were employed during the data collection phase. Additionally, all information gathered through the questionnaire and the interview were kept confidential.

3.8 Chapter Summary

This chapter outline the research methodology implemented for the study, encompassing research design, participants, setting, research instruments, data collection procedure, data analysis, and ethical considerations. The primary objective of the current research was to enhance the pronunciation skills of secondary learners in the Fundamental English course through multimodal teaching. The study was involving 20 eighth-grade students selected from an intact class, with a treatment duration spanning six weeks. Evaluation of the treatment's effectiveness was conducted through pretest and posttest on pronunciation. Moreover, the perception questionnaire was used to investigate the participants' perception about multimodal teaching implemented in their English class. Additionally, a semi-structured interview with six participants from an experimental group was carried out to delve into the features of multimodal teaching in improving their pronunciation.
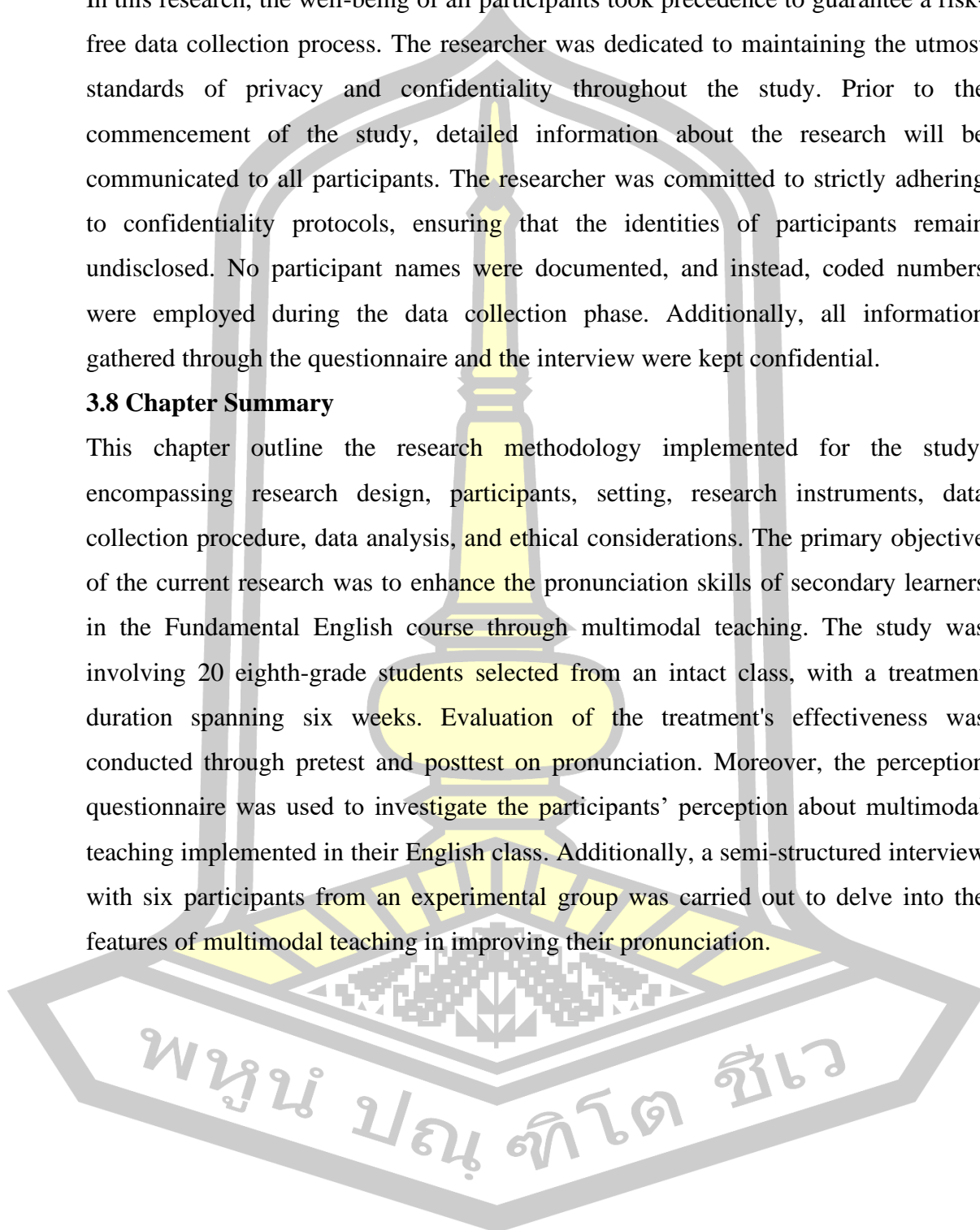
CHAPTER IV
RESULTS

This chapter presents the research results to answers the research questions. The first section presents the results related to the participants' performance on the pretest and posttest. The second section presents the students' perceptions of multimodal teaching in English classroom**.** Finally, this section describes the participants' perceptions regarding using multimodal teaching to improve pronunciation.

4.1 Multimodal Teaching and pronunciation test in Thai EFL secondary learners

This study attempted to determine the effect of multimodal teaching on improving Thai EFL secondary learners' pronunciation. The pronunciation /ed/ ending tests were developed and piloted before the main study. Descriptive and inferential statistics were applied to the quantitative data using the Statistical Package for the Social Sciences (SPSS) 29 software. The descriptive statistics comprised the mean, standard deviation, skewness, and kurtosis. The raw scores of each test were also converted into percentage to determine differences between pre-test and post-test performances.

Table 4 illustrates a summary of descriptive statistics concerning the performance of Thai EFL secondary school learners on a pronunciation test for -ed ending in regular verbs. The results indicate higher scores on post-test assessments compared to pre-test scores. Specifically, prior to receiving multimodal teaching instruction, the participants achieved a mean score of 4.60 (12.77%, SD = 3.78) on the pretest, Following the multimodal teaching instruction, the participants demonstrated significant improvement, achieving a mean score of 31.00 (86.11% SD=4.44) on the posttest. These findings suggest that multimodal teaching had a positive impact on the pronunciation of words ending in /ed/ among Thai EFL secondary learners.

Table 4 A summary of descriptive statistics of pronunciation ed ending test

Group	Time	M	(%)	SD	Skewness	Kurtosis
(N=20)	Pre-test	4.60	12.77%	3.78	0.38	-1.03
	Post-test	31.00	86.11%	4.44	-1.25	0.62

The distribution of scores was also examined for normality. Skewness and kurtosis were found to be normal across two times of tests. As illustrated in Table 4, approximately 95% of case values lie within two standard deviations from the mean.

Therefore, there appears to be no violation of the statistical assumption of normal distribution (Larson-Hall,2016).

Additionally, a paired sample t-test analysis was also conducted to determine whether there was any significant difference between pronunciation ed ending pre-test and post-test before and after receiving the instruction within the same group of participants. Effect size (d) was further calculated for the strength of multimodal teaching instruction.

As shown in Table 5, based on the scores of the participants, the two times of (pre-test and the post-test) the pronunciation ed ending test were significantly different, indicating a large effect size (t = 34.32, p <0.001, d = 3.44).

Table 5 Comparisons between pre-test and post-test within group

Group	test	t-value	*p*-value	Effect size (d)
(N=20)	Pretest vs Posttest	34.32	<.001	3.44

Note: N = 20

Figure 5 provides a visual representation of the overall performance of participants on the ed ending pronunciation test, which exhibited a significant difference with a large effect size (t = 34.32, p < .001, d = 3.44). Specifically, participants achieved a notably higher score on the posttest, averaging about 31.00 (86.11%, SD = 4.44) This indicates a substantial increase in performance for the participants following the treatment, highlighting their superior performance on the pronunciation test.
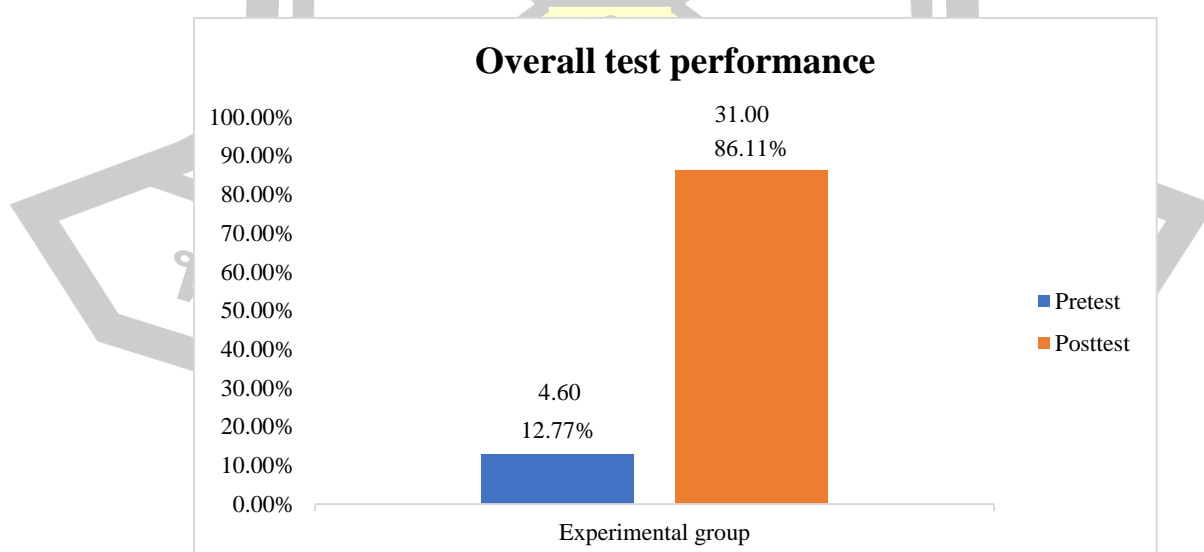
Figure 5 Participants' overall performance on pronunciation of ed ending sound

In conclusion, the participant showed a significant decrease in scores from pretest to posttest, with a large effect size (t = 34.32, p < 0.001, d = 3.44). These findings suggest an improvement of the ed pronunciation test before and after the multimodal teaching instruction.

