

Effects of a novel learning method on the academic achievement in practical English in a vocational high school: with respect to listening and speaking

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Abstract.

In this study, we have investigated effects of a newly developed learning material on academic achievements of students in practical English in a vocational high school. This new learning material could be characterized by Hangeul-based representation of English pronunciation, which is combined with powerful features of the smartphone apps. Considering the fact that most of students have quite lower level of academic preparation for English learning, we suggested a novel approach to represent English pronunciation only by Hangeul alphabets combined with special symbols. It is seen that a newly developed learning material could help students enhance listening spoken English and speaking ability to speak English with correct pronunciation more easily.

Keywords: academic achievements, a newly developed method; Self-directed manner; Smartphone-based; STT(Speech-To-Text), TTS(Text-To-Speech)

1. Introduction

Students in Korean vocational schools have shown excellent levels of technical skills in various international skill competitions. Some students are well qualified to explore the overseas job market if a basic foothold is established. In order to get a job in the field such as aviation maintenance, obtaining a required license in the relevant field is mandatory, which requires certain level of fluency in practical English. They should acquire communication skills in English required for the work places. Ability to speak English includes the correct pronunciation and intonation, which directly affect the appropriate communication in conversation (Zhang, Fachun, and Pengpeng Yin, 2009).

It is commonly known that students in vocational high schools in Korea have much less confidence in academic studies and poor motivation for learning due to accumulated deficits in learning from previous level of schools (Myeong-ae Ha, 2019). Since the difficulties encountered in English classes by students in vocational high schools are basically due to their

poor academic preparation for English learning. In this study, we have conducted an experiment to determine the effects of our new learning method on the academic achievement in practical English with focus on listening and speaking abilities.

To enhance communication skills in certain language, cultivating ability to listen and speak that language is mandatory. Being able to listen to spoken English by native speakers and to speak English with correct pronunciation mean to speak English like native speakers. Even many college students studying English Literature in Korea have difficulties speaking English with correct pronunciation even though they have studied English for more than 10 years from elementary school let alone fluent communication with native English speakers (Giyoen Na, 2000).

In general, one of the most difficult processes in learning a foreign language is learning its pronunciation, which is an integral part of learning foreign language since it directly affects learners' communicative competence. Limited pronunciation skills could decrease learners' self-confidence, restrict social interactions, and negatively affect estimation of a speaker's credibility and abilities (Gilakjani, Abbas Pourhosein, 2012).

From English teachers' point of view, one of the most difficult tasks is to teach students speaking English with correct pronunciation. Most of English teachers are faced with contradictory practices for pronunciation instruction without clear guidelines. There are no well-established systematic methods with respect to what to teach let alone how to do it. Resultantly, most teachers are uncomfortable in teaching English pronunciation during classes (Pourhossein Gilakjani, Abbas, 2016). Only a limited number of English teachers are thought to be able to teach English pronunciation properly. Teaching English pronunciations with correct accents could be a very difficult task even for those who could speak like native speakers. According to the theory of language acquisition, it is almost impossible for foreigners to speak English with native pronunciations if they started learning English after puberty. Especially in Korea, this problem seems to be worsened by the fact that accent is hardly taught in the formal English education.

To mitigate these problems, we have suggested a method of representing English pronunciation with correct accents based on Hangul combined by special symbols. Hangul is known to create syllables very effectively through combination of vowels and consonants. It has been known that Hangul has powerful features to represent English phonetic alphabets precisely. According to Yoo-hee(1824), Hangul is very effective not only in representing phonics but also as a communicational tool, which was explained in the preface of the Eonmunji written by his teacher, Jeong Dong-yu.

Accents are extremely important in speaking English compared with Hangul (Seulong Kim, 2019). Generally speaking, English is a stress-timed language that has 1st and 2nd accents. These accents play important roles in spoken English. While locations of these accents are almost natural to native speakers born and raised in English spoken societies, most of Koreans who try to learn English could not even recognize the importance of these accents. To make matters worse, accent-based pronunciation is hardly taught in the formal education in Korea let alone in vocational high schools. Most of vocational students have rarely had opportunities to learn phonics. (Shinyoung Im, 2019)

Students in vocational high schools, where fewer English courses are open compared with ordinary high schools, have much lower academic preparation in English either. Moreover, English textbooks in vocational schools do not contain any information how to pronounce English words and sentences. In some sense, it is natural that most of these students cannot pronounce English words properly. Considering these facts, it is seen that we need a very effective tool to teach English pronunciation to students in vocational high schools more efficiently.

