

“Sound Spellings: Online Pronunciation Enhancement in a Computer Assisted Language Learning Environment

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Abstract. This study examines the impact of a methodology for enhancing English as a second language pronunciation among Japanese learners through web-based listening and speaking exercises. Students in classes using an emergent approach for countering “Katakana-English,” characteristic Japanese sound patterns mistakenly adopted during English pronunciation, were compared to others doing traditional pronunciation training. The methodology used adapted a simplified reading system often utilized by broadcasters, dubbed here “Sound Spellings,” to provide new patterns of pronunciation that may assist in breaking down Katakana-based pronunciation tendencies. Independent raters compared pronunciation of written key terms from the textbook being used among a sample group, including students undergoing the Sound Spellings treatment and others instructed with traditional exercises. Results show significant improvement in pronunciation among students undergoing the Sound Spelling treatment, as compared to moderate to weak improvement among the control group. The findings suggest more development of similar approaches may help reduce Katakana-based soundings and offer significant improvement for Japanese learners of English.

Keywords: Sound Spellings, electronic textbook (etext), pronunciation teaching, Computer Assisted Language Learning (CALL), Katakana-English

1. Introduction

Learners often place greater emphasis on pronunciation than second language instructors, who may see explicit activities designed to enhance these skills, such as minimal pairs, phonemes, or word-based drills counterproductive to larger goals of maintaining a communicative classroom (Fraser, 1999; Acton, 1997; Willing, 1993). Educators generally receive little or no instruction in pronunciation training methodologies during teacher preparation and degree programs (Fraser, 1999). They also may feel uncomfort-

able giving phonetic or phoneme training to their students due to a limited background in phonology and phonetics. Indeed, effective pronunciation teaching methods require insights into difficulties faced by a particular group of language learners and an awareness of effective techniques for overcoming them. Most instructors acquire this practical knowledge through years of teaching experience, gradually learning which patterns work best with particular groups of learners.

The current study evaluates whether an internet-based textbook, or *etext*, can be effectively used as a stimulus for pronunciation activities carefully designed for intermediate learners of English in a Japanese post-secondary instructional context. Second language input and interaction with speaking models are essential features in growth of pronunciation skills (Acton, 1994; Dalton & Seidlhofer, 1994; Morley, 1989). But many, if not most L2 learners study in an educational setting whether L2 speaker interaction is all but impossible. Or, is it? If the possibilities for Computer Assisted Language Learning (CALL) based instruction are realized, it may be possible to reproduce interaction opportunities that benefit students in similar ways to actual interaction with target language speakers through computer based activities. If students can adjust their L2 pronunciation through modification, as typically found with person to person interaction, through computer-based stimulus, considerable opportunities will be created for enhancing SLA pedagogy with CALL. The impersonal nature of CALL platforms has been seen to reduce learner trepidation in communicating in some studies of CALL-based discussion (or *forum*) (See: Blackwell, Cripps, & Culhane, 2003). The suggestion made is that a somewhat artificial setting can limit fears of making errors in pronunciation arising in person to person interaction.

The electronic textbook, or *etext* used in the current study extends its paper equivalent, a content-based English textbook using Global Issues as its content (*Your World: Global Issues for English Learners*, Kyoto: Pacific Interactive Press) features a series of learning tools for a CALL environment, which augments the paper text in important methodological directions. These include: listening guides using native speakers to read key terms and paragraphs of the text; a series of pronunciation, listening, and comprehension review materials; practice quizzes and review questions; as well as numerous on-line learning tools (See: Culhane, 2003). Second Language Acquisition (SLA) theoretical underpinnings of this *etext* are quite broad (Communicative Language Teaching, Input and Output Hypotheses, Student-centered Instruction, Content-based Language Learning, Key Visual, and other recent work in SLA methodol-

ogy (See: Culhane, 2003). The purpose of the current study is to ascertain if this environment can also be used effectively to assist students in improving their English speaking ability. It is a flexible pattern that is HTML-based and therefore requires no software installation on user computers. However, this is a large challenge, considering pronunciation software for CALL typically involves huge quantities of example files and a series of hardware or computer system requirements to be met. In a limited trial of the methodology, eight classes from three universities in Kyushu, Japan were included: Kagoshima University and Kagoshima International University in Kagoshima Prefecture, and Ritsumeikan Asia Pacific University in Oita Prefecture.