4.2 Thai EFL secondary learners' perception through Multimodal Teaching in improving pronunciation

To answers research question 2 about how Thai EFL secondary school learners perceived multimodal teaching in enhancing pronunciation, both quantitative analysis of the questionnaire and qualitative analysis of semi-structured interviews were conducted. The next section presents the results drawn from the analysis of the perception questionnaire and the semi-structured interview.

4.2.1 Quantitative results of the students' perception towards Multimodal Teaching in improving pronunciation

This section presents the results obtained from the data from the perception questionnaire administered at the end of this study for the participants. Students were asked to rate a 15-items questionnaire to measure their five perceptional variables from strongly disagree (1 point), disagree (2 points), neutral (3 points), agree (4 points), and strongly agree (5 points).

Table 6 describes the results of the closed-ended statements in the questionnaire related to the students' perception regarding multimodal teaching. The results are presented using the mean, standard deviation and percentage.

As shown in Table 6, fifteen statements receive a high mean score between 4.30 - 4.85. The findings reveals that Thai EFL secondary learners perceived the usefulness of Multimodal Teaching in improving their pronunciation at very high level. A significant degree of consensus was expressed by Thai secondary school participants regarding the efficacy of multimodal teaching in improving their pronunciation. These findings support the notion that multimodal teaching is beneficial for teaching and improving English pronunciation.

Table 6 Student's perception questionnaire analysis

No.	Items	Mean	%	S.D.	Meaning
1	I enjoy learning phonetic (IPA) through multimodal teaching	4.70	94%	0.47	Very high
2	I think the multimodal teaching assist me in pronouncing	4.45	89%	0.51	Very high
3	I think the multimodal teaching guide me to pronounce English sound	4.55	91%	0.51	Very high
4	Using multimodal teaching does not help me improve pronunciation better.	4.55	91%	0.51	Very high
5	I think multimodal teaching is a good instruction in learning pronunciation	4.60	92%	0.50	Very high
6	I feel motivated when I study through multimodal teaching to pronouncing	4.40	88%	0.75	Very high
7	I feel much better when I learn pronunciation by using multimodal teaching	4.75	95%	0.44	Very high
8	I enjoy learning pronunciation through multimodal teaching from audiovisual media	4.50	90%	0.51	Very high
9	I think the pictures from multimodal teaching assist me to pronounce English sound	4.85	97%	0.37	Very high
10	I think multimodal teaching facilitate me in becoming familiar with pronouncing English sounds.	4.30	86%	0.57	Very high
11	I feel that learning English sounds by using hand gesture would help me recognize English sounds faster easily	4.75	95%	0.44	Very high
12	The multimodal teaching is appropriate for learning pronunciation at my level.	4.45	89%	0.76	Very high
13	I feel comfortable when I learn pronunciation through the multimodal teaching.	4.30	86%	0.80	Very high
14	The multimodal teaching helps me to improve my pronunciation and recall of English sounds.	4.65	93%	0.49	Very high
15	The multimodal teaching allows me to improving English sounds	4.60	92%	0.50	Very high
Total		**4.56**	**91%**	**0.54**	Very high

The analysis of the questionnaire shows that participants perceived multimodal teaching at a very high level, with a total mean of 4.56 or 91% (SD = 0.54). According to the results, the highest mean score, 4.85 (97%), is for item 9, indicating

"I think the pictures from multimodal teaching assist me in pronouncing English sounds." Subsequently, this is closely followed by item 7, signifying "I feel much better when I learn pronunciation by using multimodal teaching," and item 11, indicating "I feel that learning English sounds by using hand gestures would help me recognize English sounds faster and more easily," both with a mean score of 4.75 and 95% agreement. Additionally, item 1, demonstrating "I enjoy learning phonetics (IPA) through multimodal teaching," receives a mean score of 4.70 with 94% agreement. Moreover, item 14, indicating "multimodal teaching helps me to improve my pronunciation and recall of English sounds," obtains a mean score of 4.65 (93%). Similarly, item 5, indicating "I think multimodal teaching is good instruction for learning pronunciation," and item 15, indicating "multimodal teaching allows me to improve English sounds," acquire a mean score of 4.60 (92%). The mean score for item 3, indicating "I think multimodal teaching guides me to pronounce English sounds," is 4.55 (91%). Subsequently, the mean score for item 8, indicating "I enjoy learning pronunciation through multimodal teaching from audiovisual media," is 4.50 (90%). Furthermore, the mean score for item 2, indicating "I think multimodal teaching assists me in pronouncing," and for item 12, indicating "multimodal teaching is appropriate for learning pronunciation at my level," is 4.45 (89%). Notably, item 6, indicating "I feel motivated when I study pronunciation through multimodal teaching," receives a mean score of 4.40 (88%). Moreover, item 10, indicating "I think multimodal teaching facilitates my familiarity with pronouncing English sounds," and item 13, indicating "I feel comfortable when I learn pronunciation through multimodal teaching," receive a mean score of 4.30 (86%).

The findings from the perception questionnaire suggest that a six-week period of multimodal teaching has a potential to enhances participants' pronunciation. The majority of participants express a very high perception of the usefulness of multimodal teaching, particularly when using audiovisual media with hand gestures. This demonstrates that combining audiovisual media and hand gestures could help improve participants' pronunciation.

4.2.2 Qualitative results of the students' perceptions toward Multimodal Teaching in improving pronunciation

This section explores the participants' viewpoints on integrating multimodal teaching into their pronunciation class. Based on the qualitative data gathered from a semi-structured interview, this study demonstrates six participants' perception toward multimodal teaching in improving their pronunciation. The qualitative data were evaluated using thematic analysis. The study employed thematic analysis to identify prominent themes that encompassed the perspective of the participants. These themes comprise the learning environment, the benefits of the instruction, and the instruction challenges. The theme pertaining to learning environment explores the ambiance of the classroom during multimodal teaching instruction and student participation in learning activities, with two sub-themes identified: enjoyment and engagement. The benefits of the multimodal teaching instruction theme delve into how such instruction improves pronunciation skills among secondary school students in the northeast of Thailand, encompassing two sub-themes: emotional benefit and functional benefit. Additionally, instruction challenge with multimodal teaching instruction in pronunciation classes emerges as a central theme, with advantages and challenge identified as two sub-themes. The themes and their corresponding sub-themes, offering a structured overview of the qualitative findings derived from the participants' perceptions are presented in Table 7

Table 7 The theme for qualitative data analysis

Themes	Sub-themes	Salient characteristics
Learning atmosphere	enjoyment	fun, encouraging, joyful, happy
	engagement	participate, engage, peer activity, exchange
Benefits	emotional benefit	excited, interested, confident, concentrate, attractive, proud, want to learn more
	functional benefit	improve, develop, enhance, increase knowledge, understand,
Instruction	advantage	useful, help, applicable, easy to follow, essential

4.2.2.1 Learning atmosphere

The learning atmosphere was examined through the participants' perceptions of their engagement in learning activities, revealing two sub-themes. The first theme, labeled enjoyment, indicates that the participants generally hold positive perceptions towards learning pronunciation skills via multimodal teaching. Specifically, six participants express mixed feelings of enjoyment, including feelings of fun, happiness, and excitement. They describe multimodal teaching as enjoyable, joyful, and encouraging, contributing to a supportive and positive learning atmosphere. The interactive nature of multimodal teaching promotes active participation and collaboration among peers, fostering a sense of relaxation and comfort. Additionally, the participants find multimodal teaching not only enjoyable but also beneficial in improving their pronunciation skills. The highly positive responses from participants underscore the considerable influence of multimodal teaching in establishing a learning environment that fosters effective learning. Table 8 provides detailed insights into the participants' perspectives on the enjoyment atmosphere for learning.

Table 8 Participants' perspectives on the subtheme of enjoyment

Participants	Statement or responses
S1	*Engaging in pronunciation classes and activities with friends brings me joy, and I find that it enhances my pronunciation skills.*
S2	*Multimodal teaching has helped me learn and improve my English pronunciation. I'm happy with it.*
S3	*It was fun, and I was happy to learn pronunciation through multimodal teaching.*
S4	*I believe multimodal teaching included very interesting materials, and they helped me improve my pronunciation. It was really fun.*
S5	*I enjoyed learning about IPA through hand gestures. I was very excited when the teacher allowed me and my friends to demonstrate in front of the classroom. I really liked it.*
S6	*The teacher always encouraged me when I couldn't pronounce. She helped me to learn how to pronounce the words. She always supported all students.*

Conversely, in the sub-theme of engagement, the participants' responses are outlined in Table 9 which indicate that among the six participants, the preferred method for enhancing pronunciation skills is the utilization of multimodal teaching employed by their English teacher. The participants express that multimodal teaching captures their interest during English class and motivates them to engage actively in learning.

