



## Implementing the Augmented Reality Technology to Enhance English Pronunciation of Thai EFL Students

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### ABSTRACT

This research aimed at examining the effectiveness of the Augmented Reality technology to develop the students' ability to produce English consonant sounds and exploring the students' satisfaction with the use of AR technology. The sample was divided into two groups, one control group and one experimental group. The control group consisted of 54 first-year Business English major students whereas the experimental group comprised 52 first-year English major students. Each group was in the first section. This investigation was conducted in the second semester of the academic year 2018. They enrolled in the Introduction to Linguistics course. The control group was given a traditional method while the experimental group was implemented by using the AR technology as an additional tool. The research instruments included six instructional management plans, pre- and post- tests, a satisfaction questionnaire on the use of AR technology. The findings reveal that the posttest mean of the experimental group was higher than that of the control group. It can be concluded that using the AR technology could significantly enhance the students' abilities to produce English consonant sounds. Furthermore, the level of students' satisfaction with the use of AR technology was at the highest level.

**Keywords:** English consonant sounds, Thai students, The Augmented Reality Technology

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## Introduction

As English is regarded as ‘an international language’, it plays a crucial role in various domains of communication all over the world. In the past, English was used as only a pivotal medium of international communication in Thailand. However, within a decade of changes, it has become an essential part of people’s daily life nowadays. The social, political and economic changes, particularly the globalization, the advent of the ASEAN Economic Community (AEC) and the development of technology have greatly influenced Thai society and traditional ways of Thai people. In order to survive, they need to renew themselves to keeping up with the rapid pace of changes. As a result, English language skills are in very high demand in today’s situations.

Regarding the four skills in English language learning, pronunciation is a major concern in learning English [1]. As knowing grammar and vocabulary will enable the student to construct the sentences, they need to pronounce such of those correctly in order to avoid a communication breakdown. According to Pourshehin [2], learners with good English pronunciation are likely to be understood even if they make errors in other areas, whereas learners with bad pronunciation will not be understood, even if their grammar is perfect.

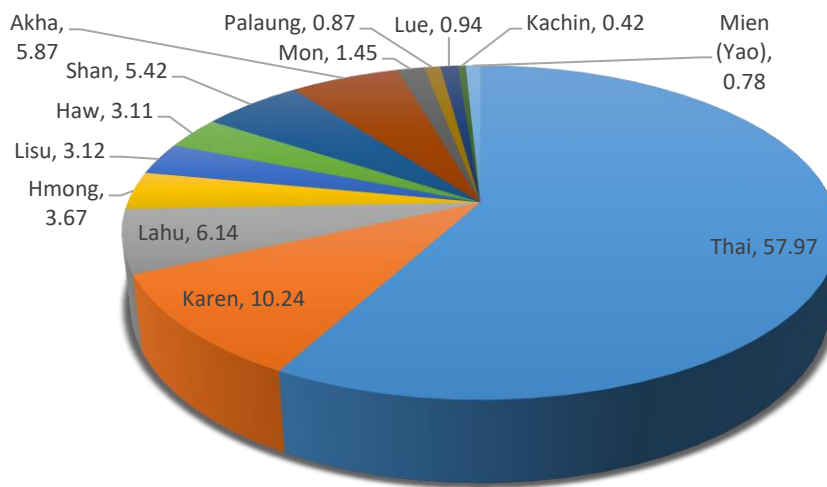
Even though Thai students start to learn English from an early age, they still have a low level of English proficiency, especially in pronunciation skill [3]. Due to the aforementioned failure, several factors are summarized to reflect the root causes of limitation in Thailand. Firstly, there are a number of phonological differences between English and Thai languages which are indicated as the sources of the English pronunciation problems [4]. Secondly, pronunciation issue is of less concern in teaching English as a foreign language in Thailand [5]. As a result, the problem was still remained. Thirdly, since English in Thailand is the foreign language, Thai students have rare opportunities to expose towards English. They receive less opportunity and encouragement to practice speaking English in their daily life so that they lack English environment for interaction [6]. Next, most English textbooks used in Thailand are commercial books which aim to reach a wide target audience as many as possible [7]. Thus, their contents go far beyond the needs of Thai learners, which lead to a mismatch of Thai pronunciation problems and their solutions. Lastly, English teachers are recognized as one of the crucial driving forces propelling English language teaching [8].

