어문연구 제6권 1996년 2월

Teaching Basic English Pronunciation Using CALL

Kim, Jeong-Ryeol*

When one acquires a foreign language, it is often the case that (s)he must break out the phonological system of his/her mother tongue which (s)he is familiar with. In the process of acquiring a new phonological system, (s)he suffers from the native language interference which contribute to hampering the intelligibility and creating misunderstanding separately or in collaboration with one another. In pronunciation Weinreich (1953) divides interference into phonic, phonotactic and supra-segmental interference and further classifies phonic into sound substitution, underdifferentiation, overdifferentiation and reinterpretation of distinctions.[1] This paper studies cases in which native speakers of Korean commits such mistakes when they acquire English as a foreign language, and attempts to explain and provide a prototype of the visual aid to help correct such pronunciation mistakes using CALL.

1. Introduction

Correct pronunciation is of prime importance to communicate and thus, phonetics is "the indispensable foundation of all study of

* Prof. J. R. Kim

language"(Sweet 1877, in Henderson 1971 : 30) and "the importance of aural medium of language" is universally recognized by including it to the regular curriculum of applied linguistics. Current development of hardware and software in Speech Technology allows to help foreign language learners acquire somewhat unfamiliar pronunciation with audio - visual aid. A few examples of such hardware developed in the U.S. are the Visible Speech Aid intonation displays for the hearing - impaired(Dickson & Ingram 1982), the Kay Electrics Visi - Pitch system(Molholt 1988, Pennington 1989) and the development of computerized tutorials in EFL using synthetic speech(Esling, Warbey & Scholefield 1984). Japanese Ministries of Education, Science and Culture sponsor Advanced Man - Machine Interface Through Spoken Language Project. EC (European Community) also launched ESPRIT Ⅰ(1984 - 1989), ESPRIT Ⅱ(1988 - 1993), ESPRIT Ⅲ(1992 - 1997) of which speech technology is an important component.[2] Information Technology Initiative Project forms a massive Speech Data Base with Speech Recognition Technology in Britain. In Germany, Architecture for Speech and Language Research started in 1991 to form a speech data base and create a recognition algorithm for a large vocabulary. In Korea, the research is limited to those projects which have immediate commercial values such as eliminating noise over the telephone conversation(KAIST 1982 - 1990), synthesizing numbers for telephone directory assistance(Kwangwoon U.) mainly sponsored by Korea Telecommunication Co. Additionally, there are small scale projects worth paying attention such as separate word recognition using pattern matching by Sungkyunkwan U. and a research on recognizing Korean explosives and vowels by analyzing formants by Youngnam U.(Oh, Kil - rok et al. 1994, 393 - 395). Most CALL programs are concerned with written words due to technical

difficulties and limited resources.

However, foreign language teaching tends to focus more on oral communication and there have been a few exceptional attempts made to incorporate technology to deal with spoken words from earlier on using computer controlled tape - recorders to give an aural component to CALL(for example, Adams et al. 1968).

Tandberg was the precursor in this field by creating a cassette - recorder which incorporates a microprocessor and is specifically designed to be driven by an external computer(Ahmad et al. 1985, 130). This system operates in such a way that computer is capable of finding any instructed position on the cassette - tape and let user hear the segment and display on the monitor questions connected to the segment, and if the user answers correctly, then it plays next segment and display next question by going through the same routine. Cassette - recorders are a slow - speed device for storing and retrieving data ; they are limited by the speed at which the tape can be wound(ibid 131). Search times can be greatly improved if one uses instead a random - access audio device(Hart 1981 : 4). Technology has made recordable audiodiscs commercially available, which in turn creates a beneficial spin - off for CALL. Once the speech is digitized and stored, it may be used in various CALL environments. For example, Korean does not distinguish /l/ and /r/ phonemically, but English does. Thus, the distinction presents difficulty to Korean learners of English. CALL can be set up to help the acquisition smoother in the following steps :

First the digital input system is used to record a set of words which include /l/ and /r/. Then a simple program is written to work in the following way. It looks up the recorded set of words, selects one word and plays it through the audio system. The screen displays the question : "Does the word include an /l/ or an /r/?

Answer L or R, or if you would like to hear the word again type A." The computer repeats the word if required, informs the student whether the sound is correctly identified and then moves on to the next word.