2. Background

The foundation for methodology used in the current student comes from recognition that second language learners hear English differently than native-speakers, are frequently unable to distinguish between different sounds in English, and may not hear pronunciation differences between themselves and stronger speakers. Pronunciation researchers frequently report each of these problems (Fraser, 1999; Acton, 1997; Yule & Macdonald, 1994). In a characteristic study, Yule & Macdonald (1994) analyzed perceivable affects and patterns of change in pronunciation as a result of four different types of pronunciation teaching. Twenty-three Chinese-speaking background students learning English with relatively weak speaking abilities were tape recorded speaking key word utterances in a limited study. *Explicit instruction* and *teacher-led corrective feedback* were surprisingly ineffective in comparison to *listen and repeat* methods controlled by students. The authors suggest such learner-centered methodologies further support goals of a communicative classroom, and likely increase student interest in a positive way for further communication opportunities (Yule & Macdonald, 1994).

The methodology used in the current study follows a learner-based approach, focusing on traditional weaknesses of Japanese-speaking learners of English; in particular, tendencies to reproduce sound systems from one of three Japanese syllabries, *Katakana*. Katakana is a 46-part syllabry used primarily to write foreign words that do not have equivalents in Chinese characters, or *Kanji*. Learners from non-alphabetic writing systems have been found to have greater difficulties referring to individual sounds within words than those from first languages using roman-based scripts (Fraser, 1999). In a Japanese context this is particularly acute, as the sound system used for Katakana is not demonstrably different from that used for native Japanese words,

written with the *Hiragana* syllabry. It is therefore quite understandable that learners would borrow these sounds when reading foreign words, whether they are written in Katakana or Roman script, known as *Roma-ji* in Japanese. Examples of how this pronunciation tendency can be seen are found in the English words *labour* and *roles*. First, one pattern is to replace “R” sounds with “L” sounds, following Katakana rules, as it does not include any exact “R” sounds. Thus, the “L” at word initial position in *labour* can become *r-ay* rather than *l-ay*, and an “L” in word initial position when the speaker pronounces the word *roles*. Japanese pronunciation requires a sound approximating a mid-point between “R” and “L”...leading to *roles* sounding more like *lo-ru-su*. The final sound in this word is also problematic because Katakana follows a strict consonant-vowel pairing in all but a limited number of syllables. The word final “R” sound in *labour* can become an extended “A” sound; when these two aspects of Katakana-based pronunciation are paired, we arrive at *ray-baa* and *lo-ru-su*. Each of these patterns were found among students in the research program.

The system for simplifying correct pronunciation of English words created, termed, *Sound Spellings*, borrows from techniques used by radio and television journalists. It is a relatively simple system of writing words according to their sounds that can assist readers with correct sounds to be used in pronunciation. For example, imagine the challenge faced for a radio announcer who must read the name of professional golfer *Mark Calcavecchia*. *Sound Spellings* provide a guide, such as *mar-k kal-ka-veck-ee-a* that allow the reader to pronounce the word much more accurately. Second language instructors rarely have the classroom time needed to teach international phonetic systems and extensive coverage of phonological rules. In contrast, simplistic writing of pronunciation patterns through *Sound Spelling* type methodologies require little time, and may prove to be powerful tools for weaker learners in a pedagogical sense. Of course there are some natural concerns with giving students incorrect spellings of a given word or phrase to assist their pronunciation. Yet, in the context of Japanese learners of English, instructors frequently notice their students already do this, by writing Katakana pronunciation guides for words they encounter on their own. *Figure 1* shows an example of a learner involved in the research program doing exactly this.