Regarding to the main causes of the failure mentioned above, pronunciation has become the chronic problem in Thai society. Several prior studies have attempted to implement appropriate materials and different approaches to tackle this kind of problems [9-13]. However, nine English non-existent sounds are still the problematic sounds in learning English in Thailand.

As technology plays a vital role in education setting today, it can be seen as a tool and a catalyst to improve and facilitate the learning process. According to the Thai government’s goal to establish Thailand as a smart nation, implementing the new technology in the educational landscape provides a more effective and efficient way of reaching out Thai students and getting time more engaged [14-18]. The Augmented Reality technology (hereafter, AR) is defined as a visualization method which layers digital information to a real world environment through a camera, creating a mixed reality, with the intent of supplementing useful information [19]. As AR is known as an alternative and effective way of learning, it has received a lot of attention in education [20- 27]. Following Rizov and Rizova’s work [28], AR

can be applied in the education process. With its use, the teachers can grab the students' attention and facilitates the learning by making the education process more interesting and interactive.

After having been as English teacher at Chiang Mai Rajabhat University for almost eight years, the students have encountered the endless difficulties on their mission to develop their pronunciation skills as a key to gaining full communicative competence. Since the mission of CMRU is to serve local communities consisting of those from culturally and linguistically diverse backgrounds, almost half of students are hill-tribe ethnic students. Figure 1 shows the number of ethnic groups found at Chiang Mai Rajabhat University.



**Figure 1** The number of ethnic groups found at Chiang Mai Rajabhat University

Within the diverse language backgrounds in CMRU classroom context, English is considered a third language alongside their mother tongues and the standard Thai language with major variances in historical backgrounds, sociological and cultural practices, as well as norms and languages, in particular. As a result, they are confronted with many such obstacles while studying English pronunciation. From the observation in Introduction to Linguistics course, the students seem to have the difficulties with English consonant sounds in production including /v/, /\*/, /ŋ/, /z/, /ð/, /ʃ/, /tʰ/, /dʒ/, and /g/. This is because English has more consonant sounds than Thai [29].

With the ethnic diversity, each classroom contains more than five ethnic groups. Although Thai students are the majority in the class, most of them speak Northern Thai or Kam Muaung dialect with different phonological system from that of the standard Thai. Comparing the phonological systems between their mother tongues and English, each group faces the pronunciation difficulties in different sets of phonemes. Furthermore, due to the shortage of foreign teachers at CMRU, Thai teachers are assigned to conduct this course, instead. So, the students haven't had a chance to learn English from the native role models, which lead them to have the difficulties in acquiring the native accent. During the phonetic session, the students have to take the oral test on how to pronounce English consonant sounds with their Thai teacher. The problem was revealed that Thai teachers, non-native speakers, judged the students' pronunciation based on subjective evaluation criteria which leads to insufficient feedbacks to show why and how the students'

pronunciation was incorrect. As a result, they could not differentiate and pronounce those sounds correctly. Additionally, as the teacher-centered practice is deeply rooted in the Thai society, the students are bored by the lessons. At CMRU, even though the teachers have tried very hard to shift from teacher-centered to learner-centered approaches, they still have dominant, and active roles in class. This makes the students much more inactive, and this is when boredom can begin.

Since Thailand focuses on integrating technology in foreign language learning as one of the national goals in the Basic Education curriculum, this study attempted to apply the AR technology in order to find out whether or not this approach would be a key to unlock the problems on track, which would help in finding appropriate solutions for English pronunciation teaching in a Thai context. To conduct the experiment with controlling for the outside variables, therefore, two groups of the students were selected to be a control group and an experimental group in this study.

