



Hacettepe University Graduate School of Social Sciences
Foreign Language Education
Department of English Language Teaching

**THE EFFECTIVENESS OF INSTRUCTION THROUGH MOODLE
AND ACCENT REDUCTION SOFTWARE ON THE
PRONUNCIATION OF EFL TEACHER TRAINEES**

A PhD Dissertation

Arif BAKLA

ANKARA, 2012

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TRAINEES

Arif BAKLA

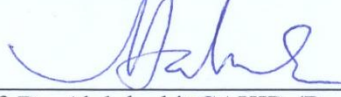
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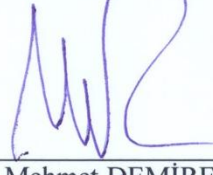
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KABUL VE ONAY

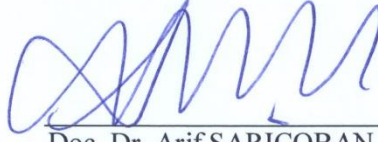
Arif BAKLA tarafından hazırlanan “The Effectiveness of Instruction through Moodle and Accent Reduction Software on the Pronunciation of EFL Teacher Trainees” başlıklı bu çalışma, 17/02/2012 tarihinde yapılan savunma sınavı sonucunda başarılı bulunarak jürimiz tarafından doktora tezi olarak kabul edilmiştir.



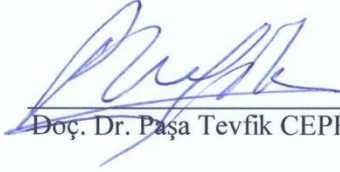
Prof. Dr. Abdulvahit ÇAKIR (Başkan)



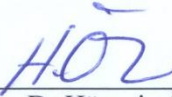
Prof. Dr. Mehmet DEMİREZEN (Danışman)



Doç. Dr. Arif SARIÇOBAN



Doç. Dr. Paşa Tevfik CEPHE



Yard. Doç. Dr. Hüseyin ÖZ

Yukarıdaki imzaların adı geçen öğretim üyelerine ait olduğunu onaylarım.

Prof. Dr. Ş. Armağan TARIM

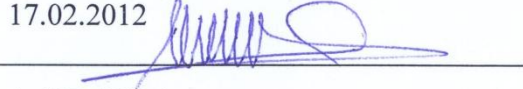
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BİLDİRİM

Hazırladığım tezin tamamen kendi çalışmam olduğunu ve her alıntıya kaynak gösterdiğimi taahhüt eder, tezimin kağıt ve elektronik kopyalarının Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü arşivlerinde aşağıda belirttiğim koşullarda saklanmasına izin verdiğimi onaylarım:

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ÖZET

BAKLA, Arif. *Moodle ve Aksan Düzeltme Yazılımı ile Öğretimin İngiliz Dili Öğretmen Adaylarının Sesletimi Üzerinde Etkinliği*, Doktora Tezi, Ankara, 2012.

İki deney grubu ve bir kontrol grubu ile yapılmış olan bu yarı-deneysel çalışma ana dili İngilizce olmayanların konuşmalarının anlaşılabilirliği ve sesbirimsel doğruluğu üzerinde ÖYS-tabanlı sesletim öğretimi ve aksan düzeltme yazılımının etkinliğini test etmeyi amaçlamaktadır. Bu çalışma, ana dili Türkçe olan öğrenciler için zorluğu ile bilinen sorunlu sesler üzerinde yoğunlaşmaktadır. Deney grubu 1 ($S=30$) belirlenen sorunlu sesleri ÖYS-tabanlı ortamda ve Deney grubu 2 ($S=29$) ilgili sesleri Pronunciation Power II adlı sesletim yazılımı aracılığıyla çalışırken, kontrol grubunda ($S=25$) geleneksel yöntem kullanılmıştır. Bütün gruplardaki katılımcılara (a) üretimsel sesletim esti, (Celce-Murcia vd., 1996; Hincks, 2005) ve (b) Sesletim Algı Testi (Shewell, 2005) uygulanmıştır. Öğretimden önce ve sonra, bütün öğrencilere Elliott'tan (1995) alınmış olan Sesletim Tutum Envanteri (STE, 12 madde, $\alpha=.840$) uygulanmıştır.

Ön-test ve son-test puanlarının t testi ile karşılaştırılması sonucunda diyalog bölümünde bütün grupların doğruluk ve anlaşılabilirlik, sorunlu ünlü ve ünsüzlerin algılanması ve tutumlar bakımından kendilerini geliştirdiği ortaya çıkmıştır. Bununla birlikte, paragraf bölümünde kontrol grubu doğruluk, $t(24) = -1.25$, $p = .222 > \alpha(.05)$ ve anlaşılabilirlik, $t(24) = 1.33$, $p = .198 > \alpha(.05)$ bakımından anlamlı gelişme gösterememiştir. Grupların son-test puanlarını karşılaştırmak için yapılan kovaryans analizi sonuçları çoğunlukla Moodle grubunun diğer grupların birinden ya da her ikisinden de daha iyi performans gösterdiğine işaret etmiştir. Diyalog bölümünde doğruluk bakımından, grupların son-test puanları arasında anlamlı bir fark çıkmamıştır, $F(2, 80) = 2.43$, $p = .095 > .05$. Fakat Moodle grubu diyalog bölümünde anlaşılabilirlik, $F(2, 80) = 14.07$, $p = .001 < .05$; ünlülerin algılanması, $F(2, 80) = 4.68$, $p = .012 < .05$ ve ünsüzlerin algılanmasında $F(2, 80) = 6.02$, $p = .004 < \alpha(.05)$ diğer iki gruptan da daha iyi performans göstermiştir. Ayrıca, paragraf bölümünde doğruluk bakımından aksan düzeltme yazılımının kullanıldığı grup, yalnızca kontrol grubundan anlamlı derecede daha iyi performans göstermiştir, $F(2, 80) = 3.68$, $p = .030 < .05$. Son olarak, Moodle grubunun tutum

puanları aksan düzeltme yazılımı grubundan anlamlı derecede farklı çıkmıştır, $F(2, 80) = 5.08$, $p = .008 < .05$. Öğrencilerin tutum puanları ile son-test puanları arasında çoğunlukla olumlu fakat istatistiksel olarak anlamsız korelasyon olduğu ortaya çıkmıştır. Genel olarak bu bulgular, sesbirim odaklı öğretimin özellikle ÖYS-tabanlı sesletim öğretiminin, yabancı dil öğrenenlerin sesletim becerilerini geliştirmede daha etkin olduğuna işaret etmiştir ve bilgisayar tabanlı aksan düzeltme yazılımının da faydalı olabileceği ortaya çıkmıştır.

Anahtar Sözcükler

Bilgisayar Destekli Sesletim Öğretimi, Moodle, Öğretim Yönetim Sistemi (ÖYS), Parçacıl Fonoloji, Ana Dili Türkçe Olan İngiliz Dili Öğretmen Adayları

ABSTRACT

BAKLA, Arif. *The Effectiveness of Instruction through Moodle and Accent Reduction Software on the Pronunciation of EFL Teacher Trainees*, PhD Dissertation, Ankara, 2012.

This quasi-experimental study with two experimental groups and a control group aims to test the effectiveness of LMS-based pronunciation instruction and accent reduction software in boosting intelligibility and segmental accuracy of nonnative speech. The present study focuses on notoriously problematic sounds for Turkish-L1 learners. The first experimental group ($N=30$) studied the selected problematic sounds in an LMS-based environment designed in Moodle, and the second ($N=29$) studied them through Pronunciation Power II, while the control group ($N=25$) was instructed in a traditional way. The participants were given a pretest and posttest containing (a) a productive pronunciation test (adapted from Celce-Murcia et al., 1996; Hincks, 2005), and (b) the Perception of Spoken English Test by Shewell (2005). Before and after the instructional period, they were also given a survey including Pronunciation Attitude Inventory (12 items, $\alpha=.840$), adapted from Elliott (1995).

A comparison of the pretest and posttest scores through t test indicated that all three groups improved their scores in terms of accuracy and intelligibility in the dialogue task, perception of problematic vowels, consonants, and attitudes. However, the control group did not show any significant improvements in terms of accuracy, $t(24) = -1.25$, $p = .222 > \alpha(.05)$, and intelligibility, $t(24) = -1.33$, $p = .198 > \alpha(.05)$ in the paragraph task. The results of ANCOVA carried out to compare the post-test scores of the groups indicated that it was mostly the Moodle group that outperformed one or both of the other groups. In terms of accuracy in the dialogue task, there was not a significant difference between the groups in the posttest, $F(2, 80) = 2.43$, $p = .095 > \alpha(.05)$. However, the Moodle group outperformed the other two groups in terms of intelligibility in the dialogue task, $F(2, 80) = 14.07$, $p = .001 < \alpha(.05)$; perception of vowels, $F(2, 80) = 4.68$, $p = .012 < \alpha(.05)$, and perception of consonants, $F(2, 80) = 6.02$, $p = .004 < \alpha(.05)$. Moreover, in terms of accuracy in the paragraph task, the accent

reduction software group did significantly better than the control group, but not than the Moodle group, $F(2, 80) = 3.68, p = .030 < \alpha(.05)$. Finally, the Moodle group's attitude scores significantly differed from those of the accent reduction software group, $F(2, 80) = 5.08, p = .008 < \alpha(.05)$. There were mostly positive but statistically insignificant correlations between the learners' PAI scores and their pos-test scores. These findings globally imply that phoneme training, especially LMS-based pronunciation training, is effective in helping nonnative speakers develop their pronunciation skills, and PC-based accent reduction software may also prove beneficial for learners.

Keywords

Computer-assisted Pronunciation Teaching, Moodle, Learning Management System (LMS), Segmental Phonology, Turkish-L1 EFL Teacher Trainees

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LIST OF ABBREVIATIONS

ANCOVA	: Analysis of Covariance
ASR	: Automatic Speech Recognition
CALL	: Computer-assisted Language Learning
CAPT	: Computer-assisted Pronunciation Teaching
CPH	: Critical Period Hypothesis
EFL	: English as a Foreign Language
EIL	: English as an International Language
LFC	: Lingua Franca Core
ELF	: English as a Lingua Franca
ESL	: English as a Second Language
ESP	: English for Specific Purposes
GA	: General American (Accent)
IPA	: International Phonetics Association
L1	: First Language
L2	: Second Language
LMS	: Learning Management System
MOODLE	: Modular Object Oriented Dynamic Learning Environment
NES	: Native English Speaker
NNS	: Nonnative speaker
NS	: Native Speaker
PAI	: Pronunciation Attitude Inventory
PHP	: Hypertext Pre-processor
RP	: Received Pronunciation
SCORM	: Sharable Content Object Reference Model
SFLT	: Second or Foreign Language Teaching and Learning
SLA	: Second Language Acquisition
TELT	: Training and Education of Language Teachers

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CHAPTER 1

INTRODUCTION

1.1. INTRODUCTION

Though pronunciation accounts for a certain amount of attainment in foreign language learning, especially in terms of the use of spoken language, it has not received enough attention in L2 teaching over the years. On the one hand, findings of several studies discussing the effect of instruction on pronunciation (Suter, 1976 cited in Robertson, 2003; Purcell and Suter, 1980; Yule and Macdonald, 1994) found almost no correlation between formal instruction and attainment in pronunciation learning. In line with such studies, some others with the same orientation claimed that pronunciation instruction is beyond control of teachers because motivation and L1 are the most prominent predictors of success in pronunciation. On the other hand, some other researchers provided evidence that instruction can help (e.g., Derwing, Munro and Wiebe 1998; Couper 2003). Bongaerts (1999) points out that all of the participants who belonged to the group of highly successful learners in his study received intensive formal training in Received Pronunciation.

Pennington (1989) is critical of Purcell and Suter (1980), who found that formal training had little or no impact on pronunciation. She stresses that quality of teaching as well as factors that affect formal pronunciation instruction are important considerations in carrying out research in phonology; she thinks that it is baseless to claim that pronunciation is unteachable or it is not worth the time and effort spent on it. She also convincingly makes the case that phonetically well-trained teachers with a communicative orientation can help learners to learn English pronunciation (p. 20). Moreover, as Robertson (2003) warns, instructional variables might have a deep impact upon the results of such studies. Similarly, Brown (2007b) correctly notes that “the quality and intensity of exposure are more important than mere length of time” (p. 285). Motivating learners and getting their attention during the lessons increase the quality of training.

In addition to the debates concerning the teachability and learnability of pronunciation in L2 pedagogy and those related to segmental and suprasegmental elements, recent issues regarding pronunciation teaching and learning tend to include a discussion of the role of technology in teaching pronunciation. This is because linguistics and SLA have taken interest in utilizing computers to develop speaking and pronunciation skills, and they have made considerable progress (Goodwin-Jones, 2009, p. 4). Seferoğlu (2005) stresses the importance of integrating technological tools into pronunciation teaching especially in contexts where L2 input is inadequate, so that learners can get a chance to practise language and interact with each other. Despite this relative progress and much discussion going on about the role of technology in pronunciation instruction, there aren't empirical studies with results that can be generalized (Murray, 2007, p. 747). In this respect, there is need for more empirical research.

The use of technology in this area includes the use of PC-based and web-based software to teach pronunciation. Although there is some compact software to practise pronunciation, such software is not goal-oriented and is not free from problems considering their scope, methodology and cost. As researchers and teachers discuss the value of these PC-based software packages (Seferoğlu, 2005), web-based and LMS-based pronunciation teaching lessons are on their way. Web-based teaching is a good alternative to off-line software because web-based software packages do not necessitate installation; an Internet connection is enough. The following sections present the nature and details of the current study and the reasons for undertaking it.

1.2. STATEMENT OF THE PROBLEM

The ability to develop near-native like fluency and intelligible pronunciation depends on quite a few factors such as exposure to native speech, attitudes, aptitude, and so forth. In most cases, intelligibility assumes more importance than near-native like fluency because most people, especially adults working or studying in English speaking countries need to understand others and make themselves understood in the speech community. In this respect, according to Corbett (2003), EFL learners should not be forced to conform to rigid standards which are difficult to attain even by native speakers

(p. 40). For EFL and ESL situations, certain degree of foreign accent can be tolerable for language learners as far as intelligibility is achieved. However, the case of foreign language teachers is rather different from EFL learners or those people who work in a foreign country. The existence of foreign accent might limit the teaching skills of language teachers. The feeling of failure in learning pronunciation might add to such a situation. In other words, EFL teachers' possible substantial progress in some other language skills might be obscured by their poor pronunciation, so they might get frustrated and they evaluate themselves negatively. Such teachers may experience a certain degree of teacher burnout because, as Cephe (2010) notes, a significant dimension of teacher burnout is "reduced personal accomplishment" (p. 31).

Unlike science teachers and some others who don't have to be native-like, language teachers do have to improve their pronunciation and at least have to catch a near native-like standard if not native-like. In order to achieve this, appropriate training should be provided at ELT departments. It may start by addressing various pronunciation problems at segmental level that result in accented speech because various types of segmental errors may have differential impact on intelligibility of nonnative speech (Rogers & Dalby, 1996). Training should focus on the production and perception of such sounds to improve intelligibility (Rogers, Dalby, and DeVane, 1994) because learners may have problems in both production and perception of the target sounds. Wells (2005) observes that learners' perception of sound contrasts is often neglected, but teachers have to teach how to produce and recognize minimal pairs; there is no way to avoid minimal pair work (p. 106). According to Aliaga-Garcia and Mora (2009), one advantage of phonetic training studies is that they enable us to test the role of input quantity and quality in learning L2 speech; this role is difficult to describe in naturalistic contexts (p. 11).

An English teacher with native-like proficiency in pronunciation can be good model for learners to imitate. Despite the significance of intelligible pronunciation, most learners exhibit severe fossilized errors. Therefore, they are negatively affected by the way they pronounce certain phonemes. Although native-like pronunciation is not limited to the articulation of individual phonemes, rehabilitating such errors is supposed to make

teacher trainees more self-confident and make their speech less accented. Such problems are not hard to guess, but a more accurate account of EFL teacher trainees' fossilization problems can be given after an analysis of errors found in a collection of learner speech samples.

1.3. PURPOSE OF THE STUDY

In order to train their prospective students in pronunciation and spoken skills, teacher trainees must have both a theoretical and practical understanding of the basics of phonetics and phonology of the target language. On the theoretical front, we have the knowledge of how speech sounds are produced, and on the practical one, there exists accurate, intelligible and near native-like use of the target language in communicational situations in academic and daily settings. The negative effect of problematic sounds can be seen in speech samples of Turkish EFL teacher trainees. An error-driven approach to pronunciation helps teacher trainees not only to get more confident in their speech, but also to be equipped with theory and practice.

Through literature review and error analysis of speech samples, this study sets out to identify the problematic phonemes for Turkish-L1 EFL teacher trainees, and it aims to explore the effectiveness of a LMS-based pronunciation instruction environment and accent reduction program to eliminate such problems. The researcher assists the participants to go beyond the so-called intelligibility threshold mentioned by some researchers like Mich, Neri and Giuliani (2006), Celce-Murcia, Brinton and Goodwin (1996), and Celce-Murcia and Goodwin (1991), to help them in their quest for improvement in accuracy.

1.4. SIGNIFICANCE OF THE STUDY

Burgess and Spencer (2000) recommend that when studying pronunciation, EFL or ESL learners should start with suprasegmental features, while those in teacher training programs should adopt a bottom up approach; that is, from segmental components to suprasegmentals (p. 209). For adult speakers to be understood better in professional

settings, perceptual and productive vowel contrast training and instruction in stress patterns work well (McCombs, 2006, p. 1). Some teachers adopt a modified bottom-up approach to pronunciation instruction because although they start with segmentals they do not assume that “the suprasegmental features will be learned without the need for formal instruction” (Luchini, 2005, 193). This signals the interaction of bottom-up and top-down approaches in pronunciation teaching. A different version of this interaction, as explained by Goodwin (2001), posits that the traditional bottom-up approach is being replaced nowadays with top-down one in which sounds are dealt with in a global manner and problematic areas are examined more closely according to this modern view (Goodwin, 2001, p. 119).

The rationale behind this study actually emerges from the calls of various researchers for empirical studies. For example, being critical of the overall ignorance of pronunciation in language teaching, Derwing and Rossiter (2002) stress the importance of carrying out empirical studies concerning the relationship between accent and pronunciation instruction, so that classroom teachers can base their practices on empirical research findings rather than intuitions to set their goals and determine their priorities (p. 379). Other researchers (Derwing and Munro, 2005; Morley, 1991) draw attention to the need for such studies to lend empirical support to classroom practices and to provide answers for critical questions or they stress the need for assessing the effectiveness of certain material types since poor materials may fail to help learners to improve their pronunciation (Macdonald, 2002), and still some others recommend working on the use and assessment of online materials (e.g., Hişmanoğlu, 2010a, 2010b).

In addition to calls for empirical research in general, some researchers (e.g., Wang and Munro, 2004) appeal for studies in computer-based training of a wider range of vowel contrasts (p. 542). Based on his quasi-experimental research on the effectiveness of text-to-speech software and Pronunciation Power I with totally 35 learners in three groups, Kılıçkaya (2011) draws attention to the need for research with larger groups of learners since his study was carried out with a small number of participants with time constraints. Hişmanoğlu (2010a) recommends that prospective studies on online

pronunciation pedagogy and materials should focus on (a) finding the right type of online materials and pedagogy, (b) training teachers on the use of online materials, (c) reliable ways of measuring success in using online materials, (d) whether to use a particular material in an online or traditional form, (e) appropriate online materials for various proficiency levels, and (f) the role of learners and teachers in online pronunciation teaching (pp. 51-52). Similarly, Goodwin-Jones (2009) suggests conducting research in traditional and computer-assisted pronunciation training (p. 8). The research undertaken in this study covers several of these issues mentioned above.

In conclusion, both intuition and empirical evidence should be used to resolve methodological problems. However, as Levis (2005) stresses, the importance attached to pronunciation has fluctuated over the years based on ideology and intuition rather than research (p. 369). Teachers' practical experience is invaluable in pronunciation pedagogy, but the problem is complete reliance on intuition. As far as the use of computer software in pronunciation teaching is concerned, Goodwin-Jones (2009) complains that although such software packages are popular, researchers opt for writing reviews about them rather than evaluating their value through empirical studies (p. 7). This is mostly true for language learning software in general and pronunciation oriented software in particular. Moreover, although there are some studies concerning the use of accent reduction software (Seferoğlu, 2005; Tuan, 2010; Tanner and Landon, 2009), text-to-speech software (Kılıçkaya, 2011), online pronunciation teaching (Hişmanoğlu, 2010a; Hişmanoğlu, 2010b; Hişmanoğlu and Hişmanoğlu, 2011), to the best of the researcher's knowledge, research on the use of Moodle for pronunciation teaching is relatively scarce (e.g., Wilson, 2008). In short, there is a need for empirical studies focusing on how technology fits in pronunciation pedagogy. Therefore, comparing pronunciation learning through accent reduction software and LMS-based learning environment is expected to contribute to the body of research in computer assisted pronunciation pedagogy.

1.5. RESEARCH QUESTIONS AND HYPOTHESES

In line with its overall goal of examining the instructional value of LMS-based and PC-based pronunciation learning environments, this study aims to seek answers to the

following broad research question: How do LMS-based pronunciation instruction CAPT software fit in pronunciation pedagogy? To answer this broad research question, a number of hypotheses and two qualitative research questions were formulated. The hypotheses are given below:

1. Phoneme training will have a statistically significant impact on segmental accuracy in the paragraph reading task in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).
2. Phoneme training will have a statistically significant impact on segmental accuracy in the dialogue task in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).
3. There will be statistically significant differences among the groups in the posttest in terms of segmental accuracy in the paragraph reading task.
4. There will be statistically significant differences among the groups in the posttest in terms of segmental accuracy in the dialogue task.
5. Phoneme training will have a statistically significant effect on intelligibility in the paragraph reading task in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).
6. Phoneme training will have a statistically significant effect on intelligibility in the dialogue task in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).
7. There will be statistically significant differences among the groups in the posttest in terms of intelligibility in the paragraph reading task.

8. Phoneme training will have a significant effect on perceptual vowel and consonant discrimination in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).
9. There will be statistically significant differences among the groups in the posttest in terms of intelligibility in the dialogue task.
10. There will be statistically significant differences among the groups in the posttest in terms of perception of vowels.
11. There will be statistically significant differences among the groups in the posttest in terms of perception of consonants.
12. All three pedagogical settings (LMS-based learning, learning through accent reduction software and learning in a traditional classroom) will be effective in helping learners to develop a positive attitude towards English pronunciation.
13. There will be statistically significant differences among the groups in the posttest in terms of developing a positive attitude towards learning English pronunciation and native-likeness.
14. There will be a significant positive correlation between the learners' attitude towards English pronunciation and their success in;
 - (a) perception of vowels
 - (b) perception of consonants
 - (c) segmental accuracy in the paragraph reading task
 - (d) segmental accuracy in the dialogue task
 - (e) intelligibility in the paragraph reading task and
 - (f) intelligibility in the dialogue task

As for the qualitative research questions, they concern how the learners in the experimental groups and the control group view the training provided. The qualitative research questions are given below.

1. What are the challenges experienced by the learners studying pronunciation through Moodle and Pronunciation Power II Software and those instructed in a traditional way?
2. What are the positive sides of the three pronunciation learning environments (LMS-based learning, learning through accent reduction software and instruction through traditional classroom)?

1.6. SCOPE AND LIMITATIONS OF THE STUDY

The present study focused on common pronunciation errors committed by EFL teacher trainees at the English Language Teaching Department of Hacettepe University. The study was carried out in the spring semester of 2010-2011 Academic year for 12 weeks. It involved only those sounds that were identified as problematic through error analysis, review of related studies examining learners' pronunciation errors and their perceptions of pronunciation problems, and functional load of phonemes. The speech sounds that are easy for Turkish L1 learners to learn and articulate as well as supra-segmental elements of speech are beyond the scope of this study.

1.7. DEFINITIONS OF TERMS

Below is a glossary of key terms that appear in this dissertation. Most of these terms belong to pronunciation and web-based pedagogy. An understanding of these terms is expected to enable the reader to get a full grasp of what is presented in this study. The terms are given in alphabetical order.

Accent: "A term used, especially by British linguists, to identify varieties of a language with respect only to phonetic and phonological properties of that variety" (Carr, 2008, p. 8).

Accuracy: “The extent to which a learner’s use of a second language conforms to the rules of the language” (Thurnbury, 2006, p. 2)

Authoring software: A computer program that is used to create interactive exercises for online learning environments

Computer-assisted pronunciation software: A PC program that teaches pronunciation to EFL/ESL learners as a part of an integrated language course or as a separately studied language area.

Intelligibility: The extent to which other people can understand a person’s speech

Learning management system: A software package that can help teachers and administrators to create content, to track students’ performance, report users performance as an e-learning system

Moodle: An acronym that stands for Modular Object Oriented Dynamic Learning Environment, an easy to use learning management system following the principles of Social Constructivism.

Native-likeness: The extent to which an EFL/ESL learner’s speech resembles that of a native speaker

Phoneme: The smallest meaning distinguishing sound in a language (usually minimal pairs are used to show the meaning differences caused by phonemes)

Post-instruction survey: A questionnaire that is administered after completion of a task or an instructional period to explore the participant perceptions about the task or the period in question

Pre-instruction survey: A questionnaire that is administered before an instructional period to identify participants’ motivation, perceptions about the task to be fulfilled.

Pronunciation Attitude Inventory: An attitudinal survey that seeks foreign language learners' attitudes towards native-likeness and learning pronunciation

Pronunciation Power II: The accent reduction software teaching English pronunciation mainly through minimal contrasts

Quasi-experimental research design: A type of research design in which the samples for the treatment and control groups are not randomly selected (Perry, 2005, p. 90).

Segmentals: The elements of pronunciation such as vowels, consonants, allophones, and so forth (Carr, 2008)

Suprasegmentals: "The class of pitch, juncture and intonation, functioning as phonemes. Prosody is another term for suprasegmentals (Demirezen, 1987, p. 174).

1.8. CONCLUSION

Adoption of various teaching practices by incorporating technological developments into language teachers' repertoires enables them to be fully equipped with instructional technology. The researcher provides the participants with opportunities to work with audio-visual and written content to support the instruction given in the pronunciation web site developed by the researcher in Moodle. A quasi-experimental research design with both quantitative and qualitative data collection tools is adopted in this study. At the end of the instructional period, the analysis of the posttest in comparison with the pretest results informed the researcher about the value of the PC-based and LMS-based instructional lessons with a remedial focus. The next section gives a review of the literature that forms the basis of this study.

CHAPTER 2

LITERATURE REVIEW

2.1. INTRODUCTION

In the last two decades, the impact of technology on language teaching pedagogy has been enormous. Since the advent of innovative tools at the turn of this century, both off-line and on-line computer-assisted language education have gained new dimensions. Each year, a new wave of software and web sites are introduced and one-way communication in traditional programs and websites has given way to more interactive environments where learner-generated content has become a regular part of online pedagogy. In such a context, new techniques have been introduced into pronunciation instruction. For example, Felps, Bortfeld and Gutierrez-Osuna (2009) discuss accent conversion that enables learners to listen to their own recorded speech after it is converted to resemble native speech through computer processing in terms of both prosodic and segmental features. This technique used with parallel recordings of the same text by native and nonnative speakers enables learners to listen to native accent from their own voice. Moreover, some software packages (e.g., Pronunciation Power I and II, Rosetta Stone, Learn to Speak English, etc.) provide intelligent feedback quickly (Eskenazi, 1999) through individualized feedback components, while some others using natural language processing make it possible for learners to interact with the computer.

Among these new developments, the latest trend still includes pronunciation training and accent reduction through the use of on-line and off-line computer assisted pronunciation software, CAPT for short. Neri, Cucchiaroni, and Strik (2002) state that CAPT software enables learners to gain access to unrestricted and real-time L2 input through various ways on their own. Such programs eliminate the constraints of classroom instruction and help learners to learn autonomously (Pennington, 1999). CAPT software also provides learners with the chance to compare their speech to that of a native speaker and track their progress throughout their course of study. These software packages and learning environments are suitable for those popularly referred to as “digital natives” (Prensky, 2001, p. 1), who rarely have problems using the available

technology. The new generation of students is more apt to utilise these interactive learning environments.

CAPT systems provide learners with a variety of interactive learning materials to practice pronunciation, and a great majority of instructional activities offered in computer-assisted pronunciation teaching contexts are not usually available in traditional learning environments. However, a significant drawback of today's systems is that they do not allow learners to speak freely to create their own sentences because automatic speech recognition (ASR) systems entail certain amount of predictability (Eskenazi, 1999, p. 65).

Most of such CAPT software is usually evaluated to decide whether it is worth spending time and money on it. Cheaper or totally free alternatives to commercial software are needed to make computer-assisted pronunciation teaching software easily accessible. Stenson, Downing, Smith and Smit, (1992) stress that language programs and administrators are interested in equipment that not only justifies the expense, but also helps learners to acquire better spoken skills in a shorter time (p. 5). Online versions of pronunciation software are obviously more accessible for learners and these versions are easier to use and cheaper if not totally free. Therefore, online applications of pronunciation teaching are becoming more and more widespread, and some initiatives have been taken to research online pronunciation instruction. Keeping these transformations and innovations in mind, the rest of the chapter gives background information on pronunciation instruction and goes on to explore other issues including CAPT, Moodle and the body of research related to these issues.

2.2. HISTORY OF PRONUNCIATION INSTRUCTION

Throughout the history of English language teaching, various approaches or methods adopted different views concerning the role of pronunciation in language pedagogy, the importance of accuracy, fluency and the approach to pronunciation teaching, and so forth. During the days of structuralism in the 1940s and 50s, grammar and pronunciation were two components that were emphasized both in America, where

audio-lingual method was the paradigm and in UK, where situational language teaching was the norm (Morley, 1991, 484). Traditional approaches to pronunciation stressed the importance of minimal pair contrasts, and they followed a structural way of practising of suprasegmental features. Drills, articulatory descriptions, imitation and mimicry memorization accounted for most of the instruction in the class. They ultimately aimed at native-like pronunciation (Luchini, 2005, 192). Inspired by the communicative language teaching and some experimental studies (Purcell and Suter, 1980) that found little or no value in teaching pronunciation, methodologists and teachers began to discuss whether to teach pronunciation and how to teach it if it is worth doing so.

A significant factor that contributed to the marginalization of pronunciation instruction was the advent of communicative approach (Levis and LeVelle, 2010, p. 2). With communicative approach and the theories that emphasize the interactive nature of language learning, the traditional view of pronunciation was changed (Pennington and Richards, 1986, p. 207). While some earlier approaches or methods stressed accuracy (Natural approach and the TPR) (Pennington and Richards, 1986, pp. 207-208), some others, especially communicative approach attached importance to intelligibility and fluency. Despite the strong emphasis before the 1960s, some researchers and methodologists began to challenge its instructional value, whether it should be taught, and if so, how it should be taught. As a result, the importance attached to pronunciation gradually diminished, and it was no longer a part of formal instruction in many programs. In Levis and LeVelle's (2010) words, "the baby (the need for spoken intelligibility) was thrown out with the bathwater (the goal of native accuracy)" (p. 2). The focus on pronunciation no longer existed in the 1970s because, as Brown (2007b) puts it, "explicit pedagogical focus on anything that smacked of linguistic nuts and bolts was under siege by proponents of the various non-directive 'let-it-just-happen' approaches to language teaching" (p. 283). Therefore, "the focus shifted to fluency rather than accuracy, encouraging an almost exclusive emphasis on suprasegmentals" in instructional activities" (Goodwin, 2001, p. 117). Another reason why the teachers with a communicative orientation ignored pronunciation was that they did not know how to deal with pronunciation communicatively. Though some followers of communicative approach accepted the significance of teaching pronunciation, they found it challenging

to integrate it into instruction (Silveira, 2002, p. 97; Celce-Murcia, et al., 1996, p. 8). They focussed on suprasegmentals and ignored segmentals and accuracy because they did not have a set of strategies to teach pronunciation communicatively (Celce-Murcia, et al., 1996, p. 8). Other significant factors that led to a decrease in the popularity of pronunciation among language teachers were CPH effect and the belief that teaching pronunciation entails expert knowledge (Fraser, 2006, p. 80). Critical period research in the 1960s resulted in a loss of interest in pronunciation teaching because the research findings in question suggested that native-like pronunciation was an undesirable goal.

The waning interest in pronunciation was also the result of the scepticism whether it was worth teaching pronunciation because the most significant predictors of success in pronunciation were thought to be talent and length of residence in a foreign country (Thurnbury, 2006, p. 185). Traditional beliefs about pronunciation were that it is unimportant and cannot be taught but it can be naturally learned by learners. Such beliefs resulted in lack of pronunciation component in language teaching (Silveira, 2002, p. 94) and most teachers did not have the necessary training or they lacked the confidence to teach pronunciation (Fraser, 2006, p. 81). Due to all these reasons, pronunciation has been marginalized over the years (Macdonald 2002; Fraser, 2006, p. 80) and the effect of this marginalization has not been eradicated yet despite recently developed pronunciation materials and a TESOL interest group (Derwing and Munro, 2005, p. 382). After a period of discussion, there has been in Morley's (1991) words some "new outlooks" (p. 481) on pronunciation. With the communicative approach, the focus on language as communication caused an urgency to reconsider pronunciation instruction (Celce-Murcia, et al., 1996, p. 7), but this did not bring about much change as far as classroom practice was concerned.

Why pronunciation fell out of favour was subject of some research studies. For example, Macdonald (2002), who researched why Australian teachers ignored pronunciation in their practices, found that the lack of pronunciation requirement in the curriculum, scarcity of quality instructional materials, lack of opportunities to improve their skills and knowledge through formal or in-service training and not being knowledgeable about how to address pronunciation in a systematic way caused this

ignorance. One possible reason that lies behind this neglect is research findings (Brown, 2008, p. 204). Derwing and Munro (2005) stress that deemphasizing pronunciation gives way to little research and available research findings are not utilized (p. 383).

Over the last few decades, the shift from teacher-centeredness to learner-centeredness in overall language teaching methodology has also affected the way pronunciation is taught. Technological developments, especially the use of audio and video tools, and computers in pronunciation teaching helped improve pedagogical conditions in language classrooms in the last quarter of the twentieth century (Morley, 1991, p. 483). There has been a renewed interest for pronunciation during 1990s and the basic premise of the new outlook on pronunciation was the importance of intelligibility for communicative competence (Morley, 1991, p. 487). Native-like proficiency is viewed as an unrealistic goal, so intelligibility is highlighted (Thurnbury, 2006, p. 164; Celce-Murcia, et al., 1996, p. 8), but accuracy is also viewed significant. For example, Thurnbury (2006) viewed inaccurate pronunciation as one of the most common causes of misunderstandings (p. 185). Because of the new insights provided by such new orientations as EIL, instead of aiming to eradicate the traces of one's L1 in L2 speech (accent reduction), some researchers favoured focussing on only those items which promoted international intelligibility (accent addition) (Thurnbury, 2006, p. 1).

Another significant development at the end of the last century was that the idea of a threshold in intelligibility and accuracy in pronunciation teaching. Building upon this idea, Jenkins (2000, 2002) carried out some empirical research into interaction between NNSs and introduced the idea of common core for international communication; that is, a set of pronunciation elements to be acquired to ensure intelligibility between NNSs of various linguistic backgrounds. The starting point for Jenkins' lingua franca core (LFC), or English for international communication (EIL) is that the number of nonnative speakers of English is greater than that of native speakers. Therefore, unlike traditional views of pronunciation teaching, LFC proposed by Jenkins (2000; 2002) focuses on interaction between nonnative speakers. This, according to Jenkins (2002), has significant implications for English language teaching, especially for pronunciation. Her perspective significantly altered the goals of pronunciation teaching because rather than

native or native-like pronunciation international intelligibility has been the ultimate aim of pronunciation teaching (p. 119). This means that if learners can successfully communicate with people from various language backgrounds, pronunciation instruction is said to have reached its objectives.

Such a shift makes it obligatory to take into account intelligibility for NNSs. In EIL, according to Jenkins (2004), the centre of attention “has been the role of pronunciation in promoting intelligibility in NNS–NNS communication, including the part played by accommodation skills” (p. 114). Jenkins (1998) views certain segmentals, nuclear stress, and articulatory settings as the most prominent elements that cause intelligibility problems among nonnative speakers. She suggests that these areas should be dealt with productively, while others can be studied in a receptive manner (p. 121). Similarly, Jenkins (2000) found out that most intelligibility problems occur because of segmental errors and/or a combination of such errors with those of nuclear stress.

Learners communicate in English whenever and wherever need arises, so it is not wise ask them to make a choice between EFL and EIL since they need both of these (Wells, 2005, p. 210). Levis (2005), however, states that LFC is not applicable in EFL contexts because learners sharing the same L1 direct themselves towards the L2 pronunciation which is deeply affected by their L1, but learners sharing different L1s seek international intelligibility (p. 371).