Table 9 Participants' perspectives on subtheme of engagement

Participants	Statement or responses
S1	*I engaged in various activities with friends and my teacher. Through gradual learning steps, I noticed a significant improvement in my pronunciation skills.*
S2	*I got to work with friends and exchange ideas.*
S3	*I concentrated on learning through the multimodal teaching presented by the teacher, and participated in all activities.*
S4	*I focused on the information that the teacher displayed on the screen and then practiced individually and with a partner.*
S5	*This was my first experience learning IPA through manual techniques. I really enjoyed doing activities with my friends. The collaborative atmosphere made the process enjoyable and enriching for all of us.*
S6	*I participated in all activities and answered when the teacher asked. When I made a mistake, I could remember it well.*

4.2.2.2 Benefit

The benefit theme focuses on students' perceptions of the advantages of incorporating multimodal teaching in pronunciation classes, revealing two sub-themes: emotional benefits and functional benefits. Within the emotional benefits sub-theme of multimodal teaching, six participants highlight its positive impact on their motivation to learn English, along with increased feelings of inspiration, confidence, and pride. Participating in multimodal activities brings enjoyment and excitement, fueling their enthusiasm for language learning. Through the interactive and immersive approach of multimodal teaching, the participants feel more motivated to tackle challenges and actively engage in the learning process.

Consequently, they report heightened confidence in their language skills and a stronger sense of pride in their progress. These emotional benefits underscore the transformative influence of multimodal teaching, not only on language acquisition but also on students' overall motivation and self-esteem in learning English. Detailed insights into participants' perspectives on the positive learning atmosphere can be found in Table 10.

Table 10 Participants' perspectives on subtheme of emotional benefit

Participants	Statement or responses
S1	*I felt more confident when I practiced with my partner and sometimes with the teacher.*
S2	*I understood the rules of the ed ending and could easily recognize them through the teacher's technique. However, I need to learn and practice more.*
S3	*I am interested in learning more about IPA and would like to increase my knowledge in this area because there are many sounds that I can pronounce correctly.*
S4	*I think multimodal teaching included very interesting materials. They helped me improve my pronunciation. It was really fun.*
S5	*After the pronunciation class, I could distinguish between voiced and voiceless sounds by using hand gestures to check. I felt a little proud of myself.*
S6	*I was excited when I studied IPA through multimodal teaching because I hadn't known about voiced and voiceless sounds in English alphabets before.*

In terms of functional benefits, six participants emphasize the positive effects of multimodal teaching on their capacity to pose and respond to questions and interact with others. They note substantial enhancements in their language proficiency, particularly in pronunciation. Through active involvement in multimodal teaching, they develop confidence in articulating themselves and participating in various activities. The structured format of this instruction offers a supportive setting for hands-on and interactive language skill practice. A thorough examination of

participant feedback concerning multimodal teaching instruction within the functional benefits category is outlined in Table 11

Table 11 Participants' perspectives on subtheme of functional benefit

Participants	Statement or responses
S1	*Studying through multimodal teaching was very interesting. I think it enhanced my pronunciation learning.*
S2	*I tried to practice as the teacher taught me and I felt that my pronunciation really improved. I felt comfortable joining classroom activities.*
S3	*I was interested in learning more about IPA and wished to increase my knowledge in this area because there were many sounds that I could pronounce correctly.*
S4	*My pronunciation improved and I learned new techniques which could help me remember the pronunciation rules more easily. I could apply the knowledge in the pronunciation classroom. I felt more confidence about my pronunciation.*
S5	*I learned how to pronounce each letter of the alphabet, particularly distinguishing between voiced and voiceless sounds. This approach helped me a lot to improve my pronunciation skills.*
S6	*I could differentiate between voiced and voiceless sounds when I learned through multimodal teaching. My pronunciation developed as a result.*

4.2.2.3 Instruction

The theme of instructional challenges, the participants' perceptions of the difficulties encountered during multimodal teaching are explored. Two distinct sub-themes, advantages and limitations, are identified within this overarching topic. In the sub-theme of advantages in multimodal teaching, two participants note language barriers as a challenge hindering their understanding and participation. Similarly, one participant mentions the complexity of instructions, struggling to navigate through intricate rules and mechanics, which also affect their participation. Conversely, one

participant points out classroom size as an issue, expressing difficulty in fully engaging with the board game due to the large number of students present, resulting in limited opportunities for active participation. A detailed examination of participant responses regarding challenges in the engagement sub-theme is provided in Table 12

Table 12 Participants' perspectives on subtheme of advantage

Participants	Statement or responses
S1	*Multimodal teaching helped me learn and improve my English pronunciation. I'm happy with it.*
S2	*This teaching method helped improve my pronunciation. It was an essential method. I heard the sound and tried to follow.*
S3	*I had a lot of fun and enjoyed learning pronunciation through multimodal teaching. It's very effective for pronunciation learning.*
S4	*Seeing how to pronounce each letter on the screen was very helpful for me, and it improved my pronunciation. There were examples on the screen with mouth pictures, and I could hear each sound.*
S5	*I found the teacher's teaching style to be modern and very effective in improving my pronunciation. The materials were colorful, bright, and appealing to me.*
S6	*I was excited to study IPA through multimodal teaching because I hadn't known about voiced and voiceless sounds in the English alphabet before. Now, I can pronounce the correct sounds and differentiate them using my hand.*

4.3 Chapter Summary

This chapter presents the quantitative findings from the perception questionnaire, supplemented by the qualitative data derived from the semi-structured interview. Overall, the result shows that multimodal teaching improve pronunciation among Thai EFL secondary learners. The analysis of the questionnaire further indicates that the participants view the use of multimodal teaching beneficial for improving pronunciation. The subsequent chapter will delve into these findings within the

context of multimedia learning theory and the explicit phonetic training. Additionally, it will examine previous research findings before concluding with implications, limitations, and suggestions for future studies.
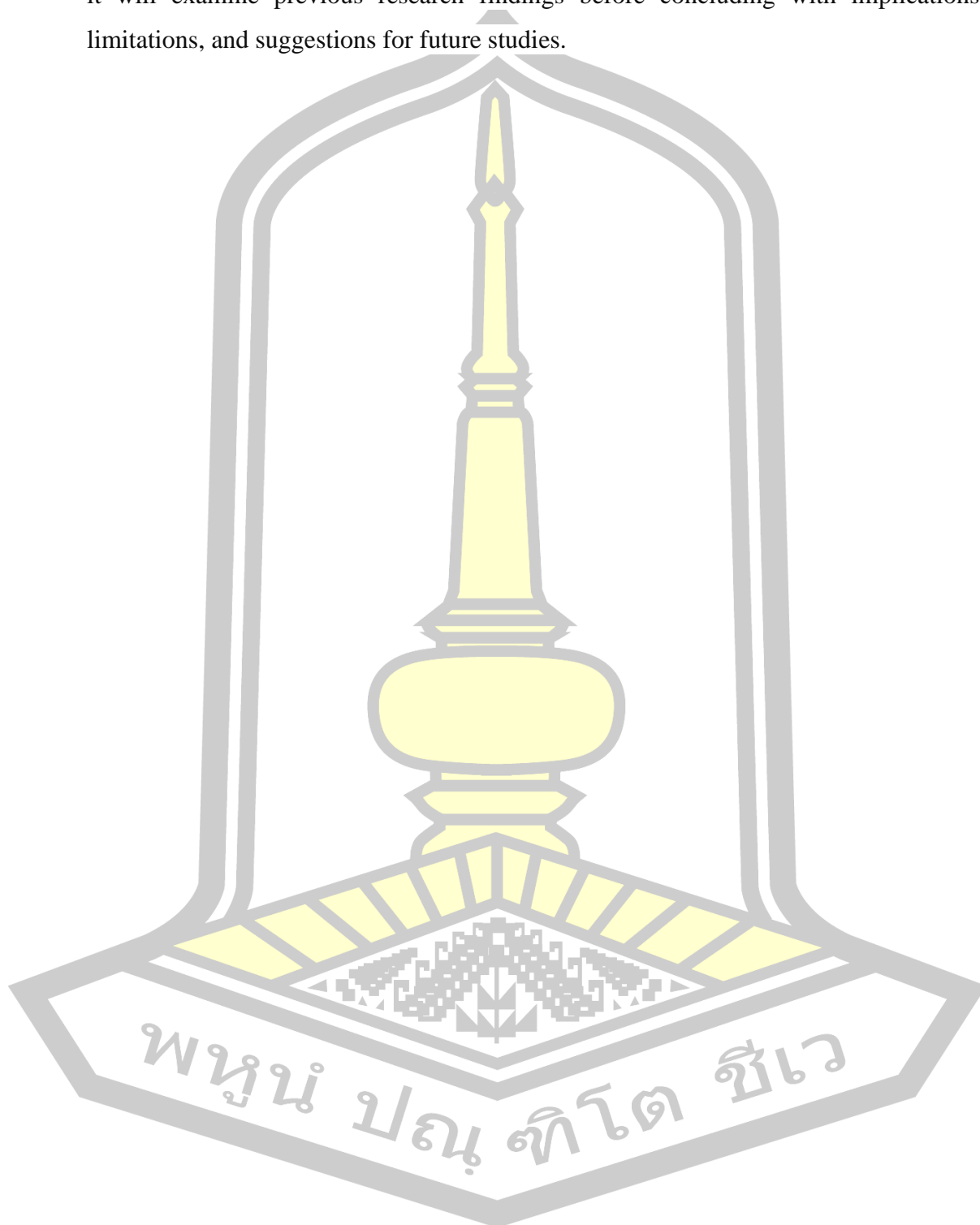
CHAPTER V

DISCUSSIONS AND CONCLUSION

This chapter presents the discussions about the effects of multimodal teaching on Thai EFL secondary learners' pronunciation (see 5.1), followed by learners' perception of multimodal teaching (see 5.2), the conclusion (see 5.3), and implications from the study (see 5.4). The chapter ends with its limitations (see 5.5) and recommendations for future studies (see 5.6).

