# A NEW APPROACH FOR HANGUL-BASED REPRESENTATION OF ENGLISH PRONUNCIATION COMBINED WITH SMARTPHONE APPS: WITH A FOCUS ON ENHANCING STUDENTS' LISTENING & SPEAKING ABILITY IN VOCATIONAL HIGH SCHOOLS IN KOREA

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**Abstract** - In this study, a novel learning method for English using Hangul-based phonetic alphabets has been suggested for English classes in vocational high schools of Korea with the focus on enhancing students' ability to listen and speak English with less difficulties. In the suggested material, pronunciation of English vocabulary is represented by only Hangul combined with specifically designed symbols for certain pronunciation, which could help students listen and speak English words muchmore easily. Also, by using the STT (Speech-To-Text) and TTS (Text-To-Speech) features of the smartphone, students could easily practice pronunciation in a self-directed manner and check how close their pronunciation is to those of native speakers.

**Keywords** - Smartphone-based, Hangul-based Phonetic Alphabets, STT(Speech-To-Text), TTS(Text-To-Speech)

## I. INTRODUCTION

With the advent of globalization and diversification of jobs, the necessity of acquiring English capability related to a specific job is increasing. While the domestic employment opportunities are not good due to the economic recession, the abilities of students in vocational schools in Korea is quite excellent as shown 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 an aviation maintenance job, obtaining a required license in the relevant field is mandatory, which requires certain level of fluency in practical English. They also should acquire communication skills using English.

It is commonly known that students in vocational high schools have less confidence in academic studies and poor motivation for learning due to accumulated deficits in learning from elementary and middle school.(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 attempted a novel approach to find self-directed learning methods so that students can learn their vocational English more easily.

To enhance communication skills, cultivating the ability to listen and speak is mandatory. To listen to and speak English correctly, one should be able to pronounce English correctly. Pronouncing English correctly means to pronounce it the same as the way native English speakers. If Korean students cannot properly learn the pronunciations used by native English speakers and learn English pronunciation in a way that they pronounce Korean from the beginning, even if they have studied English for more than 10 years from elementary school to high school and even after studying English Literature at university, communication with native English speakers are difficult.(Giyoen Na, 2000)

In general, one of the most difficult processes in learning a foreign language is learning pronunciation, which is an integral part of foreign language learning 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)

One of the most difficult parts of the teacher's point of view is also the pronunciation of the foreign language. Only a limited portion of English teachers are thought to be able to teach English pronunciation properly.

Teaching English pronunciations with correct accents could be a very difficult job even for those who could speak like native speakers. According to the theory of language acquisition, it is almost impossible for foreigners to speak precise pronunciations to the level of the native speakers if they learn 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 novel method of represent English pronunciation with accents based on Hangul combined by special symbols. Hangul is known to create syllables very efficiently through the combination of vowels and consonants. Because of these constructional features, Hangul has a wide range of literation. 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 very important in English pronunciationcompared with Hangul(Seulong Kim, 2019).

Generally speaking, English is a stress- timed language that has the 1st and the 2nd accents. These accents play important roles in spoken English. The location of the 1st and 2nd accents are almost natural to native speakers such as Americans or Canadians. However, most of Koreans who try to learn English even could not recognize importance of the 1st and 2nd accents. To make matters worse, accent-based pronunciation is hardly taught in the general schools in Korea let alone in vocational high schools. Most of the students have rarely had opportunities to learn phonics. (Shinyoung Im, 2019)

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

Unlike general English, vocational English has characteristics that the same words 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. Therefore we need efficient tools to help them listen and speak English more easily. Herein, 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.

We established a hypothesis that the more precisely students could speak English vocabularies, the easier they can hear English words and sentences. 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 test our hypothesis, we need objective tools to see if students could listen to spoken English more easily and to speak 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 an effective tools for enhancing listening and speaking abilities of students. The TTS (Text-to-Speech) function convert text input into a spoken language, which could help students practice native pronunciation. While STT (Speech-to-Text) function converts the spoken language into text output. This feature enables students to check how close their pronunciations are to those of native speakers'. In addition, the basic recording function allow students to listen to their own English pronunciations repeatedly, which would help improve their pronunciation. These features are expected to promote more efficient learning of English for vocational students in self-directed manners as well.

## II. DEVELOPMENT OF LEARNING MATERIAL

Considering the facts described in the introduction, we set the following directions to develop a new learning material for English in vocational high schools.

Firstly, the suggested learning material could help students in vocational high schools learn to speak English vocabularies and expressions more easily. In the long run, it will help them to obtain a certificate that is essential for getting a job abroad.

Secondly, English words are represented only by Hangul combined with certain symbols so that students could easily speak English words used in the field with less difficulties.

Thirdly, students could listen to the pronunciation of native speakers for certain vocabularies and sentences whenever students want to learn phonics using a smartphone without relying on a teacher.