Unlike general English, vocational English has characteristics that the same vocabularies and sentences are repeatedly used, which are necessary to understand specific knowledge. In order for students to learn a certain amount of vocabularies and sentences within a short period of time, it is necessary for students to have some ways to learn English pronunciation more easily. For this, we need efficient tools to help them listen and speak English more easily. We have presented a novel method of representing English pronunciation by Hangul combined with specific symbols and colors, which is designed to help students learn how to speak English more easily. (Chaerin Moon and Jongseong Kim, 2021)

We established a hypothesis that the more precisely students could speak English vocabularies, the easier they could hear English sentences as well. Once they get the hang of pronouncing English words represented by Hangul with specific symbols, it would be much easier for them to listen to spoken practical English. In order to validate our hypothesis, we need objective tools to see if students could listen to spoken English more easily and to speak English words and sentences with correct pronunciations. In order to achieve these purposes, we adopted special features of the smartphone.

Among many features of the smartphone apps, we adopted TTS (text-to-speech) and STT (speech-to-text) features, which is seen to be effective tools for enhancing listening and speaking abilities of students. TTS function convert text input into a spoken language, which could help students practice native pronunciation. STT function, opposite to TTS, converts any spoken language into text outputs. This feature enables students to check how close their pronunciations are to those of native speakers'. With frequent exercises using these apps, students could be more aware of importance of correct pronunciation in speaking English. In addition, teachers can use these features to help students learning phonetic alphabets in self-directed manners.

2. A novel learning material using smartphone apps

2.1. English phonetic alphabets represented by Hangul

First of all, we have represented pronunciation of each vocabulary by Hangul instead of phonetic alphabets in English. In English, accents play important roles in pronunciation (Prator & Robinett, 1985). Accents are shown by specific colors and symbols to help students recognize accents right away. With respect to pronunciations, the first accent which is most important, is indicated by red color. Blue color is used to indicate the second accent. We also used light green color for relatively weak accents of articles (a, an, the). [Table 1]

English pronunciations that do not exist in Hangul were represented by combining Hangul and certain English superscripts (V, F, R, Δ) for clear understanding. Pronunciation of [r] expressed by combining the superscript “R”. Pronunciation of [f] pronunciation is expressed

by combining the superscript “F” so that F and P are not to be confused. The same principle is applied to “V” to prevent pronouncing from “B”.(Chaerin Moon and Jongseong Kim, 2021) Lastly, pause characteristics of speaking was marked with “/” and for how to apply accents to a phrase consisting of several syllables, “~” was used. As shown in [Table 1], We have proposed a new way of learning to speak English with correct accents, which could help students speak accurately. English pronunciations represented by Hangul could provide students an effective way to speak English vocabulary right away as soon as they see the words. Special symbols would also be useful to enhance students speak correctly. We are expecting that this new learning method could ultimately enhance students' interests and improve achievements in vocational English.

Pronunciation Points	Practice Contents		
[r]	determine R [디터민]	torsion R [토션]	natural R [내츄럴]
[f]	fiber F [파이버]	fabric F [패브릭]	forward F [포워드]
[v]	invention V [인벤션]	vertical V [버티컬]	provide R V [프로바이드]
[θ] and [ð]	these Δ [디즈]	clothing Δ [클로딩]	breathing Δ [브리딩]
pause and syllables	The purpose of dimensioning is to provide a clear description of features. Δ R V V R R V F [더 퍼포즈 오브 디멘셔닝 이즈 투 프로바이드 어 클리어 디스크립션 오브 피쳐스]		

[Table 1] Pronunciation points in English vocabularies

Students could learn to pronounce words repeatedly used in practical English by learning important pronunciation points described above. When one gets used to pronouncing simple words correctly, it is much easier to speak a sentence like a native speaker [table 2] as well. “/” is used to indicate how to speak multiple phrases consisting of a sentence. In addition, “~” is used to indicate the successive pronunciation of phrases. Unlike short terminologies, pronouncing several phrases in sentences requires a lot of practice.