There are several advantages in using a computer this way. First, the inability to identify sounds troubles many students - they feel inadequate or fear that it results from a hearing difficulty. In such circumstances it may be easier to work with a machine than with a human. Compared with a cassette - recorder the computer has two advantages : first, it can tell the student immediately whether or not a sound was correctly identified ; second, there are no moving parts, no knobs to operate, no tapes to thread. In particular, the computer can repeat a word or phrase as often as is required without perceptible delay - there is no tape to wind back. This is because individual words are stored as digital data and each can be called and output just as a set of written words can be called and output via the screen.

This study first will review mispronunciation types centered around those committed by Korean learners of English following Weinreich's classification.[3] It will further look into the relationship between speech technology and CALL, and briefly describe how speech technology imported to be CALL ware by the product's types. It will finally show the CALL prototype system developed by the author to help students' basic pronunciation.

2. Mispronunciation Types

Many earlier works in this area attributes mispronunciation to interference of native phonology (Stockwell, Bowen and Martin 1965 ; Redard 1973). This direction of research has contributed a

great deal to the development of Contrastive Analysis of native and foreign languages. For example, Stockwell, Bowen and Martin (1965) made a contrastive analysis of Spanish and English for pedagogical purposes. Redard (1973) compares the phonological system of Italian to French, Spanish, German, English, Russian, Portuguese, Rumanian, Dutch, Slovene, Modern Greek and Hungarian. She then outlines the phonological difficulties most likely to be experienced by Italian students, based on these contrastive analyses. Some more research on Contrastive Analysis in the 80's and the role of interference have addressed areas which previous studies had not. These areas of inquiry include syllable structure(Broselow 1983, 1984 ; Tarone 1984), a non - linear approach to loan phonology(Singh 1985), speech processing(Lehtonen and Sajavaara 1984), fine - grained phonetic analysis(Kohler 1984), articulatory setting(Wenk 1979, 1983), rhythm(Wenk 1985), abstractness(Gussmann 1984) and cyclic/postcyclic relationships (Rubach 1984).

Also, there are a few studies based on the interference of Korean native tongue for the learners of English. To name a few : Paik(1977) discussed the interference problems in the consonants and suprasegmental features of Korean students learning English. Sherman(1987) discusses English consonantal phonemes among Korean university EFL learners. Lovely, Mcdade & Kang(1987) specifically deals with pronunciation of /p/ and /f/ by Korean learners of English. Yu(1987) studies the discriminatory power of Korean college students in the English vowels. Ahn(1991) analyzed Korean speakers' errors in English pronunciation.

Weinreich(1953) divides interference into phonic, phonotactic and suprasegmental interference and further classifies phonic into sound substitution, underdifferentiation, overdifferentiation and

reinterpretation of distinctions.

Phonotactic interference is caused by the discrepancy between the syllable structure of two systems of phonology. For example, Ahn(1991 : 104) reports that Korean learners of English uses /I/ or /ə/ as epenthetic vowels to reinterpret English consonant clusters. The following words contain word initial consonant clusters CC which are exemplified for being reinterpreted as CVC syllable structure :

/bl/ - >/bIl/ "blow"
/sk/ - >/sIk/ "skewer"
/kl/ - >/kəl/ "claps"
/pl/ - >/pəl/ "plight"

Suprasegmental interference exists, for example, when Korean learners articulate wh - questions, they tend to raise the intonation toward the end of sentence which is obvious interference from Korean interrogative sentences(Paik 1977 : 187). Also, the fact that English is a stress - timed language allows the first language interference to occur in case of Korean learners whose native language is a syllable - timed language.

Besides the areas mentioned in Weinreich(1953), there are interferences caused by the phonological processes existing in the primary system. For example, Korean has a phonological process called nasalization in which a word final stop becomes a homorganic nasal when followed by a nasal across word boundary as in "kwuk##myeong"(country name) and "pep##nyeong"(rule order) being pronounced [kuŋmyeng] and [pemnyeŋ] respectively.

Although all the causes of mispronunciation mentioned above are of much importance to foreign language teachers, this paper will focus on phonemic interference to show how CALL software

can be of good use to help learners correct their basic pronunciation.

2.1 Sound Substitution

When the secondary system[4] has a phoneme or a phonological process which does not exist in the primary system.[5] Learners of foreign language tend to substitute a closest phoneme in their native tongue for a target phoneme in the foreign language.

