THE DESIGN AND EVALUATION OF A TUTORIAL PROGRAM FOR TEACHING

THE CORRECT PRODUCTION OF ENGLISH VOWELS TO BEGINNING CHORUS

STUDENTS IN A MULTICULTURAL SITUATION

by

CAROL MORGAN JORDAN

(Under the Direction of Mary A. Leglar)

ABSTRACT

The purpose of the study was to design and test an English Vowel Tutorial for beginning choral students in a multicultural situation. Specifically, the following questions guided the study: (1) Will there be a difference in the sung production and placement of the English pure vowels between students who used the tutorial and those who did not? (2) Will gender be an influential success factor? (3) Will ethnicity be an influential success factor? (4) Will fluency in the English language be an influential success factor? (5) Will amount of practice be an influential factor? (6) Will there be a difference in self-perception of success and enjoyment of the learning experience between those students who used the tutorial and those who did not?

The study employed a two-group pretest-posttest design. Subjects were 50 beginning chorus students, ranging from ages 14-18. The students were randomly placed in experimental (Treatment A) and control (Treatment B) groups. The pretest-posttest consisted of a recording of each student singing a familiar song using a modified text which included all the vowels addressed in the tutorial. Both classes were given identical classroom instruction pertaining to vowel production. In addition, the experimental group (Treatment A) studied the vowels via a research-authored interactive CD-ROM three times per week for a 30-minute period for four weeks. Each student's pretest and posttest recordings were assessed for vowel production errors and the scores were compared. An attitudinal assessment was given to both groups to determine student perception of success and enjoyment of the unit.

The findings were analyzed via Analysis of Variance (ANOVA). Findings indicated that (1) students in the experimental group made significantly ($p < .0001$) fewer errors in the posttest assessment than those in the control group; (2) gender was not an influential success factor; (3) ethnicity was not an influential success factor; (4) English fluency was an influential success factor; (5) amount of practice was not an influential success factor. The Attitudinal Assessment indicated that students in the experimental group perceived their efforts to be significantly more successful and enjoyable than did those in the control group.

INDEX WORDS: Computer Assisted Instruction, Pure Vowel Production, Diction, Choral Singing, ESOL, CD-ROM design

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DEDICATION

To the memory of my parents, C. Shannon and Elizabeth Morgan, who instilled in me the love of learning and the joy of music.

ACKNOWLEDGEMENTS

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CHAPTER 1

INTRODUCTION

Uniform or blended vowels are a sine qua non of good choral singing. This

standard is reflected on virtually every adjudication form used in an educational or

professional setting. Consequently, the ability to sing vowels correctly constitutes one of

the most important educational outcomes of choral music classes:

> Good choral diction is essential to accurate choral singing. . . . Attempting to
> improve choral diction probably consumes more rehearsal time than any other
> aspect of choral singing, possibly because lack of vowel unification and poor
> enunciation are usually the most obvious problems that beginning directors think
> they should correct. . . . improved diction yields the most obvious positive results
> toward good choral sound. (Collins, 1999, p. 285)

In today's classroom, achieving this outcome presents a challenge to choral

conductors. Many students enter the choral program with limited vocal skills and no clear

concept of traditional choral tone or how to produce it. Their singing skill is founded on

prior experience, which often consists almost entirely of what they have heard on the

radio or on Music Television (MTV). Many of these experiences suggest a style of vocal

production and vowel formation that is unacceptable within the European choral

tradition.

In addition, growing cultural diversity, particularly the presence in the classroom

of students who are not native speakers of English, intensifies the choral teacher's

challenge. According to Volk (1998),

Predictions of population growth . . . indicate that by the year 2020, the minority populations will have doubled while the population of those from a European background will hardly have grown at all. In some cities the reversal of the population from majority to minority is already a statistical fact, and several schools in the country boast a student body that speaks twenty or more native languages. (p. 5)

According to Digranes and Digranes (1989), a special function of the school is to "attempt to recognize and to address the diverse needs of the different cultures" (p. 20).

Need for the Study

Nicholson (1994, p. 4) cites ethnicity, intelligence, and oral language as factors influencing phonetic awareness. Multicultural teaching situations are characterized not only by diversity in ethnicity but often by a broad range in cognitive ability and oral language mastery as well. This necessitates a more individualized approach to the teaching of vowel production than choral teachers have traditionally employed. The impetus for the present study was the researcher's experience as a choral teacher in a large suburban high school with an extremely diverse student body (33% African American, 23% Hispanic, 22% Caucasian, 12% Asian, and 10% "other") which includes speakers of 88 different native languages. These students, many of whom do not speak or understand English and have no experience with the European choral tradition, are often placed in beginning chorus classes to supplement their instruction in the English for Speakers of Other Languages (ESOL) program.

The needs of these students suggested that a computer-assisted, self-paced tutorial focusing on selected English vowels could be an appropriate way to provide additional instruction beyond the classroom setting. Such a tutorial would enable students to work at

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their own pace, free of peer pressure and the relative inflexibility of classroom instruction. A review of the literature and materials, however, revealed no existing computer-assisted instruction (CAI) programs designed for improvement in singing, and no vowel-specific tutorials of any depth.

Purpose of the Study

The purpose of this study was to design and test an English Vowel Tutorial for beginning choral students in a multicultural setting. The tutorial sought the following student outcomes:

* ability to describe the position of the lips, tongue, and jaw in the production of the English vowels;

* ability to produce these positions in isolated vowel phonemes;

* ability to discern whether or not the vowel phoneme is being produced correctly in the context of words;

* ability to sing the pure English vowels with acceptable vocal placement.

The study also sought to determine the effect of the use of the tutorial in improving the students' singing of selected vowel sounds and their self-perception of success and enjoyment of the learning experience.

Hypotheses

It was hypothesized that students who used a CAI English Vowel Tutorial in addition to classroom instruction would show greater improvement in singing selected English vowels than those who studied the same material only in the classroom setting. It was further hypothesized that the parameters of individualized instruction made possible

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by the tutorial would enhance the students' perception of success and that they would report a higher level of enjoyment than did those who studied the selected vowels in a classroom setting only.

To facilitate the analyses of the data and the drawing of conclusions, the following null hypotheses were formulated:

Null Hypothesis$_1$: There will be no difference in the sung production and placement of the English pure vowels between students who use the tutorial and those who do not. The following subquestions were posed: (1) Will gender be an influential success factor? (2) Will ethnicity be an influential factor? (3) Will English fluency be an influential factor? (4) Will amount of practice be an influential factor?

Null Hypothesis$_2$: There will be no difference in self-perception of success and enjoyment of the learning experience between those students who used the tutorial and those who studied the vowels in a classroom setting.

Limitations

Subjects were limited to beginning choral students enrolled in the school where the researcher taught. Only pure English vowels were addressed. Diphthongs, triphthongs, and the neutral vowel were not treated. Vowels were symbolized solely through the International Phonetic Alphabet (IPA); English phonetic spellings were used only in initial lessons. To accommodate those with limited English language ability, the tutorial used only basic, familiar English words, such as *me, it, he, let, cat, please, father, food, book,* and *warm*.

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Design of the Study

The study employed a two-group pretest-posttest design. Two high school beginning choral classes of 25 students each constituted an experimental group (Treatment A) and a control group (Treatment B). In each class every other student, in alphabetical order, was assigned to the experimental group. Each student was assigned an ID number and given two blank cassette tapes labeled with that number.

Before any vocal instruction was given, the classes were taught the simple folk song "All Night, All Day," with the text adapted to include all of the vowels presented in the tutorial (See Appendix A, p. 53). To furnish a basis for performance comparison at the end of the study, each student recorded his or her performance of the song as a vowel pretest in the privacy of a practice room, using one of the two tape cassettes provided.

Both choral classes were given identical classroom instruction pertaining to vowel production. The experimental group (Treatment A) worked with the interactive CD-ROM in the computer lab for 30 minutes three times per week. This activity continued for four weeks, giving the students in the experimental group 360 minutes of tutorial time. The control group (Treatment B) used the 360 minutes in other varied choral rehearsal activities. Between the two classes, the only difference in vowel-related instruction was the time spent in the computer lab. In addition, the students (Treatment A) were encouraged to take the CD home and practice, although none of them did.

After the four-week period, each student again recorded "All Night, All Day" using the second cassette. The researcher graded each student's pretest and posttest. The

students were given a researcher-authored Attitudinal Assessment regarding the use of the interactive CD-ROM tutorial.

Analysis of the Data

The data were collected using a line of data which read as follows: ID#/ Gender/ Ethnicity/ ESOL Level/ Pretest Errors/ Posttest Errors/ Improvement/Treatment. Pretest and posttest scores were compared and tested for significance via Analysis of Variance (ANOVA). The ANOVA provided an adjustive mean on the ethnicity, gender, and practice variables. The computer analysis of the data was completed with the cooperation of the Department of Statistics at the University of Georgia.

Organization of the Study

The document contains five chapters with references and appendices. The introductory chapter provides (1) rationale and need for the study, (2) statement of purpose, (3) hypotheses, (4) limitations, (5) summary of procedures, and (6) organizational outline of the written document. Chapter 2 contains a critical review of literature related to the history and growth of CAI as an educational tool, methodologies appropriate to the study, and evaluations of CAI effectiveness. Chapter 3 provides a detailed description of the procedures and techniques employed to produce the CD-ROM tutorial and to collect the data. Chapter 4 presents an analysis of the data and discussion. Chapter 5 offers conclusions derived from the findings and suggests directions for further study. References follow Chapter 5. The appendices include: (A) Modified "All Night,

All Day"; (B) Pre-test/Posttest Evaluation Form; (C) Tutorial Script; (D) Tutorial Slides;

(E) Attitudinal Survey Form; and (F) Raw Data.

CHAPTER 2

RELATED LITERATURE

In reviewing the literature on computer-assisted instruction (CAI), the following

aspects appeared relevant to this study: the historical development and projected

usefulness of CAI as an educational methodology; the development of successful

programs and applicable models; and the overall effectiveness of CAI programs to date.

Historical Development

CAI has been in use in almost every discipline since the early 1970s. Interest in

CAI is recorded throughout the 30-year period in more than 20,000 documents in the

Educational Resources Information Center (ERIC) database. Throughout its history, a

respectable number of journals have been founded for the sole purpose of keeping

educators informed on every aspect of CAI. Among the earlier publications are the

Journal of Educational Technology Systems (1972), *Technological Horizons in*

Education (1974), and the *Journal of Computer-Based Instruction* (1974). More recently,

electronic journals such as *Computer Assisted Language Learning* (1997) and the

Chicago Journal of Theoretical Computer Science (1995) have been established.

Databases for CAI are also a recent development. Those of note are the *Database of CAI*

Teaching Materials, Cambridge University; *The Multimedia and CAI Journals Database*,

Apple, Inc.; and the *CAI Bibliography for Teachers of English as a Second or Foreign*

Language, Shimatani and Kitao. A number of websites, such as *CAI Language Learning*, can also be accessed on the Internet. More than 115,044 pieces on CAI are currently available on the Internet.

Music educators gave public recognition to the possibilities of CAI in music as early as 1971, when an article by Raymond Allvin entitled "Computer-Assisted Music Instruction: A Look at the Potential" was published in the *Journal of Research in Music Education*. Allvin suggested that computers might be used to facilitate individualized instruction, enhance new aural-visual techniques, and make error analysis a positive factor in instructional sequences (p.132). This article, reporting on what is now very antiquated technology, was on the cutting edge of CAI in music at the dawn of the 1970s. The interest in CAI applied to music has been maintained through the years in various articles in the *Journal of Research in Music Education*. CAI was addressed in the *Music Educators Journal* in 1983 with an article by Jack Taylor entitled "Computers as Music Teachers." Like Allvin, Taylor focused on individualized instruction and aural training.