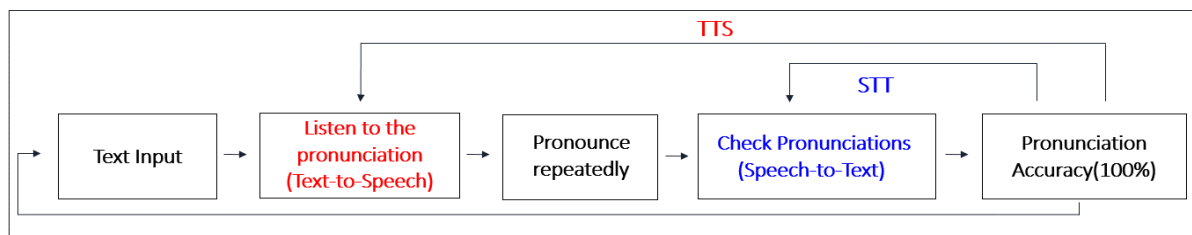
Learning Contents

Creating	a	safe	design	requires	an	understanding	of	the	forces	that	affect	bridges.
[^R 크 ^F 리에 ^R 이 ^V 팅 ^F 어 ^Δ 세 ^F 이프 ^R 디자인/리 ^R 콰 ^F 이어즈 ^R 언 언 ^R 더 ^F 스 ^Δ 탠 ^F 딩 오브 더 포~시스 ^R 댓 어 ^R 펙 ^F 트 ^R 브리 ^R 지스]												

[Table 2] Utilization of “/” and “_”

2. 2. How to learn English pronunciations using a smartphone

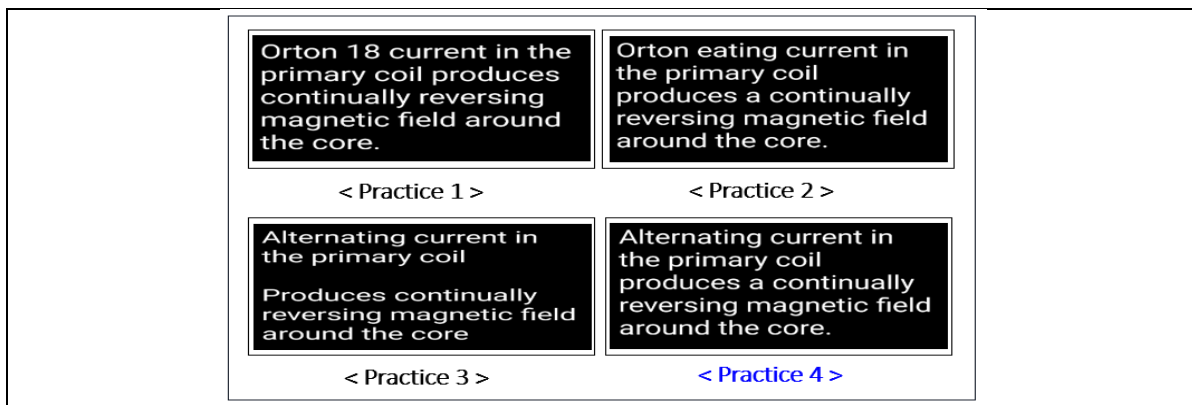
This study aims to enhance students' ability to speak English words and sentences with accurate pronunciations like native speakers. After learning important points in pronunciations, students can utilize TTS feature of the smartphone to listen to those of the native speakers repeatedly. Students also could find out how accurate their pronunciations are to those of native speakers using STT feature. [Fig. 1] illustrates the whole process of applying a smartphone both to enhance listening ability to spoken English with TTS app and to check one's own pronunciation with STT feature.



[Fig. 1] Practice of pronunciation using TTS/STT

One of reasons why we decided to devise this learning method is to make it easier for students to learn English in self-directed manners. In order to have effective self-directed learning of speaking English, students need to have tools not only for repetitive listening spoken English by native speakers but also for checking their own pronunciation with ease. With TTS, a student could listen to a pronunciation file generated by a native speaker repeatedly while they can compare their pronunciation with those of native speakers using STT. These two features will make it possible for students to learn English pronunciation in a self-directed manner without constraints of place and time.

From preliminary test results using STT, it is found that most of students could pronounce short words relatively accurate as seen in [Fig. 2]. However, more exercises are required to speak complex sentences correctly as shown in [Fig.2]. In practice 3, single sentence is wrongly recognized as two separate sentences due to poor pronunciation while the whole sentence is recognized as one sentence as seen in Practice 4.