Fourthly, students themselves could easily check how close their pronunciations are to those of a native speaker. It allows them to practice repeatedly for better pronunciation.

In this study, to achieve these goals, a novel method is suggested to speak English words and sentences correctly with ease by representing English pronunciation by Hangul combined with specific symbols. In addition, by combining the multimedia features of smartphones and learning material, this new learning method could help vocational students learn speak and hear practical English more easily.

### 2.1 English phonetic alphabet represented by Hangul

Choosing one unit in English textbooks for vocational high schools, 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)

To make it easier for students to learn accents for every vocabulary, the accents were shown by specific colors and symbols to help students recognize accents right away. We expect students to speak English vocabularies correctly with ease by using the newly suggested learning material. It is assumed that it would be much easier for students to hear the pronunciation of the words when they know how to speak those words.

With respect to pronunciations, the first accent which

is most important, was indicated by the red color. The blue color was used to indicate the second accent. We also used the light green color for relatively weak accents in articles(a, an, the)

| robot | generation | the currents |
|---|---|---|
| [로봇] | [제너레이션] | [더 커런츠] |

**[Table 1] The Representation of English Accents**

In addition to representing three kinds of accents with different colors, English pronunciations that do not exist in Hangul were represented by combining Hangul and certain English subscripts(V, F, R, △) for clear understanding.
The pronunciation of [r] is liquids, expressed by combining the subscript "R"

| circuit | reduce | electronic |
|---|---|---|
| R | R | R |
| [서킷] | [리듀스] | [일렉트로닉] |

**[Table 2] Combining a Subscript "R"**

The pronunciation of [f] pronunciation is expressed by combining the subscript "F" as fricatives so that F and P are not to be confused. The same principle is applied to "V" to prevent pronouncing from "B".

| flow | field | function |
|---|---|---|
| F | F | F |
| [플로우] | [필드] | [펑션] |
| Vase | Volume | Variation |
| V | V | V R |
| [베이스] | [볼륨] | [베리에이션] |

**[Table 3] Combining Subscripts "F" and "V"**

In addition, the pronunciations of [θ] and [ð], which are interdentals, are expressed by combining "△".

| this | through | whether |
|---|---|---|
| △ | △ | △ |
| [디스] | [쓰루] | [웨더] |

**[Table 4] Combining a Subscript "△"**

Lastly, pause characteristics of reading was marked with "/" and for how to apply accents to a phrase consisting of several syllables, "‿" was used.

| Robots are already popular in industry. [로봇츠 / 아 올~레디 파~퓰러 / 인 인더스트리] |
|---|

**[Table 5] Expressions for pause and syllables**

As shown in [Table 6], We have proposed a new way of learning to speak English with correct accents, which could help students speak precisely. 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 kind of learning method could ultimately enhance students' interests and improve achievements in vocational English.

| Learning Objectives | Learning Contents |
|---|---|
| Accents | robot generation<br>[로봇] [제너레이션] |
| Pronunciations only in English | circuit field this<br>R F<br>△<br>[서킷] [필-드] [디스] |
| Several syllables | In a device This is<br>V △<br>[이너디바이스], [디씨즈] |

**[Table 6] Learning Pronunciations(total)**

Students could learn the pronunciation of the repeated words in vocational English by learning the important pronunciation points described above. When you get used to pronouncing simple words correctly, then you need to learn to speak a sentence like a native speaker [table 7]. "/" was used to indicate how to speak multiple phrases in a sentence. In addition, "‿" was used to indicate the sucessive pronunciation of phrases.

| Learning Contents |
|---|
| They can cook and clean, and may even take<br>△<br>V<br>[데이 캔 / 쿠 캔 클린 / 앤 메이 이븐 테잌<br><br>care of young children and older people.<br>R V R<br>R<br>케어 오브 / 영 칠드런 앤 올더 피플] |

**[Table 7] Utilization of "/" and " ‿"**

Unlike short terminologies, as shown in [Table 8], you should practice not only speaking accents, but also pronouncing several phrases in sentences.

| Learning Contents |
|---|
| The currents can't pass through semiconductors<br>△ △<br>R<br>[더 커런츠 / 캔트 패스 쓰루 /<br>세미컨덕터스 |

| |
|---|
| like insulators.<br>R<br>/ 라익 인설레이터스] |
| Robots are already popular in industry.<br>R R R R<br>R<br>[로보츠 / 아 올레디 파퓰러 / 인 인더스트리] |

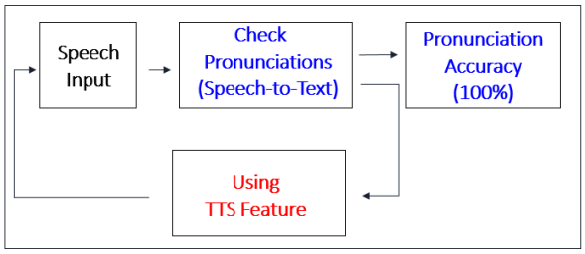
**[Table 8] Practice of Sentences**

### 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 the important points in pronunciations, students can utilize the TTS feature[Fig. 1] 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. 2] of the smartphone.