During the same period, authors in other fields were also showing interest in CAI, interaction, and CD-ROM programming. Glyn Holmes, editor of *Computer-Assisted Instruction*, stated in 1984, in a special issue on computers and the humanities, that "CAI is [a] field in the process of maturation. Obstacles to growth include the need for systematic standardization of courseware, the inherent conservatism of the educational system, and the need for improved hardware." Richard J. O'Connor touted CD-ROM technology as an innovative new teaching tool in the November 1989 issue of *The Computing Teacher*. He states:

I have come to believe that the optical disc technology used to create CD and CD-Rom programming will soon allow us to create an entirely new genre of instructional software, software that essentially will integrate conventional CAI programming with current library search and retrieval practices. . . . I believe that we are now entering a new era in computer-assisted instruction. In effect, the hardware bottleneck that has prevented development of highly interactive CAI has been broken, permitting creation of a whole genre of instructional computing software. . . . Microcomputer and optical recording technology has provided a powerful set for educators: it is now up to us to learn how to use these tools effectively in the betterment of the educational process. (pp. 50-51)

Following suit, in 1994 the Music Educators National Conference (MENC) strongly supported the concept of CAI in *The School Music Program: A New Vision*. This publication addresses music technology and defines its place in the school music program. A further show of support for music CAI is the growth and recent independence of the Association for Technology in Music Instruction (ATMI). Formed in 1975 as a special interest group of the Association for the Development of Computer Based Instructional Systems (ADCIS), ATMI became an independent organization in 1992. The organization's mission statement includes the following:

* fostering the development of technological aids for music instruction;
* reducing redundant efforts among developers of courseware and hardware;
* editing and distributing a directory of hardware and software available for use in music instruction; and
* providing consultation for new users of technology-based music instruction materials. [ATMI, 2002]

The history of CAI indicates that music educators were at the forefront of the technological boom in the early 1970s and, with the help of ATMI and similar organizations, will continue to be on the cutting edge of the development of new software and hardware for instruction in music. The field is still maturing because of the burgeoning development of new hardware and software. Technological advancement has progressed much faster than anyone could have imagined in 1971 or 1984, making much

of what has been designed obsolete within a year or two. The educational task of the 21st century is to stay current with the new technology and to keep it readily available to assist students.

Computer learning may now be considered basic to education. Wall, author of "Technology for Future Music Educators" states, "Arts curricula, standards that stipulate what school children must learn about the role of technology in music, and the increasing number of music classrooms with computers have put additional pressure on college instructors to find ways to add technology competency to music education courses" (2000, p. 14). The article offers suggestions for addressing technology competency within music education courses so that music education programs can meet accreditation requirements.

<div align="center">Programs and Models</div>

Literature pertaining to principles of programming and instructional models in the fields related to this study—singing and language—was sparse. The following databases were searched: Dissertation Abstracts International (DAI), Electronics Journals, ERIC, Galileo, Periodic Index, Academic Search Premier, and University of Georgia Libraries.

Singing

No CAI programs designed for improvement in singing were found. However, a higher level of singing-related CAI is taking place at the Oberlin College Conservatory of Music. Oberlin's Otto B. Schoepfle Vocal Arts Center is described by Zoë Ingalls in "The Technology of Singing." She describes a center housing sophisticated computers used to

analyze and improve student performance, allowing them to view graphs of their pitch, vibrato rate, and degree of nasality. Callaway (2001) experimented with using this methodology in the private studio and found it to be helpful. Work at the Schoepfle Vocal Arts Center and research such as Callaway's indicate that there is great potential for development in vocal instruction. At present, however, computer-assisted instruction for singing remediation is almost nonexistent.

No tutorials dedicated specifically to vowel production were found among the products on the commercial or educational markets. However, materials dealing more generally with diction are available and offer some direction in the programming of CAI tutorials. *Diction for Singers* includes sample tests, worksheets, and a tape for each of several languages, including English, Italian, Latin, French, German, and Spanish. Its cursory overview in each language includes consonants, vowels, and idiosyncrasies of the particular languages. Pst...Inc. has also published a set of worksheets and an accompanying tape entitled *IPA for Singers Listening Lab*. Again, this is a cursory approach to all sounds.

Three dialect tutorials were found. Instructional CDs, worksheets, and booklets are available from dialect coaches Paul Meier (2002), Andrew Jack (2002), and Judith Sullivan (2002). Although interesting, these individuals teach their students to sing or speak with an accent. The tutorials that come closest to teaching pure English vowels are Paul Meier's *Standard British English Tutorial* and *General American for Non-American Actors Tutorial*. As with the Pst...lnc. resources, these tutorials are an overview of all sounds within a given language. The focus of these two tutorials is to create the illusion that the speaker is a native Briton.

Of the 187 CAI-related abstracts listed in DAI, only three were related to music: Cooper, 1975; Turk, 1984; and Gill, 1988. None of these yielded information useful for the development of an English lyric diction tutorial program. Over 300 documents were found in an ERIC CAI/music search. Most related to instrumental music, aural training, games, and research. None related to the art of singing. Ten documents were found in a CAI/singing search. Two of the documents referred to singing as an activity, but neither article addressed the use of CAI to improve singing skills. One document (Higgins, 1987) addressed CAI to improve sight singing.

"Linking Different Cultures by Computer: A Study of Computer Assisted Music Notation Instruction" (Chen & Dennis, 1993) is the only document found that linked CAI, music, and multiculturalism. The purpose of the study was to investigate the feasibility of using computers to teach music notation to Chinese students. The authors concluded: "Individual instruction is one of the most significant features of computer based education or computer-assisted instruction. And for reaching its full potential, a well-designed structure of hypermedia was proven as an effective approach" (1993, p. 220). Although the study was not relevant to this one in terms of design, it did suggest that positive learning results might be achieved through a tutorial on English lyric diction.

Research did not yield tutorials for the systematic teaching of diction in a choral rehearsal. Chapters and books have been written on teaching choral diction, but research has not yielded any computer-assisted tutorials. A search of the *Choral Journal* from 1995 through 2000 produced no articles on the teaching of pure English vowels, and only two articles were found addressing multiculturalism in the choral classroom.

Language

Language study is well suited for CAI, as is evidenced by hundreds of documents reporting its use. Among the CAI topics are reading, language learning, literature for language learning, speech and pronunciation, learning the language without slang and idioms, and accuracy/fluency. Specific documents are "Examples of Applications to Modern Language Study" (Collett, 1980) and "Proactive Guidance in Computer-Assisted Language Learning" (Cheng, 1995). Hundreds of sites were found in an Internet search, and those studying English as a second language can benefit greatly from all of these language programs as well as those designed solely for ESOL use.

Two articles tout the Computer Assisted Language Learning (CALL) program as potentially having a great impact on learning foreign languages. This tool realizes acoustical data in real time. The first of these articles, "The Evolution of Networked Computing in the Teaching of Japanese as a Foreign Language" (Harrison, 1998), reviews the evolution of Internet-based projects for giving feedback in the teaching of the language. The second, " A CALL Tool for Improving Second Language Acquisition of English Consonants by Japanese Learners" (Lambacher, 1999), describes software that enables users to perform an acoustic analysis of their recorded utterances with a function for viewing amplitude and pitch. The students are then given electronic visual feedback (EVF), which allows them to visualize their own pronunciation with the native model. The CALL tool holds great promise in developing similar software for the teaching of singing.

A search of CAI/phonics revealed more than 30 documents. The most relevant of these was a report entitled *Computer-Assisted Literacy Instruction in Phonics* (Wisher,

1980). The purpose of this research was "to examine the feasibility of teaching the

phonics segment of the ART [Academic Remedial Training] program by computer-

driven voice synthesizer" (p. vii). Twenty-four students were given special instruction on

multimedia systems and then were integrated back into the control group. These students

did as well as the control group but no better, and future plans for continuation were

dropped.

Effectiveness of CAI Programs

Researchers are divided in their findings on the effectiveness of CAI programs.

Nordstrom (1988) states:

> Although the earliest feedback from CAI usage tended to be very favorable, the
> literature suggests that the best results even then were obtained with elementary
> school children, or when CAI was compared to conventional instruction
> supplemented with no other nontraditional methods. At higher levels of education,
> as the novelty of using computers has tended to wear off, research has generally
> failed to detect any significant difference between achievement levels attained by
> students using CAI and students using more conventional paper-and-pencil self-
> paced, auto-tutorial, or programmed instructional materials. (p. 13)

Other researchers agree with these findings. In a study of the use of CAI in

nursing education, Wininger (1994) concluded that "there were no significant differences

in the Basic Life Support exam scores between the CAI group and the TCL [traditional

classroom lecture] group. However, after examining the post test score means, it was

concluded that both methods of teaching were effective" (abstract). Coomes (1985), in a

study of reading and language skill development, states, "The general conclusion to be

drawn from this study is that using prescribed software for thirty minutes a week did not

significantly improve total reading or total language score on the Comprehensive Test of

Basic Skills" (abstract). Comparing lecture and CAI learning conditions, Watkins (1996) reported that "subjects in the lecture conditions achieved significantly more than subjects in the CD-ROM conditions" (abstract).

In contrast to these neutral or negative findings, Merkel (1984), in a study of CAI in ESL, reported that "the skill of reading was reinforced by the use of CAI and students in the Experimental Group [CAI] had higher reading rates than did those in the control Group" (abstract). King (1985) found CAI to be effective in some areas:

> Target group students [CAI] showed two major patterns of growth. In the areas tested, target students showed gains of near significance in reading comprehension and written expression as measured by normed tests. There was no significant growth shown by the target students over control students in mathematics or attitude. There were significant gains by target students in computer literacy. (Abstract)

Cotton (2002) found that CAI enables students to achieve at higher levels while enhancing learning rate. She also reported that students receiving CAI learned better and faster than students receiving conventional instruction alone. Further, she found that students like CAI: they appreciate that computers never grow tired, never become frustrated or angry, are infinitely patient, allow students to work privately, are fun and entertaining, are self-paced, do not embarrass students when they make mistakes, are more objective than teachers, free teachers for more meaningful contact with students, are impartial to race or ethnicity, are great motivators, teach in small increments, and work rapidly—closer to the rate of human thought (2002, p. 8).

The population studies by James Kulik of the Center for Research on Learning and Teaching at the University of Michigan, an authority on CAI, consisted of secondary and college students. He found that computer-based teaching:

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1. has real potential as a tool in improving student achievement in precollege classes;
2. fostered positive attitudes toward the computer;
3. can produce substantial savings in instructional time;
4. produces very robust outcomes;
5. is not a complete replacement for conventional instruction;
6. can be used to help learners become better readers, better calculators, better writers, and better problem solvers. (1983, pp. 3-7)

Mangiafico (1996) studied what needs to be done in order to make CAI a more effective teaching tool. Her findings were as follows:

> Some students used the program individually while other students used the program as a group, watching on a large screen as the instructor operated the computer. Results suggest that the two conditions are equally beneficial in enhancing SL [second language] acquisition. . . . [R]esults suggest that students who rely too much on linguistic aid offered by the program (transcriptions and translations) gain less from using the program than students who make more forthright attempts to understand video clips on their own. . . . Pages that demanded active participation on the part of the learner received more interaction from learners. Pages that allowed students to remain passive received little if any interaction. (Abstract)

It can be inferred from Mangiafico's study that just one computer in the classroom will produce positive learning results. Her research also gives credence to the use of interactive CAI over passive CAI.

Choksy, Abramson, Avon, Woods, and York (2001) have concisely summarized the findings regarding CAI and music, reminding us that not all music CAI programs have been beneficial. During the last decade of the 20th century, "programmers were devising dull, repetitive drill-and-practice programs that bored and repelled rather than encouraged and stimulated students" (p. 33). Although this has been the case in the past, Choksy et al. state that teachers should try to keep in mind the benefits of CAI: "[E]ven if CAI programs are only accessed infrequently, they provide another avenue for learning that suits particular students, settings, and circumstances. The value of its judicious use

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inside and outside of the classroom for individualizing instruction cannot be understated" (p. 34). It appears, then, that CAI programs are not different from any other teaching tool, in that teachers must always screen and manipulate anything and everything that is put before the students. Choksy et al. also make the point that "computers . . . can be used to facilitate the learning of basic skills and low-level information so as to free the teacher to work with students toward higher-level learning" (p. 5). "[G]ood teaching occurs when intervention is provided only at the moment when assistance is needed. At other times assistance constitutes an obstruction to learning" (p. 27).