The idea of phonological core gained some popularity among researchers. For example, being inspired by the philosophy of EIL, Wells (2005) suggested revising our targets in pronunciation pedagogy, especially in TESOL (p. 101). Levis (2005) rightly believes that Jenkins’ “recommendations have caused pronunciation teachers in all contexts to revisit their beliefs about intelligibility and the primacy of suprasegmentals” (p. 371). However, several of them criticized her work in LFC. For example, Kubota (2006) challenges the notion of native English speaker accents by claiming that this concept should further be clarified since participant teachers’ opinions about such accents varied a lot (p. 607). Kubota further criticizes ELF in terms of expressing personal identity in that it has no native speakers, so there is no model for learners to follow (p. 608). Dauer

(2005) wonders whether Jenkins' study can be generalized to larger populations in lower language proficiencies since she carried out this study with a group of educated speakers who were getting prepared for the Cambridge Certificate in Advanced English (p. 549). Wells (2005) stresses that /e-æ/, /æ-ʌ/ and /ɔ:-əʊ/ should be included in the LFC although Jenkins does not clearly state whether they are, questions whether sound pairs /e-æ/, /æ-ʌ/ and /ɔ:-əʊ/ should be taught in the LFC, and assumes that they should (Wells, 2005, p. 107).

In sum, there has recently been a revival of interest in pronunciation teaching to make L2 learners more efficient users of the target language (Luchini, 2005, 193). Jenkins (2004) states that “pronunciation, it seems, has regained much of the standing it held in the days of the early in the last century” (p. 120). This new orientation towards pronunciation might also be the result of globalization. The changes in instructional focus opened up new debates such as approaches to teaching pronunciation, goals and methodology (Luchini, 2005, 192). By the same token, Levis and LeVelle (2010) stress that teachers and learners both have certain interest in pronunciation and that professional conferences concerning pronunciation attract lots of attention (Levis and LeVelle, 2010, p. 1). However, there are still some unresolved debates concerning pronunciation like whether to focus on segmentals or suprasegmentals and to opt for accuracy or intelligibility.

2.2.1. Segmental versus Suprasegmental Debate

Language involves both segmental (e.g., vowels and consonants) and suprasegmental elements (e.g., stress and intonation) (Broughton, Brumfit, Flavell, Hill and Pincas, 1980, p. 52). Therefore, the lessons that deal with various elements of phonology are referred to as pronunciation classes which include the study of individual sounds, sounds in connected speech, stress, rhythm, and intonation. These elements are grouped under the terms segmental (components concerning individual phonemes and how they come together) and suprasegmental (those concerning stress, rhythm and intonation) (Thurnbury, 2006, pp. 184-185) or alternatively referred to as in words “phonemic-based” and “discourse-based” (Pennington and Richards, 1986, p. 207) elements.

In the framework of segmental or suprasegmental debate, two approaches to pronunciation have always been discussed fervently to shape pronunciation teaching methodology. On the one hand, the bottom-up approach posits that it is right to start with phonemes and work upwards because when phonemes are learned other features will naturally follow, while the top-down approach assumes that suprasegmental features are the most significant elements of speech, so they should be emphasised; segmental contrasts will be learned with ease (Dalton and Seidlhofer, 1994).

As Pennington and Richards (1986) note, there is more to pronunciation in an L2 than individual sounds (p. 212). The misconception that pronunciation instruction equals to segmentals resulted in a decrease in the significance attached to pronunciation because such a narrow focus failed to have a deep impact on overall pronunciation quality (Wong, 1993). However, the priority assigned to suprasegmentals, superiority of native models and whether native language teachers are essential have been debated (Levis, 2005, p. 376). Thompson and Gaddes (2005) view the discarding of segmental techniques as ideologically conditioned (Online, para. 9). That is, in an era when communicative language teaching deluged the profession, discrediting the value of segmental study did not result from scientific evidence. Similarly, Derwing and Munro (2005) draw attention to the lack of enough empirical studies supporting the belief that suprasegmental elements are crucial for intelligibility (p. 386).

In addition, the value of teaching suprasegmentals is not free from doubt. For some suprasegmental features such as intonation, the amount of predictability is so little that some people fail to see that there is systematic variation between languages unlike individual phonemes that exhibit certain amount of regularity (Broughton et al., 1980, p. 61). This basically diminishes the value of teaching suprasegmentals. Luchini (2005) argues that not all suprasegmental features are learnable in formal settings because some of them are acquired in time (p. 165). This is supported by Pennington and Ellis (2000), who researched whether it is feasible to teach suprasegmental elements. Their research indicated that some components such as nuclear stress and intonation appear to be learnable, while some others like pitch movement and intonation of tag question are

difficult to learn. Though some researchers believe that suprasegmentals contribute to intelligibility much more than segmentals do, some of these features are not easy to teach (Thurnbury, 2006, p. 185).

Burgess and Spencer (2000) argue that phonemes, especially consonants, can be emphasised since phonemes are significant in communication along with word stress. To comprehend syllables, it is necessary to understand and describe phonemes and to work upwards (p. 209). Thompson and Gaddes (2005) argue that in terms of affective considerations improvements in phonemes might motivate learners through a feeling of achievement, or errors might result in embarrassment (Online, para. 12). Another dimension of the issue is that native speakers may tolerate segmental errors considering them as a result of speech deficiency, while suprasegmental errors are not easily excused because such errors compel the listener to judge the speaker's personality rather than his/her language (Broughton et al., 1980, p. 61).

Jenkins (1998, 2000, 2004) claims that it is segmental features of language that cause intelligibility problems among nonnative speakers of English this is because nonnative speakers use bottom-up processing and they are unable to make use of contextual or syntactic clues to decrease negative effects of errors on intelligibility. Jenkins (2000) notes that "for EIL, and especially for NBEs nonbilingual English speakers, the greatest phonological obstacles to mutual intelligibility appear to be deviant core sounds in combination with misplaced and/or misproduced nuclear stress" (p. 155). Jenkins, therefore, recommends skipping most suprasegmental features such as weak forms, word stress (unlike nuclear stress), pitch movement, and so forth. Jenkins' ideas are summarised by Dauer (2005) who states that lingua franca core "departs from current pronunciation methodology by emphasizing segmentals (consonants and vowels) and downplaying the importance of suprasegmentals (rhythm, word stress, and intonation)" (p. 545).

Pennington and Richards (1986) maintain that segmental phonology is not the ultimate aim because correct pronunciation of phonemes does not guarantee native-likeness or intelligibility (p. 217), whereas Hahn (2004) claims that there is no conclusive empirical

evidence that clarifies how focusing on suprasegmentals increase intelligibility. Similarly, Jenkins (2000) argues that the significance of suprasegmentals and their learnability are far from being certain. As debates continue, there are some researchers who adopt a balanced view of segmental and suprasegmentals. For instance, Luchini (2005) states that;

a reasonable aim would be to establish a degree of segmental and suprasegmental balance through which learners, for personal or professional reasons, are allowed to choose whether they wish to sound as close as possible to native speakers of English or not (p. 165).

Though suprasegmentals are more important for native listeners, communication between nonnative speakers entails a balance between segmentals and suprasegmentals in EIL contexts (Jenkins, 1998, p. 121).

Adopting such a balanced view, Pennington and Richards (1986) state that “micro-perspective on phonology needs to be complemented by a macro-focus on voice-setting and prosodic features” (p. 209). By the same token, Derwing, Munro, and Wiebe (1998) suggest that learners should practice both segmentals and suprasegmentals because segmental training can concentrate on inaccurate phonemes as a form of a self-repetition strategy, while global training can assist learners to cope with difficulties of extemporaneous speech. The dual framework of pronunciation instruction links a micro-focus on speech production; that is, improving segmentals in a bottom-up fashion, and a macro-level one on speech performance; in other words, an overall emphasis on components of communication in a top-down fashion. Either of these levels can be prioritized at a certain time or they can equally be focussed on (Morley, 1991, p. 497), but training should always deal with sounds in a context because importance of each sound to communication and intelligibility will be apparent at discourse level (Goodwin, 2001, p. 122).

In conclusion, along with suprasegmental features, teachers can assign a priority to phonemes, particularly consonants having a crucial place in identification of a word together with word stress (unlike vowels which have a less significant place). One has to learn phonemes to be able to work upwards (Burgess and Spencer, 2000, p. 209). In short, the latest trend is to favour a balanced approach to teaching pronunciation

because intelligibility problems are natural results of segmental and suprasegmental features of pronunciation (Celce-Murcia, et al., 1996, p. 10; Goodwin, 2001, p. 117). Moreover, there seems to be no case at all in which one possesses poor sound production and perfect intonation. In other words, segmental and suprasegmental features are closely interrelated.

In addition to following a balanced approach to pronunciation teaching, what is learnable and what is not should be considered based on experience and empirical studies. Some aspects of language like phonemes and stress are easily learned and taught, but some others such as intonation seem to be difficult to teach and are dependent upon pedagogical factors. Therefore, teachers should work on a teachability and learnability scale and they should identify feasible goals and emphasise only those teachable and learnable items which are essential for intelligibility (Dalton and Seidlhofer 1994; Derwing and Munro, 2005; Luchini, 2005). Otherwise, most of their struggle is likely to go down the drain.

2.2.2. Intelligibility versus Native-likeness Debate

Two principles shape pronunciation teaching goals and pedagogies today. On the one hand, nativeness principle, a highly popular target among teachers in the 1960s, suggests that native-like pronunciation is both potentially acquirable and desirable. Though the effect of this principle waned due to the findings of critical period research beginning with Lenneberg (1967), it is still deeply felt in current pedagogies. On the other hand, intelligibility principle supports the idea that what learners need for successful communication is comprehensibility of speech and the contributions of various elements of language to intelligibility of speech differ. Therefore, those elements which are essential for intelligibility should be emphasized, while those relatively unhelpful should be disregarded (Levis, 2005, pp. 370-371). However, it is the nativeness principle that is mostly seen in current pronunciation materials which propose that native accents are feasible models for pronunciation learning (p. 371).

Even during the time when ardent supporters of native accents were numerous, there were some people whose words signalled the importance of meaning and the limits of acceptable pronunciation. For instance, though Hockett (1950) viewed nonnative accents as undesirable nearly 60 years ago, he stressed that learners' pronunciation need not to be an exact counterpart of native forms and that a focus on good pronunciation should not distract learners from what to say. Though nonnativeness is not a direct hindrance, the degree of accentedness might have a negative impact on the success of interaction and it might result in frustration (Lu, 2002, p. 37). Therefore, learners' pronunciation should be within a range of acceptable forms (p. 262).

Acceptable forms imply a threshold of speech intelligibility. What is intelligibility then? Goodwin (2001) defines intelligibility as "spoken English in which an accent, if present, is not distracting to the listener" (p. 118) and warns that "eradication of accent should not be our goal" (p. 118). Goodwin believes that realistic goals should be set for language learners. If learners are able to communicate successfully, this means that their speech is intelligible. In this respect, it might be easier to measure intelligibility in actual communicative contexts, while according to Morley (1991) terms such as perfection and native-like pronunciation are not easy to define. How such terms are defined is deeply affected by what one thinks about nonnative accents in general (Morley, 1991, p. 499). For example, when intelligibility is rated, sociolinguistic factors such as a learners' desire to sound accented as a sign of their identity is also important because accent is an important indication of affiliation to a group (Levis, 2005, pp. 374-375). Learners' desire to sound like a native speaker might affect the extent to which they do so.

In line with the intelligibility principle, Bowen (1972) puts forward three feasible goals for pronunciation instruction, so that learners' pronunciation can stay within the limits of acceptability. These goals include the ability (a) to communicate efficiently, (2) to differentiate between sound pairs, and (3) to perceive fluent native speech (Silveira, 2002, p. 98). Brown (2007a) cites the famous actor Arnold Schwarzenegger, who is linguistically proficient despite his noticeable accent, as an example to support his claim

that “the acquisition of the communicative and functional purposes of language is, in most circumstances, far more important than a perfect native accent” (p. 65).

Nowadays a common contention among L2 researchers is that native-like proficiency in pronunciation is hardly achievable (Morley, 1991; Thurnbury, 2006). Therefore, according to this view, a native model is not something to be imitated as it is; it functions as a tool to keep various nonnative accents similar. Morley (1991) says that “traditional pronunciation goals, by and large, exhort ESL students to strive for ‘perfect pronunciation,’ and/or near-native pronunciation” (p. 498). Yuzawa (2007) argues that it does not matter whether speakers have a strong accent if they speak English for travelling, but those who have to speak English in formal and/or international settings should have intelligible and accurate speech because good speaking style facilitates communication. To acquire these skills constant productive and perceptual practice is necessary (pp. 106-107).

Apart from its being difficult to acquire, perfect pronunciation might not be appropriate in some situations; for example, some native speakers might react negatively towards native-like accents or a person may wish to preserve the traces his L1 in his/her L2 speech; that is, native-like pronunciation is not desired by those learners who want to show the traces of their L1 identity in their L2 speech (Morley, 1991, p. 499). In addition, trying to acquire native-like pronunciation might result in frustration on the part of teachers and students if they fail to acquire it.

An accented speech does not always cause intelligibility problems (Derwing and Munro, 2005, pp. 385-386). In a study carried out by Smith and Rafiqzad (1979), it was found that native speakers were considered the least intelligible speakers (375). The factors that govern what is intelligible and what is not seem to be complex. For example, learners sharing the same L1 might understand each other very well despite certain amount of accentedness. Native-like speech is not a feasible goal because in the multilingual global community nonnative accents are acceptable, while native accents are not relevant to intercultural interaction. Moreover, nowadays it is common to attach importance to people’s heritage, a part of which is accent (Brown, 2007b, p. 284).

Brown (2007b) also advises focusing on a pronunciation threshold at the beginner levels, and on elements that improve communicative skills; he sees such issues more important than paying lots of attention to articulation only (p. 284).

Citing Harmer (2001) as an example for those researchers or educators that are in favour of the idea that learners should be given the chance to achieve near-native like or native-like proficiency in pronunciation if they desire to do so, Derwing and Munro (2005) are critical of supporting learners to struggle for native-like proficiency because of research findings which indicate that the percentage of learners achieving such proficiency is relatively low. In some cases, however, learners still favour native-like proficiency as an objective to be reached.

Jenkins (2004) says that “the prevailing concept of ‘accent reduction,’ with its tendency to regard learners as subjects for speech pathology and to exhort them to lose all traces of their L1 accent in their L2 has been questioned by those working from an EIL perspective” (p. 115). Derwing and Munro (2005) say that “the phenomenon that we call a foreign accent is a complex aspect of language that affects speakers and listeners in both perception and production and, consequently, in social interaction” (p. 379). It is not possible to talk about an accent-free speech because a standard variety itself is an accent. Some learners may wish to speak in a standard accent though acquiring such an accent is not essential for intelligible speech. Dialectal variations in a foreign language are a significant source of difficulty for language learners. Though a teacher cannot teach more than one variety due to practical considerations, learners can get perception training focusing on these variations. In this way, they can get an idea of how actual English sounds (Broughton et al., 1980, pp. 56-57). For production, the teacher can choose a standard accent which is easy to produce and understand.

In sum, for oral comprehensibility which is commonly sought in language learning, EFL learners do not need to possess near native-like or native-like pronunciation; what they actually need is intelligible pronunciation and confidence in speaking (Morley, 1991, p. 489). Among the discussions concerning segmentals versus suprasegmentals and native-likeness versus intelligibility, it had taken language teaching domain lots of

time to understand that pronunciation instruction was necessary for spoken intelligibility rather than a discussion on native-likeness or complete denial. Throughout this time pronunciation was in need of repair (Levis and LeVelle, 2010, p. 2) and today it partially is.

2.3. THEORIES OF PHONOLOGICAL ACQUISITION

There are various theories concerning the nature of learning or acquiring the sound system of a foreign language. Each of these theories or hypotheses has their own account of phonological acquisition. Two of these theories forming the theoretical background of the current study are Fossilization Theory and Contrastive Analysis Hypothesis. They will be elaborated on in the sections below.

2.3.1. Fossilization Theory

Fossilisation theory puts forward that fossilization occurs when interlanguage development ceases. One of the most widespread phenomena in foreign language teaching is fossilization at various levels including phonetic, phonological, semantic, syntactic, pragmatic and, semiotic aspects of foreign language (Han and Odlin, 2006). Foreign accent is mostly a natural result of language transfer; as Munro (2008) puts it, “the occurrence of foreign accents provides some of the clearest evidence that knowledge of a first language (L1) influences the acquisition of a second (L2)” (p. 193). In other words, language transfer and language typology are determining factors in fossilization, resulting in accented speech. Such a speech is easy to detect. In other words, even people with no phonetic training can judge nonnativeness although in rare cases some exceptional people can even mislead foreign accent raters.

Acton (1984) suggests that correcting fossilized pronunciation is rather challenging if certain level of fluency is reached (p. 72). To rehabilitate such fossilized pronunciation, teachers should assist learners to change related behaviours, to practise problematic points on a daily basis, to integrate the new pronunciation behaviours in the professional context and to gain autonomy so that they can study on their own (Acton, 1984, p. 81).

On the part of the learners, certain amount of phonetic and phonological awareness and persistent practice are essential for success in pronunciation.

How emerging technologies in computer-assisted pronunciation instruction fit in pronunciation pedagogy have been investigated lately, partly due to the desire to eliminate the effect of fossilization and foreign accent on successful communication. In this context, currently available pronunciation software utilizes speech recognition technology to evaluate user performance and to give instantaneous feedback, which is significant to eliminate fossilized errors. A decade ago, Eskenazi (1999) recommended that a CAPT system should be able to correct not only segmental but also prosodic errors (p. 66), and more recently Eskenazi (2009) stated that current CAPT software is able to detect individual errors or to give a global impression of nonnative speech (p. 834). Such programs can actually help students and teachers by making it possible to cure problematic points on an individual basis and promote independent learning, and might help alleviate anxiety. In short, carefully designed online and offline software can help learners to cure fossilized errors.

2.3.2. Contrastive Analysis Hypothesis

There are a number of predictors of success in pronunciation. One of these is native language; that is, if the teacher's familiar with the learners' mother tongue, it is easier to find out difficulties (Brown, 2007b, p. 284) because a contrastive analysis of L1 and L2 sound systems can help predict problematic areas before errors occur (Kenworthy, 1987; Broughton et al., 1980; Bada, 2001). Jenkins (2004), a researcher in favour of modern contrastive analysis, stresses that researchers should not "throw out the modern contrastive analysis baby with the old contrastive analysis bathwater" (p. 113). She adds that "the interest in contrastive analytical research itself has never disappeared entirely, even though it is nowadays complemented by an equally robust interest in other approaches to interlanguage phonology" (p. 113). In brief, the value of contrastive analysis lies in the assumption that comparing L1 and L2 phonology assists teachers to predict the problems that learners possibly have with pronunciation (Burgess and

Spencer, 2000, p. 193). Then, these problems can be graded and addressed for rehabilitation.

Some severe pronunciation problems might not be solved easily after puberty. The lack of a sound in the mother tongue of learners causes difficulties (Dalby and Kewley-Port, 1999). The source of the problem actually lies in the lack of features to produce a sound rather than the lack of the sound itself because learners experience difficulties in building representations for segments that necessitate features which do not exist in their mother tongue. Therefore, as Brown (2000) states, L1 and L2 sound systems should be compared on the basis of features. Archibald (2007) illustrates this point by saying that although Japanese does not have a /v/ sound, it provides learners with features that are necessary for learners to produce it. In this way, they do not have problems articulating it. One study supporting Brown's claim was carried out by Matthews (1997), who studied Japanese learners to see the effect of training on the perception of a target sound contrast. The instructional focus of his study was the /l/ and /r/ contrast which is notoriously difficult for Japanese learners of English. The results indicated that Japanese learners had difficulty in producing these phonemes. Matthews concluded that the source of problem was feature geometry. That is, non-existence of a feature poses problems for learners rather than lack of a particular sound in a language.

Existence of similar sounds may also be problematic. For example, the French /u/, which is similar but not identical to its English equivalent, is articulated by French learners of English instead of learning the new sound in the target language. According to Broughton et al., (1980) French speakers tend to use /ɪ/ and /i:/ interchangeably. Likewise, Spanish speakers, although having both of these sounds in their language, might conflate them (by using them as the allophones of a phoneme rather than as different phonemes) due to lack of awareness or inadequate significance given to them (pp. 61-62).

Because of such reasons, there exist some notoriously difficult sounds for learners with particular L1 backgrounds. For instance, since in most languages there are two sounds for the English phonemes /e/, /æ/ and /ʌ/, learners tend to ignore the /e/-/æ/ distinction

(e.g., Polish, Russian, German and Hungarian learners) or the distinction between /æ/-/ʌ/ (e.g., Japanese and Spanish-speaking learners) (Wells, 2005, p. 107). Similarly, Cantonese learners of English have a difficulty in distinguishing the sound /s/ from the sound /ʃ/ due to the absence of the former (Lu, 2002, p. 38); Koreans replace /f/ with /p/; Japanese-L1 learners replace /θ/ with /s/ and /ɜ:/ with /a/; Hungarian learners use /v/ instead of /w/ (Thompson and Gaddes, 2005); Japanese learners substitute /r/ with /l/ (Bada, 2001; Archibald, 2007; Schaetzel and Low, 2009); they also shorten long vowels; Spanish speakers are generally unable to distinguish between /ʃ/ and /tʃ/ sounds (Schaetzel and Low, 2009, p. 3). Some of these problematic sounds pose difficulties for Turkish learners of English (e.g., /θ/, /æ/, /w/), too. However, the sounds for which they substitute these sounds are /t/, /e/ and /v/, respectively. We can conclude that commonly confused sound pairs vary from one language background to another. In this respect, one of the most significant contributions of this hypothesis is that it assists language teachers to decide on problematic sounds of the target language, which, for Turkish-L1 learners, will be discussed later in this chapter.

2.4. PRONUNCIATION PEDAGOGY IN ELT

A number of people in the world including adult and teenage refugees, immigrants, various nonnative speakers of English in technology, business and education, and so forth need to pay a special attention to pronunciation (Morley, 1991, pp. 490-492). To teach pronunciation to such diverse groups of learners sound pedagogical principles and well prepared materials are needed. In other words, English teachers should be equipped with both theoretical and practical understanding of how pronunciation should be taught along with the necessary motivation to do so. The focus of attention for such a diverse group of learners in pronunciation teaching is, as frequently stressed, intelligible pronunciation. The picture changes a bit when it comes to EFL and ESL teachers, who are supposed to teach spoken skills and pronunciation to such diverse groups of learners. In addition to intelligibility being number-one priority, certain amount of perfection is also needed. This is because having a standard accent to teach, language teachers are immune to being lost in different variations.

In addition to intelligibility and nativeness, according to Morley (1991), current issues regarding pronunciation research and pedagogy include whether it is possible to teach or worth teaching pronunciation, what to teach and how to teach it, if instructional practices really improve learners' pronunciation, and how research can contribute to classroom instruction if it really can (p. 481). More recently, Hişmanoğlu (2006) has noted that pronunciation pedagogy and research have been supported by interdisciplinary views including those provided by neurolinguistics, psycholinguistics, sociology, semiotics and computer science (p. 108). Current research areas include such issues as accent, suprasegmental features, intelligibility at the international level, the impact of exposure to target language and motivation (Schaetzel and Low, 2009, p. 1). As for the focus of instruction, it includes phonemes, features of connected speech, stress, rhythm and intonation (Jenkins, 2004, 109).

Pennington and Richards (1986) state that pronunciation instruction “involves a complex interaction of perceptual, articulatory, and interactional factors” (p. 208). Therefore, teaching such a skill is rather challenging, so it compels teachers to make difficult pedagogical decisions. What is difficult about teaching pronunciation is summarized by (Burgess and Spencer (2000) as follows:

- The selection of features of pronunciation
- The ordering of the features selected
- The type(s) of discourse in which to practise pronunciation
- The choice of methods which will provide the most effective results
- The amount of detail to go into at different stages (p. 193)

In line with all these difficulties of learning pronunciation, two decades ago, Morley (1991) put forward some programming principles for pronunciation teaching in the light of the shift that was apparent several years before she wrote her seminal article on the pronunciation element in TESOL. These principles were as follows: (a) highlighting communicativeness rather than isolated drills, (b) giving importance to both segmental and suprasegmental elements of pronunciation and voice quality, (c) encouraging speech awareness and self-monitoring, (d) contextualisation in teaching segmentals and suprasegmentals rather than teaching them in isolation, (e) establishing a link between

speaking, listening and pronunciation in line with Gilbert's (1984) dual focus; that is, a focus on both perception and production, (f) making use of critical sound/spelling relationships, and (g) paying attention to individual's unique characteristics (Morley, 1991, pp. 493-495). Similarly, Broughton et al., (1980) proposed some principles of pronunciation pedagogy and their suggestions are mostly consistent with those of Morley's (1991) mentioned above.

When applying these principles into their specific teaching situations, practice is rather essential because, according to Broughton et al., (1980), "...imitation is the essence of the learning process" (p. 58). However, the nature of practice activities in a pronunciation lesson might provide variety or cause boredom. Although drills are ironically referred to as devices used to bore students, they are absolutely necessary in pronunciation teaching (Macdonald, 2002), but they should not be merely mechanical. They should be used in a context so that learners should be able to establish a connection between real meanings and what is actually drilled (Burgess and Spencer, 2000, p. 202). There are some traditionally used minimal pair activities such as (a) same/different drill, (b) 1/2/3 drill, (c) 1/2 drill, (d), say the other pair drill, and (e) sound feature (find the sound feature) drill (Broughton et al., 1980, p. 63). These are not communicative activities, but they are successful in drawing learners' attention to specific points.

As Broughton et al., (1980) put it "...pronunciation teaching should always be set in a context of genuine language use" (p. 50). That is, it is wise to integrate pronunciation in the coursework rather than presenting it in isolation (Brown, 2008, p. 203). Learners should be given the chance to practise pronunciation through meaningful tasks, practise alone and before the class, focus on an international audience and selected target features, get individualized feedback from both peers and the teacher (Walker, 2005, p. 552). In addition to these, Jones (1997) advises the use of authentic listening tasks introducing a variety of accents in pronunciation training (p. 111).

Concerning the way pronunciation is dealt with in the classroom, two approaches to pronunciation teaching should be mentioned: intuitive-imitative approach and analytic-

linguistic approach. On the one hand, the former assumes that learners can learn pronunciation by following appropriate models without being provided with explicit information; they gain knowledge from audio materials by listening to them. The latter, on the other hand, aims to teach it explicitly by providing learners with audio visual aids such as phonetic alphabet, charts of vocal organs, contrastive data, and so forth., (Celce-Murcia, et al., 1996, p. 2; Hişmanoğlu and Hişmanoğlu, 2010, p. 984). These two approaches can be used to complement each other. Current literature does not provide us with the best methods or materials to be used in pronunciation teaching, but Archibald (2007) states that;

..if instruction takes place which provides the learners with opportunities to both produce and perceive the sounds in question and to be exposed to metalinguistic information about the sounds to be learned, then this is likely to be an environment that will be useful to the most learners (p. 824).

Some learners have a natural talent to learn pronunciation and listening. This claim was supported by Purcell and Suter (1980), who found that aptitude for oral mimicry to be a significant predictor of accuracy in pronunciation. Similarly, Brown (2007b) highlights the importance of innate phonetic ability for success in pronunciation. He says, “Often referred to as having an ‘ear’ for language, some people manifest a phonetic coding ability that others do not” (p. 285). Lu (2002) states that “good pronunciation and intonation require persistent practice in listening, speaking, and reading aloud” (p. 37). However, learners who are not engaging themselves with what they are doing in pronunciation may not be successful even if they use the language for a long time, so practice alone is not enough (Fraser, 2006, p. 88). Various issues should be taken into consideration.

2.4.1. The Role of Pronunciation in Spoken English

Though it is often argued that correct pronunciation is essential for successful communication, researchers and teachers do not always agree on what constitutes correct pronunciation. Correct pronunciation implies an intelligibility threshold; in other words, communication is not possible if learners do not go beyond a certain level of attainment in pronunciation no matter how proficient they are in grammar and

vocabulary (Mich et al., 2006, p. 1; Celce-Murcia, et al., 1996, p. 7; Hinofotis and Bailey, 1980).

Unintelligible pronunciation, especially if it is below the threshold level, may result in having some difficulties in the workplace or in a social context. For an English teacher this might be more serious. It is the very duty of an EFL teacher to attach importance to his/her or her students' needs in terms of pronunciation as Morley (1991) puts it, "...ignoring students' pronunciation needs is an abrogation of professional responsibility" (p. 489). Viewing the issue from a different perspective, Goodwin (2001) says that "pronunciation is the language feature that most readily identifies speakers as nonnative", and that "it is a filter through which others see them and often discriminate against them" (p. 117). This is because speakers introduce their self-image via pronunciation (Pennington and Richards, 1986, p. 215). In line with its significance, the aim in teaching pronunciation is twofold; that is, the training of perceptual and productive skills, which are respectively referred to as "recognition or understanding the flow of speech, and production or fluency in the spoken language pronunciation" (Broughton et al., 1980, p. 49). Because of this relatively significant role that pronunciation plays in spoken language and in presenting self-image, language teachers should revisit their aims concerning pronunciation.

2.4.2. Phonetic and Phonological Awareness

Not being aware of pronunciation problems is a common reason for mispronunciations. This is supported by Acton (1984), who says that "many mispronunciations, especially with vowels, are simply a matter of the students' not knowing the correct sound in a particular environment or even realizing that it is being mispronounced" (p. 78). Certain amount of phonetic and phonological awareness is necessary to acquire self-monitoring and self-correction skills, which are closely related to phonetic and phonological awareness. Thompson and Gaddes (2005) define self-monitoring as "the conscious action of listening to one's own speech in order to find errors" and self-correction as "the process of fixing one's errors after they have occurred by repeating the word or

phrase correctly” (Online, para. 16). Both of these skills are necessary for autonomous pronunciation learning.

To equip learners with self-monitoring in pronunciation, consciousness raising activities that help learners recognize the differences between phonological systems of L1 and L2 are more beneficial than error correction (Jones, 1997, p. 107). To this end, Thompson and Gaddes, (2005) provide us with some strategies to assist learners to develop their self-monitoring and self-correction skills. These include “critical listening, compiling learning portfolios, utilizing CALL resources and studying in pronunciation-specific classes” (Thompson and Gaddes, 2005, On-line, para. 17). Similarly, regarding learner awareness and attitudes in pronunciation teaching, Morley (1991) emphasise the importance of helping learners to acquire self-monitoring skills and to adopt a positive attitude toward self-monitoring, and doing away with negative attitudes towards correction in addition to making learners recognize the value of being aware of their responsibilities and accomplishments (p. 506).

Broughton et al., (1980) state that main keys to successful pronunciation teaching are paying attention to the entire phonological system of the target language, sufficient awareness and practice (p. 62). Burgess and Spencer (2000) recommend the use of games, puzzles and the use of phonetic symbols to teach pronunciation as a part of awareness raising activities (p. 210). To help learners to acquire self-monitoring skills, teachers should try to develop noticing in their classes by directing students’ attention to particular forms in the input (Luchini, 2005, p. 198) and they, in cooperation with materials designers, should provide learners with the chance to get an awareness of self-responsibility, to develop self monitoring and speech modification skills (Morley, 1991, pp. 503-504). Learners should be able to make a comparison between their interlanguage forms and the target ones.

2.4.3. Pronunciation Instruction in Teacher Education

Pennington and Richards (1986) state that paradigm shifts have resulted in uncertainty about the place of pronunciation in TESL/TEFL (p. 208). As a result, pronunciation was

marginalized within applied linguistics. Considering the marginalization of pronunciation in TEFL methodology, little wonder, then, why teachers lack formal training in pronunciation (Derwing and Munro, 2005, p. 389). However, Tanner and Landon (2009) stress that teachers' lacking formal training in pronunciation causes difficulties for learners (p. 53). Even though teachers might try to experience some practical applications, their lack of training will eventually fail them.

To be able to make informed decisions about what software, course books and activities to use, and how to analyze learners' pronunciation problems and to utilise research findings, teachers should have basic a training in pronunciation. Similarly, researchers should get acquainted with how instruction proceeds in classroom (Derwing and Munro, 2005, p. 392). Burgess and Spencer (2000) state that the extent to which teachers should be provided with theoretical information depends on the level (i.e., whether the program is MA or BA) and the needs of the teacher trainees. In BA courses learners need less technical detail, but more awareness, while BA student who are already familiar with their learners' pronunciation problems look for theoretical explanations to find solutions for practical problems (p. 210).

Teachers' attitudes towards pronunciation teaching and practical experience also vary greatly since some teachers have a practical understanding of pronunciation instruction, while some others establish a research agenda for themselves or their interest in pronunciation might fluctuate over the years (Fraser, 2006, p. 90). An instructor teaching pronunciation has the role to facilitate learning in a learner-centred environment (Morley, 1991, p. 507). In this context the teacher becomes a guide. However, the way teachers view pronunciation has a deep impact on the extent to which they teach pronunciation or they achieve their aims. Moreover, the amount of time allocated for pronunciation is mostly teacher dependent, and it is directly affected by attitudes to teaching pronunciation (Hişmanoğlu and Hişmanoğlu, 2010, p. 983). In order to develop positive attitudes towards pronunciation, teachers should be equipped with appropriate pronunciation pedagogy, and pronunciation training should be based on empirical research findings (Derwing and Munro, 2005, p. 391).

Morley (1991) stresses the importance of the need to provide pre-service and in-service ESL teachers with training in phonetics and phonology, which highlights the importance of both segmental and suprasegmental aspects of English in a communicative way (p. 511). Top-down and bottom-up approaches are used in cooperation. Support for this comes from Burgess and Spencer (2000), arguing that teacher trainees should be taught phonology in an integrated fashion with the approaches to teaching pronunciation (p. 207). Inadequate attention paid to pronunciation “resulted in limited knowledge about how to integrate appropriate pronunciation instruction into second language classrooms” (Derwing and Munro, 2005, p. 383).

Lack of formal teacher training in pronunciation results in either no instruction at all or little of it with only prominent features of learners’ accent; the effect of these features on intelligibility is not considered (Derwing and Munro, 2005, p. 389). This is the commonly encountered situation around the world. For example, teachers not having enough knowledge on pronunciation usually neglect this significant area of language in Australia (MacDonald, 2002); some teachers including some of those pursuing MA ignore phonology despite the perceived need to assist learners with pronunciation. Such teachers, according to Derwing and Munro (2005), often rely on pronunciation course books and software without analysing problematic points for their students (p. 389).

Burgess and Spencer (2000) make a distinction between goals of second/foreign language teaching and those of teacher training programs. The study of pronunciation is supported by phonology in the latter (p. 192). It is advisable that we establish different goals and methodologies for EFL/ESL learners and ELT trainees. Figure 2.1 clarifies this point. In both domains in this figure, all elements are interdependent, and there is a distinction between language learners and language teachers and between practice and study. Pronunciation teaching in teacher education includes the study of phonology, but teaching pronunciation to second or foreign language learners mainly consists of practice. In pronunciation instruction intended for ESL and EFL, communicativeness is considered important. Finally, the notion of integration is also apparent in both cases.