Major(1987) states that in L2 phonology, learners' substitutions typically take the form of phoneme substitutions, (e.g., [R] for [r]), phonological processes (e.g., devoicing), phonotactic modifications (e.g., consonant cluster reduction or schwa epenthesis), and prosodic alterations (e.g., using syllable – timing for a stress – timed language).

Ahn(1991) reports in her analyses of Korean college students' errors in English pronunciation that substitution errors result from the interference of primary system. In her study (ibid 102), the majority of pronunciation difficulties are caused by the consonant sound – segments or features of sounds in their primary system to the consonantal system in the secondary system. English consonant /θ/ and /ð/ are substituted by /s/ and /d/ respectively due to the unfamiliarity of these English consonant sounds and/or to mutual interference between two systems that share certain phonetic features /θ/ and /s/ on the one hand and /ð/ and /d/ on the other. Voiceless and voiced labio – dental fricative /f/ and /v/ were replaced by the voiceless and voiced bilabial stop /p/ and /b/ respectively.

2.2 Underdifferentiation

When a distinction between two minimally paired phonemes

does not exist in one's native language, (s)he is likely not to distinguish two target phonemes intelligibly enough. Also, when a pair of phonemes do not exist in one's native language such as /f/ and /v/, it is very likely for learners not to be able to discriminate the difference or assimilate the new pronunciation to a phoneme close enough that they already know.

Ahn (1991 : 103) reports that Korean learners tend to substitute the voiced alveolar fricative /z/ for /s/ in word - medial and final position was of high frequency. Also, it is frequent to use the voiceless alveolar fricative /s/ in place of /z/. The voiced alveolar stop /d/ was often mispronounced as /t/.

Sherman(1987 : 254 - 6) reports in her study on aural discrimination difficulties with English consonantal phonemes among Korean university EFL learners that the most problematic pairs in word - initial position are /p - f/(50.0%), /ð - d/(50.0%), /θ - ð/(45.8%), /f - v/(33.3%), /j - ch/(33.3%) where the figure in the parenthesis shows the rate of errors made by subjects. The most problematic pairs in word - medial position are /θ - t/(62.5%), /p - f/(54.2%), /f - v/(54.2%), /v - b/(54.2%), and /s - z/(54.2%). The most problematic pairs in word - final position are /voiceless θ - t/(66.7%), /v - b/(54.2%), /g - k/(54.2%), /f - v/ (50.0%).

2.3 Overdifferentiation

When the primary system has oppositions which the secondary system does not as separate phonemes when speaking. For example, Korean learners of English may think of /p/ and /p'/ and /ph/ in the secondary system as separate phonemes when speaking English, although they are allophones of English /p/.

Ahn(1991 : 102 - 3) reports that only 38% of the subjects were successful in their production of /p/, although this sound exists as a

phoneme in the primary system. The subjects who participated in the investigation tended to substitute /b/ or /f/ for voiceless bilabial stop /p/. Also, voiced bilabial stop /b/ was substituted by /p/ or /v/.

2.4 Reinterpretation of Distinctions

When a bilingual distinguishes phonemes of the secondary system by features which in that system are merely concomitant or redundant, but which are relevant to the primary system(Weinreich 1953, 18), (s)he reinterprets the concomitant or redundant feature as phonemic.

For example, Korean learners of English often understand the distinction of tense and lax vowels in English as the difference of vowel length. On the other hand, Major(1987 : 188) reports that an American speaker tends to conclude that the primary distinction in long and short vowels in German is secondary distinction since in American English it is merely a concomitant characteristic of tense and lax vowels.

3. Speech Technology and Language Teaching

Current CALL software driven by hardware companies in Korea offers flashy and eye - catching audio - visual effects integrating cutting edge technology. Such software is useful to test out the hardware for how much it can take. In this case, pieces of educational software are usually sold cheap as they are bundled out together with the hardware. One rule of caution is that any piece of softwware bundle containing CALL software must be subject to a more careful look at the quality and motivation behind the development of such software. This kind of CALL software may work for testing a new piece of hardware, but above and beyond that, the value as a

courseware material might be close to zero. In order to correct the situation, teachers, experts of teaching academic courses to students, need to be more involved in the CALL software development. Teachers are the experts to choose what to include or not to include into certain courseware. The currently bundled - out courseware requires more careful look at the content of teaching materials instead of being easily impressed with any eye - catching commercial slant. The future direction of CALL must be in that software firms develop good authoringware and teachers are able to script the content using the authoringware. This will invite more teachers to get involved in the projects developing courseware and feed a full of useful contents for learners to the developers. Without teachers' involvement, the importance of courseware contents will be compromised by the hardware marketing in their scenario writing and scripting and eventually development itself. Without properly acknowledging teachers' expertise and having them lead the development of courseware, it would be impossible to expect that we will have a decent educational software in the near future.