[Fig. 2] Practice of words using STT

3. Research Methods

This study was conducted with respect to two groups of the 1st year students in OO high school located in OO City. Firstly, we compared average scores of midterm test in the previous semester to verify if two groups were identical, which showed that two groups are statistically identical. Randomly one class was selected as the experimental group and the other as the control group. The purpose of the study was to find out the effects of a newly developed learning method on academic achievements of students in practical English in a vocational high school.

For the experiment, content of the learning material is chosen from the current English textbook by considering how interesting the topic is to students. Conventional teaching material was applied to the control group, while the newly developed method was applied to the experimental group. All the classes were conducted in face-to-face teaching for both groups. After 2 hours of English classes, students' academic achievements were evaluated by written tests regarding listening and speaking ability by using TTS and STT features.

Listening test was conducted for both vocabularies and complex exclusively by using TTS while speaking ability was evaluated solely by STT outputs. Test results were quantitatively analyzed by SPSS program in order to find out the effects of the newly suggested method on the academic achievements of the students. The test problem sets for evaluation were composed of total 46 problems (36 listening and 10 speaking) on terminologies and sentences that are repeatedly used in the English textbook.

4. Experimental Results

After 2 hours of classes, we evaluated both groups with the same set of problems to determine academic achievements. A written test for listening ability was conducted by using TTS app with a problem set composed of total 36 problems (25 simple words and 11 relatively long sentences). Average scores of two groups were compared to determine the effects of the newly suggested learning method on students' academic achievements, which are given in [Table 4]. Difference between the mean values of the control group and the experimental group was found to be

statistically meaningful with a p value of 0.0003 (<.05).

Division	Average	Standard Deviation	t value	p value
Control group (Class A)	57.6	12.07	-3.848*	0.0003
Experimental group (Class B)	73.1	15.06		

[Table 4] Comparison of the average scores (Combined results from the listening test)

[Table 5] shows average scores with respect to terminologies as well as sentences. It is seen that our new learning method is more effective for longer and more complex sentences.

Division	Average	Standard Deviation	t value	p value	
Sentences	Control group	35.5	21.16	-2.849*	0.006
	Experimental group	53.3	21.33		
Terminologies	Control group	75.8	10.48	-2.600*	0.012
	Experimental group	91.8	12.50		

[Table 5] Comparison of average scores (Sentences & Terminologies combined)

Speaking ability of each student was evaluated exclusively by STT app with a problem set of 10 questions of different level of difficulties (3 difficult, 4 medium, and 3 easy level). Average scores of two groups are given in [Table 6]. It is seen that average scores of the experimental group was much higher regardless of difficulty levels. Resultant independent T-test by SPSS has shown statistically meaningful differences between two groups. This result means that new method based on English pronunciation represented with Hangul and special superscripts have quite positive effects on students' academic achievements.

Division	Average	Standard Deviation	t value	p value	
Difficult	Control group	42.7	13.39	-3.789*	0.0004
	Experimental group	60.4	18.03		
Medium	Control group	78.5	14.47	-3.206*	0.002
	Experimental group	93.2	16.55		
Easy	Control group	73.7	13.69	-3.192*	0.002
	Experimental group	84.9	9.80		

[Table 6] Comparison of average scores (Speaking test)

5. Conclusions

In this study, the effects of a new learning method, which combines Hangul and special symbols to represent English phonetics, on the academic achievements of vocational students is investigated with respect to 1st year students in a vocational high school.

Listening and speaking ability was evaluated by using TTS and STT feature, respectively. Evaluation problems were composed of terminologies and long sentences repeatedly used in the textbook. After tests, average scores of two groups were compared and quantitatively analyzed by SPSS program.

From the listening test results, it is found that average scores of the experimental group was higher than that of the control group, which was also found to be statistically significant. It is especially noteworthy that difference in scores between two groups increases as sentences are longer and more complex. From the speaking test, average scores of the experimental group was much higher than that of the control group regardless of difficulty levels. And this result was also found to be statistically significant. Similar to the listening tests, the higher the level of difficulty is, the greater the influence of the new learning method on academic achievements becomes.

In this study, it has been found that the proposed learning method could be very effective to help vocational students, who have relatively poor academic preparation, speaking English with correct pronunciations as well as enhancing their ability to listen spoken English by native speakers. The proposed method is also found to have quite positive effects on the academic achievement in English subject as well.

This study has also shown that TTS and STT features of the smartphone could be very effective pedagogical tools for teaching practical English in vocational high schools. Based on our results described in this paper, it is suggested that the newly proposed scheme should be considered as a potential option in developing English textbooks for vocational training.

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