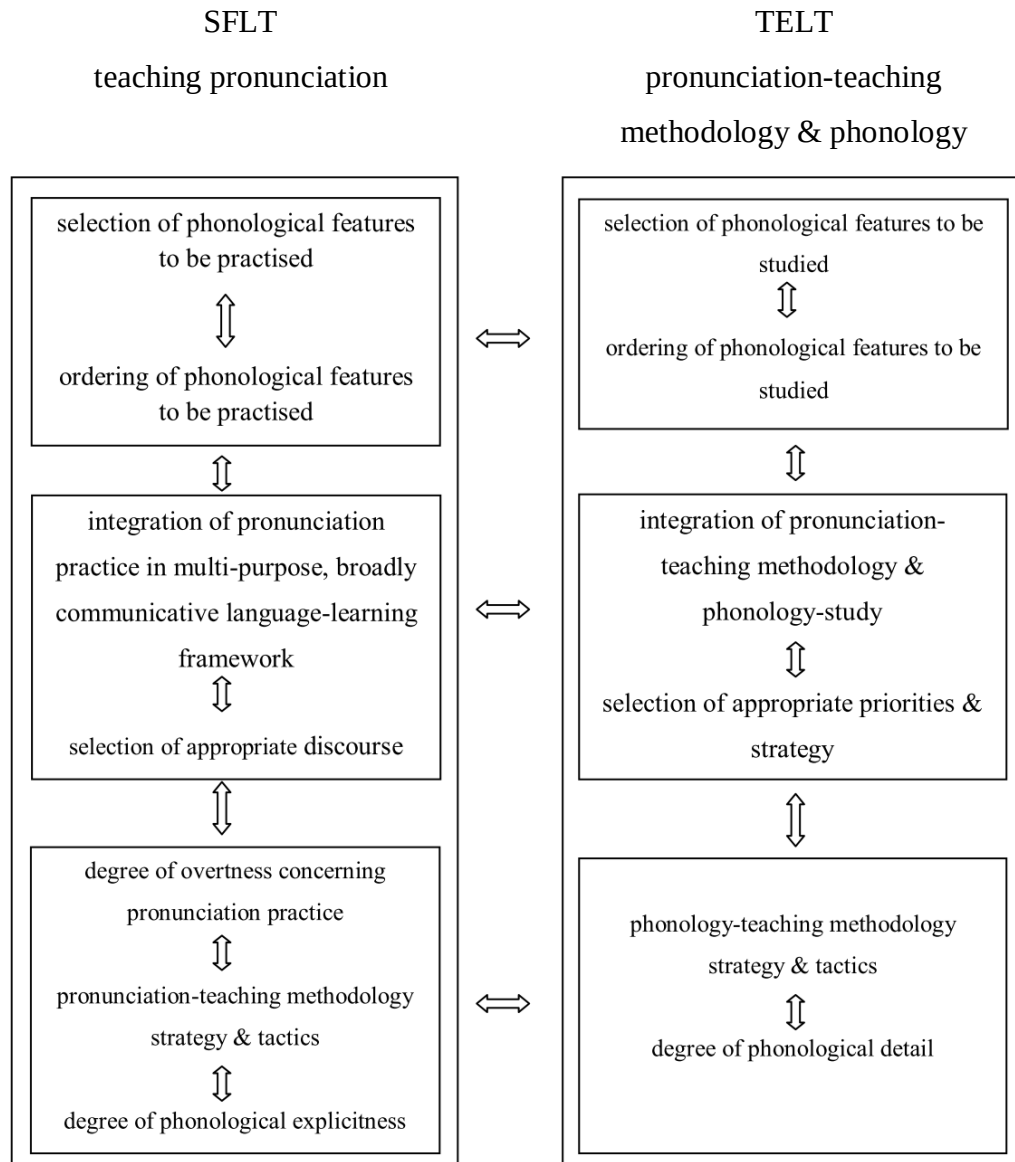


Figure 2.1. The relationship between pronunciation teaching and phonology in EFL/ESL and education of language teachers (Adapted from, Burgess, and Spencer, 2000, p. 194).

On the issue of how to train teachers to teach pronunciation, Levis (1999) suggest that teachers should be familiar with common standard dialects of English; teachers should encourage their learners to be aware of different varieties and they should be informed that it is wise to expose learners to different models in addition to the teacher's accent and those available in the audio materials that accompany the textbooks (Online, para. 8). Jenkins (1998) suggests that teachers including native ones should be trained in three

core areas; that is, sounds, nuclear stress, and articulatory setting (p. 125). In addition to this, the issue of accent is often considered from two perspectives. That is, perceptual training or listening comprehension should include various English accents, while productive training and daily language use in the classroom should consist of only one variety (Yuzawa, 2007, p. 97).

Kubota (2006), states that “Given that the participants’ current or future profession is English teaching, it is natural that they wish to acquire an NES accent to model as a target” (p. 606). As language teachers, they know that they have to possess native-like accent. Moreover, Burgess and Spencer (2000) say that “It is often the teacher's accent which the learners take, or are expected to take, as the target for their performance” (p. 207); then, the teacher should at least have near native-like accent to provide his/her learners to follow a good model. In addition, nonnative teachers of English “need to acquire an NES accent to be identified as a good learner and a capable teacher of English, which is not equivalent to identification with NESs” (Kubota, 2006, p. 606). In acquiring a NES accent phonology should function as a theoretical support in teaching pronunciation to ELT departments. Therefore, courses bearing the name ‘phonology’ should be changed into ‘pronunciation teaching’ (Burgess and Spencer, 2000, p. 193). In this way, language teachers can be trained better in teaching pronunciation.

The existence or lack of training in pronunciation in teacher training programs has a deep impact on teachers’ attitudes towards pronunciation instruction in addition to the desire to achieve native-like pronunciation. Their beliefs regarding pronunciation teaching and learning, motivation, theoretical background and practical experience in phonology can account for how and to what extent they teach pronunciation in the classroom. It is generally assumed that teachers with enough training on pronunciation often have positive attitudes, while those with little training are most often observed to exhibit certain level of dislike for it. Such a negative attitude seems to affect language learners who are likely to be discouraged from the learning process if the teacher has a heavily accented speech with poor intelligibility. To acquire the necessary pronunciation skills, teachers should make use of available technology.

2.4.4. Computer-Assisted Pronunciation Instruction

Computers have been commonly used to teach and learn language skills and areas around the world since 1970s. Pronunciation teaching is no exception for this. There are a number of ways in which computers are utilised to teach and practise pronunciation. They make it possible to use such CAPT elements as talking heads to help learners to imitate sounds (Busa, 2008; Hişmanoğlu and Hişmanoğlu, 2011), accent reduction software packages, text-to-speech technology, automatic speech recognition, and so forth. Among the most significant potentials of computer-assisted pronunciation teaching are individualized instruction, exposure to a variety of accents and contexts (Derwing and Munro, 2005, p. 391) and instantaneous corrective feedback. Moreover, through computer-based training learners are given the opportunity to have access to speech samples by a variety of native speakers (Goodwin-Jones, 2009, p. 5). This is beneficial for learners to communicate in contexts involving speakers with a variety of language backgrounds. In CAPT contexts, learners should create lots of utterances, get corrective feedback, hear different native models, focus on prosody and be free of affective barriers (Eskenazi, 1999, p. 62).

Today, computer assisted pronunciation training can be done through offline and online software. The former has been very popular for the last two decades in pronunciation instruction. Famous examples for these PC-based software packages include Pronunciation Power I and II and various other accent reduction programs such as Pronunciation Patterns and Accent Master. Earlier versions of offline software were mainly structural and accuracy oriented in the 1970s and 1980s. Within the past two decades, it was customary to see learners studying context-poor CALL materials, while they have ample opportunities today such as creating content via Web 2.0 tools, receiving feedback, communicating in an authentic context. According to Jenkins (2004), there has been an increased amount of effort to utilise computers in teaching suprasegmentals in recent years. Within the current paradigm, social media on the Internet and multimedia applications are quite important. Such tools give users the power to create a cyber world.

One of the most significant elements of CAPT is automatic speech recognition, ASR for short (Eskenazi, 1999, p. 62). The use of ASR in phonetics and phonology can be traced back to 1970s or earlier. ASR works with commercial dictation programs like Dragon Naturally Speaking (Goodwin-Jones, 2009, p. 4) or they are used as a part of pronunciation software under controlled contexts. Improvements in hardware and a decrease in prices of computers have contributed to the proliferation of automatic language trainers (Eskenazi, 1999, p. 62). Goodwin-Jones (2009) states that despite its constraints, “the promise of having a computer recognise spoken language holds so much potential for helping students improve speaking skills that ASR represents an irresistible attraction to CALL developers” (p. 5). A good ASR system should give learners the chance to see how to correct their errors (Hansen, 2006, p. 343) because identifying the error without presenting solutions for correction is not enough.

With the help of ASR technology, CAPT systems are able to provide learners with instantaneous and individualized feedback (Hansen, 2006, p. 343; Tanner and Landon, 2009, p. 51; Mich et al., 2006, p. 1). CAPT software with ASR technology mostly provides learners with a model speech which is imitated by learners. In such systems, learners’ speech is compared to native speaker samples and corrective feedback is given (Hişmanoğlu and Hişmanoğlu, 2011, p. 26). Then, learners are provided auditory and/or visual feedback on their productions including waveforms, talking heads or a recast of the utterance. Presenting the feedback component in game-like formats like Baseball, Moonride and Bowling provides learners with attractive contexts to practise (Dalby and Kewley-Port, 1999, p. 427). Corrective feedback through graphic representations enables learners to be autonomous and to progress at their own rate (Thompson and Gaddes, 2005, para. 19) and there is no limit to how many times learners can try.

The idea of ASR-based feedback seems so attractive, but it is also one of the shortcomings of CAPT if it is erroneous (Eskenazi, 1999, p. 64; Neri, Cucchiarini and Strik, 2006, p. 144; Neri et al., 2002, p. 1211) or incomprehensible. CAPT systems might detect errors correctly, but they may fail to give learners the right option to correct errors. Current CAPT systems provide two sorts of erroneous feedback in pronunciation: (a) labelling some erratic production as correct (b) or learners’ correct

pronunciations are identified as incorrect. The former is called a false positive, while the latter is termed as a false negative (Eskenazi 2009, p. 834).

Solving the problem of erroneous feedback is not enough for feedback to be useful since feedback in CAPT should possess some other significant features. That is, they should possess the four 'K's: Comprehensible, Qualitative, Quantitative and Corrective (Hansen, 2006, p. 344). After an overview of literature on pronunciation feedback in foreign language learning, Neri et al., (2002) concluded that "effective feedback should first of all be comprehensible, should not rely solely on the learner's own perception, should allow verification of response correctness, pinpoint specific errors and possibly suggest a remedy" (p. 1211). Complex diagrams, spectrograms and incomprehensible symbols which are actually intended for experts mean virtually nothing for learners with no phonetic training, so feedback should be easy to understand; moreover, it should tell the learner where the mistake is and how to correct it. However, most of the feedback types provided by CAPT software were designed for the expert, so they are not of much assistance for learners. In sum, learners might have problems comprehending or interpreting visual displays of speech patterns (Hansen, 2006, p. 343; Neri et al., 2002, p. 1210; Goodwin-Jones, 2009, p. 4), so feedback should be comprehensible.

CAPT systems can be used as a complement to regular classroom teacher (Eskenazi, 1999, p. 64) or they can be used solely as the only system to teach pronunciation. Using CAPT as a complement to regular classroom teaching increases practice time (Eskenazi, 1999, p. 73). Moreover, learners can progress at their own rate and they make decisions about what and when to study (Murray, 2007, p. 750; Goodwin-Jones, 2009, p. 5). Moreover, there exist lots of multimedia elements such as video and graphics. In CAPT, the traditional role of the teacher as a knowledge transferer is no longer possible because the teacher functions as a guide; such a change in role might be threatening for some teachers, while it might be a good opportunity for some others to put their constructivist views into practice (Murray, 2007, p. 750).

Another significant contribution of computers to pronunciation teaching is their ability to produce speech from a given text. Computer software that is capable of doing this is

called a text-to-speech program. This type of software is widely available on the Internet although fully functional versions of most of these computer programs entail registration at a certain cost. However, registered versions of these programs offer a wide range of voices and better voice quality. Free or trial versions also work to a great extent. They are especially helpful when there are no native speakers to provide learners with a model to follow.

Although computers are full of potentials in pronunciation teaching, most CAPT software packages have been created without sound pedagogical basis and most of them focus on only segmentals, and suprasegmental features of language are neglected in such programs (Seferoğlu, 2005, p. 4; Hişmanoğlu and Hişmanoğlu, 2011, p. 24). In addition to these shortcomings, most CAPT software packages have been developed with commercial concerns in mind, so most of them are designed in a way to attract a wide variety of audiences (Hansen, 2006, p. 342). CAPT developers should consider research findings concerning intelligibility and functional load (Derwing and Munro, 2005, p. 392) and identify pedagogical objectives for a particular group of learners.

Despite its promises for prospective CAPT software, the present state of ASR in computer assisted pronunciation teaching still seems to be a child if not an infant. An illuminating piece of research that supports this comes from Derwing, Munro, and Carbonaro (2000), who found that ASR software packages for ESL speech are still not as successful as human listeners in nonnative speech comprehension. Learners with a variety of accents might not be recognised by ASR systems since they are mostly designed with native speaker speech samples. The degree of tolerance might have a deep impact on what learners can gain out of such systems. What should be considered as acceptable pronunciation in CAPT should be estimated carefully since setting higher standards might discourage learners (Goodwin-Jones, 2009, p. 6) or lower standards might result in incomplete or erroneous learning.

In conclusion, although they have been very popular for the last two decades, offline software packages are currently giving way to the use of web-based pronunciation materials. The latter is utilized through an Internet connection. Such software, as its PC-

based counterparts can maximize the amount of time learners spare for production (Eskenazi, 1999, p. 63). Moreover, unlike PC-based software, an online pronunciation learning software package enables learners to gain access to it wherever there is a connection to the Internet without having to install software. In regular classroom environments, learners feel threatened and they lose self-confidence upon receiving a negative feedback or being forced to articulate a new sound (Laroy, 1995), but both PC-based and web-based pronunciation instruction environments are able to assist learners to progress at their own rate and to practise new sounds in a low-stress environment.

2.5. AN OVERVIEW OF MOODLE

Since one of the learning environments in the present study was designed in a learning management system called Modular Object Oriented Dynamic Learning Environment, *Moodle* for short, this section aims to outline the basics of this virtual teaching and learning platform. Moodle, used as a proper name today, is an open source course management system developed by Martin Dougiamas as a master's thesis in 1999. It is "a versatile course management system that has great potential for language teaching in various formats" (Suvorov, Online, para. 27). It is composed of PHP codes that are readily available for those who want to use them in their servers or alter them under a general public licence to suit their needs. It is a virtual learning environment (VLE) that allows teachers and learners to cooperate, communicate and build learning communities. It is also referred to as a learning management system (LMS), learning content management system (LCMS), course management system (CMS) or even content management system (CMS) (Dvorak, 2011; Hallowell, 2011; Stanford, 2009).

CMSs have experienced a rapid developmental phase over the last 8 years and many higher education institutions view them critical for better education (Cole and Foster, 2008, p. 2). A web browser and an Internet connection are needed to access the CMS located on a web server. According to Cole and Foster (2008), there are three good reasons why a teacher should use a CMS. The first reason is learners' getting more and more skilful in using technology and their desire to be involved in online learning. Secondly, since some students cannot spare much time for school because of their part-

time working schedule, online instruction can give them the chance to interact with the course teacher more often. Thirdly, courses delivered through a CMS are likely to be more effective if they are extensions of face-to-face communication in regular classes (p. 3).

As a gigantic web-based software package, Moodle helps teachers and educators to generate online courses without knowledge of programming languages. With the help of Moodle, learners and teachers interact and collaboratively work on projects (Renate and Hilgenstock, 2007, p. 6). Meurant (2010) claims that Moodle provides learners with pragmatic engagement and the use of English as a metalanguage. In addition, learners improve “their L2 digital Literacy” (p. 1) in Moodle. The philosophy behind Moodle is Social Constructivism (Brandl, 2005), which posits that students learn best when they interact, generate content and discuss. Though Moodle is suitable for Constructivist principles, it does not compel teachers to base their instruction on Constructivism.

A typical Moodle course is composed of both static and dynamic course materials. Examples of the former which learners read without interacting are web pages, external links to anything on the Web, a directory of files, and so forth, while those of the latter include activities with teacher-student interaction such as an assignment (a file uploaded by a student for grading), a choice (a survey that consists of only one item), quizzes or those with student-student interaction like live chat, forum pages, glossaries, wikis, blogs, and so forth (Rice, 2011, p. 11). Interactive activities actually give learners the chance to experience with Web 2.0 tools; they help enrich learning experiences and accelerate learning.

Moodle is a user-friendly software package because its users utilise web forms to store lessons instead of HTML editors and FTP to produce and send their documents over the Internet (Cole and Foster, 2008, p. 1). It offers learners lots of learning opportunities such as sharing content with peers and teachers, participating in forums and chats, taking online quizzes and exams, submitting assignments and reviewing each other's work, following grades, and so on. It helps teachers and course designers to save time,

and as Cole and Foster (2008) stress, when they learn to use a CMS, they can focus on instructional issues rather than spending so much time developing software.

According to Dvorak (2011), one of the best sides of this software is that the appearance of the software has not changed since it was first introduced to give users a feeling of familiarity, and its developers are planning to keep this consistency in future upgrades (Dvorak, 2011, p.12). This is supported by Rice and Nash (2010), who say that “as you go through a Moodle site, things look, feel, and function consistently” (p. 10). In this way, learners can focus on content and interaction rather than the software itself. Moodle increases the number of its users each day since “it is open source, is built on a sound educational philosophy, and has a huge community that supports and develops it” (Cole and Foster, 2008, p. 4). As of December, 2011, Moodle was used by 1125639 users in 78 languages in 217 countries (Moodle Statistics, 2011, Online) and there were 49000 registered Moodle sites as of early 2010 (Hallowel, 2011).

Moodle, essentially composed of blocks and modules, is a highly customizable software package. Its flexibility is one the most significant assets. The official site for Moodle lists more than 800 hundred plug-in elements that function either as a module or block, which adds interactivity into the course. The blocks or modules necessary for a particular course are installed on the server by the system administrator. Through its HTML editor, blocks and modules or authoring tools, Moodle provides instructors the chance to embed audio and video files and to give links to such files in third-party sites, those web pages which are not hosted on the Moodle server. For example, in an explanatory handbook for Moodle, Hillar (2011) puts in plain words how to deal with (a) recording audio using a microphone, (b) creating and embedding a podcast, (c) Creating MP3 files from diverse audio formats, (d) embedding free sound available on the Internet, (e) working with MIDI music, (f) editing MIDI files, and (g) embedding playlists in a Moodle activity. Audio-related potentials of Moodle are obviously not limited to these. However, such a list suffices to show that Moodle is highly flexible in terms of audio materials design. This makes it a highly favourable environment for pronunciation instruction.

Because of this flexibility to adapt itself according to needs of its users, Hallowell (2011) compares Moodle to a chameleon and notes that it is used by both private and public institutions from pre-school education to universities and by those outside educational domain (p. 6). It is the blocks and modules that give Moodle both functionality and flexibility. Due to this flexibility, the use of Moodle is open to imagination and it can function as a tool that helps educators to manage educational curriculum and therefore, can be referred to as “Curriculum and Information Management System (CIMS)” (Hallowell, 2011, p. 7).

The use of Moodle in foreign language instruction does not abound, but this hardly means that it has limited functionality in foreign language instruction. As noted earlier, it is a highly flexible system with some 800 ready-to-install modules or blocks. Each of these blocks is specifically designed for a particular function and some of these are a perfect match for the aims of a foreign language teacher. For instance, Nanogong Module is a Java application that is used for recording voice on this e-learning platform. A thorough examination of the existing modules and blocks available for download and installation is likely to enrich the e-learning experience on the Moodle site. The following section focuses on several research studies on the use of this e-learning platform in language teaching and a number of others related to pronunciation instruction, especially through technology.

2.6. RELATED STUDIES

This section provides a quick glimpse of research concerning both pronunciation teaching and the use of Moodle in language teaching. Though there have been so many research studies undertaken in pronunciation instruction, those related to language teaching through learning management systems are relatively scarce, and we know of no research focusing on pronunciation instruction through Moodle except for Wilson (2008), who used Praat and the Choice activity to provide learners with feedback about their pronunciation errors. The paragraphs below start with pronunciation research, especially the use of computers in pronunciation teaching, and go on to explain those studies related with problematic sounds for Turkish-L1 learners of English and the use

of Moodle in language teaching. For ease of reference, the related studies mentioned here have been categorised based on the issue they take up.

2.6.1. Studies on Pronunciation and CAPT

The studies mentioned in this section are basically focus on (a) suprasegmental features through CAPT software including accent reduction and text-to-speech programs or through traditional means (Seferoğlu, 2005; Tanner and Landon, 2009; Kılıçkaya, 2011), (b) the effectiveness of discrimination training in teaching problematic sounds through CAPT or traditional means (Wang and Munro, 2004; Mich et al., 2006; Neri et al., 2006, Aliaga-Garcia and Mora, 2009; Mengü, 2010; Tuan, 2010), (c) the effect of web-based teaching materials on learners' pronunciation (Hişmanoğlu and Hişmanoğlu, 2011), and (d) teachers' instructional practices in pronunciation teaching or views of learners' or teachers' on pronunciation or on the use of some pronunciation software (Sifakis and Sougari, 2005; Kartal and Şimşek, 2008; Hişmanoğlu and Hişmanoğlu, 2010; Hişmanoğlu, 2010a; Burgess and Spencer, 2000). The following paragraphs report on these studies to depict the current situation of pronunciation teaching including CAPT software, textbooks; teacher and learner views on pronunciation.

The research related to CAPT software basically includes empirical designs focussing the use of computers to practice pronunciation. For example, Kılıçkaya (2011) studied the effect of accent reduction and text-to-speech software in elementary pronunciation instruction. Totally 35 learners participated in the study in three groups including a control group and two experimental groups with 10, 13 and 12 participants, respectively. In addition to following a traditional approach to pronunciation instruction to a certain extent, both experimental groups studied pronunciation through Pronunciation Power I, but one of them additionally used text-to-speech software, while the control group studied a pronunciation course book and listened to its audio files. The results indicated that the experimental group which additionally used text-to-speech software did better in the sentence reading task, while there was not a statistically significant difference among the performances of all three groups in the word reading task. The researcher also administered a semistructured interview to learn the

participants' views on the software used. The results of this interview revealed that learners found it useful to work with visual support, to study pronunciation in a low-stress environment, to progress at their own rates, to get immediate feedback and to be able to hear the pronunciation of any word or sentence.

In another study with a quasi-experimental research design, Tanner and Landon (2009) researched the effect of Cued Pronunciation Readings (CPRs) on production and perception of three suprasegmental elements; that is, pausing, word stress and sentence-final intonation. They worked with 75 intermediate ESL students. The study had a pretest and posttest in addition to an attitudinal survey that provided insight into the treatment group's experience of CPRs. The data collection tools consisted of five spontaneous speech tasks, a perception task, and a controlled production task. The results showed that although there was not a meaningful difference between the groups in the single word pronunciation task, the experimental group which integrated the use of both accent reduction and text-to-speech software outperformed the other two groups in sentence reading task. The survey made it clear that 64 to 87 per cent of the learners in the treatment group expressed positive opinions about CRPs in terms of helping them make progress in perception and production ability, self-monitoring and public speaking, and so forth (p. 60). The researcher also utilized a semistructured interview to find out the participants' opinions on text-to-speech and accent reduction software. The learners opinion of the software were mostly positive in that they liked visual elements, stress-free learning environment, individual pace, immediate feedback, audio pronunciation of words or sentences, and the focus on spelling-writing relationship.

Seferoğlu (2005) researched whether utilising accent reduction software (Pronunciation Power II) would assist learners to improve their pronunciation both at segmental and suprasegmental level. She used the advanced version of the software that Kılıçkaya (2011) tested in his study with elementary learners. Since Seferoğlu worked with advanced learners, she used Pronunciation Power II. In this experimental study, the treatment group studied pronunciation in a laboratory, whereas the control group studied in a traditional way. The learners were tested before and after the teaching period that lasted for three weeks. The researcher, accompanied by a colleague, rated

learners' pronunciation during their ten-minute presentations on assigned topics in foreign language teaching methodology. The results showed that the learners in the treatment group outperformed those in the control group; the improvement was statistically significant at $p < 0.05$. The researcher acknowledges that there were some limitations with this research. That is, the learners in the control group did not have enough opportunities to work on their pronunciation based on the feedback given after the pretest. She also warns that testing methods and how learners' speech samples are rated could have an impact on the results of the studies on pronunciation.

Another study carried out by Bradlow, Pisoni, Akahane-Yamada, and Tohkura (1997) indicated that perceptual training on the notorious /l/ - /r/ contrast helped Japanese learners to improve their production. This implies that perception training in the form of identification and discrimination exercises can also contribute to pronunciation improvement. Citing some research as the basis of their claim, Wang and Munro (2004) assert that identification training in which the learners identify the sound they hear rather than discriminating them (e.g., same/different drill) yielded better results (p. 541).

Other studies focussed on the effect of discrimination training on attainment in pronunciation. One such study was by Mich et al., (2006), who worked with 28 pupils to test if PARLING, an ASR-based PC program consisting of stories and games to practice English pronunciation, can be a viable alternative for teacher-led pronunciation lessons. Before and after the four-week period of instruction, two groups of learners (13 in the experimental group and 15 in the control group) read aloud 28 words taken from the training material and recorded their voices. Evaluations by three experts revealed that the learners in both groups considerably improved their global pronunciation and quality of pronunciation of difficult and unknown words. The study implied that the instruction by the ASR-based software; namely, PARLING was as successful as the one by human teacher.

Mengü (2010) worked with 45 beginner students aged 17 to 22 to rehabilitate severe segmental pronunciation problems concerning common problematic sounds (i.e. /θ/, /ð/, /ŋ/, /w/, /æ/), which she selected after reviewing the related literature. The participants

received training in a language laboratory for nine weeks (5 hours a week). No pretest or posttest was used, but the learners recorded themselves pronouncing problematic sounds. She researched how beginner learners viewed their progress in articulating problematic sounds. To seek learners' opinions before and after the instructional period, the learners were given an attitudinal survey and a semistructured interview. The results showed that the learners had made progress and they felt that they could speak better; they found pronunciation lessons enjoyable and not as frightening as they had expected. They also reported that they developed monitoring skills. In short, their attitudes towards pronunciation were more positive at the end of the study.

Aliaga-Garcia and Mora (2009) worked with 36 Catalan/Spanish learners of English to research the effectiveness of phonetic training on participants' ability discriminate between four sound pairs (/p/-b/, /t/-d/ word initially, /i:/-i/ and /æ/-ʌ/), which were reportedly difficult for Catalan/Spanish learners. They looked at both voicing and voice of onset duration for the consonants and quality for vowels. After intensive training for 12 hours, the test results showed although learners could perceive and produce some sound pairs more accurately after the training, the training did not provide them with globally crucial improvements. The researchers conclude that the impact of phonetic instruction on learners' ability to perceive and produce target phonemes significantly vary according to phonetic sound feature and sound contrasts studied besides the difference in performance in production and perception tasks. In another study, Logan, Lively, and Pisoni (1991) found that it proved effective to use multiple speakers in various phonological environments to train Japanese learners to differentiate between /l/ and /r/ phonemes.

Similarly, in Wang and Munro's (2004) study, 16 Mandarin-L1 learners of English studied three vowel contrasts (/i/-ɪ/, /ʊ/-u:/, and /e/-æ/) in a computer-assisted learning environment for a period of three months. What made this study different from previous ones was that the learners themselves decided on the amount of training they needed. In this study, the researchers wanted to find out whether phonetic training can help learners to improve their perception of vowels and whether synthetic speech training can aid learners to pay attention to vowel quality rather than duration and whether they can

apply their knowledge into new situations and retain their knowledge for a long time. The performances of the treatment group in the pretest, posttest and generalization test (the third aiming to test learners on untrained items) were compared to those of the control group which received no training. The treatment group also received a late posttest three months later. The results of the study suggested that perception training supported by feedback can improve learners' production of vowel contrasts. It was also clear that the learners could direct their attention to vowel qualities and they can utilise their knowledge in new situations. The late posttest showed that they retained their knowledge and competencies at least for three months.

Neri et al., (2006) carried out a study to test the impact of ASR-based CAPT in segmental accuracy of Dutch learners with various L1 backgrounds. They developed the CAPT themselves by studying the literature; this system contained such activities as role-plays, minimal pairs, and it also provided feedback. To test this system, the researchers worked with 30 beginner learners of Dutch in three different groups for four weeks. In addition to the regular class hours, 15 learners (the treatment group) studied pronunciation through the ASR-based CAPT software mentioned above; 10 learners (Control Group 1) used a similar program and 5 five learners (Control Group 2) received no training at all. Six raters rated the recorded speech by three groups of learners for overall segmental quality; the errors were annotated and kept for analysis. The learners in the treatment group were also given a survey to explore their perceptions of the software. With an interrater reliability of .83 and .87, the speech analysis revealed that all three groups improved their global segmental quality. The treatment group showed the largest improvement. Errors for problematic phonemes were decreased by 7.6 % for the treatment group and by 1.4 for the control group 1.

In a study of segmental phonology through Pronunciation Power I and II, Tuan (2010) researched if minimal pairs work and how much they improve learner's recognition and production at word level in addition to learners' attitudes towards the use of minimal pairs. The analysis of the data collected through surveys for teachers and learners and student recordings revealed that minimal pairs were of fruitful use and they helped the teacher to increase the participants' motivation.

Hişmanoğlu (2010b) worked with 41 Turkish EFL learners on 6 problematic vowels (/æ/, /e/, /ɔ:/, /əʊ/, /u/, and /u:/). The participants studied these problematic phonemes for 3 hours in an Internet assisted pronunciation context in a computer laboratory. The lessons consisted of online exercises, video animations and audio files. At the end of the learning period, the learners' opinions were explored through a survey and an interview. The survey and interview revealed that the learners had a positive attitude towards online pronunciation learning, but they also expressed that they needed guidance to learn pronunciation better on the Internet.

In another study that is similar to Hişmanoğlu (2010b), Hişmanoğlu and Hişmanoğlu (2011) researched the extent to which Internet-based pronunciation teaching materials are useful in aiding learners to articulate problematic English vowels when compared to their traditional counterparts. Another purpose of the study was to find three most problematic vowels for Turkish learners of English. The testing instrument was a list of 30 words with problematic vowels. These words were read by both groups before and after a three-hour instructional period. The learners in the treatment group ($N=15$) improved their pronunciation and this improvement was statistically significant for the three most problematic vowels (/æ/, /əʊ/ and /e/), whereas there was no improvement in the performance of the control group ($N=15$) for these sounds. They concluded that Internet-based materials provide EFL learners with authentic language experiences and valuable opportunities to practise their pronunciation in a lively learning environment and to deal with pronunciation difficulties.

In a case study, Kartal and Şimşek (2008) wanted to explore teacher and learner views on a CAPT program called English Sound Pronunciation with ALPI. With this aim in mind, they studied with 17 eighth grade students at a primary school. The computer-assisted pronunciation instruction with ALPI lasted four hours. After the instruction, the classroom teacher was given a semistructured interview, while the learners were given an attitude scale. Descriptive analysis of the results indicated that although the teacher experienced some problems like time constraints, inadequate hardware, and the learners' having difficulty in getting used to talking heads, both learners and the class

teacher had a positive attitude towards the use of this CAPT software. Most of the learners in the study reported that (a) they used the program with ease and they enjoyed it, (b) the software promoted active participation and individualized practice, and (c) it increased motivation. Furthermore, talking heads integrated into the program was reported to be very useful and interesting. The learners said that they became aware of their mistakes after studying with this program and the teacher reported that the learners clearly developed their articulatory skills, especially after they got used to the software. However, this reported finding concerning the development in learners' articulations of English sounds was solely based on the regular class teacher's observations since no pretest or posttest was administered.

Hişmanoğlu and Hişmanoğlu (2010) surveyed 103 English language teachers employed in the preparatory language classes of five Cypriot universities (with an average age of 32) to find out the most frequently used three techniques and whether there is a correlation between top three techniques and taking a pronunciation course during BA education. They collected data through a survey with Likert items. The results indicated that the participant teachers preferred such teaching techniques which they were taught by their teachers during their BA as dictation, reading aloud and using dialogues. They were not motivated to use modern techniques. The researchers suggest that teachers' motivation should be improved and they should be informed about appropriate online pronunciation instruction resources.

In a relatively similar study, Hişmanoğlu (2010a) surveyed 109 teachers in five Cypriot universities to explore their reactions to the use of online pronunciation instruction materials, whether they use these materials or not and if there exists a relationship between teaching experience or age and the extent to which teachers utilise online materials. According to the findings of this study, 73 (% 67) of the participants said that they did not use online resources, whereas 36 (% 33) of them responded that they utilised them. He attributes this low level of use to technophobia, inadequate training in phonology and lack of computer literacy skills. Young teachers were of the opinion that online resources increased access levels, so they should be used. He also reported that using online pronunciation materials helped learners to improve their pronunciation and

provided teachers with professional development. The researcher made some recommendations such as encouraging teachers to use online materials, providing them with training and team teaching opportunities, employing computer-literate personnel at universities and designing appealing web sites for pronunciation instruction.

In an attempt to gain some insight into the planning of phonology element of an early teacher training course, Burgess and Spencer (2000) surveyed teachers' instructional practises in teaching pronunciation, what they teach and the difficulties they experience. In this research, they took pains to make a distinction between pronunciation instruction with respect to second or foreign language settings and pronunciation teaching in the training and education of language teachers in terms of instructional objectives. Virtually all teachers believed that pronunciation should be integrated with language skills, and 75 % of them were thought that pronunciation should be taught whenever there is need. The most common techniques used were chanting, drama and role-play, and they valued controlled practise in which learners' attention is directed to pronunciation and supported the teaching of phonetic alphabet to enable learners to gain access to pronunciation textbooks.

Finally, surveying Greek EFL teachers' perceptions of pronunciation instruction, Sifakis and Sougari (2005) found that of the 421 teachers surveyed, those who believed that native-like accent should be the objective reported that they did so because a native-like accent helped NNSs to boost self-confidence. They also acknowledged the significance of both segmental and suprasegmental features of English. Interesting to note in this study was that a considerable number of those who were in favour of a native-like accent on a certain level also stated that intelligibility was significant, too. Some teachers exhibited a visible conflict by stating that intelligibility should be the objective in teaching, while they adopted a "norm-bound perspective" (p. 478) in pronunciation instruction by saying that NS accents were the most desirable ones. Another significant issue, which Sifakis and Sougari (2005) noted, was that teachers were unaware of the international spread of English; that is, English as a *lingua franca*.

2.6.2. Studies on Problematic Sounds for Turkish-L1 Learners of English

Because difficulties in an L2 differ from speakers of an L1 to another (Kenworthy, 1987; Flege and Wang, 1989), several Turkish researchers carried out studies to explore the articulation problems experienced by Turkish learners of English. Demirezen carried out a bunch of studies on commonly mispronounced phonemes by Turkish EFL teacher trainees including frequently conflated sound pairs such as /t/ - /θ/ (Demirezen, 2003), /d/ - /ð/ (Demirezen, 2004) /v/ - /w/ (Demirezen, 2005c), /o/ - /ow/ (Demirezen, 2005b), /e/ - /æ/ (Demirezen, 2006), /æ/- /ə/ (Demirezen, 2007a), and problems related with phonetic and phonological processes such as palatalization (Demirezen, 2005a) and nasal devoicing of /ŋ/ (Demirezen, 2007b). In these studies, he noted that Turkish EFL teacher trainees had problems with all the sound pairs mentioned above.

Several others worked on similar sounds which were consistently considered problematic by different researchers. For example, Hişmanoğlu (2009) considered interdental sounds /θ/ and /ð/ as problematic and carried out a study to cure pronunciation problems with these sounds through audio articulation method (Demirezen, 2004); he found out that this method was successful in rehabilitating articulation problems. He also studied /o/ - /ow/ (Hişmanoğlu, 2007) through the same method. In another study, Hişmanoğlu and Hişmanoğlu (2011) reported that the most problematic English vowels for Turkish learners were /æ/. Mengü (2010) provided beginner EFL learners with a segmental training on the following sounds (i.e. /θ/, /ð/, /ŋ/, /w/, /æ/), which considered to be problematic.

Ülkersoy (2007) carried out an experimental study with sophomore EFL teacher trainees in two groups, each of them with 26 students. The researcher analysed learner errors through the pretest. As the testing tool of the study, the learners read aloud a list of words with problematic sounds and their performances were recorded for analysis. The analysis of the learner performances indicated that in addition to markedness a number of other factors such as the environment where the sound occurs, fossilized

errors, L1 interference and orthography played a significant role in difficulties in L2 pronunciation.

Sarıçoban and Kuç (2010) carried out a study to test the effectiveness of games and songs in improving segmental pronunciation of young learners with Turkish as their L1. The learners in this study worked with eight problematic sounds; that is, /w/, /v/, /n/, /ŋ/, /l/, /r/, /θ/ and /ð/. The researchers administered a pretest and a posttest and sought the learners' attitudes through a survey. The treatment for the experimental group ($N=9$) included the use of games and songs, while the control group studied pronunciation through drills, repetition and minimal pairs, and so forth. The posttest results indicated that both groups improved their pronunciation, but the experimental group's improvement was significantly higher than that of the control group. The results also revealed that instruction through games contributed to the learners' motivation and enlivened the classroom. The researchers concluded that though the treatment that the experimental group received was better at improving the learners' pronunciation, traditional techniques should not be disregarded.

As it is seen above, various researchers carried out studies on a number of problematic phonemes or phoneme contrasts. The number of such phonemes and contrasts is so high that it might not be feasible to rehabilitate such problems a limited time. It follows from this, as Broughton et al., (1980) stress that "the teaching sequence must therefore be organised in terms of priorities and degrees of difficulty (p. 62). However, as Dauer (2005) claims, it is not always so clear what can be taught and learned and how to set the priorities in pronunciation teaching (p. 549). At such a point, an error analysis should be carried out to identify problematic sounds for a particular group of learners with the same L1. Error analysis results should be utilised in cooperation with the teachers' and learners' views on problematic phonemes and the functional load of phonemes.