5.1 The effect of Multimodal Teaching in improving Thai EFL secondary learners' pronunciation

This study examined the effect of multimodal teaching on English pronunciation skills among Thai secondary school students. Explicit instruction in the IPA, coupled with multimodal teaching following an analytic-linguistic approach, demonstrated significant improvement in consonant and vowel production. Measures to evaluate students' pronunciation of the -ed ending in regular verbs were created and validated. Results indicate a notable positive effect on pronunciation skills, particularly in the group, aligning with previous research by Celce-Murcia et al. (2010), Saz et al. (2016), and Jingpeiyi (2021). The positive effect of multimodal teaching on pronunciation skills of Thai EFL primary learners could be due these reasons.

In this recent study, audio materials played a crucial role in improving pronunciation skills, particularly concerning the ed ending sound in regular verbs. Firstly, these materials offered authentic models of pronunciation, allowing learners to hear native speakers produce the language naturally, which aided in familiarizing them with pronunciation nuances, including voicing. Moreover, through active listening practice facilitated by audio resources, learners could discern individual phonemes and phonetic patterns within spoken language, enhancing their ability to distinguish between similar-sounding words and accurately reproduce sounds. Additionally, interactive features like playback control and repetition exercises enabled learners to practice pronunciation in a self-paced manner, reinforcing correct pronunciation patterns. Through regular engagement with audio resources, learners can refine their pronunciation skills, build confidence in oral communication, and ultimately achieve greater proficiency in the target language. This approach aligns with principles of

multimedia learning theory, which emphasize the effectiveness of integrating auditory and interactive elements to enhance language acquisition, as highlighted by Sidgi and Shaari (2017), Namaziandost, Esfahani, and Hashemifarnia (2018), Carmen Benitez-Correa (2020), and Wardani (2021).

Secondly, visual media utilized in this study comprised videos, mouth shapes, texts, and interactive multimedia presentations. They played a crucial role in improving pronunciation, especially concerning the ed ending in regular verbs. These media provided learners with visual cues that complemented auditory input, aiding in understanding and reproducing sound patterns. By observing native speakers' mouth movements and facial expressions in visual media, learners gained insight into the articulatory process involved in producing the ed ending sound, enabling more accurate mimicry. Additionally, visual representations of IPA symbols associated with the ed ending reinforced the connection between sound and symbol, facilitating learners' association of correct pronunciation with linguistic representation. This integration of auditory and visual stimuli aligned with multimedia learning theory, emphasizing their combined effectiveness in enhancing comprehension and retention. By utilizing visual media alongside auditory input, learners could develop a more comprehensive understanding of pronunciation, leading to improved proficiency in the target language. This is supported by a student' statement regarding the benefit of the visual input:

> *"I found it incredibly helpful to learn how to pronounce each alphabet by watching the screen. Seeing the mouth picture on the screen, for instance, showed me the proper positioning of my lips and teeth for each sound, which significantly improved my pronunciation."*

Thirdly, hand gestures in this study helped the participants distinguish between voiced and voiceless sounds by covering an ear with a hand. This is supported by Nakatsukasa (2019), Hoetjes et al. (2019), Xi et al. (2020), and Xi (2023) who confirmed that learners could use hand gestures to represent the closure of the vocal tract for voiceless sounds (/t/) or the vibration of the vocal cords for voiced sounds (/d/). These gestures helped learners associate physical actions with the production of speech sounds, improving their ability to accurately reproduce them. Moreover, gestures could aid in understanding and remembering the IPA symbols by visually

representing the articulatory features associated with each sound. Learners could use gestures to demonstrate aspects such as place of articulation, manner of articulation, and voicing, helping them internalize the characteristics of different phonetic symbols. For instance, a learner might use a specific hand movement to represent the placement of the tongue for a certain consonant sound or the position of the lips for a vowel sound. This is supported by a student' statement regarding the benefit of hand gestures:

> *"After the pronunciation class, I was able to distinguish between voiced and voiceless sounds by using hand gestures to reinforce my understanding of each sound system. This practice boosted my confidence, leading to improved pronunciation."*

Finally, this research demonstrated a positive impact of the explicit teaching of the International Phonetic Alphabet (IPA) on the pronunciation of Thai EFL secondary school students. Teaching the International Phonetic Alphabet (IPA) explicitly, as recommended by the analytic-linguistic approach, provided empirical evidence of learners' improved production of regular verbs ending in ed. The findings of this experimental study were consistent with those of Saito (2007), indicating that learners who used the IPA system for pronunciation significantly enhanced their pronunciation skills. The results indicated that learners derived numerous benefits from the intervention, including heightened awareness of sound features (Atkielski, 2019), rectification of common errors through increased awareness of linguistic elements, and the development of conceptual representations of sounds through phonetic symbols (Mompean, 2015). This is supported by a student' statement regarding the benefit of IPA training:

> *"I was very excited when learning about the IPA intervention. I never knew there was such a thing to help me pronounce voiced and voiceless sounds in English. (S3)*

5.2 Thai EFL secondary learners' perception about Multimodal Teaching in improving pronunciation

In response to Research Question 2, quantitative data were gathered through a perception questionnaire administered to the participants to gauge their perceptions of using multimodal teaching to enhance pronunciation skills. The study employed a

five-point Likert scale in the questionnaires, revealing that, on average, secondary school students expressed their perception of multimodal teaching and pronunciation improvement at very high level. The findings indicated positive perceptions towards deliberate pronunciation learning through multimodal methods, attributed to features such as communication effectiveness, diverse techniques, and adaptability to different contexts. multimodal teaching offers semi-contextualization, enhancing effectiveness within a short timeframe and enabling pronunciation skill retrieval through lesson reviews, activities, or assignments. Moreover, the qualitative data from the semi-structure interviewed also brought any significant findings. Firstly, the advantages of learning the IPA via multimodal teaching enhanced their pronunciation skill. The claim is supported by the following excerpts from participants' statements:

> *"I found it very helpful to watch how each alphabet was pronounced on the screen; it helped me sound out better. There was an example displayed on the screen, showing the mouth picture and allowing me to hear each sound clearly." (S1)*

In contrast, one participant also expressed the disadvantage during pronunciation sessions, particularly when encountering difficulties. The following excerpt supports such a claim:

> *"The teacher's detailed teaching was interesting, but there were some consonants that I couldn't pronounce. There were some of the slides that I could not follow." (S2)*

Secondly, the learning environment was characterized by enjoyment and engagement. multimodal teaching played a key role in creating a supportive and positive atmosphere. By encouraging interactive learning, it facilitated active participation and collaboration among students, fostering a relaxed and comfortable ambiance. For the sub-them enjoyment as the claim is supported by the following excerpts from participants' statements:

> *"Multimodal Teaching greatly assisted me in learning and improving my English pronunciation. I'm genuinely pleased with its effectiveness." (S2)*
> *"I enjoy learning IPA by using hand gestures, and I was very excited when the teacher allowed my friend and me to demonstrate in front of the classroom. I really liked it." (S2)*

On the other hand, within the engagement aspect, participants conveyed that multimodal teaching sparked their interest in English class and inspired them to actively participate in learning. This assertion finds backing in the following quotations from participants' responses:

> *"Engaging in pronunciation classes and activities with friends brought me joy, and I found that it enhanced my pronunciation skills." (S1)*
>
> *"I participated in activities with my friends and responded when the teacher asked questions. When I made mistakes, I found that I could remember them well." (S3)*

In addition, the theme of the benefits theme delved into how students viewed the advantages of integrating multimodal teaching into pronunciation classes, uncovering two sub-themes: emotional benefits and functional benefits. Under the emotional benefits sub-theme, students emphasized the positive influence of multimodal teaching on their motivation to learn English, as well as on their heightened feelings of inspiration, confidence, and pride as claimed by students:

> *"I understood the rules of the 'ed' ending and found them easy to recognize with the teacher's technique. I just need to learn and practice more." (S2)*
>
> *"I am interested in learning more about IPA and would like to increase my knowledge in this area. There are many sounds that I can pronounce correctly." (S3)*

On the flip side, functional benefits were observed, showcasing significant improvements in students' language proficiency, particularly in pronunciation. Engaging with multimodal teaching actively enabled them to gain confidence in expressing themselves and participating in diverse activities. The structured approach of this instruction provided a conducive environment for practical, interactive language skill development. the claim is supported by the following excerpts from participants' statements:

> *"My pronunciation has improved, and I've learned new techniques that will help me remember more easily. I can now apply this knowledge in the pronunciation classroom, and I feel much more confident." (S1)*

"I knew how to pronounce each alphabet, specifically voice and voiceless sounds. This teaching approach helped me a lot to improve my pronunciation skill." (S2)

These findings align with prior research indicating that multimodal teaching aid learners in focusing on specific aspects, such as the pronunciation of ed ending in regular verbs. The benefits of multimodal teaching in facilitating deliberate pronunciation learning among Thai secondary school students stem from its usefulness, versatility, and entertainment value. Incorporating visual images and audio sounds can motivate students to learn pronunciation effectively. Additionally, multimodal teaching aids in recognition and pronunciation. In conclusion, the current findings contribute to existing literature by affirming that multimodal teaching is an effective tool for deliberate pronunciation learning (Syzpyra-Kozlowska, 2015), Yongsheng Zhu (2008), Ganapathy & Seetharam (2016).