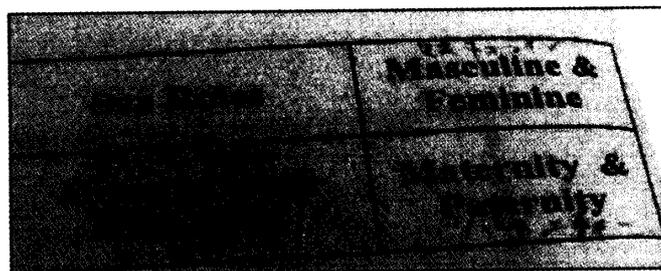


Figure 1 Student Katakana Writing to "Assist" Pronunciation

3. Methodology

Students in three classes at *Site 1* (Ritsumeikan Asia Pacific University) and two classes at *Site 2* (International University of Kagoshima) underwent the Sound Spelling teaching program. Learners were trained in a single class session on how to pronounce *Key Terms* from a chapter on Gender Issues in the textbook *Your World: Global Issues for English Learners* (Culhane, 2003), and practiced these in short periods in 1-2 later classes during the spring semester of 2003. The groups included classes of lower level (*Lower 1* and *Lower 2*) (TOEFL 350-400) at Site 1, and two groups reflecting these latter two classes (*Lower 3* and *4*) at Site 2. The Control sample, who received traditional pronunciation training, involved a moderate intermediate group at Site 3 (Kagoshima University) (*Moderate-Control*) and a lower group, reflective of the other groups in the experimental sample from Site 2 (*Lower-Control*). In the overall sample, students ranged in age from 18-20 years old, with a few students from 22-25. For the pre-training assessment students were asked to read the key terms while being video-taped. They were not given time to prepare or to query other students or their instructor on pronunciations. Thus, it was a *cold read* situation that was thought to offer the best sample of their reading-to-pronunciation tendencies for comparison with patterns produced when these were treated through the two training efforts. Most students in both groups displayed typical Katakana pronunciation tendencies, except for students in one class from Site-1, who were largely from Chinese and Korean speaking backgrounds. This challenge to the validity of the research program was at first unintended, but actually furnished a fascinating contrast with the larger Japanese speaking background sample, to be discussed further in the results section. Table 1 presents a few of the characteristic pronunciation errors found in the initial assessment; Sound Spellings examples are given to demonstrate English alphabetic soundings for these pronunciation patterns.

Table 1 *Characteristic Pronunciation Errors-Katakana and Romaji Soundings*

Key Term	Katakana Sounding	Romaji Equivalent
Gender Roles	<ul style="list-style-type: none"> ● ゼンダーロールス ● ジェンダーロールス 	<ul style="list-style-type: none"> ● zen-da-a roo-ru-su ● jen-da-a ruu-ru-su
Masculine	<ul style="list-style-type: none"> ● マスクライン ● マスキュライン 	<ul style="list-style-type: none"> ● ma-su-ku-ra-ee-n ● ma-su-kyu-ra-ee-n
Feminine	<ul style="list-style-type: none"> ● フェミナイン 	<ul style="list-style-type: none"> ● fe-mi-nain
Hierarchy	<ul style="list-style-type: none"> ● ヒラキー ● ヒエラルキー 	<ul style="list-style-type: none"> ● hi-ra-ki ● hi-e-ra-ru-ki-i
Maternity Paternity	<ul style="list-style-type: none"> ● マテニティ ● パテニティ 	<ul style="list-style-type: none"> ● ma-te-ni-tee ● pa-te-ni-tee

Once the pre-test sampling was complete the two researchers carried out the training program. In teaching pronunciation through the Sound Spelling training system in the classroom, the researchers accessed the etext website and opened one of the chapters there, in this study case: Chapter 5 "Gender Equality." This required a CAI (computer assisted instruction) room and a computer for the instructor, as well as a big display screen for the students to watch. For this study a CAI room was made available, which furnished the instructor's computer and TV monitors for each student. When the system was ready for use, the researcher employed a series of training steps, which would eventually form one set of the teaching methodology. First, students listened to the Sound Spellings of each key term (altogether, 10) once or twice. Then, they were asked to repeat them a couple of times. It was considered important for students to follow the pronunciations as given, in order to help break down Japanese-based Katakana tendencies. The imitation is the key for success. In the final step, students spoke the key terms at the same speed as the Sound Spelling model, simultaneously with the native speaker on the etext. It normally took about 30 minutes to implement each of the three steps. Of course, as "practice makes perfect," students repeated this technique in subsequent class sessions over the next few days. After these, students were videotaped for the second time to serve as the post-test evaluation.

In order to evaluate student pronunciation of these terms, contrasts were carried out through initial speaking analysis done blindly by two trained, independent raters, who were English as Second Language instructors at Canadian universities. Because the raters were not aware of which students were in Control or Experimental groups, or whether they were listening to pre-or-post test recordings of an individual student,

they were able at the same time to assess both initial and post-training results. The raters were asked to assess learners on four aspects: pronunciation of L and R sounds (abbreviated to “L” and “R” hereafter), added sounds, and an overall rating of general proficiency. Each score was out of 10, with ten being an *advanced* English as a Second Language speaker. Evaluations received from the raters were initially used to establish Control to Experimental group equivalency, providing Cronbach Alpha internal consistency estimates that met an acceptable degree for contrastive purposes (See: Tabachnick & Fidell, 2001); estimates between the respective Control and Experimental groups varied on “L” sounds (.84), “R” sounds (.79), added sounds (.75), and general proficiency (.87).