2.6.3. Studies on the Use of Moodle in Language Teaching

In addition to all these studies, it is necessary to review those related to the use of Moodle, which was used in a number of L2 studies with various issues such as placement testing and audio quiz building (Hinkelman and Grose, 2004), vocabulary teaching (Çekiç, 2011; Stanley, 2007), teaching writing (Baskerville and Robb, 2005; Robertson, 2008), grammar instruction (Al-Jarf, 2008), the use of a chatting tool and Moodle to practise oral communication (Ryobe, 2010) and others (Al-Ani, 2008; Fola-Adebayo, 2010; Meurant, 2010; Kalamarz, 2010). Some of these studies which can contribute to the discussion of the findings in the present study are briefly explained below.

Çekiç (2011) conducted a study to reveal the role of mode of input in incidental vocabulary learning. The study investigated the role of three modes of input; namely, reading only, reading +listening and reading + watching in incidental vocabulary learning. In this study, in three instructional conditions, three groups of ELT trainees ($N=95$) were exposed to new vocabulary in (a) reading + listening, (b) reading + watching, or (c) reading only conditions. The subjects in all groups were exposed to a total of 40 target words in 8 texts supplemented by reading comprehension questions. The researchers measured vocabulary learning and retention of the vocabulary items with a posttest which was developed by the researcher based on Laufer and Nation (1999) vocabulary levels test. The results of posttests and delayed posttests indicated that the experimental groups outperformed the control group and reading + listening was more conducive to incidental vocabulary learning. The significant difference was preserved in the delayed posttests, as well.

Stanley (2007), working with a group of low-motivation Japanese students, aimed at teaching vocabulary to students in an intensive reading course in a Japanese university through learner-generated glossaries. During the study, the researcher used learner training videos to provide learners with instructions on how to form glossaries and asked them to rate the effectiveness of the training videos. One major problem during this study was lack of computers in the classroom where learners can use the Moodle

course. The researcher also found that the initial use of glossary was very low though they were more frequently accessed at the end of the course. The researcher concluded that inadequate resources and class time posed problems during the study.

In an attempt to research the effect of the complexity of course design on the success of the course and to find out learners' reactions to the learning environment and problems faced during the online learning experience, Al-Jarf (2008) carried out a comparative study of three LMSs; that is Moodle, WebCT and Nicenet in a college level grammar course for EFL learners. In addition to face-to-face instruction in a regular classroom, three groups of learners studied grammar in three virtual environments designed in these three learning management systems. The learners studied grammar through external links, forums, exercises, and so on in all three learning environments. At the end of the study the learners in the Moodle and WebCT courses reported that they found the courses difficult to follow and complex, while the learners in the Nicenet course thought that the course easy to deal with. She concluded that course designers and teachers should be careful when designing and delivering online courses, especially with technologically non-savvy learners with low English proficiency levels.

To design better online courses, Al-Ani (2008) investigated 60 EFL learners' perception of a LMS-based course through a survey. The results indicated that Moodle boosted learners' participation in learning activities, and helped them to communicate and gain knowledge. In addition to these positive sides, there were some technical problems, mostly related to computer and program failures. In a similar study to explore learner attitudes towards a learning management system (Moodle) and the challenges experienced, Fola-Adebayo (2010) administered a survey with thirty-eight Likert items to a group of 94 male and 57 female students who were instructed through Moodle. He found no significant difference between the ICT skills of male and female students, and between those of students from middle and lower classes. In this study, girls were more satisfied with the online course provided, which according to the researcher, is because of boys' having higher expectations. The problem areas were as follows: using the forum, doing assignment, logging in, accessing learning materials, and editing profiles (Fola-Adebayo, 2010, p. 14).

Kalamarz (2010) used Moodle as a blended e-learning platform, in which he provided the learners, most of whom were part-time students, with an electronic workbook as a complement of the foreign language course, a web-based mock examination to help the learners to get prepared for a final foreign language examination and lessons for self-study. Before the instructional period, the students were informed about the basics of how to use Moodle, and throughout the course period, the learners' efforts were graded and monitored. The researcher reports that the introduction of Moodle into Polish context and the teachers' getting acquainted with Moodle's potentials were challenging.

In Yang and Lin's (2010) study, 47 students in a medical college participated in an on-line cultural exchange program in Moodle to develop writing skills. They were asked to write on forums and respond to other students' writings. Writing progress tests were used to measure the improvement in their writing skills. The results of writing tests and a questionnaire indicated that learners with a high positive attitude towards the Internet participated in the on-line forum more frequently, but those with a high Internet self-efficacy did not have high participation rates. Moreover, those with high participation scored better in the writing fluency exam.

2.7. CONCLUSION

In general, research in pronunciation brought about some contradictory results. Silveria (2002) attributes these controversial results to the heterogeneity of research designs. In other words, the subjects tested, L1s, age and linguistic experience of the participants and instructional periods differ greatly. However, research in CAPT brought about partially consistent results. Most of these studies indicated that learners had a positive attitude towards the use of CAPT software or Internet-based teaching (Tanner and Landon, 2009; Mengü, 2010; Tuan, 2010; Hişmanoğlu and Hişmanoğlu, 2011; Kartal and Şimşek, 2008) and the results of most of these studies encourage the use of technology to teach pronunciation.

In addition to the need to deal with mixed findings in pronunciation research, the role of technology in pronunciation instruction needs to be clarified through experience and empirical studies. Despite the existence of a considerable number of studies focussing on the use of offline computer software in pronunciation instruction, there aren't many studies on online instruction in pronunciation except for a few small scale studies like that of Hişmanoğlu and Hişmanoğlu (2010) mentioned above. Furthermore, though Moodle was not specifically designed for language education, there are quite a few studies on the use of Moodle in this domain. However, most of these studies focus on writing, grammar and vocabulary. Potentials of Moodle for pronunciation instruction are yet to be explored. Therefore, there is need for research on how on-line pronunciation instruction and the use of learning management systems fit into the overall pronunciation instruction in SLA. The present study is an attempt to carry out such a study, details of which are explained in the following chapter and the results of it are discussed in the next.

CHAPTER 3

METHODOLOGY

3.1. INTRODUCTION

In the present study, the effectiveness of an LMS-based pronunciation instruction tool and a commercial accent reduction program was tested in a quasi-experimental research design with two experimental groups and a control group. The first experimental group studied problematic sounds in an LMS-based environment, while the second experimental group studied problematic sounds through commercial software (Pronunciation Power II), and the third group was instructed in a traditional way. In addition to the tests, the learners were given an attitudinal survey including the pronunciation attitude inventory, PAI for short, by Elliott (1995) before and after the instruction.

In brief, the researcher studied three instructional environments, in which the participants worked with problematic phonemes for Turkish-L1 learners of English. The study lasted 12 weeks including speech sample collection, pretesting, actual instructional period and posttesting. This chapter elaborates on the research design, participants, screening of problematic sounds, instructional environments, data collection tools and validation procedures of these tools. Finally, it ends with an explanation of how the collected data was analysed.

3.2. RESEARCH DESIGN

Based on minimal pair contrasts of problematic sounds for Turkish-L1 learners of English, the present study follows a mixed mode quasi-experimental research methodology with two treatment groups and a control group of freshman EFL teacher trainees studying at the ELT Department of Hacettepe University in Turkey. Following an extensive review of the related literature, commonly conflated sound contrasts were chosen, and the participants were provided a six-week instruction based on minimal pair contrasts.

The first step in this research study was to identify problematic phonemes for freshman EFL teacher trainees with Turkish as their L1. The researcher followed several steps to diagnose the problematic sounds. First, he collected learner speech samples, which informed him about severe pronunciation problems experienced by EFL teacher trainees. Collected speech samples were examined by two native speakers to identify the most problematic consonants and vowels. Besides the analysis of learner speech, the pronunciation problems mentioned in the literature were also taken into account. The learners' perceptions of problematic sounds were also sought through a questionnaire.

84 participants in three groups took part in this quasi-experimental study. These learners were assigned into two experimental groups and a control group based on their sections because random assignment was not possible because of time and program limitations. The learners in the first treatment group followed the lessons in a website developed in Moodle and generated and shared content and evaluated each other's work with the help of tools available in the LMS-based course. The instructional design for the first treatment group is based on a pronunciation teaching web site that was made up of training videos and exercises that focused on problems and challenges experienced by Turkish-L1 EFL teacher trainees. The trainees in the second experimental group tried to remediate their errors by using an accent reduction program (Pronunciation Power II), while the control group studied the problematic sounds in a traditional environment.

All groups were given a pretest before the treatment and a posttest after it to check how effective the instruction had been. The performance of each testee was recorded and analysed in detail to explore the changes that occurred as a result of the treatment. The participants in all groups were also given a perception test of minimal sentences. The PAI was used in both versions of the attitudinal survey. In addition to the PAI, the pre-instructional survey included items that inquired about problematic sounds, Internet access, previous experience with online pronunciation learning, and so forth, while the post-instruction survey contained a number of Likert items supported by two open-ended questions to discover the participants' perceptions of the instruction and the challenges they encountered. In this respect, the present study is a mixed mode one

utilizing both quantitative and qualitative data to account for the value of the three instructional environments. Table 3.1 illustrates the experimental design of the study.

Table 3.1.

The Experimental Model Followed in the Study

Group	Assessment	Treatment	Assessment
Experimental 1	Pretest, Pre-instruction survey	LMS-based self-study through Moodle	Posttest, Post-instruction survey
Experimental 2	Pretest, Pre-instruction survey	Self-study through Pronunciation Power II	Posttest, Post-instruction survey
Control	Pretest, Pre-instruction survey	Traditional instruction	Posttest, Post-instruction survey

Since the participants were not randomly assigned to the experimental groups and control group, their pretest performances were compared through one-way ANOVA to see if there were any statistically significant differences to reduce the effect of variance between groups on the posttest results. Therefore, it was hypothesized that;

- (1) Participants in all three groups (Experimental Group 1, Experimental Group 2 and Control Group) would perform equally in the vowels section in the POSE test, so there would not be statistically significant differences among the groups.
- (2) Participants in all three groups (Experimental Group 1, Experimental Group 2 and Control Group) would perform equally in the consonants section in the POSE test, so there would not be statistically significant differences among the groups.
- (3) Participants in all three groups (Experimental Group 1, Experimental Group 2 and Control Group) would perform equally in the dialogue task in terms of accuracy, so there would not be statistically significant differences among the groups.
- (4) Participants in all three groups (Experimental Group 1, Experimental Group 2 and Control Group) would perform equally in the dialogue task in terms of intelligibility, so there would not be statistically significant differences among the groups.

- (5) Participants in all three groups (Experimental Group 1, Experimental Group 2 and Control Group) would perform equally in the paragraph reading task in terms of accuracy, so there would not be statistically significant differences among the groups.
- (6) Participants in all three groups (Experimental Group 1, Experimental Group 2 and Control Group) would perform equally in the paragraph reading task in terms of intelligibility, so there would not be statistically significant differences among the groups.
- (7) There would not be statistically significant differences among the three groups (Experimental Group 1, Experimental Group 2 and Control Group) in terms of their Pronunciation Attitude Inventory scores.

A one-way between subjects ANOVA was conducted to compare the groups' performances in the productive pronunciation test, the POSE test, and their scores in the Pronunciation Attitude Inventory. Before carrying out the analyses, homogeneity of variances and normality of distribution of data assumptions were checked and it was found that the scores in the datasets were normally distributed and the variances were equal. This ensured that ANOVA could be carried out for these datasets. A one-way analysis of variance for the POSE test scores in the pretest showed that the groups did not significantly differ in terms of both vowels [$F(2, 81) = 1.05, p = .354$] and consonants [$F(2, 81) = 1.06, p = .352$]. In other words, the two experimental groups and the control group were equal in their recognition of problematic sounds. ANOVA results also indicated that there were not significant differences between the accuracy scores [$F(2, 81) = 1.71, p = .187$] and intelligibility scores [$F(2, 81) = 0.95, p = .393$] of the three groups in the dialogue section of the pretest. Similarly, accuracy scores of the groups in the pretest paragraph reading task did not differ significantly [$F(2, 81) = 0.95, p = .392$]. Therefore, the null hypotheses that the groups would perform equally in the pretest in terms of (a) perceptual discrimination of vowels in the POSE test (Hypothesis 1), (b) perceptual discrimination of consonants in the POSE test (Hypothesis 2), (c) accuracy in the dialogue task (Hypothesis 3), (d) intelligibility in the dialogue task (Hypothesis 4), and (e) accuracy in the paragraph reading task (Hypothesis 5) were accepted.

Although there were not statistically significant differences among the groups in terms of the first five parameters mentioned above, there was a significant difference between the intelligibility scores of the three groups in the paragraph reading task [$F(2, 81) = 3.76, p = .027$]. Post hoc analysis using the Scheffe test revealed that the intelligibility scores of the control group ($M = 17.22, SD = 3.68$) was significantly higher than those of Experimental Group 1 ($M = 14.88, SD = 3.65$). Although the control group's mean score was higher than that of Experimental Group 2 ($M = 15.09, SD = 3.68$), the difference was not statistically significant. In other words, the participants in the control group performed better than Experimental Group 1 in terms of intelligibility in the paragraph reading task of the pretest. Therefore, the alternate hypothesis that the groups would perform differently in the pretest in terms of paragraph intelligibility (Hypothesis 6) was accepted. All in all, one-way ANOVA results showed that only intelligibility scores of the groups for the paragraph reading task significantly differed. In terms of all other results for production and perception test, the groups performed equally.

In addition to the groups' scores in the production and perception tests, their Pronunciation Attitude Inventory scores were also compared with one-way ANOVA procedure to see if there were statistically significant differences between mean scores of the experimental groups and control group. The results of the analysis of one-way ANOVA indicated that the groups significantly differed [$F(2, 81) = 3.93, p = .024$]. Post hoc comparisons using the Scheffe test indicated that the mean score for Experimental group 1 ($M = 48.63, SD = 3.80$) was significantly different than Experimental Group 2 ($M = 45.45, SD = 4.98$), and there was not a meaningful difference between the mean score for control group ($M = 48.28, SD = 5.38$) and that of Experimental group 1 and Experimental group 2, so the alternate hypothesis that the groups would be different in terms of their PAI scores (Hypothesis 7) was accepted. Since there were significant differences between the groups for PAI results and paragraph intelligibility scores, ANCOVA was used as the test of statistical significance to compare the results of the posttests.

As noted earlier, the learners were tested before and after the instructional period to provide insight into whether instruction had any impact on learners' productive and

perceptual skills in discriminating sounds often cited as problematic for Turkish-L1 learners of English. Some researchers stressed the importance of working with both perception and production (e.g., Gilbert, 1984; Dalby and Kewley-Port, 1999; Sheldon and Strange, 1982; Derwing and Munro, 2005; Ülkersoy, 2007), and the present study incorporated perception along with production. Therefore, the testing instrument in this study consisted of two components: (a) a productive test and (b) a perceptual test. Two educated native speakers of British English analysed the learners' performances recorded before and after the treatment in all groups to find out which instructional practice was better at improving learners' pronunciation.

3.3. SETTING AND PARTICIPANTS

This study was carried out in the ELT department of Hacettepe University in the Spring Semester of 2010-2011 academic year. 84 freshman teacher trainees enrolled in ELT 176 Listening and Pronunciation II took part in the study. The participants gained entry into the ELT department after they took a hundred-item multiple-choice test, mainly testing grammar, vocabulary and reading skills. In the learning environment, there was limited L2 input, and at the onset of the study, the learners had already taken a course titled "Listening and Pronunciation I." All three groups mostly consisted of female learners (See Table 3.2), and 65 of them were between 17-20 years old, while 8 learners were older than 20. 11 learners did not respond to the question asking about their age (See Table 3.3).

Table 3.2.

Gender Distribution of the Participants

	What is your gender?		Total
	Female	Male	Total
Experimental Group 1 (Moodle)	28	2	30
Experimental Group 2 (P. Power)	22	7	29
Control Group (Traditional)	19	6	25
Total	69	15	84

Table 3.3.

Age Distribution of the Participants

	How old are you?		Total
	17-20	21-24	Total
	years old	years old	
Experimental Group 1 (Moodle)	27	3	30
Experimental Group 2 (P. Power)	18	3	21
Control Group (Traditional)	20	2	22
Total	65	8	73

In addition to personal information including name, age and gender sought in the pre-instruction survey, the learners were asked several other questions regarding computer and Internet skills and their previous experience with computer-assisted pronunciation learning, online pronunciation learning and whether there is Internet connection in their accommodations to assess their readiness for studying pronunciation through computers and the Internet. Their responses are given in Table 3.4.

Table 3.4.

Participants' Responses to the Questions Related to Technology Use

Item	Group	Yes	No	Total
Have you ever used computer programs to study pronunciation?	Experimental Gr. 1	16	14	30
	Experimental Gr. 2	11	18	29
	Control Gr.	13	12	25
	Total	40	44	84
Have you ever used online pronunciation materials?	Experimental Gr. 1	5	25	30
	Experimental Gr. 2	4	25	29
	Control Gr.	3	22	25
	Total	12	72	84
Would you take an online pronunciation course if one were available to you?	Experimental Gr. 1	27	3	30
	Experimental Gr. 2	16	5	21
	Control Gr.	16	7	23
	Total	59	15	74
Do you have an Internet connection in the place where you stay?	Experimental Gr. 1	23	7	30
	Experimental Gr. 2	19	2	21
	Control Gr.	15	7	22
	Total	57	16	73

As it is clear in Table 3.4 above, most of the participants did not have any experience of online pronunciation learning except for only a small number of learners (12 out of 84), but nearly half of them used computer programs to study pronunciation. Additional open-ended questions that required them to specify the Internet site and PC programs they had used indicated that most of these programs were online text-to-speech software such as Ispeech, Acapella (Acapella Group, 2012) or Ivona to convert text into speech; some students used online versions of such software or electronic dictionaries. They did not use large-scale pronunciation learning software or Internet materials teaching pronunciation. Some learners did not respond to two of the questions (whether they would like to take an online course and whether they had Internet connection in their

accommodations). In addition to these, majority of the participants (57 out of 84) had an Internet connection in their accommodations.

Table 3.5.

Participants' Perception of their Computer Skills

	How good are you at using computers?					
	Very			Very		
	good	Good	Average	Bad	bad	Total
Experimental Group 1 (Moodle)	3	1	14	8	4	30
Experimental Group 2 (P. Power)	1	4	9	4	3	21
Control Group (Traditional)	1	3	13	4	2	23
Total	5	8	36	16	9	74

Table 3.6.

Participants' Perception of their Internet Skills

	How good are you at using the Internet?					
	Very			Very		
	good	Good	Average	Bad	bad	Total
Experimental Group 1 (Moodle)	3	1	12	8	6	30
Experimental Group 2 (P. Power)	1	4	6	9	1	21
Control Group (Traditional)	1	3	10	6	3	23
Total	5	8	28	23	10	74

10 students did not respond to the question which asked how the participants viewed themselves in terms of computer and Internet skills (See Table 3.5 and Table 3.6). In all three groups, few learners considered themselves good or very good at using the Internet (13 out of 74 learners), while a great majority of them (61 out of 74) viewed themselves average, bad or very bad Internet users. As a result, all these data concerning

the participants' readiness for computer-based pronunciation training implied that before the instruction began, it was essential that learners be given training on how to use the Moodle site and the PC program.

3.4. DATA COLLECTION TOOLS

The data collection instruments used in this study were a recording task for learner speech collection to diagnose problems on the segmental level, an attitudinal survey administered to all participants before and after the instructional period, and two pronunciation tests; that is, a perception test based on minimal sentences and a production test. The recording task for learner speech collection was exclusively for diagnostic purposes, while the perceptual and productive tests were intended to function as the pretest and posttest. As for the attitudinal survey, it served for various purposes including gaining insight into learners' perception of problematic sounds, their attitudes towards near native-like pronunciation (through PAI adopted from Elliott, 1995), how they viewed themselves in terms of intelligibility and perceived segmental difficulties for them, and so forth. These data collection instruments are explained in detail in the following sections.

3.4.1. Learner Speech Collection

As Goodwin (2001) notes, one of the easiest way to diagnose learners' segmental productions is to ask them to read a phonetically rich text with the target sounds embedded in it or to give them prompts to help them produce a short spontaneous speech (p. 129). Therefore, after the literature review, as the next step to find out the most problematic sounds for Turkish-L1 learners of English, the researcher collected learner speech samples.

In the speech collection process, the researcher collected learner speech samples with the help of two tasks (Dauer, 1993): (a) reading aloud a paragraph containing all the sounds of the English after studying it for a few minutes, and (b) giving a free speech on a list of assigned topics (a quasi-spontaneous speech) (See Appendix 1 for these tasks).

As the students performed the tasks, their voice was recorded for later analysis. These recorded learner speech samples were analyzed by two native speakers (See the Section titled “Screening of Problematic Sounds” for the results of the analysis).

3.4.2. Productive Pronunciation Test

Pronunciation tests that aim at testing segmental features of English pronunciation usually include word and sentence repetition items, reading aloud, description of a given picture, and so forth. For example, Elliott (1995) administered a pronunciation test that examined the subjects on repeating words and sentences after a model to find out the correlation between pronunciation accuracy and a number of variables including degree of field independence, hemispheric specialization and gender, and to find out the accuracy of mimicking behaviour through a picture description task.

Since there is no standard way of testing, the researcher adopted the testing materials from those tests available in pronunciation books. The productive pronunciation test consisted of 2 recording tasks: (a) a paragraph and (b) a dialogue. The learners were given some time to get acquainted with the text so that they do not “suffer from processing overload during the recording which draws their attention away from pronunciation and leads to reliance on their L1 habits” (Walker, 2005, p. 553). On the average, it took 45 seconds to role-play the dialogue and a little more than 1 minute to read the paragraph. Since longer tasks are not appropriate in terms of both the difficulty in recording the texts and evaluating them, the recordings were kept much shorter than 2 minutes.

De Jong (1977) warns that it is not easy to elicit the same response from the testees unless the tester pays a special attention to the principles of elicitation task development. In other words, the tester might get something that hardly meets the expectations (p. 239). Keeping this in mind, the researcher used no phoneme elicitation tasks since in such tasks it is rather challenging to develop items that elicit the same response from all testees. Individual ways of thinking, cultural schemata and synonyms cause testees to respond differently to stimuli such as pictures.

Pronunciation testing is generally made up of three task types: perception, production, and a combination of perception and production, which is essentially an imitation task (Jilka, Baumotte, Lewandowski, Reiterer and Rota, 2007, p. 1738), often used to test phonetic ability. In addition to not having a phoneme elicitation task, the productive pronunciation test in this study did not have any imitation tasks. The test consisted of a 228-word paragraph and a short dialogue, both containing all 44 phonemes of English; the testees were asked to read aloud the paragraph individually once and role-play the dialogue in pairs twice by exchanging roles. Their performances were recorded by using Audacity 1.3.4 Beta (Audacity Team, 2008) or built-in Windows sound recorder.

Although the use of spontaneous speech tasks are advised by various researchers (e.g., Grant, 1999), a serious drawback of such tasks is that learners tend to use avoidance strategies since they might have difficulty in transferring what they learned into actual communicative settings. Through spontaneous speech it may not be possible to uncover underlying processes due to avoidance strategies. Therefore, a significant advantage of the productive pronunciation test in this study was that avoidance strategies were not applicable since the test items were controlled pronunciation tasks.

3.4.3. Perception of Spoken English (POSE) Test

It is a common contention that listening and repeating are closely interrelated; that is, development in one of them helps the other one develop, too (Pennington, 1996). Despite the common belief that learners have to perceive a sound contrast before they can produce it, some researchers claim that how speech production relates to speech perception in SLA is beyond comprehension (Sheldon and Strange, 1982; Derwing and Munro, 2005). Whether it is essential to perceive a speech sound before one can produce such a sound is not so clear, but it is highly likely that both speech production and speech perception areas pose difficulties in acquiring the phonological and phonetic systems of a foreign language (Dalby and Kewley-Port, 1999). Therefore, to test learners' ability in perception of English sounds, the POSE test (Shewell, 2004) was used in this study. This test is further described below.

The POSE Test is a test of English pronunciation aiming to test EFL and ESL learners' ability to comprehend spoken language. The official site for this test defines itself as “a tool being designed to help nonnative English speakers (and their ESL/EFL teachers) to diagnose problems in speech perception” (Shewell, 2004). It is a validated test of perception with the Outstanding TESOL Project Award in 2005. Initially developed in cooperation with Dr. Lynn E. Henrichsen, one of the co-authors of *Pronunciation Matters*, the POSE test focuses on five major aspects of spoken English: (a) vowels, (b) consonants, (c) word stress, (d) intonation, (sentence-final), and (e) sentence stress (See Figure 3.1 below).

Perception of Spoken English (POSE) Test

Welcome!

Directions:
Click on a section to begin. A ☒ means you have already finished that section.

 **CHECK AUDIO**
Click here to check your sound system.

 Problems?
Send us [email](#)

VOWELS	☐
CONSONANTS	☐
WORD STRESS	☐
INTONATION 1	☐
INTONATION 2	☐
SENTENCE STRESS 1	☐
SENTENCE STRESS 2	☐

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Figure 3.1. The main user interface of the POSE test (Shewell, 2005, Online)

For the purposes of this study, only the tests of vowels and consonants were utilised after obtaining the necessary permission from the copyright holder (See Appendix 6 for the e-mail correspondence for the permission.). There are 38 items for vowels and 84 for consonants in this test. Each item consists of a pair of minimal sentences accompanied by a visual representation of each sentence (See Figure 3.2). Seeing these sentences and visuals, the testee is asked to choose correct sentence after hearing the audio version of one of the minimal sentences. The listener has the chance to listen to the sentence twice. The speaker icon is automatically deactivated after the testee listens to it twice.

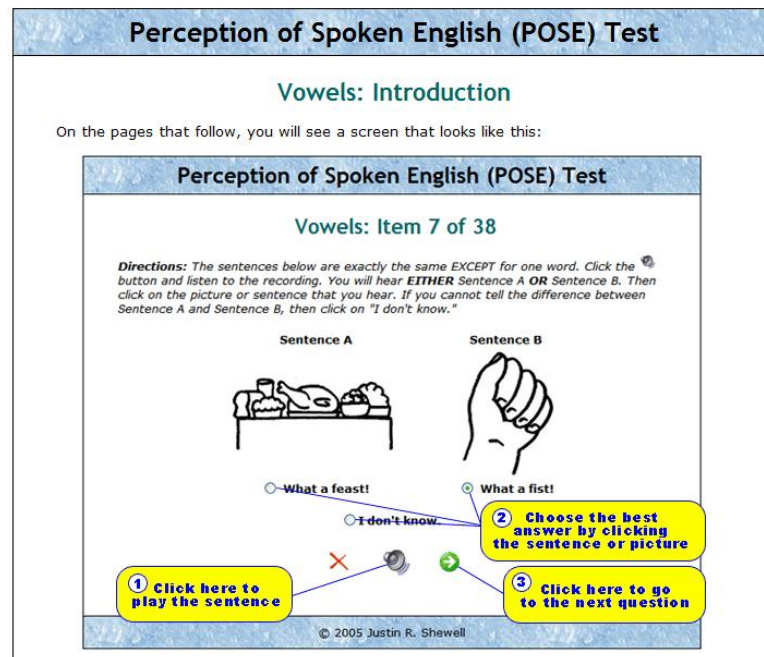


Figure 3.2. A sample test item in the POSE test (Shewell, 2005, Online)

Since this test is a computer adaptive test of perception in English pronunciation, learners took the test in the language laboratory. The test also included some less frequently used vocabulary items such as bale, dock, doze, lark, and so forth. Therefore, the learners were asked to complete several activities to learn these vocabulary items before they were given the test. The activities to teach these vocabulary items included flashcards for memorization and gap-fill exercises (See Figure 3.3 for a sample gap-fill exercise). They studied approximately 40 words in a flashcard set followed by 4 gap-fill exercises each with 10 words. All three groups completed these activities on the Internet.

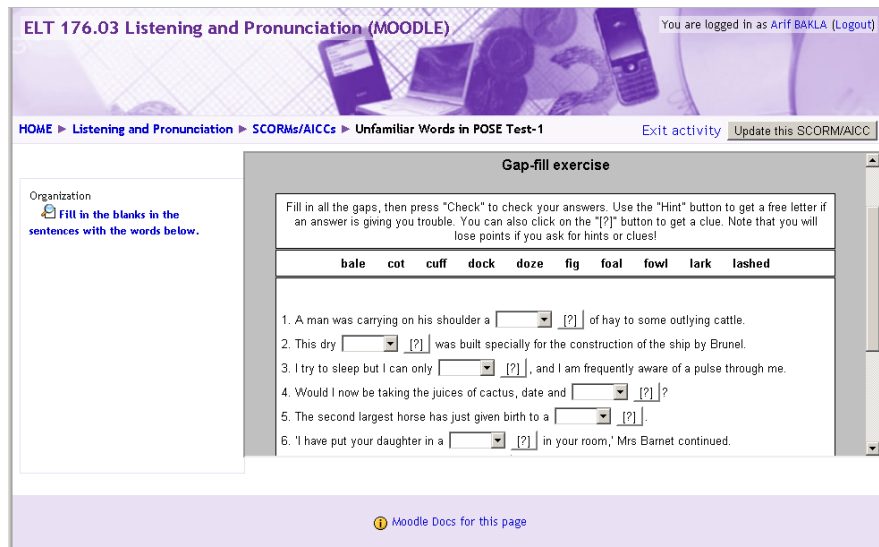


Figure 3.3. A gap-fill exercise for the unknown words in the POSE test

Upon studying all unfamiliar vocabulary items for a short time, it took 15 minutes on the average to complete the sections reserved for consonants and vowels in the test. Snapshots of the page showing the results of the test for both sections were taken by the testee, and they were sent to the researcher's e-mail address (See Figure 3.4).

Perception of Spoken English (POSE) Test		
Vowels: Results		
Legend		
✓ = correct answer	✗ = incorrect answer	? = chose "I don't know!"
Item 1: ✗ (/æ/-/ɑ/)	Item 2: ✗ (/ʌ/-/ʊ/)	Item 3: ✓ (/ɪ/-/ɛ/)
Item 4: ✗ (/i/-/ɪ/)	Item 5: ✗ (/ɑ/-/ɑr/)	Item 6: ✓ (/ɑ/-/ʌ/)
Item 7: ✗ (/ɑ/-/ʌ/)	Item 8: ✓ (/ʌ/-/ə/)	Item 9: ✗ (/ɛ/-/æ/)
Item 10: ✗ (/ɑ/-/ow/)	Item 11: ✓ (/æ/-/ɑ/)	Item 12: ✓ (/ɛ/-/æ/)
Item 13: ✓ (/ɪ/-/ɛ/)	Item 14: ✓ (/ɛ/-/æ/)	Item 15: ✗ (/æ/-/ɑ/)
Item 16: ✗ (/ɛ/-/æ/)	Item 17: ✓ (/æ/-/ɑ/)	Item 18: ✗ (/ʌ/-/ə/)
Item 19: ✗ (/i/-/ɪ/)	Item 20: ✗ (/ɪ/-/ɛ/)	Item 21: ✓ (/ɛ/-/e/)
Item 22: ✓ (/ɑ/-/ow/)	Item 23: ✓ (/ɛ/-/e/)	Item 24: ✗ (/ɪ/-/ɛ/)
Item 25: ✗ (/ɛ/-/e/)	Item 26: ✓ (/i/-/ɪ/)	Item 27: ✓ (/ɑ/-/ɑr/)
Item 28: ✓ (/ʌ/-/ʊ/)	Item 29: ✗ (/ɑ/-/ʌ/)	Item 30: ✗ (/ɛ/-/e/)
Item 31: ✓ (/ɑ/-/ow/)	Item 32: ✗ (/ʊ/-/uw/)	Item 33: ✗ (/ɑ/-/ɑr/)
Item 34: ✓ (/ɑ/-/ɑr/)	Item 35: ✓ (/ɑ/-/ʌ/)	Item 36: ✓ (/ʊ/-/uw/)
Item 37: ✗ (/i/-/ɪ/)	Item 38: ✗ (/ɑ/-/ow/)	

Figure 3.4. The POSE test result page for vowels (Shewell, 2005, Online)

The POSE test examined the learners' ability to differentiate between minimal pairs that are likely to be conflated. It helped the researcher to find out whether the learners had perception difficulties and whether they could improve themselves in correctly hearing the words with problematic sounds. The vowel section of this perception test includes 38 items testing 11 sound contrasts, while the consonant section consists of 84 items testing 25 different sound contrasts. Shewell (2004) selected these contrasts based on their functional loads, but he did not select any syllable-medial sound contrasts because he knew of no research on the functional load of such sound contrasts (Shewell, 2004, pp. 36-37), so he did not include them in the consonants section.

3.4.4. Attitudinal Survey

The attitudinal survey administered before and after the instructional period consisted of three sections: (a) 12 items asking how the learners viewed pronunciation learning and native-likeness (PAI adapted from Elliott 1995), (b) 1 item inquiring about segmental difficulties, and (c) 7 items concerning the pronunciation courses they had taken until that time, whether they had used online or PC-based materials, computer literacy and their reactions to a possible online course, and (4) personal information; that is, name, age and sex. The sections that accompanied the PAI were included because as Goodwin (2001) recommends, "at the very least, it is useful to distribute a survey to the students at the beginning of instruction that elicits their needs and interests" (p. 118).

The Pronunciation Attitude Inventory (PAI), developed by Elliott (1995), was administered to the participants so as to explore their attitudes towards learning pronunciation and native-likeness. This inventory has been used by a number of other studies on pronunciation (e.g., Engwall, 2006; Hodges, 2006; Singer, 2006; Holt and Gelormini-Lezama, 2008; Lord, 2008; Ducate and Lomicka, 2009; Holt, 2009). The PAI consisted of 12 Likert items that assessed students' attitudes toward pronunciation (See Appendix 2).

The post-instruction survey differed from the pre-instruction one in that none of the items in Section 2 and 3 of the pre-instruction survey were included in the post-

instruction version (See Appendix 4). Instead of these items, there were open-ended questions and Likert items that aimed to evaluate the learning experience the learners had had during the term. The learners' reactions to the learning environments and software were sought, in Seferoğlu's (2005) words "to complement the quantitative analysis" (p. 314). To this end, there were 5 common items (including two open-ended questions providing insight into strong and weak sides of the training, and problems experienced) intended for all three groups, 8 Likert items for the Moodle group, 5 for the Traditional Instruction Group and 4 for the Pronunciation Power Group. These questions aimed at gathering information about the learners' experience of the course they had just taken. The open-ended questions provided insight into the problems experienced and positive sides of the pronunciation training provided. In short, the 22 additional items in the post-instruction survey assessed the students' perceptions with regard to the training provided.

3.4.5. Validation of the Data Collection Tools

This section informs the reader about the validation of the data collection tools used in this study. The POSE test was validated by its originator at the initial stages with 66 learners from various L1 backgrounds including Korean, Spanish, Japanese, and Chinese. Shewell (2004) noted that due to lack of similar tests available for use, he was not able to validate it by comparing its results to a similar test. Therefore, instead of utilising parallel tests method, Shewell used the "alternate forms method" to test the reliability of the test. That is, the test was administered to the testees twice and the results were compared. The learners were assigned a form in each administration of the test. Some of the testees were given the same form in both administrations, while some others were provided with alternate forms (p. 64). He notes that the number of correct answers was nearly the same for both administrations. Moreover, except for one of the cases, all incorrectly perceived items were the same ones in both administrations (p. 72). The results of the alternate forms method used by the originator of the test implied certain degree of reliability.

For the purposes of the present study, the test was administered to 5 learners to discover potential problems and the time of administration. The piloting results showed that the vowels section could be completed less than 10 minutes, while the consonants part could be done in 15 minutes on the average. This small-scale piloting showed that a fast Internet connection is necessary to avoid unexpected connection failures and to help the learner to finish the test in a short time. The test did not have the phoneme /ŋ/, so the perception of this particular phoneme was not tested in the POSE test. On the account of the fact that users are not allowed to make changes in the test, it was not possible to add the missing phoneme into the test.

Another data collection tool validated was the PAI, which was actually used in various research studies noted earlier. Some researchers (e.g., Engwall, 2006; Ducate and Lomicka, 2009; Singer, 2006; Hodges, 2006, etc.) did not carry out any validation studies for PAI since they thought that it was already validated by Elliott (1995), the original creator of the inventory. However, in the current study, in order to see how the inventory works with Turkish-L1 learners of English, the survey was administered to 67 volunteers among the same learners that participated in the study during the pre-instructional period.