In summary, this study highlights the potential contributions of teaching the IPA to the improvement of Thai EFL secondary learners. The explicit instruction of the IPA significantly enhanced participants' ability to pronounce English consonants and distinguish between voiced and voiceless sounds more effectively. Additionally, participants expressed positive perceptions regarding the effectiveness of learning IPA through multimodal teaching in improving their pronunciation.

5.3 Conclusion of the study

The current study offers valuable insights into the learning and enhancement of pronunciation, particularly emphasizing the effectiveness of multimodal teaching among Thai EFL secondary school students. It highlights the utilization of diverse teaching resources to aid in pronunciation development among these learners. Furthermore, the study demonstrates that Thai secondary school students hold a favorable view regarding the use of multimodal teaching methods, perceiving them as engaging and beneficial for improving pronunciation. Similarly, Thai secondary school students also exhibit a positive perception towards multimodal teaching, acknowledging its engagement and benefits in enhancing pronunciation skills. In summary, the research emphasizes the efficacy of multimodal teaching in improving pronunciation and its capacity to actively involve students in the learning process.

5.4 Pedagogical Implications

This study highlights several important implications. Firstly, given the crucial role of pronunciation in language acquisition, educators are urged to acquaint themselves with modern technological teaching methods. The research strengthens the theoretical basis of multimodal approaches in enhancing language learning, emphasizing how attention and memory functions are pivotal in improving pronunciation. Through the use of tools such as videos, PowerPoints, and visual aids, multimodal teaching is shown to effectively improve learners' pronunciation skills. These findings provide practical insights for educators and language instructors, encouraging them to employ diverse teaching techniques like audiovisual materials and hand gestures to create engaging lessons that deepen students' understanding of pronunciation and overall language proficiency. Additionally, the study emphasizes the importance of integrating various sensory modalities into language learning materials to support effective pronunciation development, catering to different learning styles and preferences. Moreover, it offers valuable guidance for educational policymakers and administrators, advocating for the integration of technology and multimodal strategies in language curricula to enhance instructional effectiveness and improve learning outcomes worldwide.

5.5 Limitations of the study and recommendations for future studies

Multimodal teaching is an instructional approach that acknowledges the importance of utilizing diverse presentation methods, such as visual, auditory, and kinesthetic approaches, to support learning. This approach recognizes that learners may have different strengths and preferences, and by incorporating multiple modes of representation, teachers can cater to a broader range of learners. Although this research yields fruitful results, this study has some limitations. Firstly, the preparatory phase for multimodal teaching may seem redundant as classroom materials can be readily adapted to suit language learning contexts at any time. Therefore, the preparation stage should be tailored to the specific context of the school and students. However, this limitation may result in less time available to effectively develop and refine teaching strategies. Secondly, another limitation of the study is the relatively short duration of student exposure to multimedia drills, totaling only 18 hours. To gain a more comprehensive understanding of the impact of multimedia or technology