3.1 Visual Pronunciation : prototype

Visual pronunciation runs on Macintosh Hypercard® and consists of sound, graphic animation and text. Hypercard® is a powerful authoringware which enables to use graphics, text, sound as resources and is known to be easy to program, "programming for poets" Goodman(1990 : 10). In Hypercard application there are five basic building blocks : stacks, backgrounds, cards, fields and buttons. Stacks consist of backgrounds and cards ; backgrounds contain cards and fields ; cards contain fields and buttons. The hierarchical relationship of these objects indicates that the higher

object is usually a homogeneous collection of information. Hypercard Stack can be compared to a file cabinet consisting of drawers containing files. If a drawer in the file cabinet is labeled "English Pronunciation", one would expect its contents to consist of references to the subject of English Pronunciation. Hypercard version of this drawer is a stack labeled "English Pronunciation". The file folders in a drawer share a common style and format before it takes any files. This common style and format will be the same across folders regardless of the contained files. Hypercard background is this common style and format of the file folders. As one opens the drawer "English Pronunciation", one would expect to see files which contain contents related to the title "English Pronunciation", but also the content of each file is different from that of any other file in the drawer. Such is the case with a card in a Hypercard stack. A card contains text information, graphics information and sound resources. Each card may contain fields as background if the same format is shared by several cards as a group. These fields are filled with textual information which is different from card to card, though the format and style may be the same. Buttons are the most magical element of all in these Hypercard objects. They are placed on cards and as one pushes the button, it instantaneously take him/her somewhere crucially related for further information.

Visual Pronunciation stack consists of a card which contains the English Consonantal Phonemic Chart and the same number of cards as the number of English phonemes, that is, a phoneme a card. This card contains text field and buttons as shown in Fig 1. The first row and column are text fields indicating the place of articulation and the manner of articulation. The remaining rows and columns consist of buttons marking phonemes. Each phonemic

Place 조음점 / Manner 조음방식	Bilabial 양 순 음	Labio - dental 순 치 음	Dental 치 음	Alveolar 경구개음	Palatal 구 개 음	Velar 연구개음	Glottal 성 문 음
nasal 비 음	m			n		ŋ	
Stop vl 파열음 vl	p			t		k	
	b			d		g	
Affricate vl 파찰음 vd				tʃ			
				dʒ			
Fricative vl 마찰음 vd		f	θ	s	ʃ		
		v	ð	z	3		
Sonorant 공명음	w			l	r j		h

Fig 1.

button includes a piece of script (programming) which allows one to navigate into the card which contains phonetic articulatory animation, sound and explanation. Once, the button is pressed, the script is executed to take the user into the card with the particular phoneme.

Once the user moves to the designated card by pressing certain phoneme, the graphic animation starts with the sound in such a way to show how the air flows, whether or not the glottis trembles, how the tongue moves and whether or not the uvula is closed. This animated graphic will help users to visualize how a phoneme is articulated, and they correct their pronunciation if the articulartory point and/or the manner of articulation are incorrect. The reason why this presentation is more effective is that users can simulate or imitate the graphic movements and positions of tongue, lower jaw, glottis, uvula and points to touch or fricate. As shown in Fig 2, there are one hidden field and buttons in the same

card which control the show and hide of the field.

The hidden field which will be shown by pressing the info button contains the textual explanation of the phoneme as shown in Fig 3. Another button is the navigational button which is used to go back to where one is from, in this case it will take users back to the first card containing the phonemic chart. Another button is to show the spectrograph of the phoneme which will display the pitch and intensity of the sound.

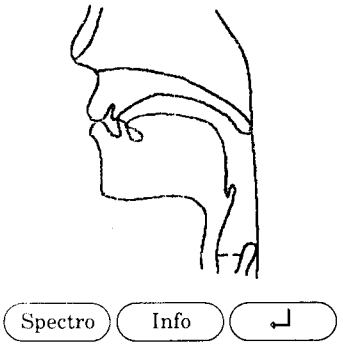


Fig. 2

Once the hidden text field is shown, one can read about the phoneme including the point of articulation, the manner of articulation and English word examples containing the phoneme.