To find out reliability value of the attitude inventory, Cronbach Alpha coefficient was calculated after the piloting. The PAI consisted of 12 items ($\alpha = .840$). George and Mallery (2003) provide researchers with a guideline on how to interpret Cronbach alpha values: “ $\alpha > .9$ – excellent, $\alpha > .8$ – good, $\alpha > .7$ – acceptable, $\alpha > .6$ – questionable, $\alpha > .5$ – poor, and $\alpha < .5$ – unacceptable” (p. 231). Since Cronbach Alpha value for the PAI was above .80, it was considered to be highly reliable. As noted earlier, Elliott (1995) calculated this value to be ($\alpha = .87$). Therefore, the Cronbach Alpha value calculated by the originator of this inventory and the value gained through the piloting in the present study indicate that this inventory is of high reliability. In addition to this, Cronbach alpha coefficients for the items for each group in the post-instruction survey were calculated. The global reliability coefficient for 18 items was ($\alpha = .765$) (See Table 3.7). This value implied that the items in the post-instruction survey were acceptable.

Table 3.7.

Cronbach Alpha Coefficient for the Post-Instructional Survey Items

Sections	Cronbach's Alpha	Number of Items
Common Items	.837	3
Items for the Moodle Group	.848	8
Items for the P. Power Group	.701	4
Items for the Traditional Group	.661	4
Overall Reliability Coefficient	.765	18

Finally, the productive pronunciation test was piloted with a group of 12 freshman EFL teacher trainees at ELT department of a private university in Konya to learn about such issues as administration time, potential problems likely to occur during voice recording, and so forth. The testees' performances were recorded and analyzed by the researcher himself and a colleague holding Ph.D. in language teaching. The piloting showed that it took no more than 5 minutes to record the tasks. Because some learners had difficulties adjusting microphone levels, some sound files were of poor quality. Therefore, this issue was later handled in the learner training sessions. This research design was put into practice beginning with the selection of problematic sounds through several criteria mentioned in the next section.

3.5. SCREENING OF PROBLEMATIC SOUNDS

The researcher followed a strict procedure to select what minimal pairs to include in the training sessions. Four different criteria helped the researcher to decide which phonemes to work on during the training: (a) a thorough analysis of the literature on problematic sounds for Turkish-L1 learners of English (Demirezen, 2003, 2004, 2005a, 2005b, 2005c, 2006, 2007a, 2007b; Hewings, 2004; Swan and Smith, 2001; Kenworthy, 1987; Kelly, 2000, pp. 144-146; Hişmanoğlu and Hişmanoğlu, 2011), (b) functional load of the phonemes (frequency of occurrence in English words), (c) the analysis of the collected speech samples, and (d) learner perceptions of problematic sounds (collected through the learner survey).

The first criterion was an literature review of problematic sounds for Turkish-L1 learners of English. Hişmanoğlu and Hişmanoğlu (2011) studied how frequently English vowels were mispronounced by EFL teacher trainees with Turkish as their L1 and found that the top problematic vowel was /æ/. It was mispronounced by 98 % of the learners. This finding resonates with Eskenazi's (1999) view that /æ/ is "a universally problematic sound" (p. 67). The other problematic vowels that emerged in Hişmanoğlu and Hişmanoğlu's (2011) study were /əʊ/ (97 %), /e/ (87 %), /ɔ:/ (79 %), /eɪ/ (60 %), /u/ (52 %), /i/ (41 %), /u:/ (36 %), /a/ (17 %), /ʌ/ (4 %) and /ɪ/ (1 %) (p. 29). Some other researchers listed problematic sounds for Turkish-L1 learners of English. The most problematic phonemes are as follows: /ŋ/ (e.g., king, sing) (Kenworthy, 1987; Kelly, 2000; Swan and Smith, 2001) /ɔ:/ - /əʊ/ (Hewings, 2004). Mengü (2010) worked with beginner students to rehabilitate articulation problems; namely, problem sounds including /θ/, /ð/, /ŋ/, /w/ and /æ/. She selected these sounds based on observation and research.

Another significant parameter that helped the researcher to select the sound pairs to focus on was the functional load of each phoneme pair in question. Functional load is simply defined by Brown (1988) as "a measure of the number of minimal pairs which can be found for a given opposition" (p. 594). It gives us the relative value of a phoneme in teaching and can also help grade commonly conflated phonemes because in Higgins' (2010) words, the functional load of a pronunciation error implies "how much potential for confusion is created by a particular vowel or consonant error and therefore how important it is" (Online, para 14). Similarly, Dalby and Kewley-Port (1999) suggest the use of phoneme frequencies and functional load of phoneme contrast to identify the significance of a phoneme contrast (p. 436). Derwing and Munro (2005) exemplify this by saying that learners' conflating /b/ and /p/ is more important than their doing so /t/ and /θ/ because of the high functional load the former phonemes carry (p. 319). Wang and Munro (2004) state that /ɪ/ - /i:/ and /e/ - /æ/, which they handled in their study, possess a high functional load, so they are likely to cause intelligibility problems if not taught (p. 550). The higher functional load of phonemes get, the more

severe errors regarding these phonemes are considered. Table 3.8 gives the rank ordering of phoneme pairs with respect to functional load.

Table 3.8.

Rank ordering of RP Phoneme Pairs Commonly Conflated by Learners

Vowels		Consonants	
10	<u>/e-æ/</u> , /æ-ʌ/, /æ-ɒ/, /ʌ-ɒ/, /ɔ:-əʊ/	10	/p-b/, /p-f/, /m, n/, /n-l/, /l-r/
9	/e-ɪ/, /e-eɪ/, /ɑ:-aɪ/, /ɜ:-əʊ/	9	/f-h/, /t-d/, /k-g/
8	<u>/i:-ɪ/</u>	8	<u>/w, v/</u> , /s-z/
7	-	7	/b-v/, /f-v/, /ð-z/, /s-ʃ/
6	/ɔ:-ɜ:/, /ɒ-əʊ/	6	/v-ð/, /s-ʒ/,
5	/ɑ:-ʌ/, /ɔ:-ɒ/, /ɜ:-ʌ/,	5	<u>/θ-ð/</u> , /θ-s/, /ð-d/, /z-dʒ/, /n-ŋ/
4	/e-eə/, /æ-ɑ:/, /ɑ:-ɒ/, /ɔ:-ʊ/, /ɜ:-e/	4	<u>/θ-t/</u>
3	/i:-ɪə/, /ɑ:-aʊ/, <u>/u:-ʊ/</u>	3	/tʃ-dʒ/
2	/ɪə-eə/	2	/tʃ-ʃ/, /ʃ-ʒ/, /j-ʒ/
1	/ɔ:-ɔɪ/, /u:-ʊə/	1	/f-θ/, /dʒ-j/

(Adapted from Brown, 1988, p. 604).

In addition to the literature review of the problematic sounds and consideration of functional loads, the analysis of the speech samples collected from randomly selected participants. Totally 25 students recorded their speech to function as speech samples. They read a paragraph and gave a one or two-minute speech on one of the several assigned topics. During the analysis, if a particular sound was consistently mispronounced in the paragraph reading task and free speech, it was considered as a problematic one. The samples were analysed by two native speakers. The interrater reliability of the ratings by the two native speaker raters was found to be Kappa = .695 ($p = .001$), 95% CI. The results revealed that sounds like /æ/, /əʊ/, /ð/ and /θ/ were highly problematic. This finding was consistent with the findings of earlier studies (e.g., Hişmanoğlu, 2011) (See Table 3.9 for the results).

Finally, the learners were asked to give their opinions about what sounds they consider problematic in the pre-instruction survey. The results revealed that interdental sounds /θ/ and /ð/ ranked number one among a number of potentially problematic sounds. Other sounds that were commonly viewed as problematic were /əʊ/, /ŋ/, /æ/, /ʊə/, /ə/, /ɒ/, /ɑ:/, /aʊ/, and so forth. (See Table 3.8). As it is clear in Table 3.8, most of the sounds identified as problematic by learners are vowels. That is, of the twenty sounds identified as problematic only 6 are consonants (/θ/, /ð/, /ŋ/, /tʃ/, /dʒ/ and /w/). This result is basically consistent with current literature on problematic sounds for Turkish-L1 learners of English.

Table 3.9.

EFL Teacher Trainees' Perceptions of Problematic Phonemes

Item	Analysis of Speech Samples		Learners' Perceptions	
	Count*	Percentage	Count**	Percentage
/θ/ as in think, thank	21	84	44	52.4
/ð/ as in these, those	22	88	30	35.7
/əʊ/ as in arrow	22	88	28	33.3
/ŋ/ as in king, sing	21	84	23	27.4
/æ/ as in bad, sad	24	96	20	23.8
/ʊə/ as in tourist	19	76	17	20.2
/ə/ as in father, mother	22	88	14	16.7
/ɒ/ as in top, hot	10	40	14	16.7
/ɑ:/ car, bar	9	36	11	13.1
/aʊ/ as in house	12	48	10	11.9
/w/ as in wet, window	17	68	9	10.7
/i:/ as in beat, feet	15	60	8	9.5
/ɜ:/ as in bird, fur	3	12	8	9.5
/tʃ/ as in Chinese, chin	1	4	6	7.1
/ɔ:/ as in caught, bought	19	76	6	7.1
/ɪə/ as in ear, fear, deer	5	20	6	7.1
/dʒ/ as in judge, jet	7	28	5	6
/ʌ/ as in cut, sun	2	8	5	6
/ɪ/ as in bit, sit	2	8	4	4.8
/ʊ/ as in pull, push	12	48	4	4.8
/eə/ as in chair	10	40	4	4.8
/u:/ as in boot, cool	11	44	3	3.6
/eɪ/ as in eight	13	52	3	3.6
/aɪ/ as in eye	11	44	1	1.2
/ɔɪ/ as in boy, toy	10	40	1	1.2

* The number of learners who misarticulated the sound (out of 25)

** The number of learners who thought the the sound was problematic (out of 84)

As a result of the analyses mentioned above, the sound pairs in Table 3.10 were chosen for training. Table 3.10 summarises why these sound pairs were considered the most suitable segmental elements to be studied in the present study. These sound pairs were identified as problematic by various researchers with a Turkish background (Demirezen 2003, 2004, 2005a, 2005b, 2005c, 2006, 2007a and 2007b; Hişmanoğlu, 2010, Mengü, 2010, and so forth) and several others working on pronunciation problems of different

nationalities (Hewings, 2004; Kenworthy, 1987, and so forth). When it comes to learners' perceptions of problematic sounds, it should be noted that their perceptions concerning the second element of each pair were provided in Table 3.10. This is because it is commonly accepted that since these sounds or the feature geometry that is essential to articulate these sounds do not exist in Turkish, Turkish-L1 learners mostly experience problems with the second element of each pair. (For the learners' perceptions of other sounds, see Table 3.9). Table 3.10 also gives information about functional loads and the results of the corpus analysis.

Table 3.10.

Sound Contrasts Selected for Training and their Various Properties

Sound Contrast Selected for training	Demirezen (2003,...2007b)	Various Turkish Researchers *	(Hewings, 2004, p. 238)	(Kenworthy, 1987, p. 157-159).	(Kelly, 2000, pp. 144-146)	(Swan and Smith, 2001, pp. 215-216)	Mean Density Value (%)**	Semantic Loading (%)**	Learners' Perceptions of the Second Element of the Pair (%)	Analysis of Learners' Speech (The Second Elem. of the Pair) (%)
/n/ – /ŋ/	+	-	-	+	+	+	0.4	65	27.4	84
/ɔ:/ – /əʊ/	+	+	+	-	-	-	6.18	49.5	33.3	88
/ɪ/ – /i:/	+	+	+	+	+	+	2.1	53	9.5	60
/ʊ/ – /u:/	+	+	+	+	+	+	0.92	61.1	3.6	44
/e/ – /æ/	+	+	+	-	-	+	2,1	66	23.8	96
/v/ – /w/	+	+	+	+	+	+	1.2	60	10.7	68
/t/ – /θ/	+	+	+	+	+	+	0.8	71	52.4	84
/d/ – /ð/	+	+	+	+	+	+	0.7	67	35.7	88

Note: A + sign indicates that the sound contrast was considered to be problematic, while a minus sign shows that it was not.

* Other researchers with a Turkish background (Mengü, 2010; Hişmanoğlu, 2009, etc.)

** Based on Higgins (2010)

In sum, as a result of extensive literature review, the analysis of learner perceptions, functional loads of phonemes and analysis of the learners' speech samples, the following minimal pair contrasts were chosen to be studied in pronunciation training in three distinct pedagogical environments: /ɪ/ - /i:/, /ʊ/ - /u:/, /e/ - /æ/, /n/ - /ŋ/, /v/ - /w/, /t/ - /θ/ , /d/ - /ð/ and /t/ - /θ/. As the literature and learner perceptions of problematic consonants indicate (See Table 3.9), consonants with the highest functional loads are hardly problematic for Turkish learners of English (/p-b/, /p-f/, /m, n/, /n-l/, /l-r/, /f-h/, /t-d/, /k-g/) in speech production though they may pose some problems in speech perception. Most sound pairs selected for this study have high functional loads. Four of them ranks among the highest three (/ɔ:-əʊ/, /e-æ/, /i:-ɪ/, /w, v/), while /θ-ð/, /θ-t/ and /n-ŋ/ have moderate functional loads. Though /u:-ʊ/ has a low functional load, it was selected to be studied since these sounds are seen in frequently used words in English. It should be noted that it does not seem possible to find sounds or sound pairs that optimally meet the requirements of all parameters mentioned above in selecting sounds for training. Therefore, it seems reasonable to select those sounds which mostly fulfil those requirements.

3.6. INSTRUCTIONAL CONTEXTS

The instructional practices in this study were LMS-based instruction, instruction through Pronunciation Power II Software, and a traditional pronunciation instruction. The participants who were assigned to three groups based on their classes studied problematic English phonemes for six weeks. The instruction for all these three groups included both production and perception training. Certain studies; for example, Dalby and Kewley-Port (1999), included perception training as a part of their effort to teach English pronunciation because perception and production might not go in a parallel fashion for certain aspects of phonology. They recommend that production tasks should be supported with perception tasks that include speakers with different accents (p. 432). Therefore, both speech production and speech perception were included as a part of the training in the present study. For this purpose, both US accent and RP were included in the listening activities as standard accents. However, for production activities the learners were recommended that they should stick to one variety since it does not appear

feasible to speak with different varieties of English, especially in a pronunciation course in which learners are trying to deal with problematic aspects of their speech. The course schedule for all three groups is given in Table 3.11 below.

Table 3.11.

Timetable for the Instructional Practices in the Study

Week	Activity
1	Registration on the Moodle site
2	Learner training for Moodle and Pronunciation Power II
3	Learner speech collection
4	The POSE Test, Pre-instruction Survey
5	The Productive Pronunciation Test
6	/ɪ/ - /i:/
7	/e/ - /æ/
8	/ɔ/ - /əʊ/, /ʊ/ - /u:/
9	/v/ - /w/
10	/n/ - /ŋ/
11	/t/ - /θ/, /d/ - /ð/
12	The Post Tests and the Post-instruction Survey

All three groups followed the same schedule when studying pronunciation, but the instructional environments were different. Though the whole study took 12 weeks, the actual instructional period lasted for 6 weeks. Two of the weeks included two sound pairs. Below are the details of the instructional environments in this study.

3.6.1. LMS-based Pronunciation Instruction

The virtual pronunciation learning environment in this study was generated by using the open-source learning management system Moodle. The participants to this e-learning platform worked on notoriously difficult problematic phonemes mentioned above. The first step in the formation of the e-learning platform was to install the open-source codes

for Moodle on a server. After the installation process, the web site was ready to use, so a different Moodle course page was created for each group of participants. The sole aim of the Moodle courses for the second experimental group and the control group was to provide them with an online platform where they could post their recordings prepared in third-party programs as well as utilising an on-site recording device available on the course pages. In addition, the learners used the Moodle site to study the unfamiliar words in the POSE test. In other words, in the Moodle courses for these groups, no pronunciation instruction took place; that is, they were for recording and vocabulary learning purposes.

The experimental group 1 studied the selected sounds on the Moodle site only during their laboratory study. They were not instructed to do extra study at home, but they sometimes had to complete assignments out of the regular class hours. The Moodle course titled “ELT 176.03 Listening and Pronunciation” was organized in the form of weeks starting from the 21st February, 2011. Each week contained materials to be studied individually, tasks to be done and links to other web sites.

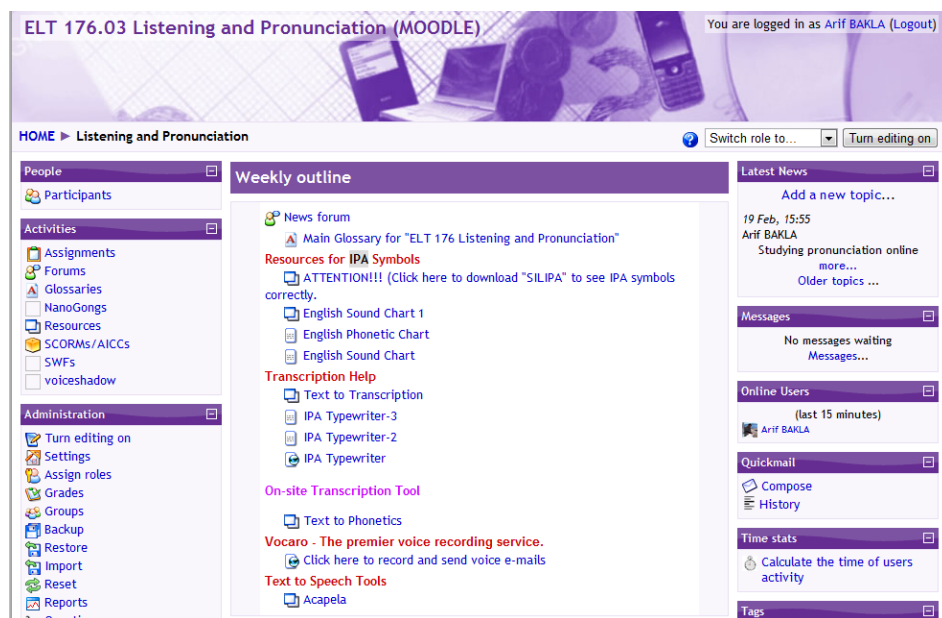


Figure 3.5. The user interface of the Moodle course for pronunciation teaching

At the top part of the web-interface of the course, there were materials which functioned as reference tools to assist the learners to learn sounds such as a bunch of links to third-party web sites, or applications embedded in the home page of the Moodle course such as text-to-speech engines like Acapella (Acapella Group, 2012), text-to-phonetics software by PhoTransEdit to get the transcription of a list of words having up to 300 characters (See Figure 3.6) or an interactive phonetic chart by British Council having the IPA alphabet with keywords for each sound as recommended by Goodwin (2001), a voice recording tool and an e-mail tool, and so forth. These were available for those who wanted to use them as reference materials whenever they needed.

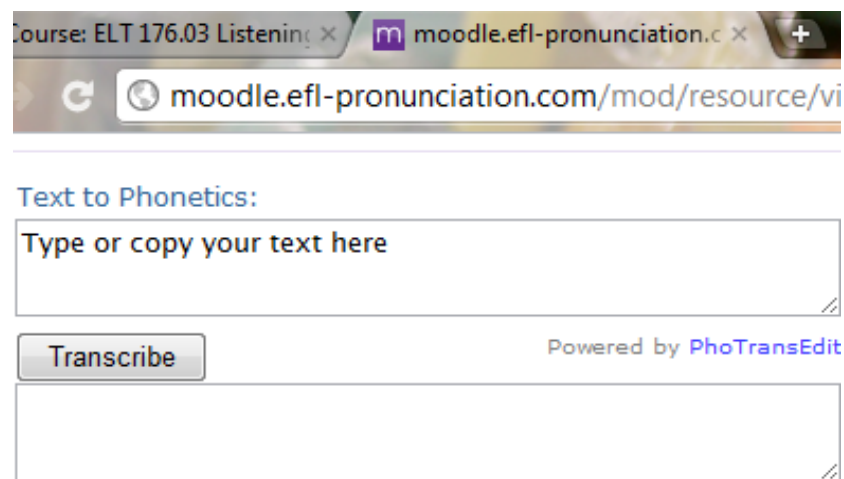


Figure 3.6. PhoTransEdit, a text-to-phonetics tool embedded on the Moodle site

In this study, various text-to-speech programs were used to produce spoken wordlists, sentences, paragraphs and dialogues to be used in the Moodle course. One of the most widely used one was Acapella (Acapella Group, 2012). This text-to-speech program provides highly natural sounding voices both in RP and GA. However, its trial version puts a character limit that can be turned into speech at one time. Despite its limitations, this text-to-speech software proved useful in producing spoken language during exercise production.

As Grant (1999) admits, creating a pronunciation learning environment that is mostly communicative is time-consuming for both teachers and learners (Online, para. 6).

Despite this need for extra time, the researcher provided the learners in the Moodle course a number of game-like and communicative activities rather than endless dreary repetition activities. However, this does not mean that there were no repetition on the Moodle site since repetition is also a helpful tool if it is used to enrich the learning environment rather than being overused. There were various opportunities for the learners to develop their pronunciation. For example, a weekly glossary was formed so as to help them to make a list of words which they had difficulty in pronouncing. A sample weekly glossary for the words containing the phonemes /ʊ/ and /u:/ is given in Figure 3.7.

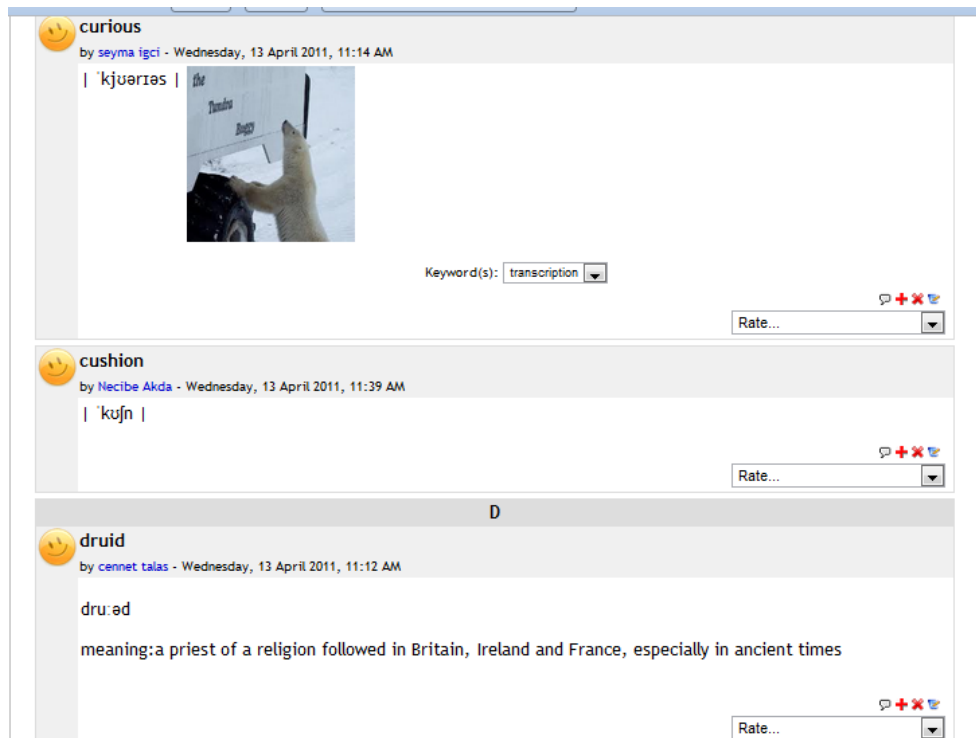


Figure 3.7. A screenshot of a page showing weekly glossary entries

Another example is a joke written in IPA symbols. Trying to understand the humour in the joke makes the activity meaningful (See Figure 3.8).



Figure 3.8. A joke written in the IPA

A list of other pronunciation practice activities in the Moodle course is given below. These are;

- A link to a phonetic chart
- Transcription
- Text to phonetics
- Text to speech exercises
- Weekly glossary
- Puzzles
- Exercises prepared with authoring tools
- Flash content
- Video explanations
- How to files
- Assignments (Voice recording)
- Links to third-party web sites

In the Moodle course, the learners were provided with both production and perception activities (See Appendix 5 for a list of other activities). In line with the findings of the study by Logan et al., (1991) and Wang and Munro's (2004) suggestion, in perception training, a variety of voices were used in the Moodle course to assist learners to get accustomed to hearing differences between various speakers and accents.

Since student recordings focusing on a few target features are highly useful if they are marked by the teacher with an appropriate grading scheme (Walker, 2005, p. 553), the Moodle site provided the learners with the opportunity to record their voices (e.g.,

through Nanogong or MoodleSpeex voice recoding tool and voiceshadow module) for peer and self-monitoring. In addition, they were able to compare their productions with that of a native speaker by listening to audio files located on the site. Broughton et al., (1980) underscore the importance of learners' recording their own voice and listening to their recordings because most people normally fail to monitor their speech if not recorded (p. 59). Another significant point about the Moodle site was that learners were consciously directed to various sites with the help of the links provided each week to prevent potential off-task surfing on the Internet since, as Murray (2007) puts it, it is relatively easy for a learner to get lost on the Internet or to visit unrelated sites if not guided properly (p. 753).

As the teachers and course designers in Kalamarz' (2010) study did, the researcher tried to motivate the learners to study on the Moodle site, including multimedia, pictures, graphic design. HTML pages, flash content and links to external web sites helped motivate learners. Moreover, in line with the suggestion that teachers should make use of suitable poems, song lyrics, and so forth to motivate learners (Celce-Murcia et al., 1996), there were some extra parts in the Moodle lesson containing games designed with authoring tools which provide new opportunities to make exercises and activities. These were flash games embedded in the Moodle course such as "Fling the teacher," (See Figure 3.9). They were used to motivate the learners in a competitive environment. With the help of tracking features in Moodle, the learners' progress was monitored. In compliance with the objectives of Acton's (1984) study, one of the aims of the course in the LMS environment was to make learners more autonomous, and concordantly to help them continue improving themselves even the after the course is over.

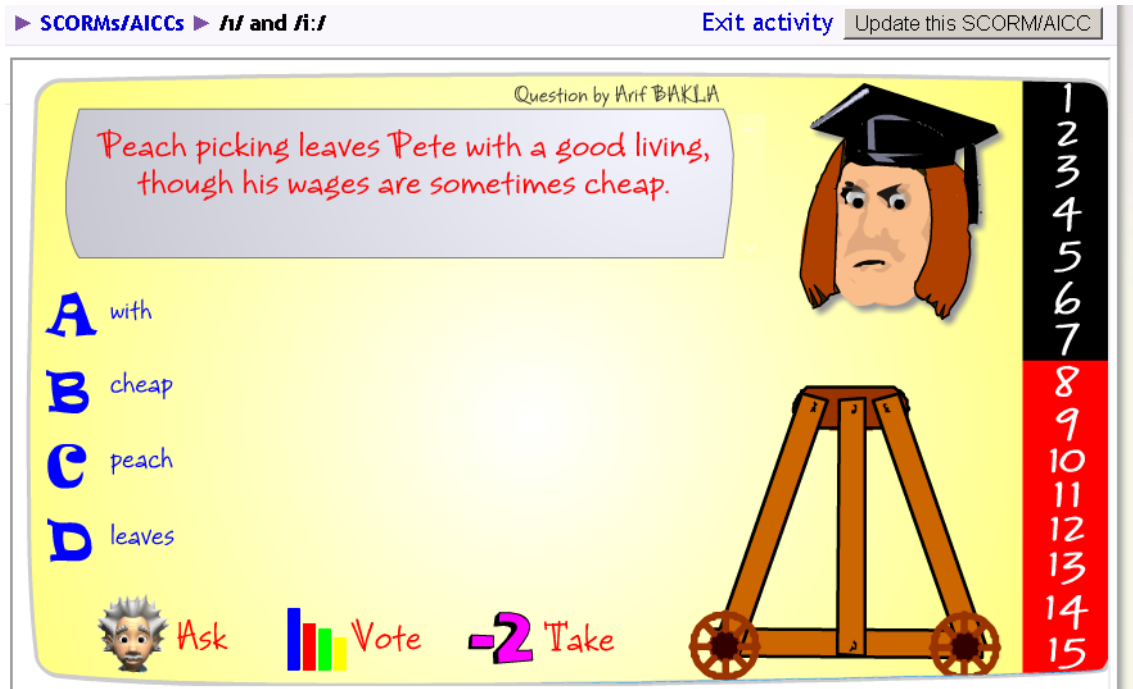


Figure 3.9. A screenshot of the flash game “Fling the teacher”

The feedback provided in Moodle can be given by peers and the teacher. In the Moodle course designed for the present study, learner productions were rated by the teacher and peers. The learners were given numerical scores out of 5 for their productions. This motivated the learners to try to get a higher score in the next attempt; thereby, making the process like a computer game (Hansen, 2006, p. 343). Since correction “should be made in a polite and friendly manner, so as not to embarrass or humiliate the student” (Hammerly, 1973, p. 107), the learners’ getting the feedback in a stress-free environment on the Moodle site was a perfect opportunity for learner-friendly error correction. According to Acton (1984), learners recognize their errors better if they are given the opportunity to compare their recorded speech with a text of what they should have said (p. 78). The Moodle course was a suitable environment for such an activity.

3.6.2. Self-Study through Accent Reduction Software

Pronunciation Power Software comes in two versions: Pronunciation Power I and Pronunciation Power II, the former aiming to teach English pronunciation to beginner to

intermediate learners and the latter intermediate to advanced ones. The participants in the Pronunciation Power Group studied problematic sounds through lessons based on minimal pair contrasts in Pronunciation Power II. This program is specifically designed to aid learners to develop their pronunciation skills in a self-study environment. In this software, a typical lesson for a given sound contains two sections: lesson and exercises. The lesson section is composed of a side view animation, a front view of a human mouth and side view legend showing how the sound is articulated (See Figure 3.10).

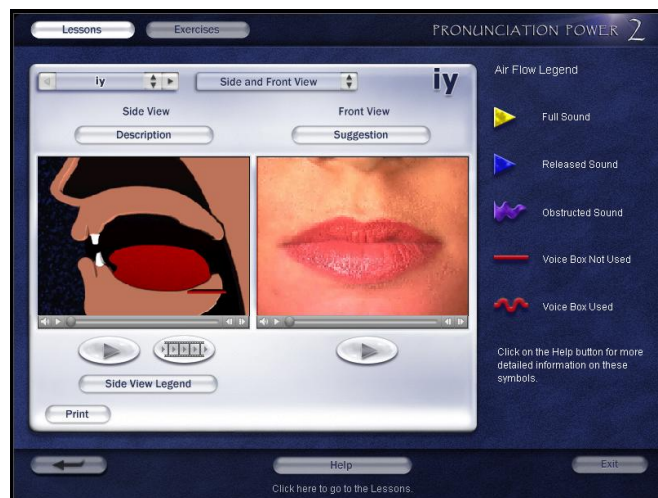


Figure 3.10. The screen for lessons in Pronunciation Power II

The side view legend, besides the animation, gives labels to speech organs which take part in the articulation process. In addition to these, learners can view a description box in which the articulation process for the sound is described and a suggestion box where the most critical information on how to produce the sound is given (See Figure 3.11).



Figure 3.11. The explanations on how to articulate a sound

The section for exercises is made up of five distinct practice activities for each sound; the format of these activities is almost the same for all sounds. These activities are as follows: (a) a list of sample words containing the target sounds, (b) sentences with minimal pairs (minimal sentences), (c) a listening discrimination task with minimal sentences (only one of these sentences are being pronounced), (d) exercises on suprasegmental features including stress, timing, articulation, intonation, and rhythm, which are collectively listed under the acronym S.T.A.I.R, and (e) sentences in the form of paragraphs containing the target phoneme.



Figure 3.12. The screen for exercises in Pronunciation Power II

It is possible to hear the words in every exercise given in this program, so learners can repeat words and sentences as many times as they wish. In addition, the spellings for the target sound in words can be highlighted, as seen in Figure 3.12, or the learners may opt for hiding these highlights. In short, this software allows learners to study all English sounds by listening to them from native speakers, choose particular sounds and practise them with the help of various exercises, view waveform of English sounds in the form of spectrograms, record their own productions (words and sentences) and compare them with those of native speakers in sound and waveform, view front and side views of the human mouth for any sound, practise sample words and sentences to learn some suprasegmental aspects of English including timing, stress, intonation and rhythm (Seferoğlu, 2005, p. 309). In brief, this program provided learners with lots of practice activities.

3.6.3. Traditional Pronunciation Instruction

The learners in the traditional instruction group studied pronunciation for six weeks by following regular classroom practices in pronunciation teaching such as reading aloud, repetition, transcribing and listening to dialogues. There was no computer-assisted practice for this group except for showing them some dialogues with the help of a projector. Immediate or delayed feedback was provided with the instructor and the learners were also strongly encouraged to provide peer feedback for their friends and monitor their own speech. They followed the same timetable with the other two groups, and they were given the same pretest, posttest and surveys. This group was also given a short Moodle training so that they could upload the recorded productions onto the Moodle site and they could study the unfamiliar words that appear in the POSE test; no other training concerning Moodle was provided for this group.

3.6.4. Learner Training

It might be rather challenging to study pronunciation through CAPT software or on the Internet without being computer literate because some learners in Prensky's (2001) words are "digital immigrants" (p.1), and they need lots of guidance to do some

computer related tasks. In order to eliminate such a difficulty, the researcher prepared audio, video and printed materials to train the participants on how to make use of various online tools to create, share and use materials. Moreover, an additional session was held to clarify the possible unclear points that were not addressed in the training materials or not fully understood by the learners although they were mentioned in such materials.

Before the learners in Moodle Group and Pronunciation Power Group began to study on the computer, a two-hour learner training concerning the basics of Moodle and Pronunciation Power II was provided. The learner training on Moodle was made up of three elements: (a) face-to-face demonstration of how to use Moodle, (b) a short video training embedded in Moodle itself, and (c) Moodle documentation available on the official Moodle site. Experimental Group 2 received training on how to use Pronunciation Power II. How to use this software was demonstrated on a computer screen projected on the wall. The learners were first asked to watch the demo and then use the program themselves. Unclear points were further clarified and explained in a short question and answer period at the end of the session. The participants in all three groups learned how to record voice and upload the recorded speech on the Moodle site. The researcher also demonstrated how to study the flashcards for the unfamiliar words in the POSE test and complete the gap-filling activities for these words on the Moodle course.

3.7. DATA ANALYSIS

The data collected through tests and surveys were analyzed by SPSS 15.0. The other software programs used during various steps of data analysis were Research Randomizer (Urbaniak and Plous, 2011) and Audacity 1.3.4 Beta (Audacity Team, 2008). The data gathered through the productive pronunciation test were evaluated by human raters; that is, two educated native speakers of British English assessed the speech samples. Moreover, a content analysis was carried out to analyze the data collected through the open-ended questions in the post-instruction survey in the study.

How each analysis mentioned above was carried out is further explained in the following sections.

3.7.1. Analysis of the POSE Test

The testees were instructed take a snapshot of the screen upon completing the POSE test sections for vowels and consonants and send it to the e-mail address of the researcher. By using the snapshots of the result pages, the researcher entered the data into SPSS 16.0 for detailed analysis. Each correct response for a given sound contrast was assigned one point and the total number of correct answers for the target phonemes was calculated for each person, so that learners had two scores (one for target vowels and another for the target consonants). These scores were also kept for later reference for correlational analyses.

3.7.2. Analysis of the Productive Pronunciation Test

It is rather challenging to test pronunciation in an objective and reliable way. The same is true for rating procedures. Though rating nonnative speech in terms of intelligibility is a subjective issue in itself; that is, raters take into account different factors when asked to rate comprehensibility and accentedness, it is not totally so because raters have some shared criteria that are difficult to define but possible to look for in nonnative speech. In the opposite case, pronunciation teaching would be useless since it would be impossible to evaluate the effect of instruction on teaching pronunciation (Derwing and Munro, 2005, p. 381). This means that we should decide on what criteria to use and who should be the raters. Human rating of speech samples and relating machine ratings to human ratings if machine rating is utilized are significant since learners talk to people not to machines in real life, so the degree of accuracy and intelligibility should be identified through human ratings (Neri et al., 2002, p. 1211). No machine rating was used for the purposes of this study because human rating of student speech samples has always been the golden standard.

In the present study, the raters were instructed to carry out holistic rating for intelligibility and atomistic rating for accuracy. When compared to the former, the latter is considered more reliable, but time consuming to carry out. It is often used for diagnostic purposes, whereas holistic rating is easier but less objective than atomistic one. In Mueller and Niedzielski's words (1968) holistic testing is "invaluable in assessing the overall impression, the intelligibility of the learner's speech and other aspects of his pronunciation which cannot be easily expressed by means of definite, clear-cut criteria" (p. 415). Although both of these assessment procedures have their own weaknesses, they complement each other.

Derwing and Munro (2005) remind us that both native and nonnative raters are good at detecting speech that deviates from their own accent (p. 383). This is mostly true because they share the same set of assumptions about their L1 and L2 and they often hear such speech. However, nonnative speakers might have difficulties in recognizing the differences between native and nonnative speech productions. Furthermore, teachers and non-teacher native speakers differ in their ratings of nonnative speech.