use on language learning outcomes, future research endeavors should consider extending this duration. Conducting similar studies with increased hours of multimedia integration, both within and outside the classroom setting, could provide valuable insights into the long-term effectiveness and sustainability of such instructional approaches.
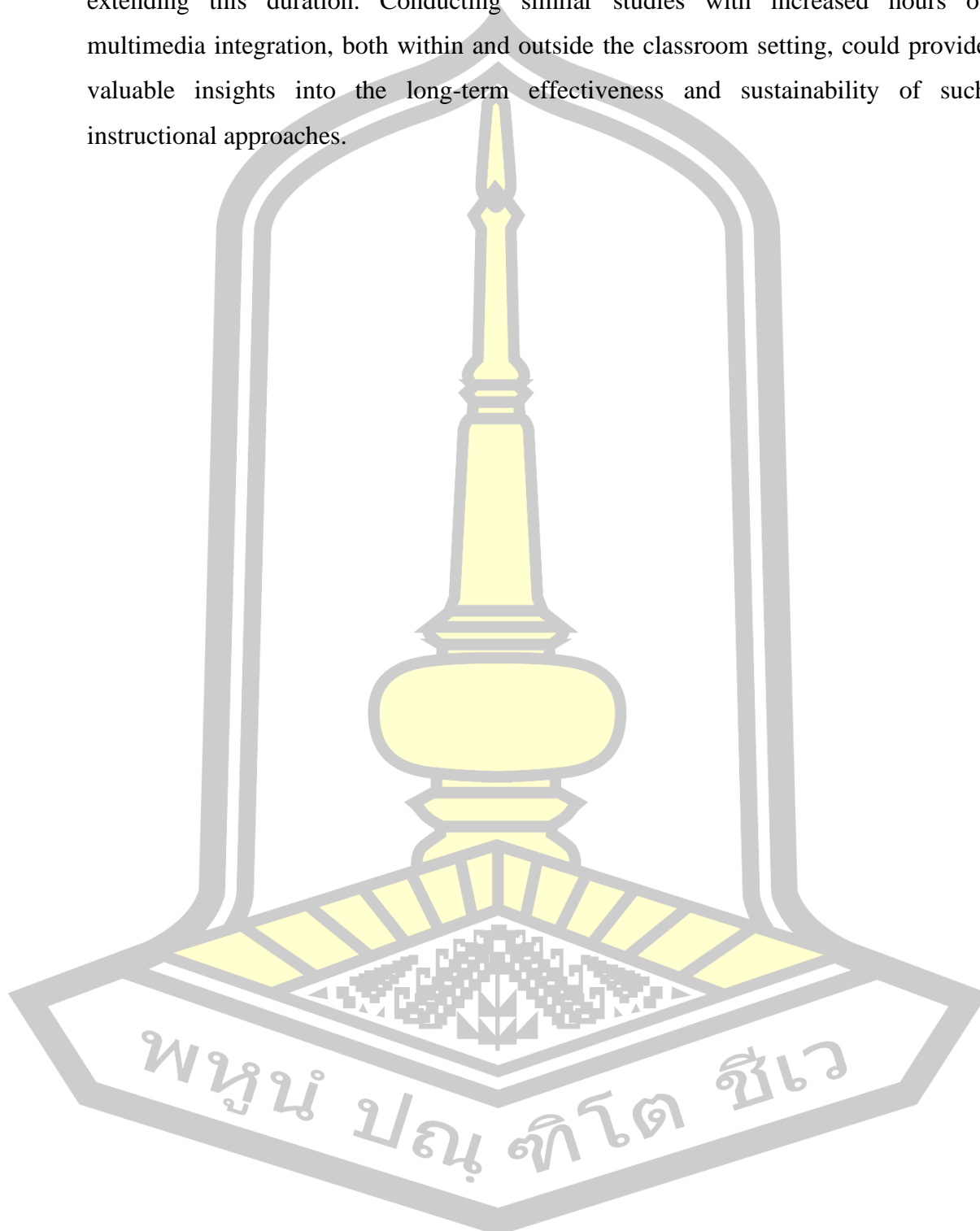
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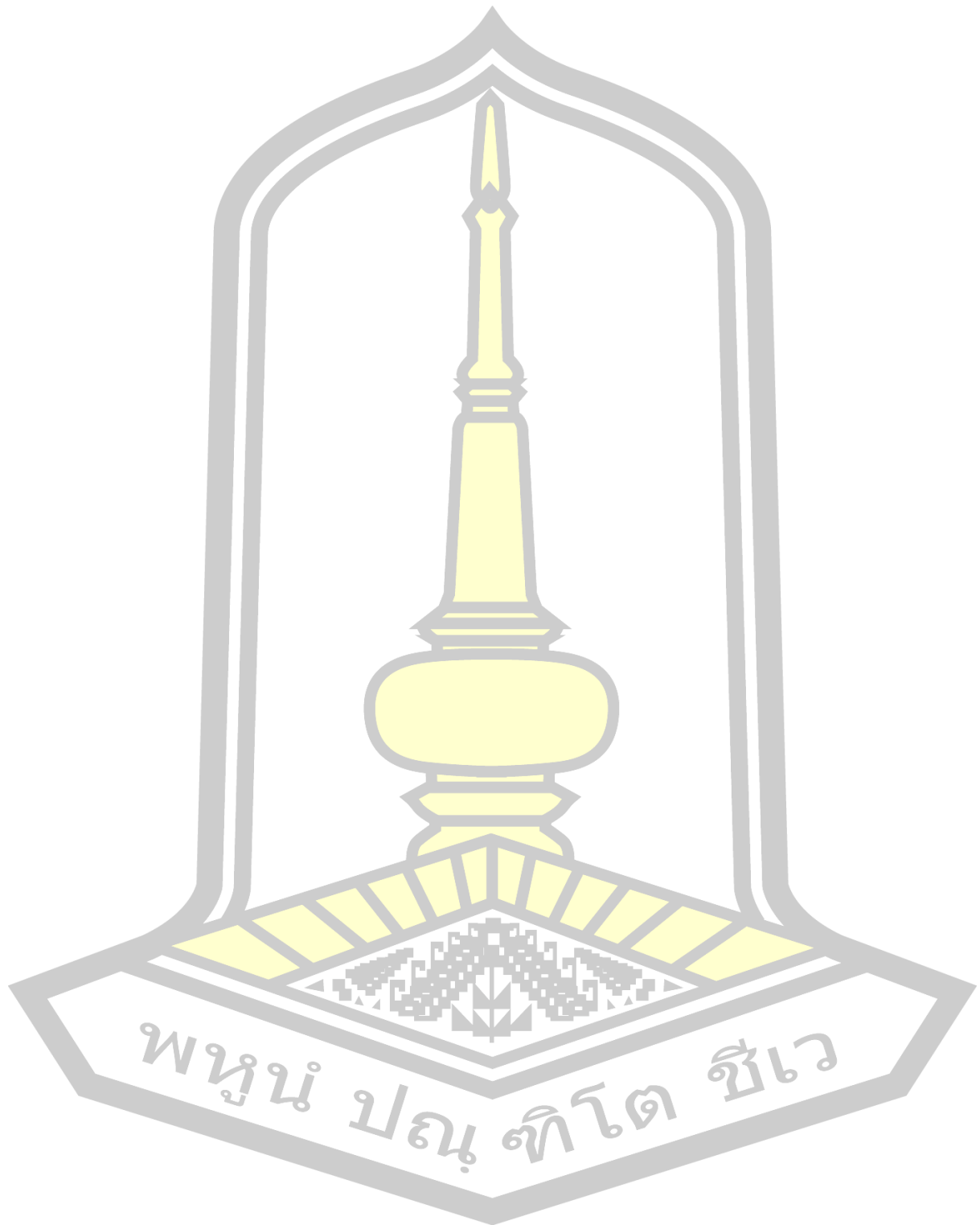
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APPENDICES
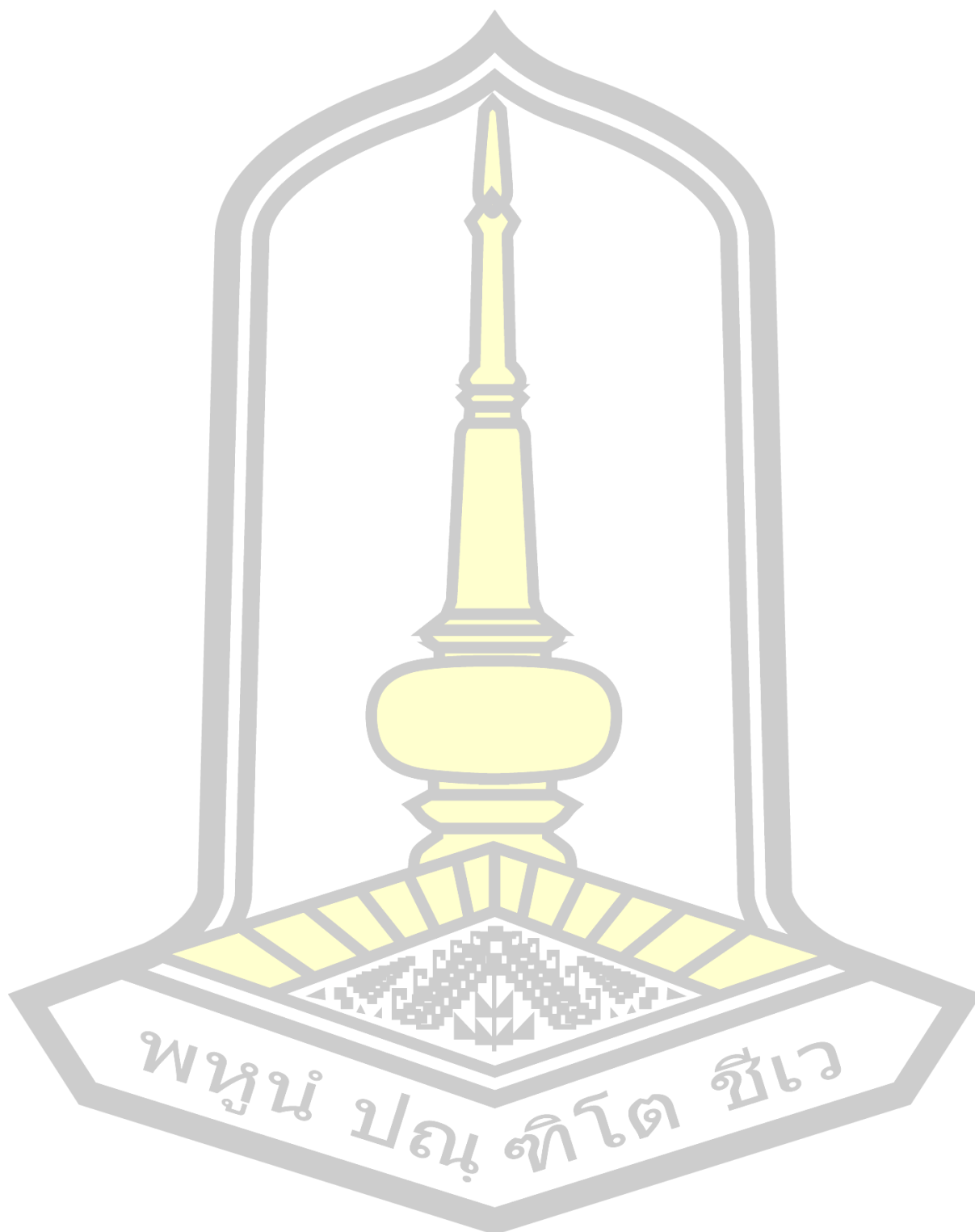
Appendix A: Pretest and Posttest

PRETEST 1

Instruction: ให้นักเรียนออกเสียงคำกริยา Regular verbs ต่อไปนี้ให้ถูกต้อง หากนักเรียนออกเสียงถูกต้อง

ได้ 1 คะแนน ออกเสียงไม่ถูกต้อง ได้ 0 คะแนน

words	correct	incorrect	point
1. wanted			
2. stopped			
3. rubbed			
4. needed			
5. watched			
6. called			
7. damaged			
8. walked			
9. claimed			
10. stuffed			
11. begged			
12. kissed			
13. cleaned			
14. washed			
15. changed			
16. laughed			
17. played			
18. referred			
19. amazed			
20. saved			
21. borrowed			
Total			

PRETEST 2

Instruction: ให้นักเรียนออกเสียงคำแต่ละคำให้ถูกต้องตามหลัก regular verbs หลังจากที่คุณครูอ่านคำในรูปปกติ

หากนักเรียนออกเสียงถูกต้อง ได้ 1 คะแนน ออกเสียงไม่ถูกต้อง ได้ 0 คะแนน

words	Regular verb	Point	
		correct	**Incorrect**
1. nad	naded		
2. wape	waped		
3. nall	nalled		
4. ning	ninged		
5. kash	kashed		
6. bote	boted		
7. pame	pamed		
8. mife	mifed		
9. wich	wiched		
10. fabe	fabed		
11. vag	vaged		
12. gine	gined		
13. wuke	wuked		
14. liss	lissed		
15. tay	tayed		
Total			

Appendix B: Questionnaire: Students' perception towards multimodal teaching

Part 1: Personal Information

Directions: Answer the following questions about your personal information by

putting the ✓ in the bracket before filling in the information.

1. Gender ( ) Male ( ) Female

Part 2: Students' perceptions towards the multimodal teaching

No.	Items	Score level				
		5	4	3	2	1
1.	I enjoy learning phonetic through Multimodal Teaching					
2.	I think the Multimodal Teaching assist me in pronouncing					
3.	I think the Multimodal Teaching guide me to pronounce English sound					
4.	Using Multimodal Teaching does not help me improve pronunciation better					
5.	I think Multimodal Teaching is a good instruction in learning pronunciation					
6.	I feel motivated when I study through Multimodal Teaching to pronouncing					
7.	I feel much better when I learn pronunciation by using Multimodal Teaching					
8.	I enjoy learning pronunciation through Multimodal Teaching from audiovisual media					
9.	I think the pictures from Multimodal Teaching assist me to pronounce English sound.					
10.	I think Multimodal Teaching facilitate me in becoming familiar with pronouncing English sounds.					
11.	I feel that learning English sounds by using hand gesture would help me recognize English sounds faster easily					
12.	The Multimodal Teaching is appropriate for learning pronunciation at my level.					
13.	I feel comfortable when I learn pronunciation through the Multimodal Teaching					
14.	The Multimodal Teaching helps me to improve my pronunciation and recall of English sounds.					
15.	The Multimodal Teaching allows me to improving English sounds					

Directions: Please answer by checking (✓) sincerely according to your opinions
5 = Strongly agree 4 = Agree 3 = Neutral 2 = Disagree 1 = Strongly disagree

Appendix C: questionnaire (Thai version)

แบบสอบถาม

ทัศนคติของนักเรียนต่อการสอนรูปแบบผสมผสาน(ภาพ เสียง ท่าทาง)