## Objectives of the Study

The purposes of this study were:

1. To examine the effectiveness of the AR technology to develop the students' ability to produce English consonant sounds
2. To explore the students' satisfaction with the use of AR technology.

## Research Methodology

The methodology of the research procedure included six major sections as follows:

### 1. Participants of the study

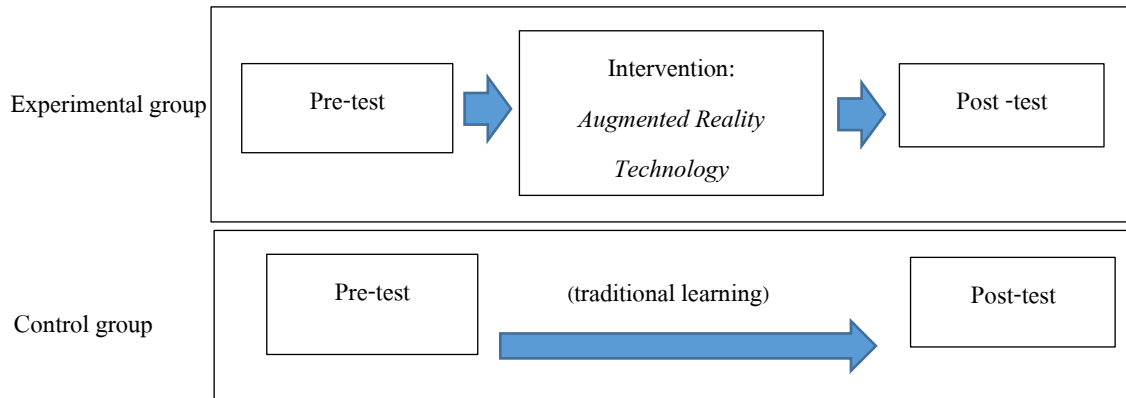
The population in this study were 207 students who enrolled in a core course entitled 'Introduction to Linguistics (ENG 1101) in the second semester of the academic year 2018. This course has four sections: 2 sections for 105 Business English major students and 2 sections for 102 English major students. The sample was divided into two groups: one control group and one experimental group. The control group consisted of 54 first-year Business English major students whereas the experimental group consisted of 52 first-year English major students by using the simple random sampling. Each group was in the first section.

### 2. Research Design

The research design was a quasi-experimental research which was based on a pretest-posttest control group design that included a control group and an experimental group. Before participating in the course, both groups were required to take a pre-test which aimed to confirm that the two groups of the students had the same level of English pronunciation ability in producing English consonant sounds. Subsequently, the control group was provided a traditional learning using Introduction to Linguistics course book and supplementary materials. However, the AR technology was implemented with the experimental group at the classroom level. At the end of the course, a posttest was administered for both groups in order to compare students' ability to produce English consonant sounds. The pre-

and post- tests were identical for both groups. Moreover, the experimental group was asked to fill in online questionnaires, which included questions for evaluating the students’ satisfaction towards the use of AR technology.

In order to gain an insight into the foundation of this study, the research framework is presented in Figure 2.



**Figure 2** The research framework of the current study

### 3. Type of Data

The data collected in this research used only a quantitative type. The details are as follows:

**Independent Variables:** Classroom with the traditional learning  
Classroom with the AR technology

**Dependent Variables:** Students’ ability to produce English consonant sounds  
Students’ satisfaction with the AR technology

### 4. Duration of the Study

The classroom research took place in November 2018, totaling four weeks of classroom sessions. Each week last three hours with a total of 12 hours.