When it comes to intelligibility, the picture gets rather complex. That is, a heavily accented speech might be quite comprehensible for a person sharing the same L1 with the speaker, while such a speech might be labelled as unintelligible. In addition, there is always a risk of getting familiar with the script both for native and nonnative raters (Walker, 2005, p. 555). In this respect native and nonnative speakers might differ in their ratings as far as intelligibility is concerned. In addition to this, as Derwing and Munro (2005) warn, there might be some "observer bias in the evaluation of classroom performance" (p. 381) since the classroom teacher, being the person who takes pains to teach his/her learners, might strive to improve the learners' pronunciation. As a consequence, the researcher did not evaluate the speech samples himself. It seemed reasonable to utilise educated native speakers teaching English for the rating procedure. In the rating process the following steps were followed.

First of all, the recorded student productions of the paragraph and the dialogue (See Appendix 3) were prepared for analysis through Audacity 1.3.4 Beta (Audacity Team,

2008). Each learner's recorded paragraph was divided into 11 parts. The cutting points were determined based on sentence boundaries. Most of the divided speech samples were made up of one sentence, but since some of the sentences were either too short or long, in one instance one of the sentences was divided into two, and in another three sentences formed one portion. Similarly, the dialogue recordings were divided into 8 parts based on the 8 lines in it.

Secondly, the divided speech samples were randomly selected for analysis. The speech samples of 84 learners were collected using the pretest and posttest. Thus, the researcher collected many hours of recorded speech for rating. Because it is not feasible to analyze such a huge amount of data by human raters, a random selection of the sentences from each recording was carried out (as it was done by Hincks, 2005). First, the pretest and posttest speech samples were divided into smaller parts of approximately equal length. Second, five portions from the paragraph and four from the dialogue were chosen randomly by using Research Randomizer Software by Urbaniak and Plous (2011), which generates random sets of numbers for random sampling. For the sampling procedure of the paragraph, the software was prompted to produce 84 sets of 5 unique numbers ranging from 1 to 11, and it was prompted to generate 84 sets of 4 unique numbers ranging from 1 to 8 for the random sampling of the dialogue lines. Thus, 5 paragraph portions and 4 dialogue lines for each speaker were randomly selected for rating.

Before the analyses were carried out, as it was the case in Tanner and Landon (2009), three native speakers of American English read aloud the paragraph and the dialogue. Their productions were also placed into student samples under pseudonyms. For the purpose of providing extra support for interrater reliability, the raters were not informed of these native speaker informants' productions. The researcher expected high, if not full, ratings for the productions of these native speaker informants. Moreover, the raters were not told whether each sample belonged to the pretest or posttest. Speech samples were numbered by assigning consecutive numbers to the pretest and posttest productions for each sentence. Thus, the raters could listen to the pretest and posttest versions of the same sentence from the paragraph or the dialogue one after the other for

the purpose of comparison (See Figure 3.13 below). The files were consecutively numbered as 0001 and 0002 to form a pair of the pretest and posttest recording of the same portion of the paragraph. Therefore, of the ten audio files for each student, 5 were pretest recordings, while 5 of them were posttest recordings of the paragraph. The raters were instructed to assign an accuracy and intelligibility rate for each sentence or dialogue line. They listened to the pretest and posttest samples one after the other to see if there was improvement.

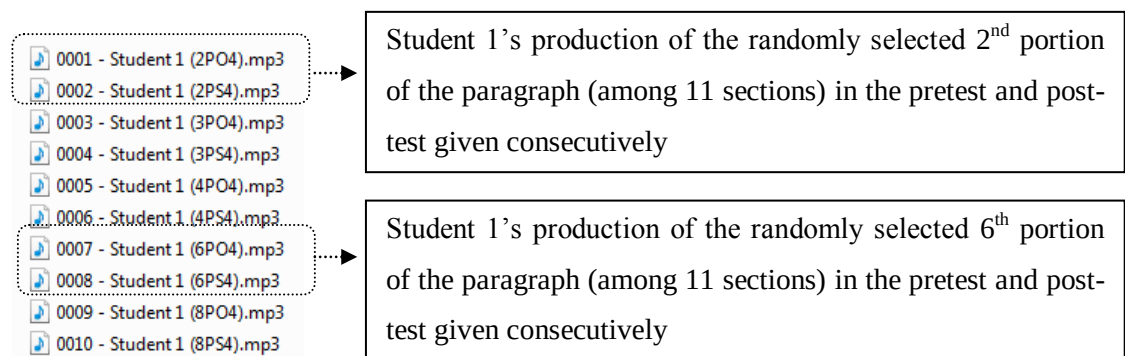


Figure 3.13. Randomly selected portions of the paragraph for each student

The ratings of the two judges were analysed to see the extent to which they agreed in their decisions. Since the number of raters were two, the interrater reliability coefficient was calculated through Cohen's Kappa measurement. Cohen's Kappa values for accuracy and intelligibility of each task for the pretest and posttest were calculated separately. This procedure provided the researcher with 8 values (for accuracy and intelligibility ratings in totally 4 tasks in 2 tests) (See Table 3.12).

Table 3.12. *Kappa Values as a Measure of Consistency Between Raters' Accuracy and Intelligibility Ratings of the Participants' Pretest and Posttest Oral Productions*

		K	Asymp. Std. Error ^(a)	Approx T ^(b)	Approx Sig.
Pretest Task 1	Agreement Measure Kappa	.713	.028	24.73	.001
Accuracy	Number of Valid Cases	420			
Pretest Task 1	Agreement Measure Kappa	.825	.022	29.65	.001
Intelligibility	Number of Valid Cases	420			
Pretest Task 2	Agreement Measure Kappa	.749	.028	25.52	.001
Accuracy	Number of Valid Cases	324			
Pretest Task 2	Agreement Measure Kappa	.798	.027	25.47	.001
Intelligibility	Number of Valid Cases	334			
Posttest Task 1	Agreement Measure Kappa	.800	.025	24.86	.001
Accuracy	Number of Valid Cases	416			
Posttest Task 1	Agreement Measure Kappa	.828	.023	25.92	.001
Intelligibility	Number of Valid Cases	415			
Posttest Task 2	Agreement Measure Kappa	.802	.027	22.87	.001
Accuracy	Number of Valid Cases	336			
Posttest Task 2	Agreement Measure Kappa	.742	.029	23.81	.001
Intelligibility	Number of Valid Cases	336			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

The Kappa coefficients were averaged to find an overall interrater reliability value. As a result, the interrater reliability for the two native speaker raters was found to be Kappa = 0.784 ($p = .001$), 95% CI (.713, .825, .749, .798, .800, .828, .802 and .740). This value implies a strong agreement between the raters. That is, the raters were highly consistent in their ratings.

3.7.3. Analysis of the Attitudinal Survey

The quantitative data collected through PAI (Elliott, 1995) helped unearth the participants' views about pronunciation and the data obtained from the items that focussed on all three instructional contexts provided the researcher with further insight into their views of quality of the instructional contexts, contributions of these contexts to their pronunciation, challenges and problems encountered, and so forth.

An attitude score for each student was found by calculating the average responses (as Engwall, 2006 did); during this calculation process the negative responses were reversed before finding the average values. In other words, each learner received a PAI score out of 60 (12 items multiplied by 5). This score was later used to seek a correlation between learners' attitudes towards pronunciation and their success in perceptual and productive pronunciation tests (See Section 4.2.5 for correlational issues).

In addition to the PAI, the post-instruction survey also contained 2 open-ended questions inquiring about the positive and negative sides of the instruction and the difficulties and problems experienced during lessons. Each group responded to these questions and a content analysis was carried out for these open-ended items in the post-instruction survey through an inductive approach to categorising the data. In other words, as the two independent raters went through the responses, they interacted with the text and formed categories of data. Then, to get quantitative data the responses to these open-ended questions were classified and coded. An interrater reliability value using the Kappa statistic was calculated to find out if the judges were consistent in their codings. The interrater reliability for the content analysis was calculated to be $Kappa = .948$. ($p = .001$), (95 % CI) (See Table 3.13). Since Cohen's Kappa values between .81 – 1.0 are considered as perfect agreement (Landis and Koch, 1977), it is possible to say that the judges were highly consistent in the coding of the qualitative data collected through open-ended items in the post-instruction survey. The data were also crosstabulated to explore the relationship among groups of learners, who were instructed in three different learning environments.

Table 3.13.

Kappa Value as a Measure of Consistency between Coding of Responses to Open-Ended Questions in the Post-Instruction Survey

		Value	Asymp. Std. Error ^(a)	Approx. T ^(b)	Approx. Sig.
Measure of Agreement	Kappa	.948	.021	31.24	.001
N of Valid Cases		129			

a Not assuming the null hypothesis.

b Using the asymptotic standard error assuming the null hypothesis.

This chapter has explained how the study was designed, how the problematic sounds were selected, and how the data were collected and analyzed. In short, the present study is a quasi-experimental one with two experimental groups and a control group. Various criteria were used to select the problematic sounds including the findings of previous studies, learners' perceptions, functional loads of the phonemes and a small-scale corpus analysis. The present study incorporated both sound perception and production and it utilised several data collection tools including tests of perception and production and an attitudinal survey. Now that the details of research design, data collection and data analysis are clear, the next chapter gives detailed information on the findings concerning the results of the pretest and the posttest, attitudinal survey and correlational issues.

CHAPTER 4

RESULTS AND DISCUSSIONS

4.1. INTRODUCTION

The previous chapter outlined how this study was designed and how the data were collected and analyzed, and this chapter reports the findings of the study. Each section initially gives the *t*-test results to inform the reader about the each group's attainment in segmental accuracy, intelligibility, perception of vowels and consonants, and improvements in attitudes towards pronunciation. The results of the *t* tests are followed by analysis of covariance of the posttest scores to compare the performance of the groups after the instructional period. Finally, the results of correlational analyses are presented, and the findings are discussed in line with those of previous studies on pronunciation instruction.

4.2. FINDINGS OF THE STUDY

This section discusses the findings of the study in detail by addressing each research hypothesis formulated in the introduction to this study. Paired samples *t*-test results indicated that the groups mostly improved their scores, while ANCOVA results showed that it was the Moodle group that mostly outperformed the other two groups in the posttest. Beginning with improvements in segmental accuracy, the details of the findings are given below.

4.2.1. Improvements in Segmental Accuracy

In this study, segmental accuracy scores of each student in the paragraph and dialogue reading tasks in the pretest and the posttest were calculated by averaging the points given by two native speaker raters. Concerning the issue of accuracy, the first two hypotheses are given below.

Hypothesis 1: Phoneme training will have a statistically significant impact on segmental accuracy in the paragraph reading task in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).

Hypothesis 2: Phoneme training will have a statistically significant impact on segmental accuracy in the dialogue task in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).

To test these hypotheses, the pretest and posttest scores for each group were compared with paired samples *t* test and group means in the posttest were compared with ANCOVA to see if the instructional environments in this study had any effect on segmental accuracy. The results of the pretest – posttest comparisons for each group are given in Table 4.1 to 4.3.

Table 4.1.

Paired Samples t-test Results for the Moodle Group in the Production Test

Accuracy	N	$\bar{x}$	<i>sd</i>	$\bar{x}_1 - \bar{x}_2$	<i>sd</i>	<i>t</i>	<i>p</i>
Paragraph – Pretest	30	16.63	3.23	-1.85	3.86	-2.63	.014
Paragraph – Posttest	30	18.48	3.26				
Dialogue – Pretest	30	9.08	3.30	-5.52	4.23	-7.14	.001
Dialogue – Posttest	30	14.60	2.01				

Paired-samples *t*-test results indicated that there was a statistically significant difference between the paragraph accuracy scores in the pretest ($M = 16.63$, $SD = 3.23$) and posttest ($M = 18.48$, $SD = 3.25$) for Experimental Group 1 $t(29) = -2.63$, $p = .014$. The difference between the scores in the dialogue reading task in the pretest ($M = 9.08$, $SD = 3.29$) and the posttest ($M = 14.60$, $SD = 2.01$) for this group was also statistically significant; $t(29) = -7.14$, $p = .001$. This implied that the learners in the first

experimental group (Moodle) improved their accuracy in the paragraph and dialogue reading tasks with the help of the LMS-based instruction (See Table 4.1).

Table 4.2.

Paired Samples t-test Results for Experimental Group 2 (P. Power) in the Production Test

Accuracy	<i>N</i>	$\bar{x}$	<i>sd</i>	$\bar{x}1 - \bar{x}2$	<i>sd</i>	<i>t</i>	<i>p</i>
Paragraph – Pretest	29	16.79	3.51	-3.40	3.21	-5.71	.001
Paragraph – Posttest	29	20.19	3.96				
Dialogue – Pretest	29	10.72	2.62	-4.95	3.19	-8.34	.001
Dialogue – Posttest	29	15.67	1.89				

The second experimental group (Pronunciation Power) also improved its accuracy scores in paragraph and dialogue reading tasks in the posttest. This improvement was statistically significant for both paragraph accuracy and dialogue accuracy scores. The difference between the accuracy scores in the paragraph reading task in the pretest ($M = 16.79$, $SD = 3.50$) and the posttest ($M = 20.18$, $SD = 3.95$) for this group was statistically significant; $t(28) = -5.71$, $p = .001$. The difference between the accuracy scores in the dialogue reading task in the pretest ($M = 10.72$, $SD = 2.61$) and the posttest ($M = 15.67$, $SD = 1.89$) for this group was statistically significant; $t(28) = -8.34$, $p = .001$, too (See Table 4.1). As the first experimental group did, the second experimental group also improved its accuracy scores in the controlled pronunciation tasks.

Table 4.3.

Paired Samples t-test Results for the Control Group in the Production Test

Accuracy	<i>N</i>	$\bar{x}$	<i>sd</i>	$\bar{x}1 - \bar{x}2$	<i>sd</i>	<i>t</i>	<i>p</i>
Paragraph – Pretest	25	17.76	2.83	-0.80	3.19	-1.25	.222
Paragraph – Posttest	25	18.56	2.51				
Dialogue – Pretest	25	10.10	4.33	-4.66	4.91	-4.74	.001
Dialogue – Posttest	25	14.76	2.30				

The control group also improved its accuracy scores in dialogue reading task but not in the paragraph reading task in the posttest at significant levels. More precisely, the difference between the accuracy scores in the dialogue reading task in the pretest ($M = 10.10$, $SD = 4.32$) and the posttest ($M = 14.76$, $SD = 2.29$) for this group was statistically significant; $t(24) = -4.74$, $p = .001$. However, the difference between the accuracy scores in the paragraph reading task in the pretest ($M = 17.76$, $SD = 2.83$) and the posttest ($M = 18.56$, $SD = 2.51$) for this group was not statistically significant; $t(24) = -1.25$, $p = .222$ (See Table 4.3). In other words, the traditional pronunciation instruction that the control group received was successful in helping learners to improve accuracy in the dialogue task, but it was not successful in the paragraph reading task. Therefore, the alternate hypothesis that phoneme training will have a statistically significant impact on segmental accuracy in paragraph reading task in each learning context was accepted for the two experimental groups, while it was rejected for the control group. In short, as it is apparent in Table 4.1, 4.2 and 4.3, the learners in both experimental groups boosted their accuracy of problematic English vowels and consonants on which they received a six-week training. However, the control group was not able to develop its accuracy scores in the paragraph reading task.

Hypothesis 3: There will be statistically significant differences among the groups in the posttest in terms of segmental accuracy in the paragraph reading task.

To test this hypothesis; in other words, to find out if the groups performed differently in the posttest, the groups were compared through one-way ANCOVA. Before conducting analysis of covariance, two significant assumptions have to be met in order to get accurate results in the analysis. These assumptions are homogeneity of variances and the homogeneity-of-regression, also known as the assumption of normality. The first is assumption tests the equality of variances of the dependent variable. The second is necessary to evaluate the “interaction between the covariate and the independent variable in the prediction of the dependent variable”. In other words, assumption of normality implies that “the dependent variable is normally distributed in the population for any specific value of the covariate and for any one level of a factor (independent variable)...” (Understanding ANCOVA, n.d., p. 6).

The results of the preliminary analysis for accuracy in paragraph reading suggested that the interaction between the covariate and the dependent variable was not significant, $F(2, 78) = 2.24, p = .113 > \alpha (.05)$, and the Levene's test of homogeneity of variances indicated that the variances were homogenous $F(2, 81) = 0.83, p = .438 > \alpha (.05)$. These results indicated that ANCOVA could be carried out for accuracy in the paragraph reading task. The pretest accuracy scores in the paragraph reading task had a significant effect on the posttest results $F(1, 80) = 19.81, p = .001 < .05$. Similarly, the ANCOVA was significant, $F(2, 80) = 3.68, p = .030 < .05, \omega^2 = .05$ (See Table 4.4).

Table 4.4.

Posttest ANCOVA Results for Accuracy in the Paragraph Reading Task

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Pretest Accuracy	178.07	1	178.07	19.81	.001
Instruction	66.09	2	33.04	3.68	.030
Error	719.04	80	8.99		
Corrected Total	950.24	83			

Follow-up analyses using the Sidak procedure to control Type I errors were carried out to test the pairwise differences among the adjusted means for the effect of learning environment on the learners' accuracy in the paragraph reading task. The results indicated that the only meaningful difference was between the scores of the learners who studied pronunciation through Pronunciation Power I (Experimental group 2) ($M = 20.30$) and those who received traditional pronunciation instruction (Control group) ($M = 18.22$) in favour of the former. The effect size for this adjusted mean difference was 0.692. The other differences; that is, the difference between the two experimental groups and the difference between the control group ($M = 18.22$) and Experimental group 1 ($M = 18.66$) were not statistically significant (See Table 4.5).

Table 4.5.

Pairwise Comparisons of Accuracy in Paragraph Reading Task

	Mean	Adjusted Mean	1	2	3
1. Experimental Gr. 1 (Moodle)	19.10	18.66	-		
2. Experimental Gr. 2 (P. Power)	20.19	20.30	1.63	-	
3. Control Group (Traditional)	18.56	18.22	.44	2.08*	-

*The mean difference is significant at the .05 level.

As a result of these findings, the alternate hypothesis that there will be statistically significant differences among the groups in the posttest in terms of segmental accuracy in the paragraph reading task was accepted. However, only the difference between Experimental group 2 and the control group was significant. This finding implies that although all three groups improved their accuracy scores in the paragraph reading task at statistically significant levels, the learners who studied pronunciation through Pronunciation Power II outperformed the control group in terms of pronouncing target sounds accurately in the paragraph reading task.

Hypothesis 4: There will be statistically significant differences among the groups in the posttest terms of segmental accuracy in dialogue task.

This hypothesis was tested by comparing the posttest performances of the groups in terms of *segmental accuracy in the dialogue task*. The results of the preliminary analysis for accuracy in dialogue reading suggested that the interaction between the covariate and the dependent variable was not significant, $F(2, 78) = .47, p = .626 > \alpha (.05)$, and the Levene's test of homogeneity of variances indicated that the variances were homogenous $F(2, 81) = 0.006, p = .994 > \alpha (.05)$. These results indicated that ANCOVA could be carried out for accuracy in dialogue reading. The pretest accuracy scores did not have a significant effect on the posttest results $F(1, 80) = 0.41, p = .523 > .05$. As it was the case with paragraph accuracy scores, Experimental group 2 ($M = 15.71$) had slightly higher scores than Experimental group 1 ($M = 14.56$) and the

control group ($M = 14.77$). However, the ANCOVA was not significant, $F(2, 80) = 2.43$, $p = .095 > .05$.

Table 4.6.

Posttest ANCOVA Results for Accuracy in the Dialogue Task

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Pretest Accuracy	1.76	1	1.76	0.41	.523
Instruction	20.81	2	10.41	2.43	.095
Error	342.64	80	4.28		
Corrected Total	363.72	83			

As a result of the ANCOVA, the alternate hypothesis that there will be statistically significant differences among the groups in the posttest in terms of segmental accuracy in the dialogue task was rejected. This finding implied that the learning environments had equal effects on segmental accuracy in dialogue task of the three groups. In other words, none of the three learning contexts proved more effective than the other two in improving the learners' segmental accuracy in the dialogue reading task.

4.2.2. Improvements in Intelligibility

Along with accuracy, the learners' intelligibility in two different tasks was assessed. In terms of the difference between the pretest and posttest scores of the groups, two hypotheses were formulated. Each hypothesis was tested based on *t*-test results. These hypotheses are as follows:

Hypothesis 5: Phoneme training will have a statistically significant effect on intelligibility in the paragraph reading task in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).

Hypothesis 6: Phoneme training will have a statistically significant effect on intelligibility in the dialogue task in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).

Table 4.7.

Paired Samples t-test results for Experimental Group 1 (Moodle) in the Production Test

Intelligibility	<i>N</i>	$\bar{x}$	<i>sd</i>	$\bar{x}1 - \bar{x}2$	<i>sd</i>	<i>t</i>	<i>p</i>
Paragraph – Pretest	30	14.88	3.65	-4.85	3.01	-8.84	.001
Paragraph – Posttest	30	19.73	4.07				
Dialogue – Pretest	30	9.20	3.20	-5.88	2.70	-11.95	.001
Dialogue – Posttest	30	15.08	2.62				

Experimental group 1 (Moodle) improved its intelligibility scores in the paragraph and dialogue reading tasks in the posttest. The difference between the intelligibility scores in the paragraph reading task in the pretest ($M = 14.88$, $SD = 3.64$) and the posttest ($M = 19.73$, $SD = 4.07$) for this group was statistically significant; $t(29) = 8.83$, $p = .001$. The difference between the intelligibility scores in the dialogue reading task in the pretest ($M = 9.20$, $SD = 3.19$) and the posttest ($M = 15.08$, $SD = 2.61$) for this group was also statistically significant; $t(29) = -11.95$, $p = .001$ (See Table 4.7). This indicated that LMS-based training helped the participants to improve their intelligibility in the paragraph dialogue tasks.

Table 4.8.

Paired Samples t-test Results for Experimental Group 2 (P. Power) in the Production Test

Intelligibility	<i>N</i>	$\bar{x}$	<i>sd</i>	$\bar{x}1 - \bar{x}2$	<i>sd</i>	<i>t</i>	<i>p</i>
Paragraph – Pretest	29	15.09	2.94	-5.14	3.82	-7.24	.001
Paragraph – Posttest	29	20.22	3.69				
Dialogue – Pretest	29	10.02	2.89	-4.05	2.20	-9.93	.001
Dialogue – Posttest	29	14.07	2.18				

Experimental group 2 (Pronunciation Power) improved its intelligibility scores in paragraph and dialogue reading tasks in the posttest. The difference between the intelligibility scores in the paragraph reading task in the pretest ($M = 15.08$, $SD = 2.94$) and the posttest ($M = 20.22$, $SD = 3.69$) for this group was statistically significant; $t(28) = -7.23$, $p = .001$. Similarly, the difference between the intelligibility scores in the dialogue reading task in the pretest ($M = 10.01$, $SD = 2.89$) and the posttest ($M = 14.06$, $SD = 2.17$) for this group was statistically significant; $t(28) = -9.93$, $p = .001$ (See Table 4.8). This finding implied that the accent reduction software was effective in improving the participants' intelligibility.

Table 4.9.

Paired Samples t-test Results for the Control Group in the Production Test

Intelligibility	<i>N</i>	$\bar{x}$	<i>sd</i>	$\bar{x}1 - \bar{x}2$	<i>sd</i>	<i>t</i>	<i>p</i>
Paragraph – Pretest	25	17.22	3.68	-0.78	2.99	-1.33	.198
Paragraph – Posttest	25	18.00	2.92				
Dialogue – Pretest	25	10.42	4.06	-2.68	1.97	-6.79	.001
Dialogue – Posttest	25	13.10	3.31				

The control group improved its intelligibility scores in the dialogue reading task in the posttest, but the improvement was not statistically significant for paragraph intelligibility. That is, the difference between the intelligibility scores in the paragraph

reading task in the pretest ($M = 17.22$, $SD = 3.68$) and the posttest ($M = 18.00$, $SD = 2.91$) for this group was not statistically significant; $t(24) = -1.33$, $p = .198$. However, the difference between the intelligibility scores in the dialogue reading task in the pretest ($M = 10.42$, $SD = 4.05$) and the posttest ($M = 13.10$, $SD = 3.30$) for this group was statistically significant; $t(24) = -6.79$, $p = .001$ (See Table 4.9).

These results indicated that the alternate hypothesis that phoneme training will have a statistically significant effect on intelligibility in the paragraph reading task in each learning context was accepted for both experimental groups, while it was rejected for the control group. This meant that LMS-based pronunciation instruction and learning pronunciation through accent reduction software were more effective in improving learners' intelligibility in a controlled pronunciation task. However, the alternate hypothesis that phoneme training will have a statistically significant effect on intelligibility in the dialogue task in each learning context was accepted for all three groups. From a global perspective, the two experimental groups were successful in improving their intelligibility in paragraph and dialogue tasks. However, the control group failed to show improvement in one aspect.

Hypothesis 7: There will be statistically significant differences among the groups in the posttest in terms of intelligibility in the paragraph reading task.

The results of the preliminary analysis for intelligibility in paragraph reading suggested that the interaction between the covariate and the dependent variable is not significant, $F(2, 78) = 1.26$, $p = .290 > \alpha (.05)$, and the Levene's test of homogeneity of variances indicated that the variances were homogenous $F(2, 81) = 1.93$, $p = .151 > \alpha (.05)$. These results indicated that ANCOVA could be carried out for intelligibility in the paragraph reading task. The pretest intelligibility scores in the paragraph reading had a significant effect on the posttest results $F(1, 80) = 37.61$, $p = .001 < .05$; the ANCOVA was also significant, $F(2, 80) = 9.85$, $p = .001 < .05$, $\omega^2 = .14$ (See Table 4.10).

Table 4.10.

ANCOVA Results for Intelligibility in the Paragraph Reading Task

Source	SS	df	MS	F	p
Pretest Intelligibility	341.08	1	341.08	37.61	.001
Instruction	178.72	2	89.36	9.85	.001
Error	725.58	80	9.07		
Corrected Total	1138.68	83			

Post hoc analyses using the Sidak procedure to control Type I errors were carried out to test the pairwise differences among the adjusted means for the effect of learning environment on the learners' intelligibility in the paragraph reading task. The results indicated that both experimental groups did significantly better than the control group. In other words, the learners in Experimental group 1 (Moodle) ($M = 20.19$) and the learners in Experimental group 2 (Pronunciation Power II) ($M = 20.56$) had significantly higher intelligibility scores for the paragraph reading task than those in the control group ($M = 17.06$) (See Table 4.11). The effect sizes for these adjusted mean differences were 1.04, and 1.16, respectively. This indicates that the LMS-based training and training through accent reduction software were more effective than the traditional training in improving the participants' intelligibility in the paragraph reading task.

Table 4.11.

Pairwise Comparisons of Intelligibility in the Paragraph Reading Task

	Mean	Adjusted Mean	1	2	3
1. Experimental Gr. 1 (Moodle)	19.73	20.19	-		
2. Experimental Gr. 2 (P. Power)	20.22	20.56	0.37	-	
3. Control Group (Traditional)	18.00	17.06	3.13*	3.50*	-

*The mean difference is significant at the .05 level.

As it is seen in Table 4.11, the mean scores of both experimental groups significantly differed from that of the control group. This suggested that the alternate hypothesis that there will be statistically significant differences among the groups in the posttest in terms of intelligibility in the paragraph reading task was accepted.

Hypothesis 8: There will be statistically significant differences among the groups in the posttest in terms of intelligibility in the dialogue task.

The results of the preliminary analysis for intelligibility in the dialogue task suggested that the interaction between the covariate and the dependent variable was not significant, $F(2, 78) = 1.71$, $p = .187 > \alpha(.05)$, and the Levene's test of homogeneity of variances indicated that the variances were homogenous $F(2, 81) = 1.17$, $p = .316 > \alpha(.05)$. These results implied that ANCOVA could be carried out for intelligibility in the dialogue task. The pretest accuracy scores had a significant effect on the posttest results $F(1, 80) = 90.38$, $p = .001 < .05$. However, the ANCOVA was significant, $F(2, 80) = 14.07$, $p = .001 < .05$, $\omega^2 = .14$. (See Table 4.12). 14 % ($\omega^2 = .14$) of the total variance in the learners' intelligibility in the dialogue reading task was accounted for by the type of instructional environments controlling for the effect of the covariate.

Table 4.12.

ANCOVA Results for Intelligibility in the Dialogue Task

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Pretest (Dialogue Intelligibility)	315.31	1	315.31	90.38	.001
Instruction	98.17	2	49.09	14.07	.001
Error	279.10	80	3.49		
Total	648,29	83			

Follow-up analyses using the Sidak procedure to control Type I errors were carried out to test the pairwise differences among the adjusted means for the effect of learning environment on the learners' intelligibility in the dialogue reading task. The results

indicated that the learners who studied pronunciation on the Moodle site (Experimental group 1) ($M = 15.46$) had significantly higher intelligibility scores for the dialogue reading task than those who studied pronunciation through Pronunciation Power II (Experimental group 2) ($M = 13.97$) and than the learners who received traditional pronunciation instruction (Control group) ($M = 12.76$) (See Table 4.13). The effect sizes for these adjusted mean differences were 0.80, and 1.44, respectively.

Table 4.13.

Pairwise Comparisons of Intelligibility in Dialogue in the Posttest

	Mean	Adjusted Mean	1	2	3
1. Eperimental Gr. 1 (Moodle)	15.08	15.46	-		
2. Experimental Gr. 2 (P. Power)	14.07	13.97	1.49*	-	
3. Control Group (Traditional)	13.10	12.76	2.70*	1.20	-

*The mean difference is significant at the ,05 level.

The alternate hypothesis that there will be statistically significant differences among the groups in the posttest in terms of intelligibility in the dialogue task was accepted because the Moodle group outperformed the Pronunciation Power Group and the control group in the dialogue task in the posttest. This implied that instruction through Moodle was better than the other two learning environments although these two learning environments also helped the participants to improve their intelligibility scores in the dialogue task.

4.2.3. Improvements in the Perception of Vowels and Consonants

Hypothesis 9: Phoneme training will have a significant effect on perceptual vowel and consonant discrimination in each learning context (LMS-based learning, learning through accent reduction software and instruction through traditional classroom).

To test the improvements in learners' perception of segmental contrasts, the pretest and posttest scores of each group were compared through paired samples *t* test. There were statistically significant differences between pretest and posttest scores of Experimental Group 1 (Moodle) for vowels and consonants (See Table 4.14).

Table 4.14.

Paired Samples t-test Results for Moodle Group in the POSE test

Test - Section	<i>N</i>	$\bar{x}$	<i>sd</i>	$\bar{x}1 - \bar{x}2$	<i>sd</i>	<i>t</i>	<i>p</i>
Pretest -Vowels	30	9.83	1.95	-1.73	1.80	-5.28	.001
Posttest - Vowels	30	11.57	1.01				
Pretest - Consonants	30	10.67	1.97	-1.77	1.85	-5.23	.001
Posttest - Consonants	30	12.43	1.01				

Experimental group 1 (Moodle) improved its perception of both vowels and consonants in the POSE test. The difference between this group's scores in vowels in the pretest ($M = 9.83$, $SD = 1.94$) and the posttest ($M = 11.56$, $SD = 1.00$) was statistically significant; $t(29) = -5.27$, $p = .001$. Similarly, the difference between the pretest ($M = 10.66$, $SD = 1.97$) and the posttest ($M = 12.43$, $SD = 1.00$) scores for consonants was also statistically significant; $t(29) = -5.22$, $p = .001$ (See Table 4.14).

Table 4.15.

Paired Samples t-test Results for P. Power Group in the POSE test

Test - Section	<i>N</i>	$\bar{x}$	<i>sd</i>	$\bar{x}1 - \bar{x}2$	<i>sd</i>	<i>t</i>	<i>p</i>
Pretest -Vowels	29	9.48	1.62	-1.21	1.42	-4.57	.001
Posttest - Vowels	29	10.69	1.28				
Pretest - Consonants	29	10.66	1.45	-1.17	1.00	-6.30	.001
Posttest - Consonants	29	11.83	1.00				

Experimental Group 2 (Pronunciation Power) also improved its perception of both vowels and consonants in the POSE test. This improvement was statistically significant

for both vowels and consonants. The difference between this group's scores for vowels in the pretest ($M = 9.48$, $SD = 1.61$) and the posttest ($M = 10.68$, $SD = 1.28$) was statistically significant; $t(28) = -4.56$, $p = .001$. Similarly, the difference between the pretest ($M = 10.65$, $SD = 1.44$) and the posttest ($M = 11.82$, $SD = 1.00$) for consonants was statistically significant, too; $t(28) = -6.29$, $p = .001$ (See Table 4.15).

Table 4.16.

Paired Samples t-test Results for the Control Group in the POSE Test

Test - Section	<i>N</i>	$\bar{x}$	<i>sd</i>	$\bar{x}1 - \bar{x}2$	<i>sd</i>	<i>t</i>	<i>p</i>
Pretest -Vowels	25	9.20	1.12	-1.28	1.46	-4.39	.001
Posttest - Vowels	25	10.48	1.53				
Pretest - Consonants	25	10.08	1.53	-1.36	1.38	-4.93	.001
Posttest - Consonants	25	11.44	1.12				

The control group improved its perception of both vowels and consonants in the POSE test. The difference between this group's scores for vowels in the pretest ($M = 9.20$, $SD = 1.11$) and the posttest ($M = 10.48$, $SD = 1.53$) was statistically significant; $t(24) = -4.38$, $p = .001$. Similarly, the difference between the pretest ($M = 10.08$, $SD = 1.52$) and the posttest ($M = 11.44$, $SD = 1.12$) for consonants was also statistically significant; $t(24) = -4.92$, $p = .001$ (See Table 4.16).

The results of the paired samples *t* test comparing the pretest and posttest scores of the groups in the POSE test revealed that all three groups improved their scores in terms of perceptual vowel and consonant discrimination at statistically significant levels. Therefore, the alternate hypothesis that phoneme training will have a significant effect on perceptual vowel and consonant discrimination in each learning context was accepted. This result suggests that phoneme discrimination regardless of whether it is technology supported can help learners to develop their perception of problematic sounds used in context.

Hypothesis 10: There will be statistically significant differences among the groups in the posttest in terms of perception of vowels.

The results of the preliminary analysis for vowels in the POSE test suggested that the interaction between the covariate and the dependent variable was not significant, $F(2, 78) = 1.63$, $p = .202 > \alpha (.05)$, and the Levene's test of homogeneity of variances indicated that the variances were homogenous $F(2, 81) = 2.07$, $p = .132 > \alpha (.05)$. These results indicated that ANCOVA could be carried out for vowels in the POSE test. The pretest vowels scores had a significant effect on the posttest results $F(1, 80) = 19.94$, $p = .001 < .05$, and the ANCOVA was significant, $F(2, 80) = 4.69$, $p = .012 < .05$, $\omega^2 = .06$. Only 6 % ($\omega^2 = .06$) of the total variance in the perception of consonants was accounted for by the type of the instructional environments controlling for the effect of the covariate (See Table 4.17).

Table 4.17.

ANCOVA Results for the Perception of Vowels in the Posttest

Source	SS	df	MS	F	p
Pretest (Vowels)	24.14	1	24.14	17.94	.001
Instruction	12.61	2	6.30	4.68	.012
Error	107.67	80	1.35		
Total	150.70	83			

Post hoc analyses were carried out to test the pairwise differences among the adjusted means for the effect of learning environment on the perception of problematic vowels. The Sidak procedure was used to control for Type I errors across three comparisons. The results indicated that the learners who studied pronunciation on the Moodle site (Experimental group 1) ($M = 11.46$) had significantly higher perception scores for vowels in the POSE test than those who studied pronunciation through Pronunciation Power II (Experimental group 2) ($M = 10.70$) and than the learners who received traditional pronunciation instruction (Control group) ($M = 10.59$). The adjusted mean differences had 1.53, and 0.75, respectively as the effect sizes (See Table 4.18).

Table 4.18.

Pairwise Comparisons of Vowels in the POSE Test

Group	Mean	Adjusted Mean	1	2	3
1. Eperimental Gr. 1 (Moodle)	11.57	11.46	-		
2. Experimental Gr. 2 (P. Power)	10.69	10.70	0.76*	-	
3. Control Group (Traditional)	10.48	10.59	0.87*	0.12	-

*The mean difference is significant at the .05 level.

The results indicated that the Moodle group was ahead of the other two groups at the end of the instructional period in the perception of vowels. Therefore, the alternate hypothesis that there will be statistically significant differences among the groups in the posttest in terms of perception of vowels was accepted in favour of the Moodle group.

Hypothesis 11: There will be statistically significant differences among the groups in the posttest in terms of perception of consonants.