4. Findings

The general finding is that students in each class benefited from pronunciation training, irrespective of whether it was Sound Spelling treatment or traditional exercises. This provides a measure of validity for the recording and evaluation procedures, as some growth in pronunciation would be expected as a general trend in mean scores following treatment of any kind (See: Schumacher & McMillan, 2001). However, students in the Sound Spelling classes made significantly greater gains in overall pronunciation scores than students undergoing traditional pronunciation exercises ($F=30.05$, (1,154) $p.<0.001$). Table 2 reports the ANOVA findings in contrasting Experimental to Control group changes in overall pronunciation means scores.

Table 2 ANOVA Findings Overall Pronunciation Mean Score Comparison

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	141.044	1	20.149	30.058	.001
Within Groups	103.234	154	.670		
Total	244.278	161			

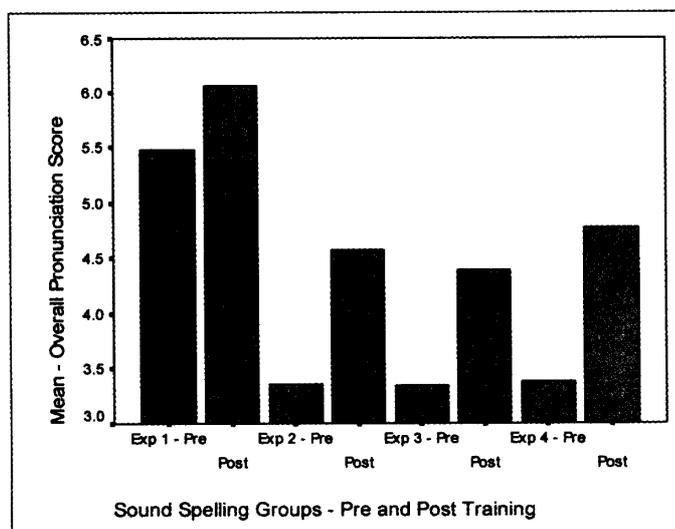
Average scores for students in the Experimental group undergoing Sound Spelling training rose from (3.89) to (4.95) on the 10 point evaluation scale from the independent raters. Table 3 breaks down the changes in pronunciation scores by each group, comparing the same students from before Sound Spelling training to following the sessions on pronunciation of the same words.

Table 3 Pronunciation Scores and Changes Experimental Groups-Pre-Post Treatment

GROUP	Mean	Change	Sig.	Std. Deviation	N
Experiment #1	Pre-test	5.472		1.049	18
	Post-test	6.055	+0.58	.396	18
Experiment #2	Pre	3.361		.681	18
	Post	4.583	+1.22	.002	18
Experiment #3	Pre	3.347		.647	23
	Post	4.391	+1.04	.001	23
Experiment #4	Pre	3.386		.554	22
	Post	4.772	+1.39	.001	22

* The mean difference is significant at the .05 level. ** Levene statistics gathered to test for homogeneity of variances were not significant (Levene=1.284, Sig.,262).

The greatest improvement in pronunciation occurred in the weakest groups, which is unsurprising, as these learners had the most room for improvement. In contrast, more extensive training would likely be needed to enhance what is an already higher level of pronunciation among stronger students. However, the Sound Spelling training given was designed for relatively weak speakers, and therefore the results reflect objectives of the research program. *Figure 2* displays the findings in a graphical format, allowing for a clear pattern of growth to be seen.

*Figure 2* Pre-Post Scores for Experimental Groups

In *Figure 2* it can be seen students with the highest pre-test scores (Exp-1) benefited least from the Sound Spellings treatment. However, it should also be noted that even this group did display stronger overall performance scores in ratings from the independent evaluators. Other groups, Exp-2 / EXP-3 / and Exp 4, show significantly higher overall pronunciation scores post-treatment.