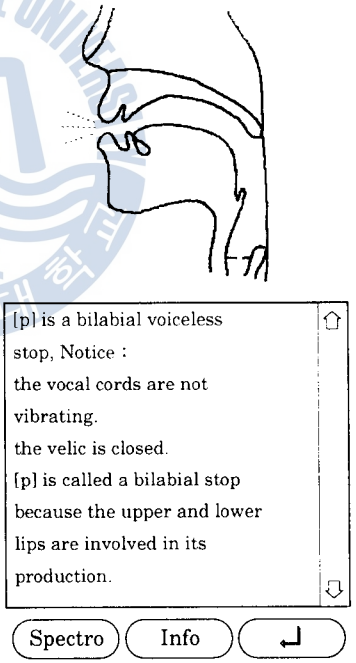


Fig. 3

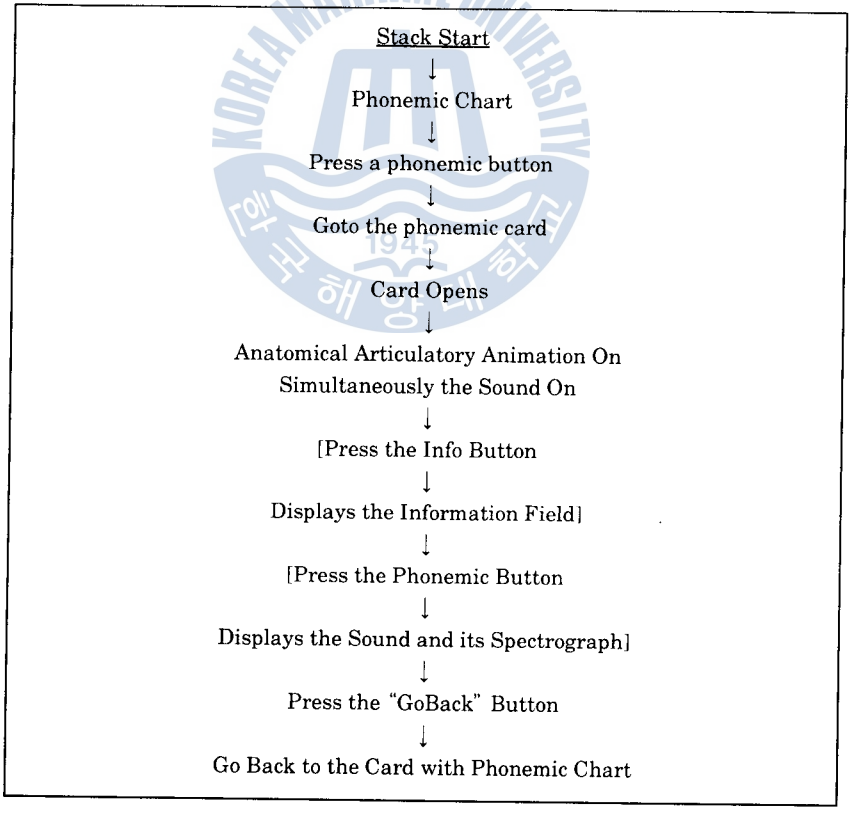
3.2 Scripting

Considering what Visual Pronunciation can do, the script(programming) itself is extremely simple. All it requires is the data, objects, navigational scripting. Before the paper discusses scripting with examples, it reviews the flow chart of Visual Pronun-

ciation as follows :

As the stack of Visual Pronunciation opens, the card with phonemic chart appears. Each phonemic button executes the following script when pressed. The keyword, mouseUp, takes the name of the phonemic button, for example /p/, as its argument and pass the argument to the function, *articulate*. The function, *articulate*, checks the field "map" of card "map" in Chart 1 to match if any first item in the field is the name of the phonemic button, that is /p/. If it does match, push the current card and go through the

Flow Chart



```
on mouseUp
  articulate(short name of me)
end mouseUp

on articulate myname
  repeat with i=1 to number of lines of fld "map" of cd "map"
    if myname=item 1 of line i of fld "map" of cd "map" then
      push cd
      repeat with j=2 to number of items of line i of fld "map" of cd "map"
        go cd(item j of line i of fld "map" of cd "map")
        wait 20
      end repeat
      exit repeat
    end if
  end repeat
end articulate
```

Script 1

```
p, p1, p2
t, t1, t2
k, k1, k2
m, m1, m2, m3
.....
```

Chart 1

designated series of cards.[6] Moving across a series of cards brings the effects of animation like moving the low jaw or flowing air streaks.