The results of the preliminary analysis for consonants in the POSE test suggested that the interaction between the covariate and the dependent variable was not significant, $F(2, 78) = 2.46$, $p = .092 > \alpha (.05)$, and the Levene's test of homogeneity of variances indicated that the variances were homogenous $F(2, 81) = 1.82$, $p = .169 > \alpha (.05)$. These results indicated that ANCOVA could be carried out for consonants in the POSE test. The pretest scores for consonants had a significant effect on the posttest results $F(1, 80) = 26.86$, $p = .001 < .05$. The ANCOVA was significant, $F(2, 80) = 6.02$, $p = .004 < .05$, $\omega^2 = .804$. Only 8 % ($\omega^2 = .08$) of the total variance in the perception of consonants was accounted for by the type of instructional environments controlling for the effect of the covariate (See Table 4.19).

Table 4.19.

ANCOVA Results for the Perception of Consonants in the Posttest

Source	SS	df	MS	F	p
Pretest POSE Consonants	22.03	1	22.03	26.86	.000
Instruction	9.87	2	4.94	6.02	.004
Error	65.63	80	0.82		
Total	101.57	83			

Post hoc analyses were carried out to test the pairwise differences among the adjusted means for the effect of learning environment on the perception of problematic consonants. The Sidak procedure was used to control for Type I errors across the three comparisons. The results indicated that the learners who studied pronunciation on the Moodle site (Experimental group 1) ($M = 12.38$) had significantly higher perception scores for consonants in the POSE test than those who studied pronunciation through Pronunciation Power II (Experimental group 2) ($M = 11.78$) and than the learners who received traditional pronunciation instruction (Control group) ($M = 11.57$). The adjusted mean differences had 0.67, and 0.90 as the effect sizes, respectively (Table 4.20).

Table 4.20.

Pairwise Comparisons of Perception of Consonants in the Posttest

	Mean	Adjusted Mean	1	2	3
1. Experimental Gr. 1 (Moodle)	12.43	12.38	-		
2. Experimental Gr. 2 (P. Power)	11.83	11.78	0.60*	-	
3. Control Group (Traditional)	11.44	11.57	0.81*	0.21	-

*The mean difference is significant at the .05 level.

As it was the case with the mean posttest scores of the three groups in the perception of vowels, the Moodle group did better than the other two groups in the perception of the consonants in the posttest (POSE). As a result, the alternate hypothesis that there will be statistically significant differences among the groups in the posttest in terms of perception of consonants was accepted. This suggested that the LMS-based training provided learners a better environment in which the learners could improve their skills in perceptual discrimination of problematic English phonemes.

4.2.4. Improvements in Learner Attitudes

The PAI was administered before and after the six-week instructional period to find out if there were any differences in the learners' attitudes towards pronunciation and native speaker accents. Paired samples *t*-test results for the two experimental groups and the control group indicated that there were statistically significant differences between learners' attitudes before and after the instructional period (See Table 4.21). Based on PAI results, learners had a positive attitude towards learning pronunciation and native-like or near native-like pronunciation.

Hypothesis 12: All three pedagogical settings (LMS-based learning, learning through accent reduction software and learning in a traditional classroom) will be effective in helping learners to develop a positive attitude towards English pronunciation.

Table 4.21.

Paired Samples t-test Results for the Control Group for the PAI Scores

PAI and Group	<i>N</i>	$\bar{x}$	<i>sd</i>	$\bar{x}1 - \bar{x}2$	<i>sd</i>	<i>t</i>	<i>p</i>
Pre-PAI (Ex. Gr. 1)	30	48.63	3.80	-5.10	5.08	-5.50	.001
Post-PAI (Ex. Gr. 1)	30	53.73	3.28				
Pre-PAI (Ex. Gr. 2)	29	45.45	4.98	-4.17	5.73	-3.92	.001
Post-PAI (Ex. Gr. 2)	29	49.62	5.26				
Pre-PAI (Cont. Gr.)	25	48.28	5.38	-3.32	6.82	-2.43	.023
Post-PAI (Cont. Gr.)	25	51.60	4.11				

The learners in all three groups improved their attitudes at the end of the instructional period. The improvements were significant for all three groups (See Table 4.21). It was the first experimental group that improved its PAI scores most. The difference between first experimental group's pre-instruction PAI scores ($M = 48.63$, $SD = 3.80$) and its post-instruction PAI scores ($M = 53.73$, $SD = 3.27$) was statistically significant; $t(29) = -5.49$, $p = .001$. The difference between the second experimental group's pre-instruction PAI scores ($M = 45.44$, $SD = 4.98$) and its post-instruction PAI scores ($M = 49.62$, $SD = 5.26$) was statistically significant; $t(28) = -3.92$, $p = .001$. The difference between the control group's pre-instruction PAI scores ($M = 48.28$, $SD = 5.38$) and its post-instruction PAI scores ($M = 51.60$, $SD = 4.11$) was statistically significant; $t(24) = -3.92$, $p = .023$. (See Table 4.21). This indicated that all three groups improved their PAI scores. Therefore, the alternate hypothesis that all three instructional settings (LMS-based learning, learning through accent reduction software and learning in a traditional classroom) will be effective in helping learners to develop a positive attitude towards English pronunciation was accepted.

Hypothesis 13: There will be statistically significant differences among the groups in the posttest in terms of developing a positive attitude towards learning English pronunciation and native-likeness.

PAI scores were also analysed if the interaction between the covariate and the dependent variable statistically significant. The analysis revealed that the interaction was not significant, $F(2, 78) = 2.05$, $p = .135 > \alpha (.05)$, and the Levene's test of homogeneity of variances showed that the variances were homogenous $F(2, 81) = 2.01$, $p = .141 > \alpha (.05)$. These results meant that analysis of variance could be carried out for PAI scores. The pre-instruction PAI scores did not have a significant effect on the post-instruction PAI results $F(1, 80) = 2.04$, $p = .158 > \alpha (.05)$. The ANCOVA of the post-instruction PAI scores was significant, $F(2, 80) = 5.08$, $p = .008 < \alpha (.05)$, $\omega^2 = .843$ (See Table 4.22). Only 8 % ($\omega^2 = .08$) of the total variance in PAI scores was accounted for by the type of instructional environments controlling for the effect of the covariate.

Table 4.22.

ANCOVA Results for Post-instruction PAI Scores

Source	SS	df	MS	F	p
Pre-instruction PAI	37.02	1	37.02	2.04	.158
Instruction	184.81	2	92.40	5.08	.008
Error	1455.67	80	18.20		
Total	1742.32	83			

Post hoc analyses were carried out to test the differences among the adjusted means for the groups in PAI scores. The results of the Sidak procedure suggested that the learners in Experimental group 1 (Moodle) had a more positive attitude towards English pronunciation and nativelikeness ($M = 53.56$) than the Experimental group 2 (Pronunciation Power) ($M = 49.90$). However, the difference between Experimental Group 1 and the control group ($M = 51.48$) and the difference between Experimental Group 2 and the control group were not statistically meaningful (See Table 4.23). The adjusted mean difference had 0.86 as the effect size.

Table 4.23.

Pairwise comparisons of Post-instruction PAI Scores

	Mean	Adjusted Mean	1	2	3
1. Experimental Gr. 1 (Moodle)	53.73	53.56	-		
2. Experimental Gr. 2 (P. Power)	49.62	49.90	3.66*	-	
3. Control Group (Traditional)	51.60	51.48	2.08	1.57	-

*The mean difference is significant at the ,05 level.

The alternate hypothesis that there will be statistically significant differences among the groups in the posttest in terms of developing a positive attitude towards learning English

pronunciation and native-likeness was accepted. In other words, the Moodle training improved the teacher trainees' attitudes more than the other two instructional conditions did.

4.2.5. Correlational Considerations

This section gives the results of the correlational analyses carried out to find how each group's posttest results correlated with its PAI scores. Pearson correlations were calculated to find out this. The results revealed that though posttest scores to a large extent positively correlated with learners' PAI scores, these correlations, except for two instances, were not statistically significant. More detailed information can be seen in Table 4.24 to 4.27.

Hypothesis 14: There will be a significant positive correlation between the learners' attitude towards English pronunciation and their success in;

- (a) perception of vowels*
- (b) perception of consonants*
- (c) segmental accuracy in the paragraph reading task*
- (d) segmental accuracy in the dialogue task*
- (e) intelligibility in the paragraph reading task and*
- (f) intelligibility in the dialogue task*

Table 4.24.

Correlations between the PAI Scores and the Posttest Scores (Moodle Gr.)

		<i>r</i>	<i>p</i>
Post-instruction PAI	Perception of Vowels	.068	.720
	Perception of Consonants	.277	.139
	Paragraph Accuracy	.138	.466
	Dialogue Accuracy	.234	.214
	Paragraph Intelligibility	.173	.362
	Dialogue Intelligibility	.422	.020

The Moodle Group's scores in the posttest and its PAI scores were all positively correlated though only dialogue intelligibility scores of the learners in this group were significantly correlated with PAI scores. There were no negative correlations between PAI scores and the scores in the posttest.

Table 4.25.

Correlations between the PAI Scores and Posttest Scores (P. Power Gr.)

		<i>r</i>	<i>p</i>
Post-instruction PAI	Perception of Vowels	.003	.987
	Perception of Consonants	-.128	.508
	Paragraph Accuracy	.122	.528
	Dialogue Accuracy	.312	.099
	Paragraph Intelligibility	.071	.715
	Dialogue Intelligibility	.264	.166

For Experimental Group 2, there were no significant correlations regardless of positively or negatively. There is only one negative correlation (between perception of consonants and PAI scores). The other correlations were positive though none of these were at statistically significant levels (See Table 4.25).

Table 4.26.

Correlations between the PAI Scores and Posttests Scores (Control Gr.)

		<i>r</i>	<i>p</i>
Post-instruction PAI	Perception of Vowels	.191	.361
	Perception of Consonants	.013	.952
	Paragraph Accuracy	-.397	.050
	Dialogue Accuracy	.184	.330
	Paragraph Intelligibility	.035	.869
	Dialogue Intelligibility	.187	.371

For the control group, there was a significant negative correlation between accuracy scores of the learners in the posttest paragraph reading task and their PAI scores. This meant that those learners with higher attitude scores did worse than those with lower scores. For other parts of the posttest, there was a positive correlation between each item and the PAI scores. However, none of these correlations were statistically significant.

Table 4.27.

Correlations between the PAI Scores and the Posttest Scores (All Groups)

		<i>r</i>	<i>p</i>
Post-instruction PAI	Perception of Vowels	.176	.108
	Perception of Consonants	.112	.311
	Paragraph Accuracy	-.067	.544
	Dialogue Accuracy	.137	.214
	Paragraph Intelligibility	.064	.566
	Dialogue Intelligibility	.297	.006

As it is seen in Table 4.24, 4.25 and 4.26, the only item with a significant positive correlation with the PAI scores was intelligibility in the dialogue task. All the other correlations were not significant. For two of the pairs (PAI scores – perception of consonants and PAI scores – accuracy in the paragraph task) the correlation was negative and it was at a significant level for the latter. In line with these results, except for Hypothesis 14 (f), all alternate hypotheses were rejected.

4.2.6. The Participants' Perceptions of the Training Provided

All of the participants regardless of the training they received during the term responded to three Likert items and two open-ended questions to reveal their views on the training provided. The open-ended questions helped the researcher find answer for the following qualitative research questions:

1. What are the challenges experienced by the learners studying pronunciation through Moodle and Pronunciation Power II Software and those instructed in a traditional way?
2. What are the positive sides of the three pronunciation learning environments (LMS-based learning, learning through accent reduction software and instruction through traditional classroom)?

In addition to the items intended for all three groups, the learners in each group were further given Likert items based on the training they got during the term. The responses to the five common items are summarised below.

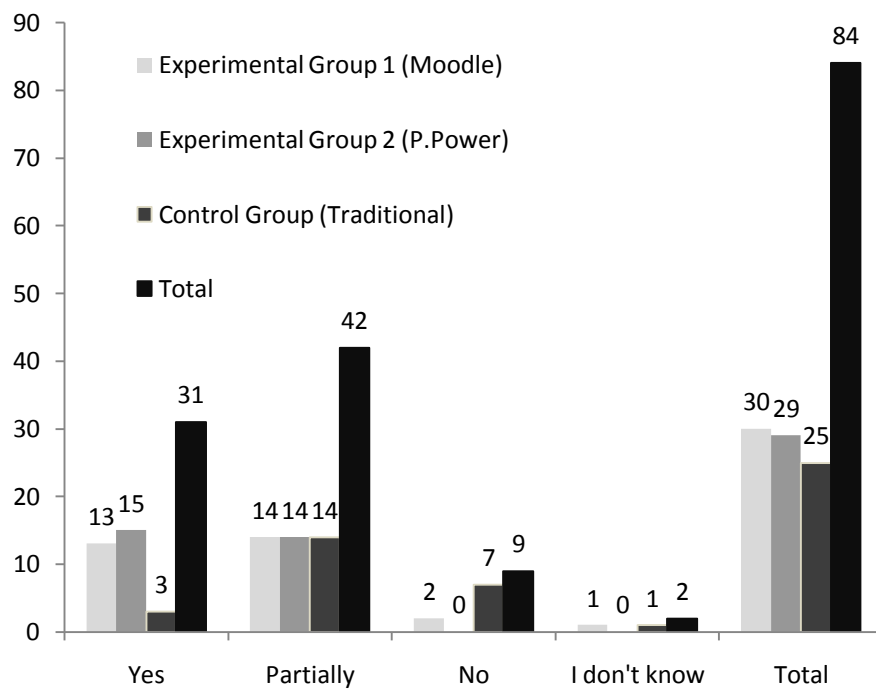


Figure 4.1. Responses to the question “Do you think your pronunciation has improved with the help of this training?”

As it is apparent in Figure 4.1, almost all participants in all three groups thought that the training helped them to improve their pronunciation. This finding is in line with the results of the pretest and posttest comparisons of each group. Interesting to note was that of the three groups, it was the second experimental one (Pronunciation Power

Group), in which all the participants thought that their pronunciation had significantly or partially improved thanks to the training through the accent reduction software.

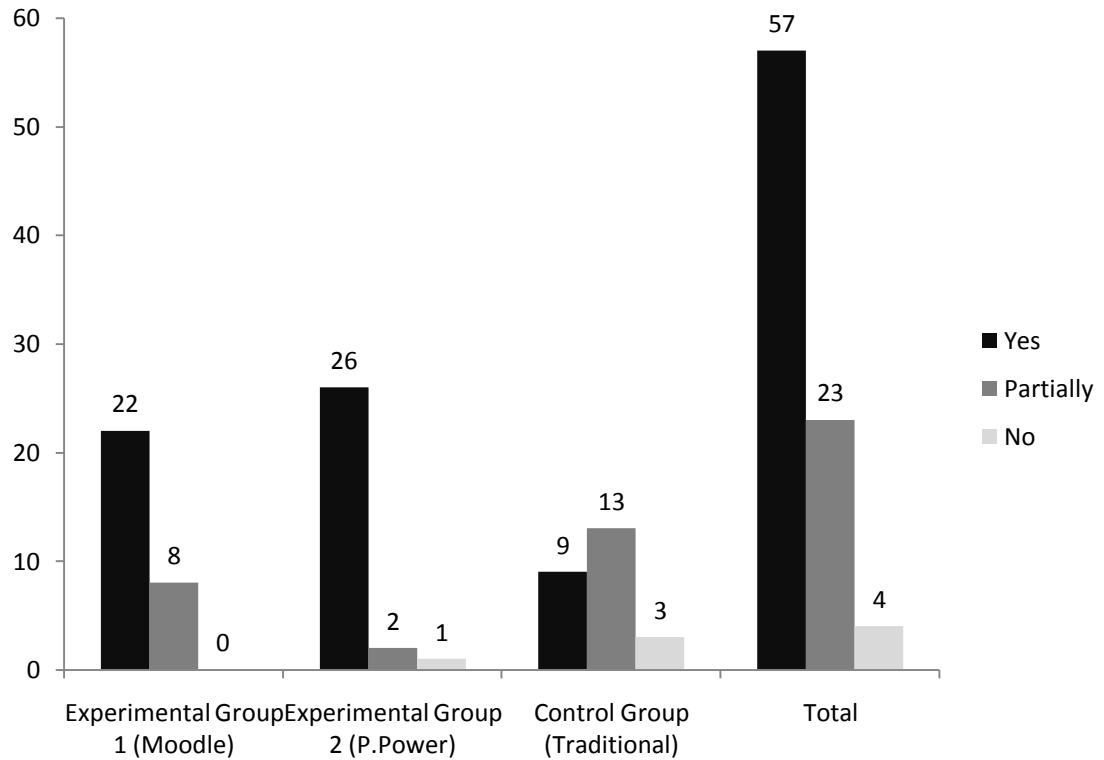


Figure 4.2. Responses to the question “Has this training been helpful for you?”

When the results are viewed globally, it is seen that 57 out of 84 learners viewed the training helpful in general. If the data is examined group by group, it is clear that almost all learners in the experimental groups reported that they found the training helpful though 8 learners in the Moodle group and two learners in the Pronunciation Power group said that the training was partially helpful. The responses indicated that it was the control group which had the largest number of participants who thought that the training was partially helpful. In addition, no one in the Moodle group found the training unhelpful, while 1 in the Pronunciation Power Group and 3 in the control group thought that the training was not helpful.

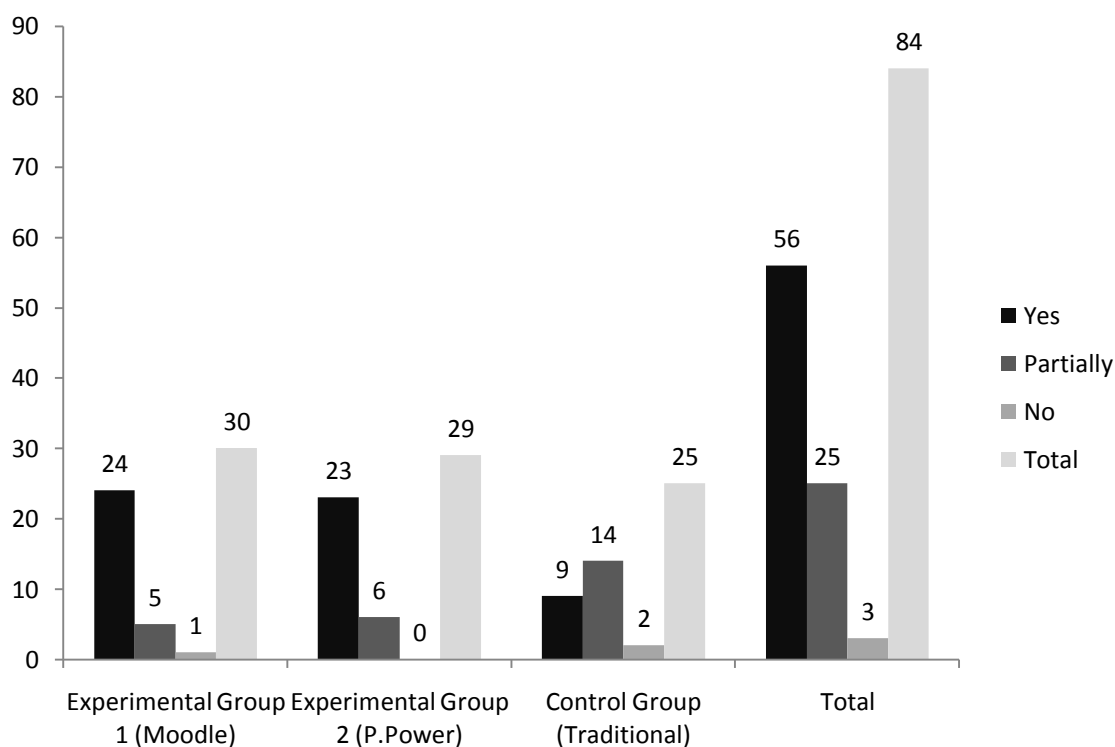


Figure 4.3. Responses to the question “Has this training helped you to acquire an awareness of English pronunciation?”

81 out of 84 learners reported that they somehow acquired pronunciation awareness. This means that the courses for all groups were successful in terms of equipping learners with an awareness of pronunciation which is essential for further focus on prospective pronunciation learning and perhaps teaching. In conclusion, it is clear that the responses to the three questions directed at all three groups received similar responses, which implies a consistence of learners' responses.

The three Likert items were followed by two open-ended questions. The first question was about the problems and challenges experienced during the training. The content analysis of the responses (See Data Analysis section to see how they were analysed) helped the researcher to convert qualitative data into quantitative data. Below are the results of the analysis given group by group for each question.

Question 1: What problems and challenges did you experience during this training?

The responses to this open-ended question provided some feedback on the difficulties and problems that emerged during the training. 14 learners in the Pronunciation Power Group, 6 learners in the control group and 24 learners in the Moodle Group responded to this question.

Pronunciation Power Group: The main issues that emerged in the responses provided by the Pronunciation Power Group were problems with articulating various sounds, technical problems, and difficulty in understanding the accent of the speakers. 4 out of 14 learners reported that they had problems with particular sounds, especially regarding vowels, fossilized sounds and distinguishing similar sounds. For instance, one respondent said, “There were several problems about pronunciation. Especially, the difference between /t/ and /θ/ was a great problem.”

3 respondents reported that they experienced certain technical problems, and again 3 others mentioned the difficulty they had with understanding the accent of the speakers. The sentence “I have had some trouble to understand the speaker's accent while listening” illustrates this point. In addition to these, each of the following problems was mentioned by only one respondent: Inclusion of difficult words in the training material, inadequate learner training on the program, lack of online pronunciation training in the course. Moreover, by saying, “I think time isn't enough to learn all these pronunciation rules, this lesson can be taught during a long period. In my opinion, it can be more efficient” one respondent expressed his discontent with the available lesson time.

Control Group: In the control group, 2 respondents out of 6 reported that they had technical problems, especially while they were recording their voice for the pretest and posttest. Though the researcher intentionally provided the learners with both US and RP accents as a part of perception activities to help them to get acquainted with both of them, one respondent expressed his concern about being confused with these accents. Apart from these, one learner mentioned lack of enough time for practice and another complained about the lack of a native speakers to converse with.

Moodle Group: Moodle Group responded to the question concerning the problems and challenges experienced in a more detailed way than the other two groups reported above; totally 24 learners responded to this question. The most frequently raised issues were technical problems, problems related to certain sounds, limited time, having difficulty in getting acquainted with the system at first, students' missing some classes and their lack of interest and noise in the classroom. Half of the respondents (12 out of 24) mentioned some kind of a technical problem they experienced during the training such as lack of an Internet connection at home and recording their voice. 9 out of 24 respondents mentioned problems related to specific sounds. Some learners mentioned similar sounding phonemes. For example, one of them said, "I had problem with pronouncing similar sounds, like /v/ and /w/. I realized that I pronounce similar sounds in the same way."

To a lesser extent (2 out of 24) reported problems related to getting acquainted with the e-learning platform. The following comment from a respondent illustrates this point: "We had some problems at first because we had never used like a complicated system about pronunciation but later we got accustomed to it." Two respondents complained about noise in the classroom and two accepted that they missed classes and they did not have enough motivation or interest to help them learn better. In addition to these, approximately 20 of the respondents (5 out of 24) expressed that they did not experience any problems during the training.

Question 2: What were the positive sides of the training provided this semester?

Pronunciation Power Group: The second question was responded to by 10 learners in the P. Power Group, 5 learners in the control group and 21 learners in the Moodle group. Out of 10 learners who responded to this question in the Pronunciation Power group, 8 of them reported that they improved their pronunciation. One of these respondents said, "There have been a lot of positive sides of training. Firstly, I noticed that several words wrongly pronounced I learned how to correct these errors. Maybe, I can speak more frequent than the past times." 2 respondents said that the training helped

them to correct their errors, while a learner found the training generally positive. Finally, one learner said that she did not know how to evaluate the training.

Traditional Group: 5 learners responded to this question in the control group. It is interesting to note that 2 respondents out of 5 in the control group spoke about pronunciation awareness, which is key to continuing to develop oneself even after formal training. Two of them said that they improved their pronunciation. Moreover, one learner found the training to be interesting, while another reported that the training helped him to learn new words.

Moodle Group: The third group that responded to the second question was Moodle group. Totally 21 learners responded to this questions. Out of these 21 learners, 10 of them stated that they improved their pronunciation, and similarly 9 of them found the training generally positive. 6 learners said that they learned the pronunciation of some new words and 4 learners reported that they found the system highly effective. Like those learners in the Pronunciation Power Group, 3 learners stated that this training helped them to develop awareness and 2 others said that the training helped them to recognize their mistakes. The following comment from a respondent in this group illustrates some of the points mentioned above:

The exercises were so useful. The most important contribution to us is to be aware of pronunciation. Thanks to this, I started listening so much I registered some web sites related with understanding native speaker and so forth. Of course, now I am not the best but day by day I will improve. This training showed me the way I will go.

Other emerging issues, each of which was mentioned only once, were having the chance to work with the IPA symbols and to watch videos and the training sessions' (a) being enjoyable and easy to follow, (b) motivating learners to do some extra work, (c) helping them to use the Web for pronunciation study, (d) guiding them in their pronunciation studies, (f) improving listening comprehension skills, and (g) helping him to change the views on pronunciation for the better. In addition to all these, one learner found the visual design of the Moodle site attractive.

As noted earlier, the participants were directed 3 common Likert items and 2 open-ended questions, the responses to which were summarised above. In addition to these common questions, each group in the study responded to Likert items which inquired about various issues about the type of training they got. There were 8 items for the first experimental group (Moodle), 4 for Experimental Group 2 and 5 for the control group. The responses to these items are given in Table 4.28, 4.29 and 4.30, respectively.

Table 4.28. *Learner Perceptions of LMS-based Training (Experimental Group 1)*

Items		I totally agree	I agree	I partially agree	I disagree	I totally disagree	Average
1. I feel that I improved my pronunciation by recording myself reading texts in the foreign language.	<i>f</i>	11	12	5	2	0	4.07
	%	36.7	40	16.7	6.7	0	
2. I would like to continue to work on my pronunciation by recording myself in future foreign language classes.	<i>f</i>	11	8	7	4	0	3.87
	%	36.7	26.7	23.3	13.3	0	
3. I found recording dialogues to be a useful exercise.	<i>f</i>	13	12	4	1	0	4.23
	%	43.3	40	13.3	3.3	0	
4. I enjoyed doing the activities on the Moodle site.	<i>f</i>	16	5	5	3	1	4.07
	%	53.3	16.7	16.7	10	3.3	
5. I studied on the Moodle site outside the classroom.	<i>f</i>	11	7	7	2	3	3.70
	%	36.7	23.3	23.3	6.7	10	
6. I enjoyed getting comments from my classmates.	<i>f</i>	5	2	16	3	4	3.03
	%	16.7	6.7	53.3	10	13.3	
7. I enjoyed getting comments from my teacher.	<i>f</i>	9	9	8	1	3	3.67
	%	30	30	26.7	3.3	10	
8. I learned new ways to learn pronunciation on the Moodle site.	<i>f</i>	17	9	3	0	1	4.37
	%	56.7	30	10	0	3.3	

* Out of 5 (A higher value shows a more positive attitude)

The learners in the first experimental group (Moodle Group) generally expressed positive opinions about the training they got on the Moodle site. At various points during the training they were asked to complete some tasks by recording themselves while reading some texts or dialogues. The average value for the items related to recording voice (the first three) was above 4, which implied that the participants liked recording their voice and found such an activity useful. Though 70 % of the participants liked the activities (not including those who partially enjoyed the activities), some learners did not like getting feedback from the instructor or the peers (7 or 4 learners respectively). Some 20 % of the participants reported that they had used the online system outside the class. Finally, nearly all participants said that the Moodle course taught them how to learn. The responses to this final item promises much more improvement for learners since they learned how to utilize text-to-speech and text-to-phonetics tools, and they got to know online materials and how to reach them.

Table 4.29.

Learner Perceptions of the Training with Pronunciation Power

Items		I totally agree	I agree	I partially agree	I disagree	I totally disagree	Average*
1. I think Pronunciation Power II is a useful PC program.	<i>f</i>	12	16	1	0	0	4.4
	%	41.4	55.2	3.4	0	0	
2. Studying pronunciation by using Pronunciation Power II was boring.	<i>f</i>	2	2	12	12	1	2.8
	%	6.9	6.9	41.4	41.4	3.4	
3. The exercises in Pronunciation Power II were enjoyable for me.	<i>f</i>	4	15	8	2	0	3.8
	%	13.8	51.7	27.6	6.9	0	
4. I enjoyed viewing spectrograms (Pronunciation Power).	<i>f</i>	6	14	7	2	0	3.8
	%	20.7	48.3	24.1	6.9	0	

* Out of 5 (A higher value shows a more positive attitude)

Almost all participants to the second treatment group, who studied pronunciation through Pronunciation Power II, found the software useful. The second item brought about an average value below 3, which is consistent with the next item which is well above 3 (See Table 4.29). Thus, these two items implied that the learners found the activities in the software enjoyable though several people did not agree to such an idea. As the last item in this part, the learners were asked a question about spectrograms. Most of them found these visual representations of speech enjoyable to view.

Table 4.30.

Learner Perceptions of the Traditional Pronunciation Training

Items		I totally agree	I agree	I partially agree	I disagree	I totally disagree	Average*
1. I found practising dialogues to be a useful exercise.	<i>f</i>	9	9	5	1	1	3.7
	%	36	36	20	4	4	
2. I studied pronunciation outside the classroom.	<i>f</i>	5	11	5	2	2	3.7
	%	20	44	20	8	8	
3. I enjoyed getting comments from my teacher.	<i>f</i>	5	7	9	2	2	3.4
	%	20	28	36	8	8	
4. I enjoyed getting comments from my classmates.	<i>f</i>	3	9	7	3	3	3.2
	%	12	36	28	12	12	
5. I disliked the activities we did in the classroom.	<i>f</i>	2	9	8	5	1	2.8
	%	8	36	32	20	4	

* Out of 5 (A higher value shows a more positive attitude)

When compared with the responses given to similar questions intended for the other two groups, the average value for the responses given by the second treatment group was

slightly below 4. One item (getting comments from friends) in this group received similar responses to those provided by the Moodle group. It follows from this that the learners were somehow anxious about getting feedback from others whether the provider is the instructor or a peer or they found it useless to get it. A word of caution would be that the responses to the last item asking about whether they liked the activities done in the classroom provided a wide range of answers, a good number of them (32 %) centering around partial enjoyment.

4. 3. DISCUSSIONS OF THE FINDINGS

Unlike the studies that found almost no correlation between training and attainment in pronunciation (Suter, 1976, cited in Robertson, 2003; Purcell and Suter, 1980; Yule and MacDonald, 1994), the findings of the present study suggested that improving pronunciation quality is possible through phonetic training centering on intelligibility and segmental accuracy. All three groups, especially the treatment groups improved their intelligibility and accuracy in the current study, but for most sections of the posttest it was the LMS-based instruction group that showed the largest improvement. Such a finding is consistent with the findings of the study by Neri et al., (2006), who found that all three groups (the first experimental group trained through ASR-based CAPT developed by the researchers, the second experimental group trained through a similar CAPT software and no instruction group) improved their global segmental quality.

Similary, in the study by Mich et al., (2006) both the experimental group trained through ASR-based program and the control group that received teacher-led instruction improved their global quality of pronunciation. In the present study, in both experimental conditions; that is, the LMS-based instruction and instruction through accent reduction software was proved effective in boosting the participants' intelligibility and segmental accuracy, while traditional instruction proved partially effective. In short, these findings corroborates those of the studies which found that instruction helps learners to improve their pronunciation (Derwing et al., 1998; Couper 2003). However, the findings of phonetic training studies should be taken with care

because, as Aliaga-Garcia and Mora (2009) noted, the findings of such studies might have been affected by various factors such as the sound feature studied, the distinction between perception and production, speech rating procedures, the type of training provided and so forth.

Though LMS-based pronunciation instruction is scarce in foreign language teaching literature, the findings of the present study became a sample for how to use a learning management system to teach pronunciation. Because LMS-based teaching is basically web-based instruction, the findings of this study can also be compared with those focusing on the use of web-based materials in pronunciation teaching. One such study, as noted earlier, was by Hişmanoğlu (2010b), who studied the effectiveness of Internet-based materials on curing problems with three sound pairs (/æ/, /e/, /ɔ:/, /əʊ/, /u/, and /u:/). In terms of LMS-based pronunciation training, the findings of this study corroborates those of Hişmanoğlu's (2010b) and Hişmanoğlu and Hişmanoğlu's (2011) because in both studies web-based materials proved useful in improving learners' pronunciation in terms of problematic points.

Furthermore, as it was the case with some other studies (e.g., Kılıçkaya, 2011; Tanner and Landon, 2009; Kartal and Şimşek, 2008), the participants to experimental groups liked to learn pronunciation in a low-stress environment and to focus on problematic phonemes and to progress at their own pace. As Morley (1991) puts it, "a comfortable classroom atmosphere is essential for maximum achievement" (p. 504) in pronunciation teaching and learning. A pronunciation learning environment in Moodle seems to provide learners with this stress-free environment because learners mostly feel comfortable recording their voices and getting comments from the teacher or peers. Self-evaluation also works in pronunciation teaching because as Brown (2008) notes, by listening to their own recorded speech, learners can focus on their strong and weak sides in pronunciation (Brown, 2008, p. 203).

Another significant finding of the study was that almost all learners (81 in 84) gained awareness in learning pronunciation (See Figure 4.3 in the previous section). This finding is in line with the results of the study by Kartal and Şimşek (2008). They found

that the software called “English sound Pronunciation with ALPI” helped the participants to become aware of their mistakes and they developed their articulatory skills. In terms of the teacher trainees’ future studies such a findings is quite significant, as Brown (2008) stresses, if learners are not aware of their aims and objectives in pronunciation learning and the relationship of pronunciation to other language skills and their responsibility in pronunciation learning, pronunciation instruction is highly likely to fail (p. 205). Then, one can conclude that phonetic training increases learners’ awareness in learning pronunciation; thereby, making them more sensitive to fossilized errors. In other words, learners get eager to learn the correct way to pronounce problematic phonemes. In terms of the participants’ positive attitudes towards the CAPT training, the findings of the present study corroborates the results of various studies that incorporated the use of CAPT software in teaching pronunciation (Tanner and Landon, 2009; Mengü, 2010; Tuan, 2010; Hişmanoğlu and Hişmanoğlu, 2011; Kartal and Şimşek, 2008). The participants to the present study mostly found the LMS-based pronunciation context and the use of accent reduction software beneficial as it was the case with the studies mentioned above.

It should also be noted that though the students’ expressing their positive opinions about the lesson is an indication of learning, such positive evaluations are not enough to render a lesson successful. The learners in all groups mostly expressed positive ideas about the training, and the *t*-test results supported their opinion. In short, the results of the study indicated that learners’ self-perceptions of the training they received were mostly consistent with their performances in the perception and production test.

In the overall scale, the learners’ PAI scores did not correlate with posttest results except for intelligibility in the dialogue task. This implies that it is difficult to establish a direct relationship between learners’ attitudes towards native-like pronunciation and their success in achieving high levels of accuracy and intelligibility. Unlike the findings of the present study, Elliott (1995) discovered that higher scores on the PAI correlated with higher scores on the pronunciation test and were a predictor of pronunciation accuracy, but they did not predict higher scores as a result of the formal instruction provided to the experimental group. By contrast, Hammond and Flege

(1989) showed that it was in fact the learners with the least empathy toward a language group who performed best at imitating native pronunciation (pp. 6-7). The findings of present research mostly corroborates those of the latter mentioned above.

In terms of the problems and difficulties experienced by the participants in the experimental groups in the present study, technical problems and challenges ranked first. This was the same with some other studies (e.g., Al-Ani, 2008; Kalamarz, 2010). Another problem also experienced by Stanley (2007) was the lack of enough computers to give provide each learner with a fully equipped computer. This implies that if teacher is intending to put some type of CAPT software into practice in pronunciation classes, it is normal for him/her to expect some technology related problems. Such problems often center around hardware or software and how to use the programs or web sites. It is not easy for the class teacher to solve hardware problems easily, but he/she should always have a second plan to put into practice in case there is a problem or a difficulty.

CHAPTER 5

CONCLUSION

5.1. INTRODUCTION

Felps et al., (2009) claim that “by achieving near-native pronunciation, L2 learners stand more to gain than just better intelligibility” (p. 920). The findings of this study revealed that the same goes for EFL teacher trainees. That is, remediating pronunciation difficulties can assist teacher trainees to improve both their intelligibility and self-confidence despite the common contention that instruction on fossilized pronunciation errors is prone to failure and that foreign accent is not easily overcome, especially beyond the so-called Critical Period. Curing of critical errors committed by nonnative speakers is possible in some cases, but persistent practice and increased motivation are necessary to get a feeling of success in learning and teaching pronunciation and accent reduction. The findings of this study indicated that giving learners a chance to practise pronunciation after an error analysis of learner speech could be helpful to solve severe pronunciation problems through remedial lessons.