The purpose of the research program was not simply to establish whether this system worked, but also to define where it appears to offer the most for Japanese learners of English. The next step in the research program was therefore to determine the source of these higher evaluations. The four separate aspects of student pronunciation evaluated by the raters were then contrasted for this purpose among the Experimental group from pre to post testing. These were: pronunciation of "L" and "R" sounds, stress, and added sounds. Table 4 reports the ANOVA findings from pre to post test scores among students undergoing the Sound Spelling treatment in each area.

Table 4 ANOVA Findings L, R, STRESS, and ADDED Pre-Post Comparison

Variable	Mean	Change	df	Mean Square	f	Sig.
L Sounds Pre-test	3.61	+0.75	1, 161	22.594	22.78	.002
	Post-test					
R Sounds Pre-test	3.62	+0.42	1, 158	7.136	5.76	.018
	Post-test					
Stress Pre-test	3.72	+0.13	1, 158	.816	.963	.328
	Post-test					
Added Sounds Pre-test	3.71	+0.32	1, 161	4.14	4.49	.036
	Post-test					

* The mean difference is significant at the .05 level. ** Levene statistics gathered to test for homogeneity of variances were not significant

Table 4 shows significant improvement among students in ratings in three areas: L sounds, R sounds, and in a reduction of the amount of added sounds. *Figures 3, and 4* graphically display these findings.

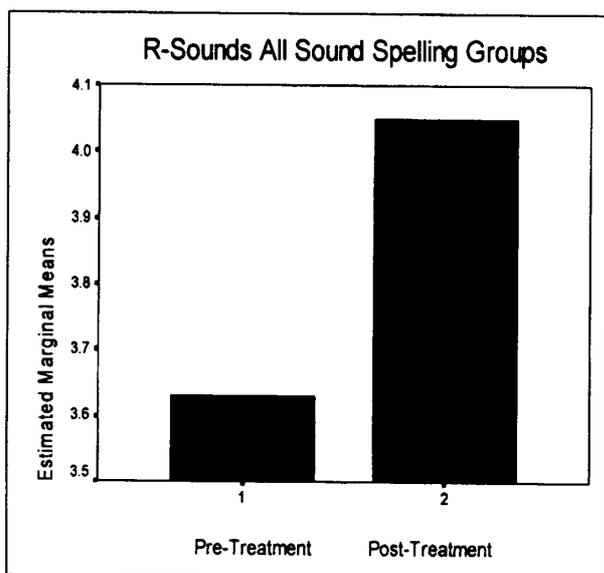


Figure 3 Pre-Post Treatment R Sounds

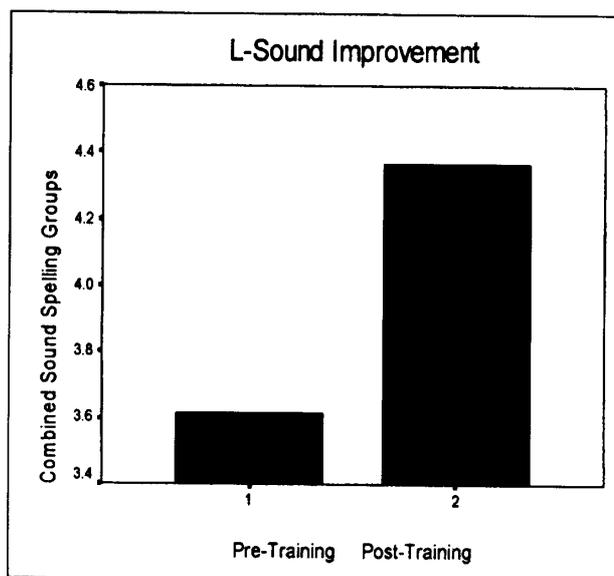


Figure 4 Pre-Post Treatment L Scores

While improvements were shown in the stress evaluations, these are shown in Table 4 to not be significant. *Figure 5* displays this graphically.