> Today's education technology offers avenues to address individual needs as students move separately through zones of proximal development for each of a myriad of tasks. Whereas a lone teacher is unable to remain readily available to assist all students in a class at any given time, students may be free to receive assistance from a CD-ROM, computer application, or World- Wide Web-site as a "more capable other." (p. 28)

The literature on the effectiveness of CAI leads to the conclusion that three factors are important. The first factor is the software: it must be chosen or, better yet, designed with the educational interest of the student population in mind. It cannot be merely prescribed as "one size fits all." The second factor is the interactivity of the software. The literature shows that passive software leads to passive results. The third and final factor is the intervention of the teacher. Positive findings in the literature recommend that the teacher become a proactive guide through the process of CAI.

CHAPTER 3

METHODOLOGY

Design of the Tutorial

The researcher-designed English Vowel Tutorial consisted of nine CD-ROM visual/audio lessons; each included verbal instruction, vocal modeling, directions for guided practice, and a self-test. In addition, as a reference for the students, the verbal instruction (script) was also available in printed form. The audio/video modeling clips were recorded using a SONY Mini-DV camcorder, digitized and programmed into CAI format in collaboration with WBC Media, Inc., technicians. Microsoft PowerPoint was used for this process. The final draft of the clips was transferred from a hard drive to CD-ROM format and tested on IBM computers with Pentium 3 processors. The tutorial was then mass-produced on CD-ROM.

Script Resources

Four definitive texts were used as resource material in writing the subject content of the tutorial: *The Singer's Manual of English Diction* (Marshall, 1953), *English Diction for the Singer* (Pfautsch, 1971), *Diction for Singers* (Wall, Caldwell, Gavilanes, & Allen, 1990), and *International Phonetic Alphabet for Singers* (Wall, 1989). *A Pronouncing Dictionary of American English* (Kenyon & Knott, 1953) was used as a resource to clarify any discrepancies found among the four sources. After the subject matter was

authored, three choral directors known for their success in teaching diction, a voice teacher, and a speech pathologist validated it.

Theoretical Model

The theoretical design of the tutorial was based on PROTO-TEG, a three-dimensional self-improvement program for geometry (Dillenbourg, 1989). The first dimension of the model is the content of learning. According to Dillenbourg, "The knowledge in an Intelligent Tutoring System (ITS) includes four sets of knowledge: the domain model, the tutoring model, the student model, and the interface managing the student machine dialogue" (p. 194). The English Vowel Tutorial, like PROTO-TEG, is located between the student model and tutoring model categories, since the knowledge it attempts to impart concerns the relationship between the student and the tutoring models. The second dimension classifies systems according to their learning strategy, or the way of acquiring knowledge. The most frequently used strategies are learning by instruction and learning by deduction. Both of these strategies were employed in the English Vowel Tutorial. The third dimension is the generalizability of the acquired knowledge. Generalizable or conceptual knowledge is the goal of the English Vowel Tutorial.

Lesson Structure

The structure of the lessons was loosely based on Gunning's (2001) nine-step procedure for teaching vowel patterns. Step 1 is building phonemic awareness; it is during this process that the student listens to the vowel sound and articulates it slowly. Step 2 is adding the onset or the initial consonant or consonant cluster. Step 3 is adding

the rime, which is the vowel and an ending consonant or cluster. Step 4 is mixed practice. Step 5 is introducing the model word that will help the student remember the vowel sound. Step 6 is guided practice, and Step 7 is application. The English Vowel Tutorial did not include Step 8 (spelling) or Step 9 (writing).

Lesson Content

These principles were applied to the English Vowel Tutorial as follows. The first part of each lesson clarified the target vowel as a forward or back sound. Next, the production of the vowel was described in relation to placement of the lips, tongue, and jaw. The student was first introduced to the spoken vowel and proceeded next to the sung or sustained speech vowel sound. Finally, the vowel sound was placed in the context of words. Each step of the tutorial called for student response and self-evaluation, and each lesson concluded with an evaluation and an assignment for further study. The concepts of the lifted soft palate, referred to as "space in the mouth," and the appropriate vocal singing placement to be used throughout the course of the tutorial were introduced in the first lesson and reinforced throughout the entire tutorial. Bright, middle (preferred), and dark placements were demonstrated and explored.

Lesson Sequence

The forward vowels and their IPA symbols were introduced first: [i], [ɪ], and [ɛ]. These three vowels were practiced and tested after Lesson 3. Lesson 4 introduced the forward "a" sound [æ]. Lesson 5 introduced the back "a" sound [ɑ]. These lessons were followed by vowel practice and a vowel test. Lesson 6 presented the back vowel [u], and

Lesson 7 introduced the back vowel [ʊ]. Lessons 6 and 7 were reinforced with vowel

practice and a vowel test. Lesson 8 introduced the two similar back vowels [o] and [ɔ].

This lesson concluded with vowel practice and a test. The tutorial ended with a

cumulative review.

Production of the CD-ROM

The researcher retained the services of WBCMedia, Inc., a professional

production company, in order to produce the CD-ROM tutorial. The project manager,

Lee Wolfe, and the researcher held three lengthy consultations, and two shorter sessions.

The following steps and programs were used to create the CD-ROM tutorial.

1. Digitized video from tape to computer using Pinnacle Systems DV Tools;
2. Edited the video clips and extracted audio clips using Adobe Premiere;
3. Exported the video clips as .avi files;
4. Exported audio clips as .wav;
5. Enhanced the audio clips;
6. Scanned vowel symbols and text and converted output to .jpg files;
7. Edited scanned files using Adobe Photoshop;
8. Utilized Microsoft PowerPoint for presentation material;
9. Imported video clips and stills into PowerPoint;
10. Imported audio only clips into PowerPoint;
11. Timed each slide individually to automatically run in the proper sequence;
12. Created navigation buttons and programmed navigation for each slide, forward, backward, pause and end;
13. Programmed test files with auto run features and menu using ROM With a View DC software;
14. Produced test CD using CD Creator software;
15. Tested program on Meadowcreek HS network and discovered that PowerPoint software version was incompatible with network software that was two generations older;
16. Reprogrammed and set new timing for PowerPoint to eliminate all features that were incompatible with older version;
17. Reprogrammed autorun function and menu;
18. Produced second test CD;
19. Discovered video incompatibility with network due to missing codec in Windows and system limitations for video play;

20. Produced autorun program with menu to install proper video codec on network;
21. Re-edited base video files to reduce file sizes and improve replay compatibility with network;
22. Reproduced entire PowerPoint program importing new (smaller) video clips;
23. Reset all timing and navigation;
24. Programmed new autorun menu;
25. Produced third test CD that functioned properly on Meadowcreek HS network;
26. Produced 28 copies of CD's with labels and instructions for student use.

The process of the CD production took approximately one month. When the finished CD's were delivered to the school, the actual study began.

Subjects

Two beginning chorus classes taught by the researcher were chosen as subjects because beginning choral students could be assumed to have no significant prior choral knowledge. At the school that served as the research site, beginning chorus is an elective, nonauditioned, nonperforming class, designed to provide basic vocal instruction and to teach sight-reading. Each class enrolled 25 students, a total of 50 subjects, who were randomly scheduled into the two sections of beginning chorus. One-third of the students in each class were enrolled in or had completed the high school ESOL program.

Procedure

During the first four weeks of the course, all students received the same instruction in the fundamentals of good singing posture, the breathing process, and the vocal mechanism. Students participated in daily warm-ups that strengthened and developed their support, wind, resonating, and articulation systems. In order to exercise

their voices, develop their musical ear, and enhance their vocal technique, the students were taught songs from rote and from printed music. Sight-reading was practiced on a daily basis. Among the songs the students learned was "All Night, All Day." This song utilizes 60 examples of the 9 vowel sounds presented in the tutorial (See Appendix A, p.53).

All students were given daily instruction in the production of pure vowels in the warm-up phase of the choral class. The mode of instruction was teacher modeling followed by student imitation. No direct verbal instructions regarding vowel production were given.

In the fifth week of the semester, the subjects were divided into experimental (Treatment Group A) and control (Treatment Group B) groups. In alphabetical order, starting with the first student in each class, every other student was assigned to Treatment Group A. The remaining students were assigned to Treatment Group B. Each student was assigned an ID number and was given two blank cassette tapes labeled with that number.

The students were told as a group that they would go individually into a practice room and record themselves singing "All Night, All Day." The students were told that the tape would serve as a pretest and that they would record a posttest in 6 weeks. The students were informed that the tapes would be compared and assessed for improvement, but that their performance on the tapes would have no affect on their grade for the class. Each student was given individual instruction on how to work the tape recorder and the taped accompaniment. Those students who did not understand these directions because

of limited English or limited technical skills were allowed to have a "helper" in the room to run the equipment.

Two versions of "All Night, All Day" were on a music stand in the practice room. One paper simply had the words; the other paper had the words and the IPA symbols (See Appendices A and B, pp. 53-55). Five students out of 50 asked about the paper with IPA but did not inquire about its use.

Five students in each class recorded the pretest during the class period. At the beginning of the class period, the students who would record that day were given their tapes and a review of the recording process. They went into the practice room one at a time (with the exception of those with helpers) and recorded while the class continued. When the students came out of the practice room, they put their tapes into a designated box. The entire recording process was finished in six days. Day six was used for those students who may have been sick on their assigned singing day or who may have been absent during recording week.

For the experimental treatment, the school's computer lab was reserved for two periods a day, three times a week, for four weeks, for a total of 360 minutes of tutorial time. All students in a class, regardless of treatment group, were in the lab during class time. Before going to the computer lab on day one, each student in both groups was assigned a computer working space. All the students in Group A sat near one another, as did all the students in Group B. On the three days per week scheduled for the computer lab, all students first reported to the chorus room to perform the same vocal warm-ups, which included the indirect teaching of the pure vowels. On the two days per week when

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the students did not go to the computer lab, regular classroom instruction took place. Both classes received identical classroom instruction.

The only difference in instruction between the two groups was in the activities performed in the computer lab. While the students in Treatment Group A worked with the researcher-designed English Vowel Tutorial, the students in Treatment Group B utilized the 360 minutes in researcher-assigned computer projects, such as the study of folk music, the systems of the voice, composer web search, and small group activities.

Each student in Treatment Group A was given his or her own CD-ROM of the researcher-authored English Vowel Tutorial. The students were instructed to turn in their CD-ROMs at the end of the class period but were also encouraged to take them home for practice (although no one ever did, because most did not have a computer and/or the necessary software). Likewise, they were given the option of following a tutorial script, but none chose to do so. They were also allowed to use headphones, and while all students in the group began the sessions using headphones, many found them uncomfortable and removed them before the end of the session. The students were asked to write down the answers to the tutorial review questions. The final step in the process was for the students to write the IPA symbols for each of the studied pure vowel sounds in "All Night, All Day."

At the end of the treatment period, all students completed a posttest, following a procedure identical to that used for the pretest. During the posttest singing of the song, the Treatment A students used their own IPA guides as they sang the song. Fifteen students reported that they now understood how to use the IPA guide that they saw at

their first recording. The guide was available for the students in Treatment B, but they

did not know how to use it.

The researcher assessed each student's pretest and posttest recordings of "All

Night, All Day". Tapes were identified by number only. Each of the 60 vowel sounds in

the pretest and posttest recordings was evaluated as follows: the rating of 1 was assigned

if the vowel production was accurate and present; the rating of 0 was assigned if vowel

accuracy was not present. (The vowel sound [o] was articulated seven times at the end of

the song and was therefore given the weight of seven.) Thus a score of 60 was perfect a

perfect score.