The findings of the present study provide support for the use of LMS-based instruction. This indicates that a better alternative to PC-based software or traditional instruction could be a virtual learning environment focussing on problematic aspects of pronunciation for EFL teacher trainees. The training provided in the current study helped the learners to boost their confidence and raise their awareness of pronunciation. The Moodle course which is designed based on results of error analysis worked well with EFL teacher trainees because LMS-based systems are highly customizable for the needs of a specific group of learners. One of the most significant findings of this study is that LMS-based training helped learners to improve their intelligibility, accuracy, perceptual discrimination of vowels and consonants as well as attitudes towards native-like pronunciation and confidence in studying pronunciation. Other findings and implications of this study are discussed later in this chapter after a summary of how the study was carried out.

5.2. SUMMARY OF THE STUDY

The present study set out to find the effect of a commercial pronunciation teaching software package and a LMS-based pronunciation learning environment designed through Moodle on EFL teacher trainees' pronunciation and their attitudes towards learning pronunciation. 84 EFL teacher trainees at Hacettepe University took part in this quasi-experimental study. Because of time limitations, some phonemes, especially vowels were selected for practice through the results of the learner survey, literature review, error analysis and functional loads of phonemes. The participants were assigned to three groups based on their sections. As the first step of the study, the participants in the Pronunciation Power group and those in the Moodle group were trained on how to use the Pronunciation Power II software and the Moodle site. The learner training for Pronunciation Power II software included such issues as navigating around the PC program, recording one's voice, and so forth. The Moodle training focussed on navigating around the site, recording voice, uploading assignments, using the links, providing peer feedback by using voiceshadow, and so forth. In addition, all three groups received training on how to submit assignments and how to do vocabulary exercises on the Moodle site.

After the learner training sessions, the researcher asked the participants in all three groups to read aloud and record a paragraph and a dialogue for the purpose of speech collection. The collected speech samples were analyzed by two native speakers to discover problematic sounds for Turkish-L1 learners of English. Through literature review, results of the speech samples' analysis, functional load of the phonemes and learner perceptions of difficult phonemes, a set of problematic sounds including both vowels and consonants were selected to be studied during the instructional period. Before the instruction began, the learners were administered (a) an attitudinal survey including an attitude inventory adapted from Elliott (1995) and questions concerning online pronunciation instruction, computer literacy, and so forth, (b) a pretest including a productive test of pronunciation including a paragraph reading task (from Celce-Murcia et al., 1996, p. 398) and a dialogue task (from Hincks, 2005, p. 167), and a perception test (from Shewell, 2004).

The actual instructional period lasted for six weeks with 60 to 90 minutes each. Each group studied pronunciation in a different learning environment. That is, the first experimental group studied on an interactive web-based learning environment designed through Moodle, and the second experimental group used accent reduction software (Pronunciation Power II), while the control group was instructed in a traditional way. At the end of the instruction, the learners were given the same the attitudinal survey with two open-ended questions and extra Likert items that asked the participants to evaluate the training they received. These items in the survey asked the participants to give their opinions and perceptions of the instructional activities. For the productive pronunciation test, the learners were asked to record their voice reading the paragraph and roleplaying the dialogue in the pretest.

As noted earlier, participants' sound productions were analysed in terms of accuracy and intelligibility in the paragraph and dialogue tasks. Firstly, accuracy as a crucial element of speech production was analysed. Though both experimental groups improved their accuracy in the paragraph reading task at statistically significant levels, the difference between the control group's pretest and posttest score was not significant. In terms of dialogue accuracy results, all three groups improved their scores at statistically significant levels. The ANCOVA carried out to compare the posttest performances of the groups in terms of accuracy in the paragraph and dialogue tasks revealed that the difference between Experimental group 2 (Pronunciation Power) ($M = 20.30$) and the control group ($M = 18.22$) was statistically significant, while the difference between dialogue accuracy scores of the groups were not statistically significant $F(2, 80) = 2.43, p = .095 > .05$.

Secondly, for paragraph intelligibility, it was again the control group that failed to improve its mean scores at a significant level. The improvements in the scores for intelligibility in dialogue task for all three groups were statistically significant. In short, the control group failed to improve its mean scores for accuracy and intelligibility in paragraph reading task. ANCOVA results for intelligibility for paragraph and dialogue task indicated that both experimental groups outperformed the control group in terms of intelligibility in the paragraph task. The difference between the two experimental groups

was not significant. For intelligibility in dialogue task it was the Moodle group that outperformed the other two groups.

In terms of the perception of problematic English sounds, paired samples *t*-test results indicated that all three groups improved their scores at statistically significant levels at the end of the training sessions. ANCOVA results showed that Moodle group did better than the Pronunciation Power group and the control group in the perception of problematic vowels and consonants. This implied that studying pronunciation through Moodle helped learners to improve their perception of both problematic vowels and consonants.

In addition to these, a comparison of all three groups' PAI scores revealed that the learners had more positive attitudes towards learning pronunciation and native speaker accents at the end of the instructional period. This improvement was statistically significant for the two experimental groups and the control group. The learners' post-instruction PAI scores were compared with ANCOVA. When compared with the Pronunciation Power (Experimental Group 2) group, the Moodle group's (Experimental Group 1) attitudes were significantly more positive. In other words, the Moodle group improved its attitudes more than the Pronunciation Power group did. This meant that Moodle provided the learners with more encouragement in learning pronunciation and helped the participants to feel that it is possible to improve pronunciation. The difference was not significant when compared to the control group.

The findings of the present study implied that an innovative alternative to CAPT software could be the use of learning management systems to help learners study pronunciation in an online learning community. The integration of Web 2.0 tools to enable learners to design, share and evaluate user-generated content in LMSs is already possible in Moodle. In addition, the World Wide Web is a gigantic resource that is waiting to be explored by teachers and learners as far as learning management systems are concerned. It is certainly up to the instructor to explore the potentials of learning management systems for their own needs. As Stenson et al., (1992) stress, CAPT system seems to be more fruitful when they are used as a complement of regular

classroom instruction rather than replacing human teachers. Though this is currently true, CAPT systems will be better at teaching pronunciation when they are perfect in providing fully accurate instantaneous feedback.

5.3. PEDAGOGICAL IMPLICATIONS OF THE STUDY

This extensive study on the perception and production of problematic English sounds for Turkish-L1 learners of English in three different learning environments provided the researcher a number of pedagogical implications. These implications are related to general pedagogical issues regarding pronunciation instruction and the use of technological tools in pronunciation teaching. In addition to these, motivational issues are also considered. Each of these issues is explained below.

Teachers may depend on their intuitions and personal experience, but they are not enough to set goals in pronunciation instruction. As it was the case at the beginning of the study, teachers should be equipped with the ability to analyze learners' speech and use this analysis for pinpointing problematic areas based on experimental research including corpus studies. If they do not consider their students' needs in pronunciation in terms of perception and production, the instruction might focus on unnecessary points (Derwing and Munro, 2005, pp. 387-388). In this study, the researcher used several parameters to diagnose problematic sounds. Therefore, the learners mostly expressed positive ideas about the training provided because they worked on sounds which they thought as problematic for them. In short, problematic aspects of learners' speech should be researched before an attempt to cure fossilized problems and to boost accuracy and intelligibility.

It is highly recommended that sounds should be taught in a context because all sounds of English can be seen in the simplest texts available for beginner learners. This means that decontextualized drilling is of no use in teaching sounds to nonnative learners of English (Broughton et al., 1980, pp. 61-62). During the training sessions in this study, contextualized exercises were motivating for learners. Therefore, it is wise to teach in context rather than in isolation. However, it might be difficult to design communicative tasks to teach pronunciation. Drills can sometimes be used, but they should not be used

in a way to bore the trainees. Instead of overusing drills and decontextualised exercises, teachers can utilise games, jokes, songs and other materials that render a pronunciation practice activity meaningful. Learner/teacher-generated content could be used to arouse interest in the instructional material.

Besides the significance of contextualisation, the difference between the activities for perception and those for production and the concepts of accuracy and intelligibility should be taken into consideration when designing materials for pronunciation practice. How these elements or dimensions of pronunciation are viewed determine the nature of pronunciation pedagogy. This study indicated that it is possible to start with segmentals and work upwards because it is often easier to see segmental improvements in learners' speech than to see suprasegmental ones. On the part of the learners, this implies that recognizable improvement motivates them and helps them to acquire necessary self-confidence to learn pronunciation. However, starting with segmentals does not mean that suprasegmental elements should be ignored because a balanced view of pronunciation focusing on both accuracy and intelligibility is recommended today. Following a short segmental study, teachers can focus on suprasegmentals which are usually more difficult to improve. The participants to this study improved their motivations and self-confidence by focusing on problematic phonemes because as the survey items related to their progress indicated, they were aware of the improvement.

As it is often recommended (e.g., Broughton et al., 1980), learners should listen to different accents. This is basically necessary for perception training. These accents should mostly consist of both native and nonnative ones because in international communication speakers have to interact with people with diverse language backgrounds. However, some learners in this study, especially those who studied pronunciation on through Moodle expressed that they felt confused upon hearing various accents. This situation implies that learners should be informed about why they are presented with different varieties in perception training. They should also be informed that the situation is different when it comes to productive training because one standard variety should form the instructional focus. Furthermore, because some learners expressed negative opinions about the feedback they received, the place of

feedback in pronunciation teaching should be clarified and how to provide peer feedback and how to make use of the feedback given by the teacher and peers should be taught before they start studying pronunciation.

Other issues that should be considered are related to the use of technology in pronunciation teaching. For example, a significant implication of this study is that instructors should pay enough attention to learner training if they are introduced to CAPT software or a web-based or LMS-based training in pronunciation. Although most learners are good at dealing with computer and web-based applications and software, there are still some students who have difficulties using computers and the Internet. This was clear in the learners' responses to the questions concerning the evaluation of the PC-based and LMS-based learning experience. As noted earlier, some learners had difficulty getting used to the learning situation. Before the instruction, instructors should demonstrate how to use PC-based or web-based pronunciation software, and how to utilize recording and text to speech software that is freely available on the Internet. Besides this, those learners with a certain degree of technophobia should be guided and trained to make use of the available technology.

Recording applications like Nanonong or Voiceshadow give learners the chance to self-edit or peer edit recorded speech. Oral reading and recording in Moodle, in addition to the value of Moodle recordings in terms of self-, peer- and teacher-monitoring, helped learners to focus on accuracy alone. Another dimension of web-based instruction concerns the design of online materials either in the form of sharable learning objects or interactive web pages. When designing materials for online instruction, basic online materials design principles should be taken into consideration in line with the accumulated research in pronunciation instruction.

Another significant implication of the study concerns teacher training. In order to teach pronunciation through CAPT software and Internet-based materials including the use of LMSs, teachers have to be trained in computer applications in pronunciation teaching. In terms of computer literacy, the current situation of language teachers does not seem to be promising because, as Hişmanoğlu and Hişmanoğlu's (2010) study revealed,

teachers mostly depend on traditional instructional techniques to teach pronunciation and they have little or no experience of instruction through computers and the Internet. To change this for the better, teachers should be trained in computer-assisted pronunciation teaching. This is because most studies supported the use of computers in the teaching of pronunciation.

5.4. RECOMMENDATIONS FOR FURTHER STUDIES

Taking its bases from constructivist pedagogy, Moodle is better at providing learners with socio-cultural aspects of language learning. Unlike PC-based software packages, learners in Moodle courses can interact, peer review, record their voice and get human feedback. However, LMS-based training does not incorporate some significant aspects of CAPT. For example, automatic speech recognition and instantaneous automatic feedback in Moodle would be a nice development. As noted earlier, several learners in each group did not enjoy getting feedback or comments from the teacher or peers. This might be due to anxiety or fear of being unsuccessful. Prospective studies can focus on the issue of feedback in virtual learning environments.

Another interesting issue that can form the basis of future studies can be the integration of Web 2.0 tools into PC software. In other words, the users of PC software can form online learning communities as an extension of offline pronunciation study. Such studies can focus on how PC software and learning management systems can be used in cooperation. Prospective studies on pronunciation instruction in a virtual learning environment can deal with (a) suprasegmental elements, (b) integration speech recognition (accordingly automatic feedback) in learning management systems, and (c) teaching pronunciation through teacher-to-learner and learner-to-learner synchronous communication. In addition, comparative studies can be carried out to compare different learning management systems like Blackboard, Drupal, WebCT, and so forth. in terms of their effectiveness in pronunciation pedagogy in general or more specifically in terms of how they deal with the issue of feedback, materials design, tracking student activity and so forth.

Finally, the research on issue of learner attitudes has provided mixed results to date. Some researchers found that those learners with a positive attitude towards native-likeness performed better, while some others found no correlations between success in pronunciation and positive attitudes towards native-likeness. The findings of the present study did not find significant correlations between the participants scores and their attitudes. This implies that this issue is yet to be researched in more detail. Attitudes and motivation are closely related; positive attitudes are expected increase motivation. However, there is not strong evidence to support this. Therefore, along with attitudes, as Brown (2008) notes, such learner factors as motivation, L1 background, personality that are argued to play a significant role in success in pronunciation learning should be researched (Brown, 2008, p. 205). In other words, the correlation between success in pronunciation and each of these factors should be analysed through empirical research studies.

5.5. LIMITATIONS OF THE STUDY

Carrying out studies with a technological focus entails the use of technologically fully equipped classrooms to do the research with ease. However, in terms of technological equipment, there were some problems that were hard to solve. There was not enough hardware such as quality microphones or headphones to record high quality sound. The learners often had to change such hardware, so they spent lots of time adjusting sound levels for microphones and headphones. A number of research studies utilised soundproof booths to record speech samples, the laboratory in which the study was carried out lacked such equipment. Some recorded speech samples were of poor quality due to the noise in the classroom. One solution for this was to ask the participants to record their tasks at home, but this was also problematic since some learners did not have an Internet connection in the place where they stayed (16 out of 73 learners) and most of those learners informed the researcher that the Internet connection was very poor, especially at night. As a consequence, some learners failed to complete some of the assignments.

A significant problem in teaching pronunciation through computer software is that of feedback (Hansen, 2006, p. 342). Feedback in pronunciation teaching is crucial since it is difficult for learners to be aware of their errors (Neri et al., 2002, p. 1209). In a traditional classroom the teacher can give feedback, but in CAPT, the feedback is given by the program. One limitation of the LMS-based course was that it took a long time to rate learner speech productions and write comments for them. As it was the case with the study done by Tanner and Landon (2009), the feedback that the participants received from the teacher was limited. Moreover, according to Hansen (2006), this mode of feedback is against the principle of instantaneous feedback (p. 343). In addition, the participants in the Moodle group provided peer feedback for each other, while those in the Pronunciation Power Group received ASR-based feedback from the computer. Finally, the learners in the control group received instantaneous feedback from the teacher during the class hours. In addition to this, the learners in the Moodle group were asked to practise certain words with the help of text-to-speech software available on the Net. This both constituted an alternative for the late arrival of individualized feedback by the teacher or peers and gave way to self-monitoring by matching their productions with those of text-to-speech software.

Pronunciation training in the classroom is likely to make a difference in a short time, but whether the effect of training on learners' pronunciation lasts for a long time is not certain (Pennington and Richards, 1986, p. 220). The degree of attrition was expressed by Acton (1984), who noted that "there is a normal attrition of approximately 25 per cent" (p. 81) after a phonetic training program. As it was the case with some other studies on the effectiveness of CAPT on learners' pronunciation (e.g., Seferoğlu, 2005), one of the limitations of the study was that no delayed posttest was conducted due to motivational constraints on the part of the participants and time limitations. It is recommended that further studies dealing with the same issue include a delayed posttest for more reliable results. Furthermore, this research study has a quasi-experimental design. Fully randomized studies with longer periods of instructional time can also provide more reliable results.

Although the learners in the P. Power group and those in the Moodle group were provided with a learner training for an hour and were provided with video and written materials on how to use the P. Power software and the Moodle site, there were still some learners who had technical difficulties. These difficulties were mainly related to recording voice, using the web site and the PC software, and so forth. This is because, though most learners were able to carry out basic operations in computer-based training, some of them had difficult time coping with the difficulties that aroused during the lessons. This is because the participants, as one can easily guess, were not equally proficient in terms of their computer skills. Though some of them acted as digital natives, some others did as digital immigrants. In order to study pronunciation effectively both on the Moodle site and through Pronunciation Power, certain amount of computer literacy is essential. Although the participants were provided with learner training, some of them failed to attend the learning training sessions or they somehow had difficulty in understanding how to make use of the web site or the PC program. This in turn partially affected their motivation.

Some learners failed to complete some of the recording tasks assigned weekly. Perhaps they would have performed better in the productive pronunciation test if they had completed all the assignments on time. Problems with the hardware and software played a significant role in failing to complete the assignments. Another problem was limited time available for instruction. Although it is possible to study pronunciation through Moodle at any time, most of the participants studied only during class hours because they did not have access to a fast Internet connection in their houses or dorms. Therefore, they had limited time to study. Several learners failed to complete the tasks to show considerable, permanent change in their pronunciation. Still some of them had difficult time recording their voices due to problems with recording hardware.

5.6. CONCLUSION

As it was apparent in the present study, innovative web-based applications within a learning management system can provide lots of opportunities such as interactivity, increased motivation, self-paced learning, self-assessment and peer evaluation,

communication and quality education. The scientific knowledge accumulated in foreign language education and education of language teachers should be integrated with the potentials of online learning. In such a context, off-line software is about to lose supporters because virtual learning environments are highly customizable, but integrated use of online and offline software can be helpful. In learning and teaching languages, technology has great potentials, but it is not a “panacea” (Derwing and Munro, 2005, p. 390). The same goes for accent reduction software and Moodle, which provides educators with a user-friendly interface for online course development and management.

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APPENDICES

APPENDIX 1: LEARNER SPEECH COLLECTION TOOL

1. Formal Reading (Paragraph Reading)

Learning to speak a foreign language fluently and without an accent isn't easy. In most educational systems, students spend many years studying grammatical rules, but they don't get much of a chance to speak. Arriving in a new country can be a frustrating experience. Although they may be able to read and write very well, they often find that they can't understand what people say to them. English is especially difficult because the pronunciation of words is not clearly shown by how they're written. But the major problem is being able to listen, think, and respond in another language at a natural speed. This takes time and practice.

(Dauer, 1993, p. 6)

2. Giving a Free Speech

Give a short, two-minute speech about one of the following topics. Tell a story about what happened to you. Two minutes is a very short time, so only describe the most important details.

1. An embarrassing or humorous situation that you had with the English language or culture.
2. An interesting or unusual experience that you had over vacation.
3. Your first day in this country, at this university, or at your job.
4. Your problems speaking English and why you are taking this course.
5. Define a technical term or describe a process related to your professional field.

(Dauer, 1993, p. 7)

APPENDIX 2: PRE-INSTRUCTION SURVEY ON PRONUNCIATION

Dear teacher trainees,

The following survey has been prepared to research teacher trainees' attitudes towards English pronunciation. Please note that the data collected will be used as the main source of data for a PhD dissertation, and the data collected through this survey are absolutely confidential. There are 23 items in 4 sections in this survey. Thanks in advance for your help and frank answers.

Arif BAKLA

Section I:

The Pronunciation Attitude Inventory (PAI)*

This section is devoted to your beliefs about pronunciation.

Please answer all items using the following response categories:

5 = Always or almost always true of me 4 = Usually true of me 3 = Somewhat true of me 2 = Usually not true of me 1 = Never or almost never true of me					
1. I would like to sound as native as possible when speaking English.	5 ()	4 ()	3 ()	2 ()	1 ()
2. Acquiring proper pronunciation in English is important to me.	5 ()	4 ()	3 ()	2 ()	1 ()
3. I will never be able to speak English with a good accent.	5 ()	4 ()	3 ()	2 ()	1 ()
4. I believe I can improve my pronunciation skills in English.	5 ()	4 ()	3 ()	2 ()	1 ()
5. I believe more emphasis should be given to proper pronunciation in EFL teacher training programs.	5 ()	4 ()	3 ()	2 ()	1 ()
6. One of my personal goals is to acquire proper pronunciation skills and preferably be able to pass as a near-native speaker of the language.	5 ()	4 ()	3 ()	2 ()	1 ()

7. I try to imitate English speakers as much as possible.	5 ()	4 ()	3 ()	2 ()	1 ()
8. Communicating is much more important than sounding like a native speaker of English.	5 ()	4 ()	3 ()	2 ()	1 ()
9. Good pronunciation skills in English are less important than learning vocabulary and grammar.	5 ()	4 ()	3 ()	2 ()	1 ()
10. I want to improve my accent when speaking English.	5 ()	4 ()	3 ()	2 ()	1 ()
11. I am concerned with my progress in my pronunciation of English.	5 ()	4 ()	3 ()	2 ()	1 ()
12. Sounding like a native speaker is very important to me.	5 ()	4 ()	3 ()	2 ()	1 ()

*[Adapted from Elliott (1995); 12 items, $\alpha = .87$]

Section II:

Please answer the following questions.

Which of the following sounds of English are really problematic for you? (Tick the problematic ones.)

Consonants	Vowels	Diphthongs
☐ /ŋ/ as in king, sing	☐ /i:/ as in beat, feet	☐ /eɪ/ as in eight, hate
☐ /w/ as in wet, window	☐ /ɪ/ as in bit, sit	☐ /aɪ/ as in eye, five
☐ /θ/ as in think, thank	☐ /ʊ/ as in pull, push	☐ /ɔɪ/ as in boy, toy
☐ /ð/ as in these, those	☐ /u:/ as in boot, cool	☐ /əʊ/ as in arrow, note
☐ /tʃ/ as in Chinese, chin	☐ /ə/ as in father, mother	☐ /aʊ/ as in house, mouse
☐ /dʒ/ as in judge, jet	☐ /ɜ:/ as in bird, fur	☐ /eə/ as in chair, fair
	☐ /ɔ:/ as in caught, bought	☐ /ɪə/ as in ear, fear, deer
	☐ /æ/ as in bad, sad	☐ /ʊə/ as in tourist, sure
	☐ /ʌ/ as in cut, sun	
	☐ /ɑ:/ as in car, bar	
	☐ /ɒ/ as in top, hot	

Section III:**Please answer the following questions.**

1. Have you ever taken a pronunciation course?

☐ Yes☐ No

2. Do you know how to pronounce the IPA (International Phonetic Alphabet) symbols?

☐ Yes☐ No

3. Have you ever used computer programs to study pronunciation?

☐ Yes☐ No

Which of the following PC programs have you used?

☐ Pronunciation Power☐ Learn to Speak English☐ American Accent Training Programs☐ The Pronunciation Suite☐ Text to speech software☐ Dictionary software☐ Other (Please specify).

4. Have you ever used online pronunciation materials?

☐ Yes☐ No

Which of the following web sites have you used?

☐ Phonetics.org at<http://www.phonetics.org>☐ Ship or Sheep at

<http://www.shiporsheep.com/>

☐ ATT Labs Text to speech Engine at

<http://www2.research.att.com/~ttsweb/tts/demo.php>

☐ Web Sites for Minimal Pairs at

<http://www.lemoda.net/english/minpairs/index.html>

☐ English Corner at

<http://www.englishcorner.vacau.com/pronunciation/pronunciation.html>

☐ MW's Learner Dictionary at

<http://www.learnersdictionary.com/pronex/pronex.htm>

☐ Pronunciation Patterns at

<http://www.pronunciationpatterns.com/>

☐ Agenda Web at

<http://www.agendaweb.org/phonetic.html>

☐ Phonetics: The Sounds of US English at

<http://www.uiowa.edu/~acadtech/phonetics/english/frameset.html>

Other(s):

Please specify: _____

5. Would you take an online pronunciation course if one were available to you?

☐ Yes

☐ No

6. Please rate how good you are at using computers.

☐ Very good

☐ Good

☐ Average

☐ Bad

☐ Very bad

7. Please rate how good you are at using the Internet.

- ☐ Very good
☐ Good
☐ Average
☐ Bad
☐ Very bad

8. Do you have an Internet connection in the place where you stay?

- ☐ Yes
☐ No

Section IV: Personal Information:

Name & Surname:

Gender: ☐ Male ☐ Female	Age: ☐ 17-20 ☐ 21-24
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Thanks for your participation.

Note: Contact name and e-mail address are given below in case you need them. Please feel free to get in touch with the researcher to get a summary of the findings if you are interested.

The Researcher's

Name & Surname: Arif BAKLA

E-mail Address: arifbakla@yahoo.com

Your E-mail Address:

APPENDIX 3: THE PRODUCTIVE PRONUNCIATION TEST

Recording Task 1: Paragraph Reading

Study the following passage carefully for about two minutes, but do not make any marks on the paper. Read the passage clearly and expressively into the microphone.

If English is not your native language, people may have noticed that you come from another country because of your “foreign accent.” Why do people usually have an accent when they speak a second language? Several theories address this issue. Many people believe that only young children can learn a second language without an accent, but applied linguists have reported cases of older individuals who have mastered a second language without an accent. Another common belief is that your first language influences your pronunciation in a second language. Most native speakers of English can, for example, recognize people from France by their French accents. They may also be able to identify Spanish or Arabic speakers over the telephone, just by listening carefully to their pronunciation. Does this mean that accents can’t be changed? Not at all! But old habits won’t change without a lot of work, will they? In the end, the path to learning to speak a second language without an accent appears to be a combination of hard work, a good ear, and a strong desire to sound like a native speaker. You also need accurate information about the English sound system and lots of exposure to the spoken language. Will you manage to make progress, or will you just give up? Only time will tell, I’m afraid. Good luck, and don’t forget to work hard.

(Celce-Murcia et al., 1996, p. 398)

Recording Task 2: Roleplaying a Dialogue

Study the following passage carefully for about two minutes to see that you understand the development of the dialogue, but do not make any marks on the paper. Roleplay the following dialogue with a friend and record your voice.

JOE: Where are you going, Betty?

BETTY: Hello, Joe. I'm going shopping at IKEA. I've just moved and I need some things for my room. Would you like to come with me, or are you going to work?

JOE: Thanks, I'd like to come. I want to buy a few things, too.

BETTY: I'm going to look for a chair, a rug, and perhaps a picture.

JOE: A rug? How big? Did you measure your room?

BETTY: Oh, no. I'm only going to get a little one. A big one would be very expensive. I haven't got much money.

JOE: I haven't either. First let's go along to that old shop—the one near the railway station.

BETTY: OK. My boyfriend told me that was a good place to start.

(Hincks, 2005, p. 167)

APPENDIX 4: POST-INSTRUCTION SURVEY ON PRONUNCIATION

Dear teacher trainees,

The following survey has been prepared to research teacher trainees' attitudes towards English pronunciation. Please note that the data collected will be used as the main source of data for a PhD dissertation, and the data collected through this survey are absolutely confidential. There are 36 items in 4 sections in this survey. Thanks in advance for your help and frank answers.

Arif BAKLA

Section I: The Pronunciation Attitude Inventory (PAI)*

This section is devoted to your beliefs about pronunciation.

Please answer all items using the following response categories:

5 = Always or almost always true of me 4 = Usually true of me 3 = Somewhat true of me 2 = Usually not true of me 1 = Never or almost never true of me					
1. I would like to sound as native as possible when speaking English.	5 ()	4 ()	3 ()	2 ()	1 ()
2. Acquiring proper pronunciation in English is important to me.	5 ()	4 ()	3 ()	2 ()	1 ()
3. I will never be able to speak English with a good accent.	5 ()	4 ()	3 ()	2 ()	1 ()
4. I believe I can improve my pronunciation skills in English.	5 ()	4 ()	3 ()	2 ()	1 ()
5. I believe more emphasis should be given to proper pronunciation in EFL teacher training programs.	5 ()	4 ()	3 ()	2 ()	1 ()
6. One of my personal goals is to acquire proper pronunciation skills and preferably be able to pass as a near-native speaker of the language.	5 ()	4 ()	3 ()	2 ()	1 ()
7. I try to imitate English speakers as much as possible.	5 ()	4 ()	3 ()	2 ()	1 ()

8. Communicating is much more important than sounding like a native speaker of English.	5 ()	4 ()	3 ()	2 ()	1 ()
9. Good pronunciation skills in English are less important than learning vocabulary and grammar.	5 ()	4 ()	3 ()	2 ()	1 ()
10. I want to improve my accent when speaking English.	5 ()	4 ()	3 ()	2 ()	1 ()
11. I am concerned with my progress in my pronunciation of English.	5 ()	4 ()	3 ()	2 ()	1 ()
12. Sounding like a native speaker is very important to me.	5 ()	4 ()	3 ()	2 ()	1 ()

*[Adapted from Elliott (1995); 12 items, $\alpha = .87$]

Section II (Evaluating the Training)

Now that you have just completed the pronunciation training this semester, think about your experience and answer the following questions.

A. The items in this section should be answered by all three groups.

1. Has this training helped you to acquire an awareness of English pronunciation?

- ☐ Yes
☐ Partially
☐ No
☐ I don't know

2. Has this training been helpful for you?

- ☐ Yes
☐ Partially
☐ No
☐ I don't know

3. Do you think your pronunciation has improved with the help of this training?

- ☐ Yes
- ☐ Partially
- ☐ No
- ☐ I don't know

4. What problems and challenges did you experience during this training?

5. What were the positive and negative sides of the training provided this semester?

B. Questions for LMS-based Instruction on the Moodle Site (Only for the participants in the Moodle group). Please answer all items using the following response categories.

5 = Always or almost always true of me

4 = Usually true of me

3 = Somewhat true of me

2 = Usually not true of me

1 = Never or almost never true of me

1. I feel that I improved my pronunciation by recording myself reading texts in the foreign language.	5 ()	4 ()	3 ()	2 ()	1 ()
2. I would like to continue to work on my pronunciation by recording myself in future foreign language classes.	5 ()	4 ()	3 ()	2 ()	1 ()
3. I found recording dialogues to be a useful exercise.	5 ()	4 ()	3 ()	2 ()	1 ()
4. I enjoyed doing the activities on the Moodle site.	5 ()	4 ()	3 ()	2 ()	1 ()
5. I studied on the Moodle site outside the classroom.	5 ()	4 ()	3 ()	2 ()	1 ()

6. I enjoyed getting comments from my classmates.	5 ()	4 ()	3 ()	2 ()	1 ()
7. I enjoyed getting comments from my teacher.	5 ()	4 ()	3 ()	2 ()	1 ()
8. I learned new ways to learn pronunciation on the Moodle site.	5 ()	4 ()	3 ()	2 ()	1 ()

C. Questions for Traditional Instruction Group (Only for the participants to the traditional instruction class). Please answer all items using the following response categories:

5 = Always or almost always true of me

4 = Usually true of me

3 = Somewhat true of me

2 = Usually not true of me

1 = Never or almost never true of me

1. I found practising dialogues to be a useful exercise.	5 ()	4 ()	3 ()	2 ()	1 ()
2. I disliked the activities we did in the classroom.	5 ()	4 ()	3 ()	2 ()	1 ()
3. I studied pronunciation outside the classroom.	5 ()	4 ()	3 ()	2 ()	1 ()
4. I enjoyed getting comments from my teacher.	5 ()	4 ()	3 ()	2 ()	1 ()
5. I enjoyed getting comments from my classmates.	5 ()	4 ()	3 ()	2 ()	1 ()

D. Questions for Pronunciation Power Group (Only for the participants who studied pronunciation through Pronunciation Power Software). Please answer all items using the following response categories:

5 = Always or almost always true of me

4 = Usually true of me

3 = Somewhat true of me

2 = Usually not true of me

1 = Never or almost never true of me

1. I enjoyed getting comments from the software (Pronunciation Power).	5 ()	4 ()	3 ()	2 ()	1 ()
2. The exercises in “Pronunciation Power” were enjoyable for me.	5 ()	4 ()	3 ()	2 ()	1 ()
3. Studying pronunciation by using “Pronunciation Power” was boring.	5 ()	4 ()	3 ()	2 ()	1 ()
4. I think “Pronunciation Power” is a useful PC program.	5 ()	4 ()	3 ()	2 ()	1 ()

Section IV: Personal Information:

Name & Surname:

Gender: ☐ Male ☐ Female	Age: ☐ 17-20 ☐ 21-24
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Thanks for your participation.

Note: Contact name and e-mail address is given below in case you need. Please feel free to get in touch with the researcher to get a summary of the findings if you are interested.

Contact Name: Arif BAKLA

E-mail Address: arifbakla@yahoo.com

Your E-mail:

APPENDIX 5: A LIST OF SAMPLE MOODLE ACTIVITIES

1. Listening to dialogues and identifying the words heard.
2. Listening to a text and following its transcription.
3. Studying transcription of a paragraph or a dialogue and reading it into a microphone.
4. Listening to a dialogue and filling in blanks.
5. Listening and spelling words.
6. Using Acapella to listen to a dialogue.
7. Transcribing words by using PhoTransEdit.
8. Writing down the dialogue transcribed in IPA.
9. Reading a transcribed joke and retelling it and recording the performance.
10. Listening and choosing the right word.
11. Roleplaying a dialogue after listening to it.

APPENDIX 6: THE PERMISSION TO USE THE POSE TEST

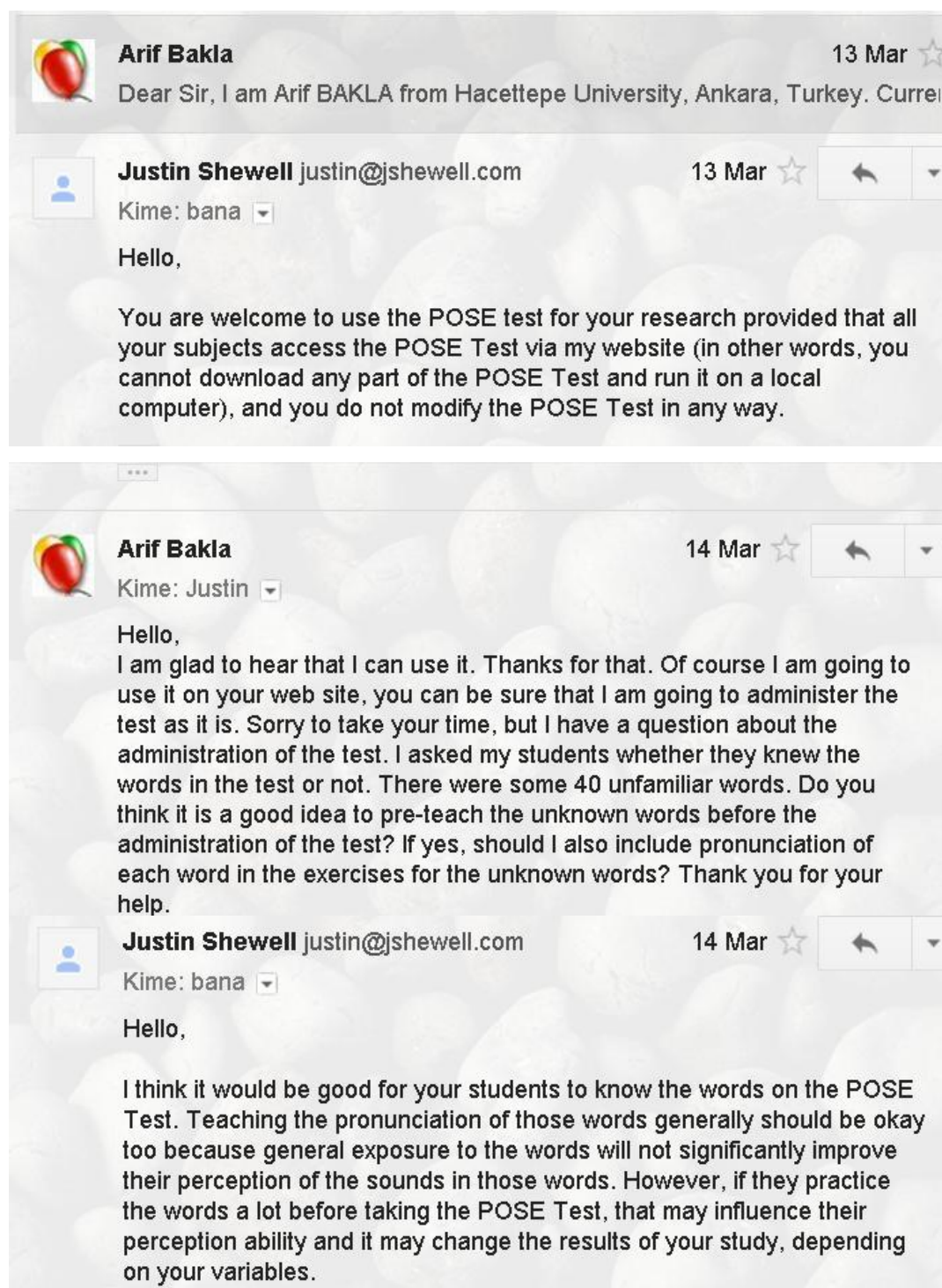


Figure A6.1. Email correspondence with Justin Sheewell, the copyright holder of the POSE Test (Bakla, arifbakla@yahoo.com, 13th March, 2011)