### 5. Research Instruments

The research instruments were categorized into three types:

5.1 Six instructional management plans which were implemented by using the AR technology as follows:

Unit 1	Introduction	1 hour
Unit 2	Articulatory phonetics	2 hours
Unit 3	The vocal tract	2 hours
Unit 4	The articulation of English consonants	2 hours
Unit 5	Problem Sounds in English	2 hours
Unit 6	Problem Sounds in English (continued)	3 hours

5.2 The pre- and post- tests measuring the students’ ability to produce English consonant sounds.

The pre – and post – tests were the oral examination. A list of 30 words was designed from nine problematic English consonant sounds appearing both in either the initial or final positions and both two positions in words including /v/, /ʃ/, /ʒ/, /z/, /ð/, /ʒ/, /tʃ/, /dʒ/, and /g/ and that were suggested by the prior studies.

### 5.3 The questionnaire measuring the satisfaction of the students with the use of AR technology.

This questionnaire is close-end question type which is divided into 2 parts. The first part deals with the background information of the respondents The second part explores the level of students’ satisfaction on the use of AR technology. The questionnaire was designed by using 5–level scale which corresponds from least to most levels of the students’ satisfaction.

## 6. Data collection and analysis

In order to compare the students’ ability to produce English consonant sounds in the Introduction to Linguistics course, the AR technology was incorporated as an instructional tool for the experimental group. As Sumadio & Rambli [30] mentioned, the AR tools used in education contribute to the activation of motivation, introduce new opportunities, provide more enjoyable learning atmosphere and increase the interaction among learners, making the learning process more active, effective and meaningful. In this study, Phonic Tricksters, HP Reveal, and Zappar were designed to create an appropriate language learning environment via the AR technology. Texts, photos, audio, animations, videos and three dimensional models which were interesting and appropriate for students’ level were embedded into makers through the AR technology. Different applications used in the present study provide the students to experience a new way of teaching which combines the real-world environment with the virtual reality. Phonic Tricksters application in AR technology was designed to practice English consonant sounds. The students use their camera to catch the Tricksters flying around them by pronouncing the letter with a correct sound. It makes the students’ learning process very natural and fun. Additionally, HP Reveal, and Zappar applications which enable 3D models visualization into AR technology were used to present the lessons through animations, pronunciations and videos. They seem to be the instructional aids in teaching pronunciation which visualize the step-by-step procedures to produce English consonant sounds. They are regarded as gap-fillings to promote a greater depth of understanding in the students’ pronunciation concept. Figure 3 illustrates the examples of AR applications used for the experimental group.



Figure 3 The examples of AR applications used for the experimental group

Regarding to the control group, the students were introduced through a traditional learning method. They were provided an ordinary teaching style with the course book and supplementary materials. The textbook used in this study was a compilation from various sources. The pre- and post- tests containing 30 English words English were administered to both groups. It took approximately ten minutes and was worth 30 marks for each student. The application named 'Speech Recognition' was used as a tool to evaluate the students' abilities to produce English consonant sound in order to avoid the teacher's subjectivity. If the student could pronounce each word correctly, he/she would get one point. However, the student who pronounces the word incorrectly would get no point. After that, the experimental group was asked to answer the questionnaire to rate their satisfaction on the AR technology. Then, the scores from the pre- and post- tests of both groups were calculated to find the difference by using T-test. Moreover, the data elicited from the questionnaires was analyzed in terms of standard deviation and mean.

## Findings

The data from the pre- and post- tests of production between the control and experimental groups is shown in Table 1.

**Table 1** Comparison of the data from the pre-tests of production between the control and experimental groups

Group	N	of pretest	S.D.	t	Sig.
Control group	54	7.59	1.888	.231	.818
Experimental group	52	7.52	1.321		

Table 1 presents the data of the pre-tests of production between the control and experimental groups. The pretest mean of the control group was 7.59 out of 30 whereas the pretest mean of the experimental group was 7.52 out of 30. There is no significant difference between the pretest means of the control and experimental groups. It could be concluded that both groups had relatively the same levels of pronunciation ability to produce English consonant sounds

Regarding the comparison of the scores from the posttest between the control and experimental groups, the result is shown in Table 2.