At the end of the study, all subjects were given a researcher-designed Attitudinal

Assessment regarding their confidence in their ability to sing the targeted vowels and

their enjoyment of the learning experience. (See Appendix E, p. 111).

CHAPTER 4

ANALYSIS, FINDINGS, AND DISCUSSION

The purpose of this study was to design and test an English Vowel Tutorial for beginning choral students in a multicultural setting. The study also sought to determine the effect of the use of the tutorial in improving the students' singing of selected vowel sounds and their self-perception of success and enjoyment of the learning experience.

The study employed a two-group pretest-posttest design. Two high school beginning choral classes of 25 students each were divided alphabetically into an experimental group (Treatment A) and a control group (Treatment B). A summary of the raw data for pretest and posttest assessments can be found in Tables 4.1, 4.2, 4.3, and 4.4.

TABLE 4.1   Pretest and Posttest Assessment

ID #	Sex	Ethnicity	ESOL Level	Pretest Errors (out of 60)	Posttest Errors (out of 60)	Improvement	Treatment Group (Experimental)
01	F	Hispanic	Exited	21	17	+4	A
02	F	White/American	NE	15	6	+9	A
03	F	Black/American	NE	21	10	+11	A
04	F	Black/American	NE	13	3	+10	A
05	F	Black/American	NE	15	7	+8	A
06	M	Asian/Vietnamese	Exited	17	7	+10	A
07	F	White/Russian	Exited	13	11	+2	A
08	F	Black/American	NE	9	4	+5	A
09	F	Black/American	NE	20	15	+5	A
10	F	Black/African	Exited	25	4	+21	A
11	F	Hispanic	NE	24	15	+9	A
12	M	Hispanic	1	41	9	+32	A
13	F	Black/American	NE	24	14	+10	A

Key: NE   Not Enrolled in ESOL
              Exited   Was enrolled in ESOL; no longer in need of Sheltered
                               Program
              Level 1   Non-English speaker
              Level 2   Beginning ESOL
              Level 3   Intermediate ESOL
              Level 4   Advanced ESOL

TABLE 4.2   Pretest and Posttest Assessment

ID #	Sex	Ethnicity	ESOL Level	Pretest Errors (out of 60)	Posttest Errors (out of 60)	Improvement	Treatment Group (Experimental)
14	F	Asian/Japanese	4	23	9	+14	A
15	M	White/American	NE	25	13	+12	A
16	F	Hispanic	Exited	26	17	+9	A
17	F	Black/American	NE	12	9	+3	A
18	M	Hispanic	3	23	4	+19	A
19	F	Indian/Bengla	Exited	11	4	+7	A
20	F	Asian/Vietnamese	2	10	7	+3	A
21	F	Black/American	NE	20	9	+11	A
22	M	Asian/Chinese	Exited	28	11	+17	A
23	F	Black/American	NE	14	14	+0	A
24	F	Black/American	NE	9	4	+5	A
25	F	Asian/Vietnamese	Exited	17	6	+11	A

Key: NE   Not Enrolled in ESOL
              Exited   Was enrolled in ESOL; no longer in need of Sheltered
                               Program
              Level 1   Non-English speaker
              Level 2   Beginning ESOL
              Level 3   Intermediate ESOL
              Level 4   Advanced ESOL

TABLE 4.3   Pretest and Posttest Assessment

ID #	Sex	Ethnicity	ESOL Level	Pretest Errors (out of 60)	Posttest Errors (out of 60)	Improvement	Treatment Group (Control)
26	F	White/American	NE	24	25	-1	B
27	F	Black/American	NE	12	16	-4	B
28	F	Black/African	Exited	8	3	+5	B
29	F	Black/American	NE	16	16	+0	B
30	F	Black/American	NE	6	5	+1	B
31	M	Hispanic	Exited	17	16	+1	B
32	F	Black/American	NE	13	20	-7	B
33	F	Indian/Bengla	Exited	7	9	-2	B
34	F	Hispanic	Exited	19	20	-1	B
35	F	Black/American	NE	21	16	+5	B
36	F	Hispanic	NE	8	8	+0	B
37	M	White/American	NE	30	29	+1	B
38	F	Black/American	NE	26	22	+4	B

Key: NE   Not Enrolled in ESOL
         Exited   Was enrolled in ESOL; no longer in need of Sheltered
                     Program
         Level 1   Non-English speaker
         Level 2   Beginning ESOL
         Level 3   Intermediate ESOL
         Level 4   Advanced ESOL

TABLE 4.4   Pretest and Posttest Assessment

ID #	Sex	Ethnicity	ESOL Level	Pretest Errors (out of 60)	Posttest Errors (out of 60)	Improvement	Treatment Group (Control)
39	M	Black/American	NE	16	21	-5	B
40	F	Asian/Vietnamese	1	43	40	+3	B
41	F	Black/American	NE	17	9	+8	B
42	F	Asian/Vietnamese	Exited	5	5	+0	B
43	F	Hispanic	Exited	20	21	-1	B
44	M	Hispanic	1	30	18	+12	B
45	F	Hispanic	NE	8	10	-2	B
46	F	Hispanic	NE	16	19	-3	B
47	F	Hispanic	1	24	22	+2	B
48	M	Black/African	Exited	25	48	-23	B
49	F	Hispanic	Exited	21	18	+3	B
50	F	Black/American	NE	10	4	+6	B

Key: NE   Not Enrolled in ESOL
         Exited   Was enrolled in ESOL; no longer in need of Sheltered
                     Program
         Level 1   Non-English speaker
         Level 2   Beginning ESOL
         Level 3   Intermediate ESOL
         Level 4   Advanced ESOL

Analysis and Findings

The computer analysis of the data was completed with the cooperation of the Department of Statistics at the University of Georgia. Pretest and posttest scores were compared and tested for significance via Analysis of Variance (ANOVA). ESOL level was controlled through the ANOVA, allowing a 6.93 variance to be added to the ESOL posttest scores.

Pretest errors were examined to determine if any difference by groups appeared. It was found that boys had significantly more pretest errors (25.50) than girls (16.65). (See Table 4.5). When comparing by ethnicity, no significant differences were evident in the pretest error scores. (See Table 4.6). The seven students currently enrolled in ESOL classes (designated by CL), had significantly more pretest errors (27.71) than those who had exited or never enrolled in ESOL, which were about the same (17.50 and 16.44). (See Table 4.7). The treatment group variable showed no significant differences for pretest errors, indicating that no effects were observable at that point. (See Table 4.8).

Table 4.5   Pretest Errors by Gender

Sex	Number	Mean	Standard Deviation
Female	40	16.6500000	7.52959971
Male	10	25.2000000	7.65651502

Table 4.6 Pretest Errors by Ethnicity			

Ethnicity	Number	Mean	Standard Deviation
Asian	7	20.4285714	12.5413601
Black	19	15.4736842	5.4300442
Hispanic	14	21.2857143	8.3705397
White	4	23.5000000	6.2449980
Other	6	14.8333333	8.1588398

Table 4.7 Pretest Errors by ESOL Level			

ESOL Level	Number	Mean	Standard Deviation
CL (Currently Enrolled)	7	27.2142857	11.4559197
Exited the Program	16	17.5000000	7.0616334
Never Enrolled	27	16.4444444	6.3991185

Table 4.8 Pretest Errors by Treatment Group			

Treatment Group	Number	Mean	Standard Deviation
A	25	19.0400000	7.38512018
B	25	17.6800000	9.10915291

Pretest and posttest scores were assessed for improvement. Improvement was defined as:

Improvement = (Pretest Errors) – (Posttest Errors)

and models it as a function of treatment group and ESOL group. The relevant equations are:

Imp = -1.278 + ESOLSCORE (for Treatment B)
Imp = +8.244 + ESOLSCORE (for Treatment A)

where ESOLSCORE = 0 for those in Exit or NE (never enrolled) and
         ESOLSCORE = 6.93 for those in CL (currently enrolled).

This definition and parameters indicated that those in the Treatment A group scored approximately 9.4 points better (i.e., they made 9.4 fewer errors) than those in the Treatment B group. Those students in the ESOL classes improved approximately 7 points without the treatment and $7 + 8 = 15$ points higher with the treatment. Neither gender nor ethnicity was significant after controlling for group and ESOL level. They were not included in the model. The typical error (RMSE) for this model is 6.24 points, meaning that if one used it to predict an individual student's improvement, based on his/her treatment group and ESOL level, the actual improvement would be expected to be within +/- 6.24 points of the predicted improvement about 68% of the time.

There is very strong statistical evidence ($p < .0001$) that the treatment provided by the CD-ROM tutorial improved the ability to produce pure vowels. The SAS output containing the analysis of the data is shown in Appendix F, p. 112. The data predict that students in Treatment Group A will improve 9 points more than equivalent students in the Treatment Group B. Experimental Treatment A thus appears to be significantly more effective in helping students attain pure vowel production than is the control Treatment B. (See Table 4.9.)

	Table 4.9	Improvement after Treatment B and Treatment A	

+15			
+14			
+13			
+12			
+11			
+10			
+9			
+8			
+7			
+6			
+5			
+4			
+3			
+2			
+1			
0			
-1			
Improvement Treatment B	Improvement Treatment B + ESOL variance (6.93)	Improvement Treatment A	Improvement Treatment A +ESOL variance (6.93)
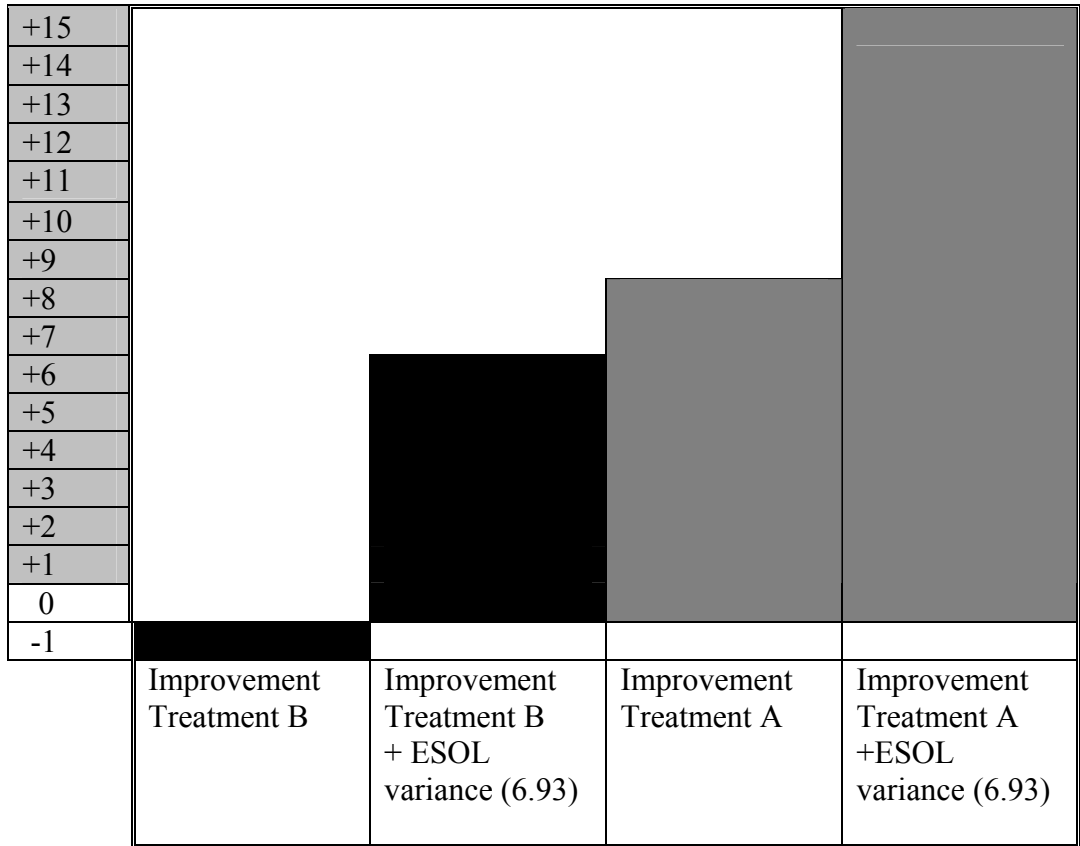
According to the Attitudinal Assessment data, students who participated in the CD-ROM vowel tutorial felt much more confident about their ability to sing a pure vowel sound. Seventeen students in the Treatment A group responded "very confident"; 7 students in the Treatment B group responded "very confident." Eight students in the Treatment A group responded "somewhat confident"; 14 students in the Treatment B group responded "somewhat confident." Four students in the Treatment B group responded "not confident"; no students in the Treatment A group responded "not confident." (See Table 4.10.)