ส่วนที่ 1 : ข้อมูลส่วนตัว

คำชี้แจง: โปรดทำเครื่องหมาย ✓ หน้าข้อความที่ตรงกับข้อมูลของผู้ตอบแบบสอบถาม

( ) ชาย ( ) หญิง

ส่วนที่ 2 : ทัศนคติของนักเรียนต่อการสอนรูปแบบผสมผสาน (ภาพ เสียง และท่าทาง)

คำชี้แจง: โปรดทำเครื่องหมาย ✓ ในช่องระดับความคิดเห็นของท่าน

5 = เห็นด้วยมากที่สุด   4 = เห็นด้วย   3 = เห็นด้วยปานกลาง

2 = ไม่เห็นด้วย   1 = ไม่เห็นด้วยมากที่สุด

No.	Items	Score level				
		5	4	3	2	1
1.	ฉันมีความสุขเมื่อเรียนสัทศาสตร์(เสียง) ผ่านการสอนรูปแบบผสมผสาน					
2.	ฉันคิดว่าการสอนรูปแบบผสมผสานช่วยส่งเสริมการออกเสียง					
3.	ฉันคิดว่าการสอนรูปแบบผสมผสานแนะนำฉันในการออกเสียงภาษาอังกฤษ					
4.	ฉันคิดว่าเสียงในการสอนรูปแบบผสมผสานไม่ช่วยในการพัฒนาออกเสียงภาษาอังกฤษ					
5.	ฉันคิดว่าการสอนรูปแบบผสมผสานเป็นการสอนที่ดีสำหรับการเรียนออกเสียง					
6.	ฉันรู้สึกถูกกระตุ้นเมื่อฉันเรียนการออกเสียงผ่านการสอนแบบรูปแบบผสมผสาน					
7.	ฉันรู้สึกเรียนรู้การออกเสียงได้ดีขึ้นผ่านการสอนแบบรูปแบบผสมผสาน					
8.	ฉันมีความสุขในการเรียนออกเสียงผ่านการสอนรูปแบบผสมผสาน(ภาพ เสียง และท่าทาง)					
9.	ฉันคิดว่าภาพที่เห็นในสื่อผสมผสานช่วยในการออกเสียงภาษาอังกฤษของฉัน					
10.	ฉันคิดว่ารูปแบบการสอนผสมผสานทำให้ฉันคุ้นเคยกับการออกเสียงภาษาอังกฤษ					
11.	ฉันรู้สึกว่าการเรียนรู้การออกเสียงภาษาอังกฤษโดยการใช้ท่าทางมือประกอบช่วยให้ฉันจดจำเสียงภาษาภาษาอังกฤษได้รวดเร็วและง่ายขึ้น					
12.	การสอนรูปแบบผสมผสานเหมาะสำหรับการเรียนรู้การออกเสียงในระดับของฉัน					
13.	ฉันรู้สึกสบายเมื่อได้เรียนรู้การออกเสียงผ่านการสอนแบบผสมผสาน					
14.	วิธีการหลายรูปแบบช่วยให้ฉันปรับปรุงการออกเสียงและการจำเสียงภาษาอังกฤษได้					
15.	วิธีการสอนรูปแบบผสมผสานช่วยให้ฉันพัฒนาการออกเสียงภาษาอังกฤษ					

Appendix D: Semi–structured interviews of students through multimodal instruction.

1. What do you think about the use of the audiovisual media combine hand gestures instruction in this pronunciation class?

   นักเรียนคิดอย่างไรเกี่ยวกับการใช้การสอนแบบผสมผสาน(เสียง ภาพและท่าทาง)ในห้องเรียนการออกเสียง

2. Did the audiovisual media combine hand gestures instruction improve your ability to pronounce in English, or did it cause on improvement? Explain?

   การสอนแบบผสมผสาน(เสียง ภาพ และท่าทาง)ปรับปรุงความสามารถในการออกเสียงของนักเรียนหรือไม่ อธิบาย

3. How do you describe yourself as a participant in the audiovisual media combine hand gestures instruction?

   นักเรียนเป็นผู้มีส่วนร่วมในการสอนรูปแบบหลากหลาย(เสียง ภาพ และท่าทาง)ได้อย่างไร

4. Please describe your English pronunciation before taking this course.

   จงอธิบายการออกเสียงของคุณก่อนเรียน

5. Please describe your English pronunciation after taking this course.

   จงอธิบายการออกเสียงของคุณหลังเรียน

6. What do you think about the kind of instruction the teacher employed in this course?

   คุณคิดอย่างไรเกี่ยวกับวิธีการสอนที่คุณครูใช้ในการสอน

7. After studying in the classroom, have you studied elsewhere for additional knowledge?

   หลังจากเรียนในห้องเรียนแล้ว คุณได้ไปหาความรู้เพิ่มเติมอีกไหม
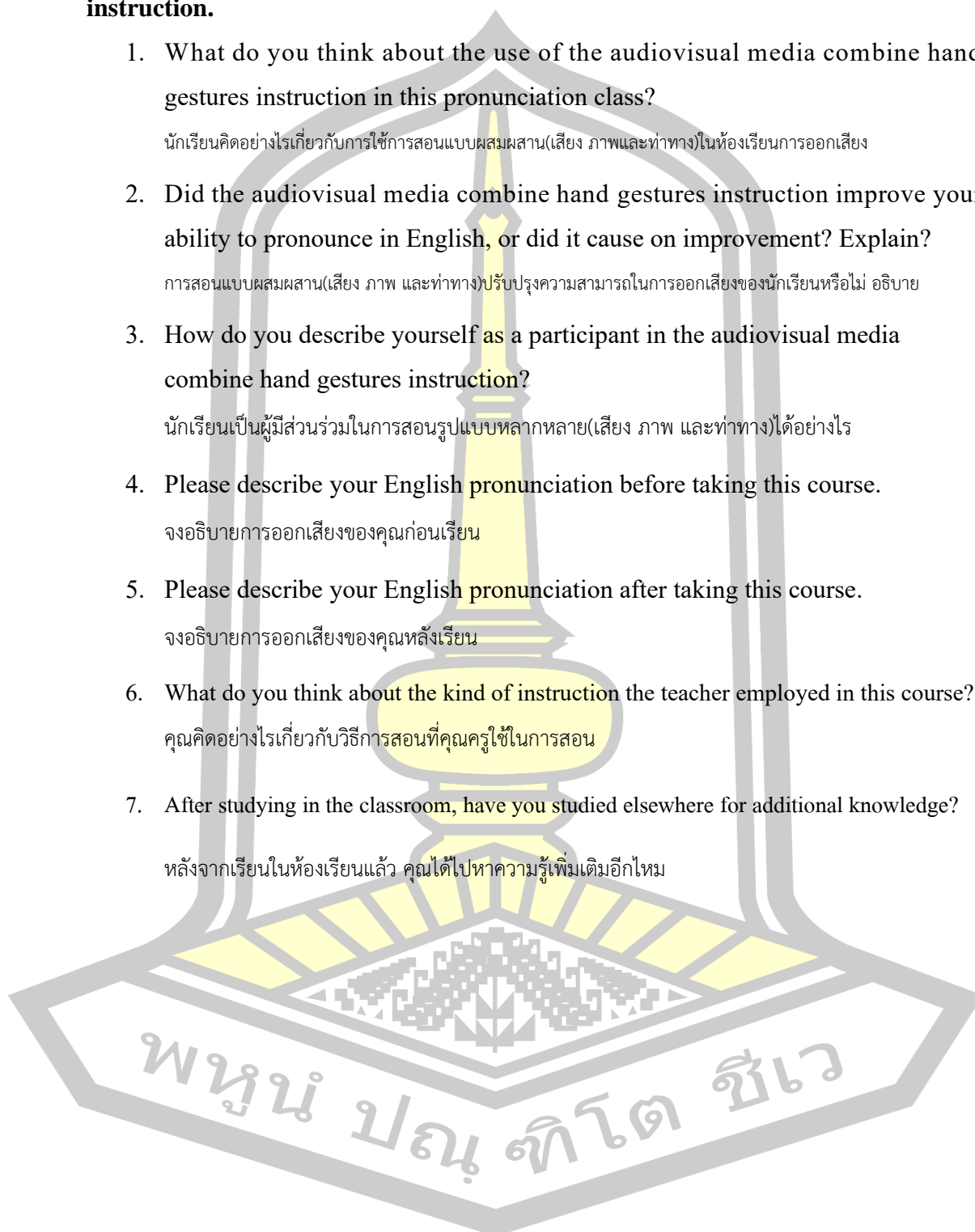
Appendix E: Pronunciation Evaluation (Rubric)

The instructor will assess the participants' pronunciation of regular verbs (/t/, /d/, /id/) . The scores are dichotomous: (1) if the target word which emphasize in the ending sound is correctly pronounced; (0) if it is incorrectly pronounced. Three teachers who are teaching the same course will be asked to rate students' pronunciation. Interrater reliability will also be conducted