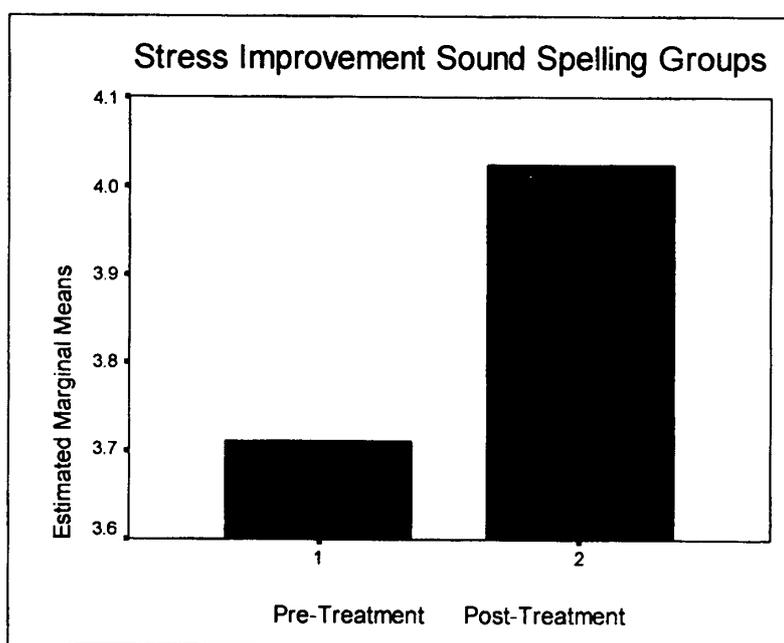


Figure 5 Stress Improvements-Sound Spelling Group

5. Discussion

The findings suggest the type of training offered in the Sound Spelling system may be beneficial for Japanese learners of English in counteracting typical pronunciation difficulties they face, particularly in regards to "L" and "R" sounds, in reducing the

number of added sounds, and in assisting them with overall pronunciation tendencies. The goals for second language pronunciation teaching should be to have students increase both in confidence to speak and in the intelligibility of their utterances. Thus, this methodology should be seen as only part of a larger process aimed at reducing learner anxiety for speaking that builds confidence to practice and also use their English in more dynamic communicative situations. As many Japanese learners of English lack confidence when speaking in public, particularly in their second language, it needs to be further evaluated the degree to which this type of methodology decreases this anxiety. It is unclear what effect a methodology like Sound Spellings has on directly countering fears of incorrect pronunciation, likely to be key aspects of such anxiety, and how this relates to speaking behaviour of language learners. From this perspective, the next step in a thorough analysis of the Sound Spelling methodology calls for an exhaustive research effort involving a longitudinal design that features similar pronunciation evaluation, but also includes attitudinal components in learner reactions to the treatment.

References

- Acton, W. (1997) Seven Suggestions of Highly Successful Pronunciation Teaching. *The Language Teacher*, Vol., 21, No. 2 Online Version.
- Culhane, S.F. (2003) (Ed.,) *Your World: Global Issues for English Learners*. Kyoto: Pacific Interactive Press.
- (1999) "Entering the 21st Century; the Challenge and Opportunity of CALL in Second Language Instruction", *Polyglossia*, Center for Modern Language Education, Ritsumeikan Asia Pacific University, Vol. 2, Pp. 136-143.
- & Blackwell, J., & Cripps, A. (2003) Online Forum Discussion in an English as a Second Language Context: Relating Teacher Initiation to Student Entries. *Polyglossia*, Ritsumeikan Asia Pacific University, Center for Modern Language Education, Vol., 8, In Press.
- Dalton, C., & Seidlhofer, B. (1994) *Pronunciation*. Oxford: Oxford University Press.
- Fraser, H. (1999) ESL Pronunciation Teaching: Could it Be More Effective? *Australian Language Matters*, Vol., 7, No. 4, 7-14.
- Mills, D. (2000) Web-based technology as a resource for form-focused language learning. *TESOL Quarterly*, Pp. 603-615.

- Morley, J. (1989) *Current Perspectives on Teaching Pronunciation*. Washington, D.C. TESOL Publications.
- Tabachnick, B. & Fidell, L. (2001) *Using Multivariate Statistics* (Fourth Edition), New York: Harper Collins.
- Warschauer, M. & Kern, R. (2000) *Network-Based Language Teaching: Concepts and Practice*. Cambridge: Cambridge University Press.
- Watts, N. (1997) A Learner-Based Design Model for Interactive Multimedia Language Learning Packages. *System* Vol. 25, No. 1, Pp. 1-8.
- Willing, K. (1993) *Learning Styles in Adult Migrant Education*. Sydney, Australia: Australian National Center for English Language Teaching and Research.
- Yule, G. & Macdonald, D (1994) *The Effects of Pronunciation Teaching*. Faculty of Education, Simon Fraser University, Burnaby, Canada.