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Table 4.10 Attitudinal Assessment Question A

A. Recalling your vowel learning experience, how confident do you feel about your ability to sing a pure vowel sound?																									
Group A Very confident																									
Group B Very confident																									
Group A Somewhat confident																									
Group B Somewhat confident																									
Group A Not confident																									
Group B Not confident																									
Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

The data from the Attitudinal Assessment revealed that 18 students, or 72%, of the Treatment A group enjoyed learning about vowels through the CD-ROM tutorial. (See Table 4.11). Among the Treatment B group, only 10 students, or 40%, enjoyed learning about pure vowels through warm-up practice. Four students (16%) responded, "I do not enjoy this part of choral learning." (See Table 4.12). No students in the Treatment A group circled this response. (See Table 4.11.)

Table 4.11 Attitudinal Assessment Question B
Treatment A Group

B. Recalling your vowel instruction, did you enjoy learning about vowels through the CD-ROM tutorial?																									
Group A Very Much																									
Group A It's OK																									
Group A I do not enjoy this part of choral learning																									
Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Table 4.12 Attitudinal Assessment Question B
Treatment B Group

B. Recalling daily vowel warm-up, did you enjoy learning about vowels through this practice?																									
Group B Very Much																									
Group B It's OK																									
Group B I do not enjoy this part of choral learning																									
Students	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Table 4.13 summarizes student responses to the items on the Attitudinal Assessment in

percentages.

Table 4.13 Results of the Attitudinal Survey

A. Recalling your vowel learning experience, how confident do you feel about your ability to sing a pure vowel sound?			
	Very confident	Somewhat confident	Not confident
Treatment A	68%	32%	0%
Treatment B	28%	56%	16%
B. Recalling you vowel instruction, did you enjoy learning about vowels through the CD-ROM tutorial?			
	Very much	It's OK	I do not enjoy this part of choral learning
Treatment A	72%	28%	0%
B. Recalling daily vowel warm-up, did you enjoy learning about vowels through this practice?			
	Very much	It's OK	I do not enjoy this part of choral learning
Treatment B	40%	44%	16%

According to the researcher's observation, the students enjoyed working with the

CD-ROM tutorial. Many were pleased to recognize their teacher on the CD-ROM and

seemed interested in what she had to say. Many inquired how the CD-ROM was

produced. As they worked, the students made admirable attempts to imitate the vowel

model that was presented. They often asked, "Am I doing this right?" They also asked

for suggestions about ways to improve their vowel production attempts. During the

written review at the end of the tutorial, the students became intense in their efforts to

differentiate the nine basic vowel sounds. Most were able to answer the questions

through their own review of the vowel production without returning to the lessons, and

most were able to write the IPA symbols for each of the studied pure vowel sounds in "All Night, All Day."

Discussion

Participants in the study were asked to list suggestions to make the CD-ROM instruction more interesting and more effective. Among the many responses, the following were of note:

1.   Maybe put a review of each section to refresh our memory and use more life situations to explain it.

2.   It could be more colorful in the background.

3.   Have some music that lots of kids like, and involve that music in the CD-ROM.

4.   Try to have some humorous things in it.

5.   The picture/film shown should show only either the mouth pronouncing the vowel or the whole face.

6.   The backboard is not needed.

7.   Perhaps diagrams of how the breath moves through the mouth can also help. The diagrams can be used instead of the text describing the jaw placement.

8.   I would have liked a slide bar controlling video play. I found that I can only restart video and not resume.

9.   You could have some kids teach so it would be a little more interesting.

10.   The questioning and answering needs to give feedback.

11.   I think this program can be very helpful and educational in helping others to sing.

12.   I think it is a great way to learn how to get good singing lessons. Great job!

The ESOL teachers at the school where the study took place were very interested in this project, seeing it as a potential means of enriching the language instruction that is already taking place in their classrooms. According to the statistical data, the CD-ROM could serve this purpose.

However, it became clear during the study that the design of the CD-ROM tutorial could be improved in several respects. In consultation with Lee Wolfe of WBC Media, Inc., and his Institute for Performance Excellence, who collaborated with the researcher in the development of the CD-ROM, the following recommendations were made:

Video:
1.   Change the video background and set to be more professional.

2.   Provide a green or blue screen for display of information.

3.   Provide more close-up views of jaw placement, lip formation, and tongue placement.

4.   Use some animation, such as side-view cutaways of nose to jaw area in order to show the tongue against the lower and upper teeth.

Audio:
1.   Provide higher quality sound utilizing professional recording equipment.

2.   Provide more audio examples of vowel sounds incorporating different people and different vocal timbres.

3.   Demonstrate the singing pronunciation vs. the correct and incorrect speaking pronunciation of vowels, using ESOL students to demonstrate the beginning, intermediate, and final transitions to correct enunciation.

Programming:
1.   Include questions as part of the program. The students' answers would be stored, graded and returned to them automatically, probably through an internet or intranet database function, as is currently done with self-paced instruction.

2. Provide each student with a headset and microphone to record his or her own voice digitally on the PC for self-evaluation.

3. Provide a method for instructor evaluation and assistance using either recorded and/or live student audio.

4. Use instructional and professional software to incorporate all of the above.

Discussion of Selected Recommendations for Improvement of the CD-ROM

Of the improvements listed above, the addition of a green or blue screen is important because it would allow the superimposition of a video, text, or photo. This type of video superimposition would not only impart a more professional quality to the CD-ROM, it would offer opportunities for animations, word lists, and video clips of other singers.

Also of great importance is the manner in which the instructor evaluates student learning. The CD-ROM tutorial tests two different learning criteria, both of which must be evaluated. The first of these is IPA vowel reference, which is tested in writing. The second is the vowel sound produced by the student in response to the verbal instruction. Suggestions are made for the improvement of each in a redesign of the program:

Written evaluation. There are two ways to build questions into a program. The first is to place them on the CD for students' interaction, with answers stored on the individual PC or network for manual or automated scoring. The second is for the student to be automatically connected from the CD to a website containing the questions. When the student clicked on the "complete" or "submit" button, the answers would be entered

into a database. The correct and incorrect answers could be calculated and the results

displayed for the student to review and/or print.

The ideal method would be to display the incorrect answer with a reference to the

specific section of instructions covering that question. The student could directly access

that section to learn the correct answer before retaking the test. It is also possible to

program each incorrect answer so that the student must review the segment before

retaking the test. Students who attempted to retake the test without reviewing the

instructional segment would receive a message directing them to return to that segment

for review before retaking the test. Page numbers and instructional segment designation

within the course would allow for navigation directly to a specific segment or topic.

Auditory evaluation. Students could practice using headphones with a

microphone attached. By clicking on a prompt within the program, they could hear

themselves and simultaneously record their voices. Evaluation of the student

vocalization would occur with a network connection that provides the instructor access to

the students' computers and/or files being created by the students. The instructor could

either listen live or review the digitally recorded voice of each student. The instructor

would use the students' names and ID numbers as specific file designations to identify

recordings. Each file would also reference the lesson and sequence of recording.

Programming requirements. Various products are available to accomplish each

of the above, but none of them can accomplish all of the recommended improvements.

Any instructional design would require a combination of products. Among them are

Macromedia products such as Authorware, Director, and Flash; Adobe products like

Premiere, PhotoShop, and AfterEffects; other products like Anark Studio 2 and Lectora;

and a variety of others that provide compatible tools to develop instructional courseware

with full-motion videos, titles, animation, and still photography. An improved design

would also require the developer to use such programming tools as Visual Basic, Java,

HTML, and databases such as Microsoft Access. The entire design and function of the

programs can be integrated with or developed exclusively to function on CD-ROM,

Intranet, and/or Internet applications.

However, it is far from certain that the computer systems in a typical school

system would have the capabilities of operating a redesigned CD-ROM vowel tutorial.

The challenges in running the present CD-ROM vowel tutorial on school computers were

great because the software was out of date, as is often the case in school computer labs.

The software currently installed on the computers used in this study would be unable to

operate the new design. This factor is certainly a potential obstacle in planning and

producing new CAI programs.

CHAPTER 5

CONCLUSIONS AND SUGGESTIONS FOR FURTHER STUDY

It was hypothesized that students using the researcher-authored English Vowel Tutorial in addition to classroom instruction would show greater improvement in singing selected English vowels than those who studied the material in a group setting only. It was further hypothesized that the parameters of individualized instruction made possible by the tutorial would enhance the students' perception of success and that their enjoyment level would be higher than those who studied the vowels only in a classroom setting.

To facilitate the analyses of the data and the drawing of conclusions, the following null hypotheses were formulated:

Null Hypothesis$_1$: There will be no difference in the sung production and placement of the English pure vowels between students who use the tutorial and those who do not. The following subquestions were posed: (1) Will gender be an influential success factor? (2) Will ethnicity be an influential factor? (3) Will English fluency be an influential factor? (4) Will amount of practice be an influential factor?

Null Hypothesis$_2$: There will be no difference in self-perception of success and enjoyment of the learning experience between those students who used the tutorial and those who studied the vowels in a classroom setting.

Conclusions

Based on the data, Null Hypothesis$_1$ is rejected. The students in the experimental group (Treatment A) made 9.4 fewer errors in the posttest assessment than those students in the control group (Treatment B). The students in the control group showed no improvement whatsoever. These students made 1.3 additional errors in the posttest assessment.

Based on the data, the answers to the subquestions are as follows. (1) Gender was not an influential success factor after controlling for group and ESOL level. (2) Ethnicity was not an influential success factor after controlling for group and ESOL level. (3) English fluency was an influential success factor. (4) The amount of practice was not an influential success factor. All the students in the experimental group worked with the CD-ROM tutorial for the same amount of time. All of the students in the control group practiced the singing of vowels together. No extra time was allocated to any one student.

Based on the Attitudinal Assessment, Null Hypothesis$_2$ is rejected. Sixty-eight percent of the students in the experimental group felt very confident about their ability to sing a pure vowel, compared to 28% in the control group. Seventy-two percent of the students in the experimental group reported that they very much enjoyed learning about pure vowel sounds using the CD-ROM tutorial, compared to 40% in the control group who reported that they very much enjoyed learning about pure vowels through daily warm-up exercises. (See Table 5.1.) These data simply substantiate what has already been stated in the literature: students enjoy computer-assisted instruction.

In summary, the researcher-created and -produced CD-ROM tutorial proved to be a successful learning tool for the teaching of pure vowel sounds. The students who

worked with the tutorial scored substantially higher on the posttest than those who did not. The students who worked with the tutorial perceived that they were successful in producing pure vowel sounds, and they enjoyed learning about the pure vowels in the process.

Suggestions for Further Study

This study has laid the foundation for further studies and/or product development. Suggested further studies would include using a younger study group (grades 6-8), using intermediate and/or advanced choruses, testing the CD-ROM tutorial in a non-multicultural situation, and working with the CD-ROM for a longer period of time (more than four weeks).