Other scripts in the stack include those to show and hide the info field and to navigate the stack from card to card. The following script describes that as this button is pressed, the field "info" becomes visible meaning that the fields shows up with explanation on how to pronounce the phoneme /p/.

```
on mouseUp
  if visible of fld "info" is true then
    set visible of fld "info" to false
  else set visible of fld "info" to true
end mouseUp
```

Script 2

```
on mouseUp
  pop cd
end mouseUp
```

Script 3

Script 3 describes that as the button is pressed, it pops the top on the stack and moves to the top.[7] In this case, once user views the series of cards showing the articulatory action, then the last card stays on until user takes an action. Therefore, if user wants to try another phoneme in the same cycle, (s)he needs to go back to the first card where the phonemic chart resides. This is where user uses the navigation button just to move around card to card in the stack.

As we have browsed through the scripts that are used to utilize Visual Pronunciation, there is nothing magical about them. Any user can script with a little learning and experience to accomplish in creating a teaching tool. Visual Pronunciation demonstrates the point well in that it aids the phonetic acquisition by providing a visual image as to how to articulate certain English phoneme.

3.3 Further Development

Visual Pronunciation currently shows only a segmental phoneme without any contextual presentation. However, mispronunciation

tends to occur more often when a phoneme is contextually influenced by either an adjacent phoneme or suprasegmental element. Visual Pronunciation will be improved to reflect the above observation in such a way that any combination of phoneme can be viewed in sequence visually emphasizing the changes made in a connected sequence of phonemes.

Another area of improvement to be made is that user records his/her pronunciation and is able to see the spectrograph in real time. By doing this, user can visually compare his/her spectrograph with already recorded one and try to maximize the imitation of the graph.

4. Conclusion

Speech technology is an essential component of CALL software aiding phonetic acquisition. It includes recognition for reception of speech signals and synthesis for production of speech. The former case remains to solve the problems involving recognizing a continuous speech using unlimited number of vocabulary independent of speakers. The later case remains to solve intelligibility and naturalness of the produced speech.

There are various ways to integrate speech technology in foreign language teaching. For example, we can hire speech technology to improve functional skills such as listening comprehension. This paper demonstrates another way to use a corner of speech technology in a broader sense to visualize the articulation of English phonemes. This paper is also intended to show that the courseware development in CALL needs to integrate teachers' expertise more vigorously and this environment will be best furnished by providing easy – to – use authoringware for teachers.

Notes

1. Details of sound substitution, underdifferentiation, overdifferentiation and reinterpretation of distinctions appear in Section 2. Mispronunciation Types.
2. Mispronunciation Types.2. ESPRIT stands for European Strategic Program for Research and Development in Information Technology.
3. Weinreich(1953) divides interference into phonic, phonotactic and suprasegmental interference and further classifies phonic into sound substitution, underdifferentiation, overdifferentiation and reinterpretation of distinctions.
4. Secondary system refers to the phonological system of foreign language which learners are learning.
5. Primary system refers to the phonological system used by the speakers as their native language. For example, a Korean learner of English has Korean phonological system as his/her primary system.
6. The action "push" indicates that Hypercard puts the current card onto the stack and moves into another card.
7. The action "pop" is the opposite to the action "push", that is, it destacks the top from the stack.

References

Adams, E. N., H. W. Morrison & J. M. Reddy(1968) "Conversation with a Computer as a Technique of Language Instruction." *Modern Language Journal*, 52(1), pp.3 - 16.

Ahmad, K., G. Corbett, M. Rogers & R. Sussex(1985) *Computers, Language Learning and Language Teaching*. Cambridge University Press.

Ahn, Mikyung(1991) *An Analysis of Korean Speakers' Errors in English Pronunciation*. M. A. Thesis, University of Wales, Cardiff.

Broselow, E.(1983) "Nonobvious Transfer : On Predicting Epenthesis Errors." In Susan Gass and Larry Selinker(eds.), *Language Transfer in Language Learning*, pp.269 - 280. Newbury House, Rowley, MA.

Broselow, E.(1984) "An Investigation of Transfer in Second Language Phonology." *IRAL* 22(4), pp. 256 - 269.