**[Fig. 1] the TTS feature**



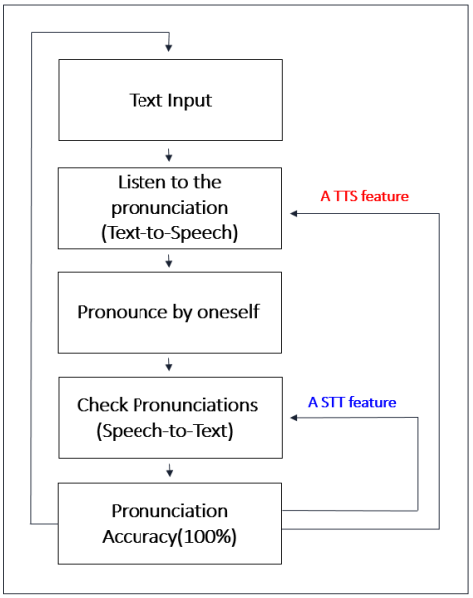

**[Fig. 2] the STT feature**

In order to help students learn English pronunciations more easily, we have proposed a learning method using the TTS (Text-to-Speech) and STT (Speech-to-Text) functions of a smartphone. It was intended for self-directed repetitive listening to the pronunciation file generated by the native speaker using the TTS app of the smartphone, and the STT app was used to directly check how close his pronunciation was to those of native speakers.

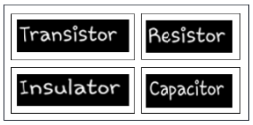
TTS is a computer program which produces the human voice output equivalent to the text input of words and/or sentences by a user. Some TTS apps in smartphones nowadays could produce quite natural voices. Using a TTS app, students can directly listen to the native speaker's pronunciation by typing an English word or sentences they want to listen to. TTS has the advantage of allowing students to learn English pronunciation in a self-directed manner without the constraints of place and time.

In order to have an effective self-directed learning of speaking English, students need to have a tool to check their pronunciation as well. This can be done by using the STT function. STT is a process in which a smartphone interprets the spoken sentences from a user and converts them into text data. Students could check their pronunciation by comparing text output from STT app with original sentences. It makes students acknowledge any problems in their pronunciation and let them know the differences between their pronunciation and that of native speaker's.

[Fig. 3] illustrates the whole process by which students enter the texts (word or sentence), listen to the native speaker's pronunciation with the TTS function, practice pronunciation, and check their pronunciation with the STT function.

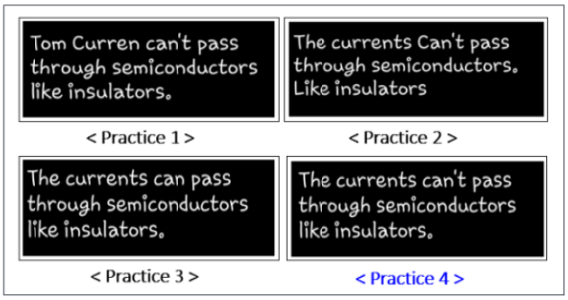



**[Fig. 3] Practice of pronunciation using TTS/STT**




**[Fig. 4] Practice of words using STT**

After practicing English pronunciation with the newly suggested phonetic symbols, the results were checked using the STT application. In the case of short words in vocational English, it was found that students' pronunciation was recognized relatively accurately [Fig. 4].




**[Fig. 5] Practice of sentences using STT**

On the other hand, in the case of complex sentences, we recommended students practice several times for correct pronunciation.[Fig. 5] As long as a sentence is concerned, it is important for students to understand how to pronounce multiple phrases in a row.

In practice 2, as shown in [Fig. 5] one sentence is wrongly recognized as two sentences due to poor pronunciation while the whole sentence is recognized as one sentence as seen in Practice 4.

## III. CONCLUSION

In this study, a novel method to represent English pronunciations by Hangul combined with special symbols has been proposed for the first time. The suggested method is expected to allow students of vocational high schools with very poor English background, to pronounce accent-oriented English pronunciation.

First, English phonetic symbols are represented by Hangul so that students could speak English more easily. Accents in English pronunciations that are not found in the Korean language are shown by combining specific colors and special symbols. This way, students could easily speak words and sentences repeatedly present in vocational English even if they are not familiar with English pronunciation symbols at all. Meanwhile, the learning method using smartphones was adopted so that students could learn English more effectively in self-directed manners. By combining TTS and STT apps with Hangul based representation of English pronunciation, we have tried to provide effective tools for students to listen to native speakers' pronunciation and check how close their pronunciation is to that of native speakers' . We will publish the effect of the newly-developed learning method on academic achievement of students in practical English. We also suggest this newly-developed method could be applied for new textbooks in vocational schools as well as kindergarten and elementary schools.

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