A redesigning of the CD-ROM tutorial to include diphthongs and tripthongs is a definite option for further study. It is almost impossible to teach English, or any language for that matter, without these complex sounds. And finally, a plausible, though time-consuming and expensive endeavor, would be to revise the CD-ROM tutorial, incorporating all of the suggestions in the discussion section of this document. This would probably require grant funding or connections with a media company willing to take a risk on making the idea a reality.

REFERENCES

Allvin, R. L. (1971). Computer-assisted music instruction: A look at the potential.

   Journal of Research in Music Education, 14(2) 131-143.

Andrew Jack. (n.d.). Retrieved July 13, 2002, from

   http://www.andrewjack.com/biography.htm

Association for Technology in Music Instruction. (n.d.). *Mission Statement*. Retrieved

   July 13, 2002, from http://www.music.org/atmi/mission.html

Callaway, P. (2001) The use of computer generated spectrographic analysis of female

   voices in the college voice studio. (Doctoral dissertation, University of Georgia,

   2001).

Chen, S. S., & Dennis, J. R. (1993). Linking different cultures by computers: A study of

   computer-assisted notation instruction. *Journal of Educational Technology*

   Systems 21(3), 207-224.

Cheng, C. (1995). *Pro-active guidance in computer-assisted language learning.* Urbana,

   IL: (ERIC Document Reproduction Service No. ED384229)

Choksy, L., Abramson, R. M., Avon, E. G., Woods, D., & York, F. (2001). *Teaching*

   music in the 21st century. Upper Saddle River, NJ: Prentice Hall.

Collett, M.J. (1980). *Examples of Applications of Computer to Modern Language Study*.

   (ERIC Document Reproduction Service No. EJ234456)

Collins, D. L. (1999). *Teaching choral music.* Upper Saddle River, NJ: Simon &

   Schuster.

The communicating voice – Judith Sullivan. (n.d.). Retrieved July 13, 2002 from

   http://www.judithsullivan.com

Coomes, P. A. (1985). The effects of computer assisted instruction on the development

   of reading and language skills (Doctoral dissertation, University of North Texas,

   1985).

Cooper, R. M. (1975). The efficacy of computer assisted instruction compared with

   traditional teacher-taught and self-taught methods of teaching beginning music

   theory (Doctoral dissertation, University of North Carolina at Greensboro, 1975).

Cotton, K. (2002). Computer-assisted instruction. *School Improvement Research Series*

   (SIRS). Close-up #10. Retrieved July 13, 2002, from

   http://www.nwrel.org/scpd/sirs/5/cu10.html

Diction for singers, English. (1992). Dallas, TX: Pst . . . Inc.

Digranes, J. L. A., & Digranes, S. H. (1989). Adapting computer applications for

   multicultural teaching. *Computing Teacher*, 20-23.

Dillenbourg, Pierre. (1989). Designing a self-improving tutor: PROTO-TEG.

   Instructional Science, 18, 193-216.

Gill, M. J. (1988). Zyklus: A performer's analysis: A video taped timpani method

   utilizing computer assisted instruction for ear training (Doctoral dissertation,

   University of Southern Mississippi, 1988).

Gunning, T. G. (2001). *Building words*. Boston, MA: Allyn & Bacon.

Harrison, R. (1998). The evolution of networked computing in the teaching of Japanese

   as a foreign language. *Computer Assisted Language Learning, 11*(4), 437-452.

Higgins, William R. (1987). *A Review. A Real-Time Microcomputer-Assisted System for Translating Aural, Monophonic Tones into Music Notation as an Aid in Sight-Singing.* Reston, VA. (ERIC Document Reproduction Service No. EJ 361799)

Holmes, G. E. (1984). Computers and the humanities [Special issue]. *Computer Assisted Instruction.* (ERIC Document Reproduction Service No. ED284764)

Ingalls, Z. (1995). The technology of singing. *Chronicle of Higher Education, 41* (Feb. 17), A21-3 il.

Kenyon, J. S., & Thomas, A. K. (1953). *A pronouncing dictionary of American English.* Springfield, MA: Merriam-Webster.

King, M. H. (1985). The impact of computer assisted instruction on the acquisition of a second language (Doctoral dissertation. United States International University).

Kulik, J. A. (1983). *Effects of computer-based teaching on learners.* Dallas, TX.: (ERIC Document Reproduction Service No. ED246899)

Lambacher, S. (1999). A CALL tool for improving second language acquisition of English consonants by Japanese learners. *Computer Assisted Language Learning, 12*(2), 137-156.

Mangiafico, L. F. (1996). The relative effects of classroom demonstration and individual use of interactive multimedia on second language listening comprehension (Doctoral dissertation, Vanderbilt University, 1996).

Marshall M. (1953). *The singer's manual of English diction.* New York: Schirmer Books. Meier, P. (2002).

Merkel, A. I. (1984). A study of the effectiveness of using computer assisted instruction in the teaching of English as a second language (Doctoral dissertation, Indiana University, 1984).

Music Educators National Conference (1994). *The school music program: A new vision.* Reston, VA: MENC.

Nicholson, R. (1994). *At the cutting edge: Recent research on learning to read and spell.* Wellington, NZ: New Zealand Council for Educational Research.

Nordstrom, G. H. (1988). *Computer-assisted instruction: A review of research on the effectiveness of CAI.* Arizona. (ERIC Document Reproduction Service No. ED301409)

O'Connor, R. J. (1989). CD-ROM technology: A new teaching tool. *Computing Teacher,* 50-51.

Paul Meier Dialect Services. (n.d.). Retrieved July 13, 2002 from http://www.paulmeier.com/dialectservices.htm

Pfautsch, L. (1971). *English diction for the singer.* New York: Lawson-Gould Music Publishers.

Taylor, J. A. (1983). Computers as music teachers. *Music Educators Journal, 69*(5), 43-45.

Turk, G. C. (1984). Development of the music listening strategy—tempo: Computer assisted instruction in music listening (Doctoral dissertation, University of Kansas).

Volk, T. M. (1998). *Music, education, and multiculturalism*. Oxford, England: Oxford University Press.

Wall, J. (1989). *International phonetic alphabet for singers*. Dallas, TX: Pst . . . Inc.

Wall, J., Caldwell, R., Gavilanes, T., & Allen, S. (1990). *Diction for singers*. Dallas TX: Pst . . . Inc.

Walls, Kimberly C. (2000). Technology for future music educators. *Journal of Music Teacher Education, 9*(2), 14-21.

Watkins, G. L. (1996) Effects of CD-ROM instruction on achievement and attitudes (Doctoral dissertation, University of Idaho).

Wininger, H. H. (1994). The effect of computer assisted instruction on achievement outcomes (MSN thesis, Bellarmine College).

Wisher, R. (1980). *Computer-assisted literacy instruction in phonics.* San Diego, CA. (ERIC Document Reproduction Service No. ED 190067)

APPENDIX A

"ALL NIGHT, ALL DAY" MODIFIED TEXT

All night, all day,

Angels watching over me my Lord,

All night, all day,

Angels watching over me.

If you see me take a look,

Angels watching over me my Lord.

I will read the Holy book,

Angels watching over me.

All night, all day,

Angels watching over me my Lord,

All night, all day,

Angels watching over me.

Ooooooooo.

PRETEST/POSTTEST EVALUATION

All night, all day,
—   —

An - gels watch - ing o - ver me my Lord.
          —   —   — —   —   —

All night, all day,
—   —

An - gels watch - ing o - ver me.
          —   —   — —   —

If you   see   me take   a   look.
—   —   —   —   —   —

An - gels watch - ing o - ver me my Lord.
          —   —   — —   —   —

I will read the Ho - ly book.
      —   —   — —   —   —

An - gels watch - ing o - ver me.
          —   —   — —   —

All night, all day,
—   —

An - gels watch - ing o - ver me my Lord.
          —   —   — —   —   —

All night, all day,
—   —

An - gels watch - ing o - ver me.
          —   —   — —   —

Ooooooo (last phrase)
— — — — — — —

Number of correct vowel sounds_____ (Out of 60)

All Night, All Day (modified text with IPA Symbols)

All night, all day,
[ɔ]   [ɔ]

An - gels watch - ing o - ver me my Lord.
     [ɛ]   [ɔ]   [i]   [o]   [i]   [ɔ]

All night, all day,
[ɔ]   [ɔ]

An - gels watch - ing o - ver me.
     [ɛ]   [ɔ]   [i]   [o]   [i]

If you see me take a   look.
[ɪ] [u] [i] [i]   [ɑ] [ʊ]

An - gels watch - ing o - ver me my Lord.
     [ɛ]   [ɔ]   [i]   [o]   [i]   [ɔ]

I will read the Ho - ly book.
  [ɪ]   [i]   [ɑ] [o]   [i] [ʊ]

An - gels watch - ing o - ver me.
     [ɛ]   [ɔ]   [i]   [o]   [i]

All night, all day,
[ɔ]   [ɔ]

An - gels watch - ing o - ver me my Lord.
     [ɛ]   [ɔ]   [i]   [o]   [i]   [ɔ]

All night, all day,
[ɔ]   [ɔ]

An - gels watch - ing o - ver me.
     [ɛ]   [ɔ]   [i]   [o]   [i]

Ooooooo (last phrase)
[u] x 7

Number of correct vowel sounds_____ (Out of 60)

APPENDIX C

TUTORIAL SCRIPT

Introduction
Hello. My name is Mrs. Jordan. As both a singer and a choral director, I am going to
lead you through a series of lessons which will teach you to sing pure English vowels
correctly. A pure vowel is a speech sound sustained without a change in sound or
movement of the tongue, lips, or jaw until the air flow ceases. In the English language,
we consider ah, ee, ih, oh, and oo pure vowels. They are pure because they have only
one sound. You will learn how to sing these vowels as well as some others.

Why is learning vowel sounds important for good singing? Producing vowels correctly
contributes to beautiful singing. If you, as an individual, produce the vowels correctly,
you will sing beautifully. If everyone in the choir produces the vowels correctly, the
choir will sound beautiful.

How do we learn to sing vowels correctly? First, we must learn to pronounce the spoken
vowel.   Secondly, we must learn to sustain this vowel sound in singing. And lastly, we
must learn the correct position of the jaw, tongue, and lips during the singing of the
vowel.

I will give you instructions regarding the position of your jaw, your tongue, and your lips.
Because we are all different, the position of your jaw, tongue, and lips may vary slightly.
So you must listen.

Let's begin.

Lesson 1

The first vowel we will be singing is perhaps the easiest to produce. This vowel is *ee* as in the word *beet*. In order to sing the *ee* vowel, the jaw is relaxed. The tip of the tongue touches the lower teeth. The lips are unrounded and gently parted. The soft palate, or the roof of the mouth, is lifted which means you have a feeling of space inside the mouth.

How do we create space in the mouth? Try this. Pretend that it's your birthday. You have asked your parents for gift that you really want. Your parents have told you that the gift is too expensive and that's there's no way they can give it to you. You open your gift and low and behold, it's the gift you've wanted [demonstrate surprised Ah]. . .Without knowing it, you raise your soft palate, lift your eyebrows, and create space in your mouth.

Let's get back to the *ee* vowel, keeping all of this in mind.

Listen: [Demonstrate spoken vowel only]

Listen again: [Demonstrate spoken vowel only]

Your turn. Please speak *ee*. [Give cue to start.]

Now let's sing *ee*. Listen: [Sing the vowel only.]

Listen again: [Sing the vowel only.]

Now it's your turn. Please sing an *ee*. [Demonstrate and give cue to respond]

Please sing an *ee* again. [Demonstrate and give cue to respond]

When you sang *ee*, did you notice where the <u>sides</u> of your tongue were? (pause) The sides of the tongue should have been gently touching the upper molars.

Try again and notice the position of the tongue. [Demonstrate and give cue to respond]

When we sing any vowel, we have to decide whether we want it to sound bright [demonstrate], middle [demonstrate], or dark [demonstrate]. These terms relate to the *placement* of your voice. I prefer for my singers to sing in the middle. However, there are times when a director may ask you to use a bright or dark placement. During this tutorial, however, please strive to keep your placement in the middle.