Dickson, B. C. & J. C. Ingram(1982) *A Teacher's Manual for the Visible Speech Aid for the Hearing - impaired Microcomputer Package*. Software Research Co., Victoria, BC.

Esling, J. H., M. Warbey & J. R. Scholefield(1984) "ESL Courseware : A Developmental Framework Including Discussions of University - Level and Elementary - Level Programs." *TEAL Occasional Papers*, 8, pp. 41 - 51.

Gussmann, E.(1984) "Contrastive Analysis, Substantive Evidence and the Abstractness Issue." In Theoretical Issues in Contrastive Phonology(ed.) , Stig Eliasson(ed.), *Theoretical Issues in Contrastive Phonology*, pp. 27 - 36. Julius Groos Verlag, Heidelberg.

Hart, R. S.(1981) "Language study and the PLATO system." *Studies in Language Learning*, 3, pp.1 - 24.

Henderson, E. J. A.(1971) *The Indispensible Foundation : A Selection from the Writings of Henry Sweet*. Oxford University Press, London.

Kohler, K.(1984) "Contrastive Phonology and the Acquisition of Phonetic Skills." In Stig Eliasson(ed.) *Theoretical Issues in Contrastive Phonology*. Julius Groos Verlag, Heidelberg.

Lehtonen, J. and K. Sajavaara(1984) "Phonology and Speech Processing in Cross - language Communication." In Stig Eliasson(ed.), *Theoretical Issues in Contrastive Phonology*, pp.85 - 99.

Lovely, R., M. Mcdade & Min - Sue Kang(1987) "Pronunciation of /P/ and /F/ by Korean Learners of English." *Yenge Kyoyuk* (*English Education*) 33(2), pp. 197 - 215.

Molholt, G.(1988) "Computer - assisted instruction in pronunciation for Chinese speakers of American English." *TESOL Quarterly*, 22, pp.91 - 111.

Oh, Kil - Rok, Ki - Sun Choi & Se - Young Park(1994) *Hangul Konghak(Korean Language Engineering)*. Daeyoung - sa, Seoul, Korea.

Paik, Young - Ja(1977) "Pronunciation Difficulties of Korean Students Learning English as a Second Language." *Ehak Yonkwu(Language Research)* 13(2), pp.177 - 189.

Pennington, M. C.(1989) "Applications of computers in the development of speaking and listening proficiency." In M.C. Pennington(ed.), *Teaching Languages with Computers : The State of the Art*, pp. 99 - 121. Athelstan, La Jolla, CA.

Redard, F.(1973) *Contrastive Phonemics : Notes and Exercises*. Centre de Linguistique U Newchatel, Newchatel, Switzerland.

Rubach, J.(1984) "Rule Typology and Phonological Interference." In Stig Eliasson(ed.), *Theoretical Issues in Contrastive Phonology*, pp. 37 - 50. Julius Groos Verlag, Heidelberg.

Sherman, L.(1987) "Aural Discrimination Difficulties with English Consonantal Phonemes Among Korean University EFL Learners." *Yenge Kyoyuk(English Education)* 33(2), pp. 249 - 272

Singh, R.(1985) "Prosodic Adaptation in Interphonology." *Lingua*, 77(4), pp.269 - 282.

Stockwell, R., D. J. Bowen and J.W. Martin(1965) *The Grammatical Structures of English and Spanish*. University of Chicago Press, Chicago.

Sweet, H.(1877) *A Handbook of Phonetics*. Clarendon Press, London.

Tarone, E,(1984) "The Role of the Syllable in Interlanguage Phonology." In Stig Eliasson(ed.), *Theoretical Issues in Contrastive Phonology*, pp. 63 - 72.

Wenk, B. J.(1979) "Articulatory Setting and De - fossilization." *Interlanguage Studies Bulletin*, 4, pp. 202 - 220.

_____.(1983) "Articulatory Setting and the Acquisition of

Second Language Phonology." *Revue de Phonetique Appliquee*, 65, pp.51 – 65.

_____.(1979) "Speech Rhythms in Second Language Phonology." *Language and Speech*, 28(2), pp.157 – 175.

Yu, Man – Geun(1987) "A Study of Korean College Students' Discrminatory Power on English Vowels." *Ungyong Enehak* (*Applied Linguistics*) 8(2), Language Research Center, Seoul National University.

KOREA MARITIME UNIVERSITY
1945
한국해양대학교