**Table 2** Comparison of the data from the post tests of production between the control and experimental groups

Group	N	of posttest	S.D.	t	Sig.
Control group (without using the AR technology)	54	18.57	2.024	-10.985	.000
Experimental group (using the AR technology)	52	23.08	2.195		

Table 2 presents the data of the post-tests of production between the control and experimental groups. The posttest mean of the control group was 18.57 while the posttest mean of the experimental group was 23.08. The difference between both groups was 4.89. It was evident that the posttest mean of the experimental group was higher than the posttest mean of the control group. It could be concluded that using the AR technology could significantly enhance the students' pronunciation abilities.

As the questionnaires were conducted to measure the students' satisfaction with the use of AR technology to produce English consonant sounds, the result is illustrated in Table 3.

**Table 3** The students' satisfaction towards the AR technology

Satisfaction	Mean	Level of Satisfaction
1. The AR technology helps students to better understand the contents.	4.56	highest
2. The AR technology helps students to be active.	4.72	highest
3. The AR technology makes the classroom atmosphere to be more fun.	4.95	highest
4. The AR technology makes the class content more interactive.	4.53	highest
5. The AR technology can increase the students' motivation in learning English.	4.50	highest
6. The AR technology helps students more engaged in class.	4.45	high
7. The AR technology helps students to become a fast learner.	4.35	high
8. The AR technology stimulates the students' curiosity.	4.65	highest
9. The AR technology makes the lessons more interesting and entertaining.	4.65	highest
10. The AR technology saves time for students to spend on their learning process.	4.42	high
11. The AR technology reduces language barrier because it presents the contents in the form of animation which is an easiest way to perceive.	4.50	highest
12. The AR technology increases student participation in class.	4.65	highest
13. The AR technology improves and increases the students' memory.	4.65	highest
<b>Overall satisfaction</b>	<b>4.58</b>	<b>very satisfied</b>

Table 3 shows the level of the students' satisfaction with the use of AR technology. From the table, it is obvious that the overall satisfaction of the students was at the highest level (4.58).



## Conclusion and Discussion

This study investigated the effectiveness of the AR technology to develop the students' ability to produce English consonant sounds and explored the students' satisfaction with the use of AR technology in the Thai classroom context. The results revealed that the posttest mean of the experimental group was higher than that of the control group after the implementation of the AR technology. This finding confirmed the study of Ekrem Solak and Recep Cakir [31], revealing that participants from the experimental group achieved higher scores than participants in the control group and they also performed better in recalling the learnt information. In other words, the use of AR applications makes a positive contribution to enhance the students' pronunciation abilities. It is in line with Gün [32] that AR technology is amusing, remarkable and helped to facilitate learning and to visualize the abstract concepts in mind. Moreover, the finding of this study was consistent with the results of the previous studies [21, 33-34]. For example, Lui [35] used the AR technology to help Japanese elementary school students to improve their English proficiency. At the end of the implementation, the AR technology made a positive impact on student performances. Similarly, Barreira et al [33] implemented the AR technology in an English course. The research revealed that the group taught with AR technology performed better than those in the control group. As AR technology is a mixture of the virtual reality with a real life, it plays an important role in educational area. With the outstanding innovation in digital technology, AR makes teaching and learning process more productive and offers a variety of learning environment.

The benefits of AR technology help the students to boost their understanding and to introduce new opportunities for learning English. With the key role of new technology, the experimental group expressed their satisfaction at a high level. This is in line with the previous studies. Sumodio & Rambli [30] stated that AR technology was an effective tool that activates the students' motivation, provided them more enjoyable learning atmosphere and increased the interaction among learners, making the learning process more active, effective and meaningful. Besides, it provides flexibility to learners, and boosts creative thinking skills, interpretation and problem-solving abilities [36]. With these advantages, the AR technology therefore becomes a powerful tool to expand the students' perspectives in learning languages.

However, the results of the present study are limited to the groups of first-year students in learning to produce English consonant sounds. As an implication for the further study, a course syllabus can be designed by using the AR technology with the other fields of language learning such as teaching grammar, vocabulary, reading, and writing.

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