[Demonstrate middle.]

Please sing an *ee* sound keeping your voice placement in the middle.

Let's move on to singing words with the *ee* vowel sound in them. Please sing these words after I sing them, making sure that your *ee* sounds like the *ee* in *beet*. Do not let the consonants change the pure sound of the vowel.

1.   me
2.   he
3.   she
4.   we

Do you feel your tongue forming a high arch in the front of your mouth? Try *we* again.

4.   we

Do you feel the arch? A vowel that forms a high arch in the mouth is called a ***forward vowel***. The vowel that we are singing now is the <u>most forward</u> of all of the English vowels. Let's continue with the words, keeping the position of the forward tongue, lips, and jaw in mind.

5.   please
6.   key
7.   breathe
8.   team

Please sing the words one at a time on your own, taking care to produce every *ee* vowel correctly. Remember your middle placement.

Ask yourself, did your *ee* sound like mine?   Were your jaw, tongue, and lips in the position I described? Would you blend with the other members of your choir in singing *ee*?

Let's evaluate your understanding of the pure *ee* vowel sound. Choose the one that you think is correct.

1. [Demonstrate an incorrect *ee* vowel.]
2. [Demonstrate a correct *ee* vowel.]
3. [Demonstrate an incorrect *ee* vowel.]

Which of those *ee* vowel sounds was correct? If you chose No.2, you picked the right one. If you did not choose the correct vowel sound, you should review this lesson.

Your assignment for tonight will be to practice the *ee* vowel sound in the privacy of your room. Take your vowel booklet home. Watch yourself in the mirror. Select *ee* words to sing. Practice until you feel comfortable with the *ee* sound.

Throughout each lesson you will see a symbol for each sound. The symbol for *ee* is **[i]**. It looks like this. [Show symbol.] This symbol is from the International Phonetic Alphabet and will always be inside brackets. The International Phonetic Alphabet, or IPA, is a phonetic or sound alphabet in which <u>one</u> symbol stands for <u>one</u> sound. This alphabet was developed by the International Phonetic Association in 1886. Within each lesson you will see the IPA symbol for that particular vowel sound.

Lesson 2

The next vowel we will be singing is another *forward* vowel. Do you remember the definition of a forward vowel? [pause] A vowel that forms a high arch in the mouth is called a *forward vowel*.

The second vowel is *ih* **[ɪ]** as in the word *bit*. This is the IPA symbol for the ih sound. [Show symbol.] Like *ee* **[i]**, the jaw is relaxed. The high arch of the tongue moves slightly back from the *ee* **[i]** position, creating more space in the mouth. The lips are unrounded and gently parted. Like *ee*, you should have a feeling of space inside the mouth. Do you remember how to get the feeling of space in your mouth? Remember the birthday surprise? [Demonstrate] You try it.

The only difference between *ee* **[i]** and *ih* **[ɪ]** is the slight movement of the front of the tongue back from the **[i]** position resulting in a change in the curvature of the tongue.

Let's speak the *ih* **[ɪ]** vowel, keeping all of this in mind.

Listen: [Demonstrate spoken vowel only]

Listen again: [Demonstrate spoken vowel only]

Your turn. Please speak *ih* **[ɪ]**. [Give cue to start.]

Now let's sing *ih* **[ɪ]**. Listen: [Sing the vowel only.]

Listen again: [Sing the vowel only.]

Now it's your turn Please sing an *ih* **[ɪ].** [Demonstrate and give cue to respond]

Please sing an *ih* **[ɪ]** again**.** [Demonstrate and give cue to respond]

When you sang *ih* **[ɪ]**, did you notice where the sides of your tongue were? (pause) Like in *ee* **[ɪ]**, the sides of the tongue should have been gently touching the upper molars.

Try again and notice the position of the tongue. [Demonstrate and give cue to respond]

Is the placement of your voice bright, middle or dark? Do you remember the three sounds? [Sing *ih* **[ɪ]** using bright, middle and dark placements] Sing *ih* **[ɪ]** again keeping your placement in the middle.

[Demonstrate middle and give cue to sing.]

Let's move on to singing words with the ***ih* [ɪ]** vowel sound in them. Please sing these words after I sing them, making sure that your ***ih* [ɪ]** sounds like the ***ih* [ɪ]** in ***bit***. Do not let the consonants change the pure sound of the vowel.

1.   it
 2.   sick
3.   his
4.   gift

Is your jaw relaxed? Is your tongue in a high arch? Do the sides of your tongue touch your back molars? Are your lips unrounded and gently parted? Keep all of these positions in mind as we sing the remaining words.

5.   sit
6.   wind
7.   pin
8.   quit

Please sing the words one at a time on your own, taking care to produce every ***ih* [ɪ]** vowel uniformly.

[Show the 8 words and the IPA symbol.]

Ask yourself, did your ***ih* [ɪ]** sound like mine? Were your jaw, tongue, and lips in the position I described? Did you have the feeling of space in your mouth? Would you blend with the other members of your choir in singing ***ih* [ɪ]**?

Let's test your understanding of the ***ih* [ɪ]** vowel sound. Of the three sounds that I am going to sing for you, select the correct ***ih* [ɪ]**.

1.   [Sing **[i]**.]
2.   [Sing a bright **[ɪ]**.]
3.   [Sing a middle **[ɪ]**.]

Which of the three sounds was correct? [pause] If you chose the last sound, you are correct. What was the first sound? [Sing it again. Pause.] It was the ***ee* [i]** sound**.** Why was the second sound incorrect? [Pause.] It was too bright.

Your assignment is to practice the ***ih*** vowel tonight in the privacy of your room. Take care to keep the jaw relaxed, the tongue arch high in your mouth, and the lips unrounded and gently parted. [Sing ***ih* [ɪ]**.]

Good luck and listen!

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Lesson 3

The third vowel we will be singing is another *forward* vowel. This vowel is **[ɛ]** as in the word *bet*. This is its IPA symbol. [Show symbol.]

Listen: [Say **[ɛ].**]

Listen again: [Say vowel only]

Please say an **[ɛ].** [Demonstrate and give cue to respond]

Please say an **[ɛ]** again**.** [Demonstrate and give cue to respond]

Do you feel that the jaw is relaxed and lowered? Did you feel the high arch of the tongue moves slightly backward, creating more space in the mouth? Do you see that the lips are unrounded? Did you feel the lower lip drop in an easy relaxed manner? Do you have a feeling of space inside the mouth?

Sing the vowel, trying to feel the position of the jaw, tongue, and lips. [Demonstrate and give cue to respond.]

Try again. [Demonstrate and give cue to respond]

Please sing these words after I sing them, making sure that your **[ɛ]** sounds like the **[ɛ]** in bet:

1.   wed
2.   let
3.   fed
4.   pen

Is your lower lip dropped in an easy relaxed manner? Sing *pen* again, keeping in mind the position of the lower lip.

4.   pen
5.   tell
6.   well
7.   red
8.   twenty

Please sing the words one at a time on your own, taking care to produce every **[ɛ]** vowel correctly.

[Show the 8 words and the IPA symbol.]

Did your **[ɛ]** sound like mine or did you confuse **[ɪ]** for **[ɛ]**? Were your jaw, tongue, and lips, in the position I described? Would you blend with the other members of your choir in singing **[ɛ]**?

Listen to these three sounds and pick out the **[ɛ]** vowel.

1.   [Sing **[ɛ]**.]
2.   [Sing **[ɪ]**.]
3.   [Sing **[i]**.]

Which one is **[ɛ]**? [Pause.] If you chose the first sound you are correct.

If you need more practice, return to the beginning of the lesson. If you have listened carefully and have mastered the sound of the **[ɛ]** vowel, please proceed to the vowel practice.

<u>Vowel Practice</u>

Practice singing the **[i], [ɪ],** and **[ɛ]** vowel sounds. As you proceed from left to right, keep in mind that the tongue moves slightly backward in the mouth and that the jaw drops ever so slightly.

[Demonstrate the three vowel sounds.]

Please sing the vowel sounds after I sing them. [Sing the vowels and cue to start.]

Listen as I sing the first three words on the list. [Sing beet, bit, bet.]

Now you sing the words after I sing them. Do not let the consonants change the sound of the pure vowel. [Sing beet, bit, bet and give cue to start.]

Let's proceed with the practice words. Sing the following words from left to right. Go at your own pace, concentrating on the vowel sound as you sing the word. If you need to review the vowels individually, return to Lesson 1 for **[i]**, Lesson 2 for **[ɪ]**, and Lesson 3 for **[ɛ]**.

Practice words

[i]	**[ɪ]**	**[ɛ]**
beet	**bit**	**bet**
me	**it**	**wed**
he	**his**	**let**
she	**sick**	**fed**
glee	**gift**	**get**
please	**sit**	**red**
we	**wind**	**well**
breathe	**pin**	**pen**
team	**quit**	**twenty**

Let's see how you do if we mix up the vowel sounds. In the following vowel test, it is up to you to decide which vowel sound, **[i]**, **[ɪ]**, or **[ɛ]**, is correct. If you are ready, please proceed to the test.

Vowel Test

Sing the following words taking care to form the forward vowel carefully and accurately.

1. shed
2. his
3. breathe
4. hen
5. pin
6. team
7. she
8. pen
9. wind
10. sick

If you scored over 90% on the test, proceed with Lesson 4. If you scored less than 90%, isolate your problem vowel and review the appropriate lesson. You may need to review all of Lessons 1, 2, and 3.

Lesson 4

The English language consists of one *forward "a"* vowel and one *back "a"* vowel. These sounds are very similar. Only slight movements of the tongue and jaw create the differences between them.   Lessons 4 will focus on the *forward* vowel **[æ]**.

The vowel **[æ]** is as in the word ***bat***. This sound does not exist in German or in Italian, but is a must for mastering English.

Please say ***bat***. [Demonstrate and give cue to respond.]

What are the positions of the jaw, tongue, and lips for this sound? The jaw is relaxed and slightly lowered. The high point of the tongue is forward in the mouth, slightly lower than for **[ɛ]**. The tip of the tongue touches the back of the lower front teeth. The sides of the tongue do not touch the upper back teeth. The lips are unrounded and more open than for **[ɛ]**.

Listen to the vowel. [Demonstrate vowel only]

Listen again: [Demonstrate vowel only]

Please sing an **[æ].** [Demonstrate and give cue to respond]

Please sing an **[æ]** again**.** [Demonstrate and give cue to respond]

Please sing these words after I sing them, making sure that your **[æ]** sounds like the **[æ]** in ***bat:***

1.   cat
2.   hat
3.   man

Is the **[æ]** you are saying a forward sound? Is the high point of your tongue forward in the mouth? Continue with ***can***.

4.   can
5.   sad
6.   hand
7.   lamp
8.   fashion

Is the placement of your voice bright, middle or dark? Do you remember the three sounds? [Sing **[æ]** using bright, middle and dark placements] Sing **[æ]** again keeping your placement in the middle.

[Demonstrate middle and give cue to sing.]

Please sing the words one at a time on your own, taking care to produce every **[æ]** vowel correctly.

[Show the 8 words and the IPA symbol.]

Did your **[æ]** sound like mine? Was your vowel pure - making only one sound? Were your jaw, tongue, and lips in the position I described? Would you blend with the other members of your choir in singing **[æ]**?

Let's test your understanding of the vowel sound **[æ]**. Pick the correct vowel sound out of these three sounds.
1.   [Sing **[æ]**.]
2.   [Sing **[i]**.]
3.   [Sing **[ɪ]**.]

Which sound was like **[æ]** in *bat*? [Pause.] If you chose the first sound you are correct. If you did not choose the first sound, please go back and review the lesson.

Your assignment is to take this booklet home and practice the eight practice words in the privacy of your home. Pay close attention to the position of your jaw, tongue, and lips as you form the words with the vowel. What are these positions?