No.	Aspect	score	criteria
1.	Pronunciation	0	incorrectly pronounced ***Example***: The word "walked" if the student pronounced [ˈwɑkd], [ˈwɑkəd], [ˈwɑkdəd], [ˈwɑktəd], [ˈwɑktɪd], [ˈwɑkdɪd], [ˈwɑkɪd]
		1	correctly pronounced ***Example:*** The word "walked" if the student pronounced ed ending sound correctly [ˈwɑkt]
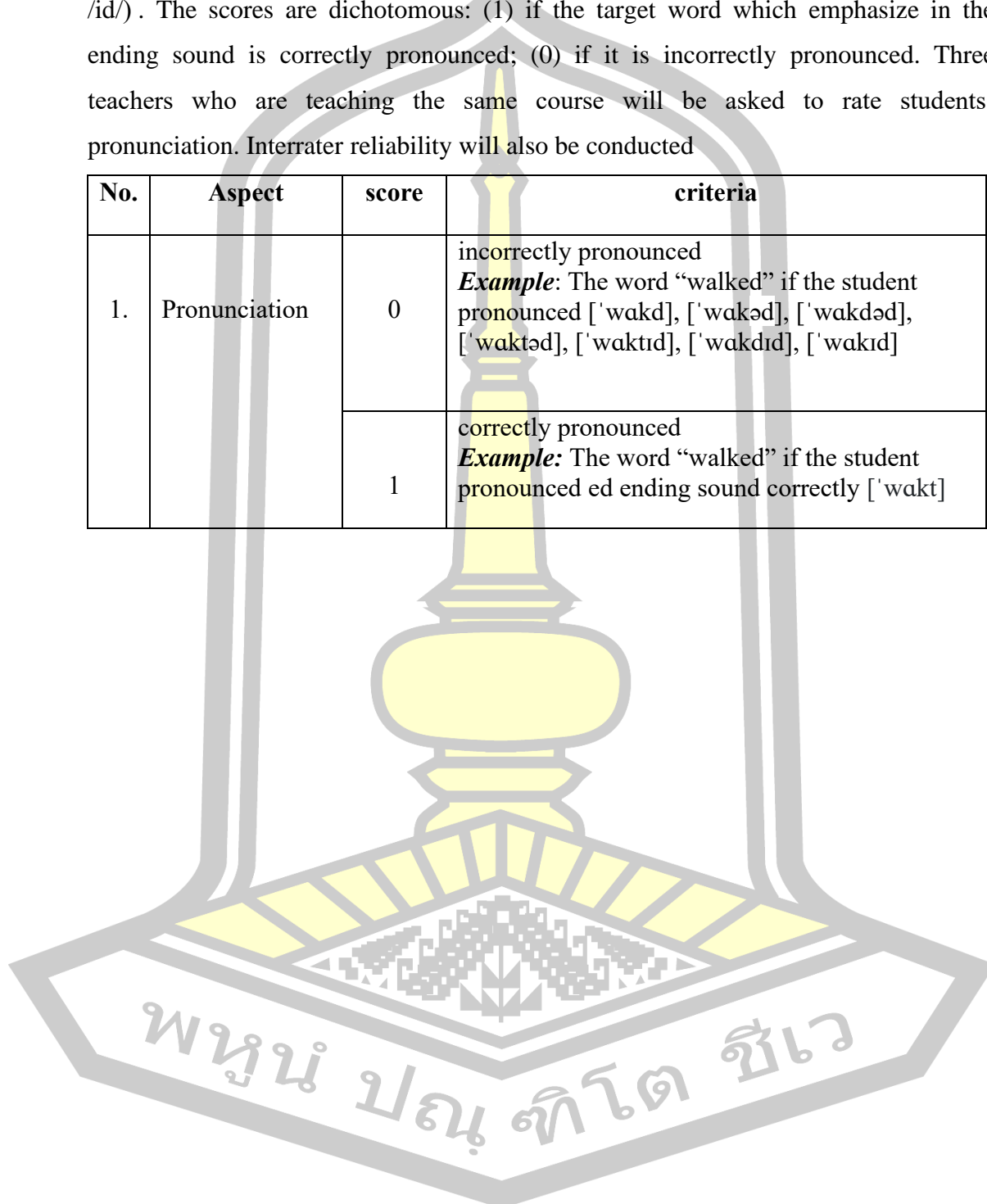
Appendix F: An example lesson by using Multimodal Teaching (audiovisual media)

Lesson plan 3: The integrations of phonetics, rule of adding ed and the rule of pronouncing regular verbs
Grade: 8   Semester: 2   Academic year 2023
Teacher: Wipavee Panyathikul   Duration: 1 hour

Indicators:

- **F2.2 Gr.8/1** Compare and explain similarities and differences between pronunciation of various kinds of sentences and word order in accordance with structures of sentences in foreign languages and Thai language.
- **F2.2 Gr.8/2** Compare and explain similarities and difference between the lifestyles and culture of native speakers and those of Thais.

Learning objectives:

1. Students can comprehend the pronunciation of consonant sounds.
2. Students can accurately articulate regular verbs.

Content:

- The articulatory system of voice and voiceless sound
  Voice and voiceless consonants

  Example: 13 voice consonants

/b/, /d/, /g/, /v/, / ð /, /z/, /ʒ /, /dʒ/, /m/, /n/, /ŋ/, /l/, /r/

  8 voiceless consonants

/p/, /t/, /k/, /f/, /θ/, /s/, / ʃ /, / tʃ /, /h/

- The rule of adding ed after regular verbs

rules for adding "ed" to verbs in English.

1. Regular Verbs:

  - For most regular verbs, simply add "ed" to the base form.

  Example: Walk (base form) becomes Walked (past tense).

2. Verbs Ending in "e":

  - If a regular verb ends in an "e," drop the "e" and add "ed."

Example:	**Base form**	**Past tense**
	Dance	Danced

3. One-Syllable Verbs with a Single Vowel Followed by a Single Consonant:

  - Double the final consonant before adding "ed" if the verb has one syllable and follows the pattern consonant-vowel-consonant.

Example:	**Base form**	**Past tense**
	Stop	Stopped

4. Verbs Ending in "ie"

  - Change the "ie" to "y" and add "ed."

Example:	**Base form**	**Past tense**
	Die	Died

5. Verbs with a Short Vowel Sound Stressed in the Last Syllable:

  - Double the final consonant before adding "ed."

Example:	**Base form**	**Past tense**
	Beg	Begged

- The rule of pronounce the inflectional ed

The rules to pronouncing the "ed" ending of regular verbs in English, there are three common sounds: /t/, /d/, and /ɪd/. The pronunciation depends on the final sound of the base verb.

1. /t/ Sound:

When the base verb ends in an unvoiced sound

(sounds made without vibrating the vocal cords), the "ed" ending is ***pronounced as /t/.***

   Example: walk (base form) becomes walked (pronounced as /wɔkt/).

2. /d/ Sound:

When the base verb ends in a voiced sound (sounds made with vibrating vocal cords), except for /d/ or /t/, the "ed" ending is ***pronounced as /d/.***

   Example: play (base form) becomes played (pronounced as /pleɪd/).

3. /ɪd/ Sound:

When the base verb ends in /d/ or /t/, the "ed" ending is ***pronounced as /ɪd/.***

   Example: need (base form) becomes needed (pronounced as /niːdɪd/).

Vocabulary:

/t/	/d/	/id/
1. helped	1. called	1. wanted
2. looked	2. cleaned	2. needed
3. laughed	3. offered	3. decided
4. washed	4. damaged	4. accepted
5. watched	5. loved	5. painted
6. kissed	6. stopped	6. interested
7. danced	7. amazed	7. started
8. fixed	8. rubbed	8. ended
9. walked	9. claimed	9. tasted
10.finished	10.saved	10.waited

Materials:

- Present the content through audiovisual media (articulatory system describe consonants)
- Games
- worksheet

Evaluation:

- Students have the ability to distinguish between voiced and voiceless sounds.
- Students can accurately articulate regular verbs ending with "ed."
- Students can discern the various sounds of "ed" endings, including /t/, /d/, and /ɪd/.

Teaching procedures:

Teacher	Student
Warm up	
• The teacher welcomes students and takes attendance. • The teacher prompts students to recap what they have learned in this unit. •The teacher collects and reiterates students' responses to the class.	•Students exchange greetings with the teacher. •Students respond to the teacher's inquiries, providing answers related to voice and voiceless consonants, as well as both rules pertaining to regular verbs. •Students actively listen to the teacher.
Presentation	
• The instructor utilizes audiovisual aids, incorporating both sound and visuals, to deliver the lesson content. •The lesson covers the articulatory system, emphasizing voice and voiced consonants. • It includes explanations of the rules for adding "ed" and pronouncing regular verbs.	• Students utilize audiovisual materials to observe and revisit each piece of content.

Practice	
• The teacher allows students to engage in hands-on practice by following the audiovisual content they observe and hear, employing games, worksheets, and pronunciation exercises.	• Students acquire knowledge through the combination of playing games and participating in purposeful activities.
Production	
• The teacher offers students the opportunity to revisit what they have learned during the class.	• Students can articulate what they have learned, providing examples, and seek assistance if they encounter any misunderstandings.

Comments:

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Appendix G: An example of design Multimodal Teaching (audiovisual media)

BIOGRAPHY

NAME   Wipavee Panyathikul

DATE OF BIRTH   August 23,1992

PLACE OF BIRTH   Ubonratchathani, Thailand

ADDRESS   59 Benchama Rd. Nai Mueang sub-district, Mueang
                      district, Ubonratchathani province 34000

POSITION   A teacher

PLACE OF WORK   Bandongtawang School, Phosai district, Ubonratchathani
                      34340

EDUCATION   2015 Bachelor of Education B.Ed. (English),
                      Ubonratchathani Rajabhat University
                      2024 Master of Education (M.Ed) Program in English
                      Language Teaching, Mahasarakham University,
                      Thailand