[Jaw   relaxed and sightly lowered]
[Tongue   high point of the tongue is forward in the mouth; the tip touches the back
              of the front teeth.]
[Lips   unrounded and open]

Watch yourself in the mirror. Good luck!

Lesson 5

The vowel sound we will study next is our first *back* vowel.

What is a *back* vowel sound? Back vowels are articulated with the high point of the tongue in the back of the mouth. This is the opposite from a *front* vowel, where the high point of the tongue is in the front of the mouth.

Our first *back* vowel **[ɑ]** is called the *dark ah*. It is the *ah* heard in *father*. Where is the jaw? The jaw is relaxed and dropped to its lowest position. Where is the tongue? The tip of the tongue touches the back of the bottom front teeth. The arch is high and is in the back of the mouth. What about the position of the lips? The lips are open and in a relaxed open oval position. You should have a feeling of space in the mouth. Do you remember how to find the space? Remember your special birthday present? [Demonstrate.]

Say *father*. [Demonstrate and give cue to respond.]

Say *ah*. [Demonstrate and give cue to respond.]

Please sing *father.* [Demonstrate and give cue to respond]

Please sing an **[ɑ].** [Demonstrate and give cue to respond]

Please sing these words after I sing them, making sure that your **[ɑ]** sounds like the **[ɑ]** in *father:*

1. star
2. far
3. part
4. arm
5. heart

Do you have the feeling of space in your mouth? Is your *ah* pure?

6. palm
7. dark
8. bar

Please sing the words one at a time on your own, taking care to produce every **[ɑ]** vowel correctly. Do not allow the consonants to close your jaw.

[Show the 8 words and the IPA symbol.]

Ask yourself, did your **[ɑ]** sound like mine? Was your jaw dropped sufficiently? Was the high arch of your tongue in the back of your mouth? Would you blend with the other members of your choir in singing **[ɑ]**?

Are you able to differentiate between the forward **"a"** sound and the back **"a"** sound? Let's see if you can do this.

Identify which of the vowel sounds you hear. Do you hear **[æ]** as in *bat* or **[ɑ]** as in *father*? Listen:

1.   [Sing **[ɑ]**.]
2.   [Sing **[æ]**.]

Which example was the **[ɑ]** as in *father*? [Pause.] The first example is correct.

That leaves the second example as the **[æ]** in *bat*.

Your assignment is to take this booklet home and practice the eight **[ɑ]** practice words. Pay close attention to the position of your jaw, tongue, and lips as you form these words with the vowel. Remember that **ah** is a *back* vowel.

 Good luck!

<u>**Vowel Practice**</u>

Practice singing the **[æ]** and **[ɑ]** vowel sounds. As you proceed from left to right, keep in mind that slight movements of the tongue and jaw create the differences between these *"a"* vowels.

[Demonstrate the two vowel sounds.]

Please sing the vowel sounds after I sing them. [Sing the vowels and cue to start.]

Listen as I sing the first words on the lists. [Sing bat, bar.]

Please sing the words after I sing them {Sing bat, bar and give cue to respond.]

Proceed with the practice words, moving at your own pace from left to right. If you need to review the vowels individually, return to Lesson 4 for **[æ]** and Lesson 5 for **[ɑ]**. Remember the position of the jaw, tongue, and lips for each.

Practice words

[æ]	[ɑ]
bat	bar
cat	far
hat	part
can	arm
sad	star
hand	palm
lamp	dark
fashion	heart
sat	father

Was the placement of your voice for each of these vowel sounds bright, middle or dark? Do you remember the the difference between the three sounds? [Sing **[ɑ]** using bright, middle and dark placements] Sing the **[ɑ]** words again keeping your placement in the middle.

Are you are comfortable with the two *"a"* vowel sounds? If you are, proceed to the following *"a"* vowel test. If you are not, review Lesson 4 for **[æ]** and Lesson 5 for **[ɑ]**.

Vowel Test

The *"a"* vowel sounds are found in the following words. Identify what vowel sound is in each word, and take care to sing it correctly. Remember that the consonants do not change the sound of the vowel.

Sing the following words taking care to form the vowel carefully and accurately.

1.   bar
2.   hat
3.   heart
4.   lamp
5.   cat
6.   dark
7.   star
8.   fashion
9.   apple
10.   sad

If you scored over 90% on the test, proceed with Lesson 6. If you scored less than 90%, isolate your problem vowel and review the appropriate lesson.

<u>Lesson 6</u>

The next vowel we will study is the purest of all vowel sounds. Do you know what it is? [Pause.]

This pure vowel sound is ***oo***. It is pronounced as in the word ***boot***. Like ***ah***, it is a back vowel. In order to sing this vowel, the jaw is relaxed and slightly lowered. As with all back vowels, it is articulated with the high point of the tongue in the back of the mouth. The tip of the tongue touches the back of the bottom front teeth. Most importantly, you must round the lips. You should almost feel as if you are sipping through a straw. You should feel space in the mouth. The IPA symbol for ***oo*** looks like this [Show symbol].

Let's begin by learning the correct pronunciation of ***oo***.

Listen: [Say ***oo***]

Listen again and repeat the sound. [Say ***oo*** and give cue to respond.]

Now please sing an **[u].** [Demonstrate and give cue to respond]

Please sing an **[u]** again**.** [Demonstrate and give cue to respond]

Please sing these words after I sing them, making sure that your **[u]** sounds like the **[u]** in ***boot:*** Remember to round your lips and feel space in the mouth.

1.   hoot
2.   too
3.   moon
4.   soon

Are your lips rounded? Is the high arch of the tongue in the back of your mouth? Is your voice placement in the middle? If not, practice the first four words again. If you are forming the vowel correctly, continue with the word ***do***. Listen and respond. [Sing ***do***.]

5.   do
6.   blue
7.   food
8.   goof

Please sing the words one at a time on your own, taking care to produce every **[u]** vowel correctly.

[Show the 8 words and the IPA symbol.]

Did your **[u]** sound like mine? Were your lips rounded? Was the jaw and tongue in the position I described? In forming your pure **[u]** would you blend with the other members of your choir ?

Let's test your understanding of the **[u]** vowel sound. Of the three sounds that I am going to sing for you, select the correct **[u]**.

1.   [Sing a bright **[u]**.]
2.   [Sing a dark **[u]**.]
3.   [Sing a middle **[u]**.]

Which of the three sounds was correct? [pause] If you chose the last sound, you are correct. What was the first sound? [Sing it again. Pause.] It was a bright **[u]** sound. Why was the second sound incorrect? [Pause.] It was too dark. Please remember that for this tutorial all of the vowel sounds should have a middle placement. The last sound was placed correctly.

Your assignment tonight is to practice the **[u]** vowel in the privacy of your room. Take care to keep a jaw relaxed and in a slightly lowered position. Remember that the tongue arch is high in the back of your mouth with the tip of the tongue touching the back of the front teeth. The lips are rounded. [Sing **[u]**.]

Practice well!

Lesson 7

The next vowel we will study is the *back* vowel **[ʊ].** It is pronounced as in the word *book*. For this vowel, the jaw is slightly lower for **[ʊ]** than for **[u̲]**. The high point of the tongue is in back of the mouth close to the roof of the mouth. The tip of the tongue touches the back of the bottom front teeth. The lips are rounded, but more relaxed than **[u̲]**.

Listen: [Demonstrate spoken vowel only]

Listen again and repeat: [Demonstrate spoken vowel and give cue to respond.]

Please listen to me sing an **[ʊ].** [Demonstrate and give cue to respond]

Please sing an **[ʊ].** [Demonstrate and give cue to respond]

Is your jaw slightly lowered? Is the high point of the tongue in the back of the mouth close to the roof of the mouth? Are your lips rounded, but less relaxed than **[u]**?

If you need more practice, go back to the start of the lesson. If the position is correct, please sing these words after I sing them, making sure that your **[ʊ]** sounds like the **[ʊ]** in *book* :
1.   hook
2.   full
3.   pull
4.   push
5.   stood
6.   look
7.   good
8.   would

Please sing the words one at a time on your own, taking care to produce every **[ʊ]** vowel correctly.

[Show the 8 words and the IPA symbol.]

Did your **[ʊ]** sound like mine? Were your lips less rounded than **[u]**? Was the jaw, tongue, and lips in the position I described? In forming your **[ʊ]** would you blend with the other members of your choir ?

Listen to these three sounds and pick out the [ʊ] vowel.

1.   [Sing [ʊ].]
2.   [Sing [u].]
3.   [Sing [i].]

Which one is [ʊ]? [Pause.] If you chose the first sound you are correct. What were the other two sounds?

Your assignment tonight is to practice the [ʊ] vowel in the privacy of your room. Take care to keep a jaw relaxed and in a slightly lowered position. Remember that the tongue arch is high in the back of your mouth with the tip of the tongue touching the back of the front teeth. The lips are rounded. [Sing [ʊ].]

Practice well!

If you need more practice, return to the beginning of the lesson. If you have listened carefully and have mastered the sound of the [ʊ] vowel, please proceed to the vowel practice.

Vowel Practice

Practice singing the **[u]** and **[ʊ]** vowel sounds. As you proceed from left to right, keep in mind that the jaw drops slightly and the lips become less rounded.

[Demonstrate the two vowel sounds.]

Please sing the vowel sounds after I sing them. [Sing the vowels and cue to start.]

Listen as I sing the first two words on the list. [Sing boot, book.]

Please sing the words after I sing them {Sing boot, book and give cue to start.]

Proceed with the practice words, moving at your own pace from left to right. Remember that both of these vowels are back vowels sung with rounded lips. If you need to review the vowels individually, return to Lesson 6 for **[u]** and Lesson 7 for **[ʊ]**.

Practice words

[u]	**[ʊ]**
boot	**book**
hoot	**hook**
too	**took**
moon	**pull**
soon	**push**
do	**look**
blue	**brook**
food	**good**
goof	**would**

If you are comfortable with these two vowel sounds, proceed to the following ***back*** vowel test.

Vowel Test

Sing the following words taking care to form the *back* vowel carefully and accurately.
1.   boot
2.   book
3.   pull
4.   push
5.   do
6.   moon
7.   food
8.   good
9.   full
10.   goof

Lesson 8

The next two back vowels are very similar. The only difference between them is a change in the lips. The vowel [o] is pronounced as in *hope.* The vowel [ɔ] is pronounced as in *haw*. The jaw is slightly lower for [o] and [ɔ] than for [ʊ]. The back of the tongue is less elevated for both than for [ʊ]. The tip of the tongue touches the bottom of the front teeth. There is a slight protrusion of the lips forming an oval for [o]; the oval becomes slightly larger for [ɔ]**,** thus dropping the jaw ever so slightly. [o] is the *"oh"* sound most often used in English; [ɔ] is the *"oh"* sound most often used in Latin.

First we will study [o] as in hope. When you sing this vowel, take care to sing only one vowel sound. In English, the pure [o] is often grouped in a diphthong. Do not do that here!

Listen: [Demonstrate spoken vowel only]

Listen again and speak [o]: [Demonstrate spoken vowel and give cue to respond.]

Please sing an [o]**.** [Demonstrate and give cue to respond]

Please sing an [o] again**.** [Demonstrate and give cue to respond]

Is your jaw slightly lowered? Is the back of the tongue slightly elevated? Is there a slight protrusion of your lips forming an oval? Is your voice placement in the middle? If the answer to any of these questions is no, go back to the beginning of the lesson. If the answer to all of these questions is yes, proceed to the next step.

Sing these words after I sing them, making sure that your [o] sounds like the [o] in *hope:*

1. obey
2. omit
3. police
4. polite
5. home
6. comb
7. know
8. pillow

Now sing these words one at a time on your own, taking care to produce every [o] vowel correctly.

[Show the 8 words and the IPA symbol.]

Did your **[o]** sound like mine? Was the **[o]** only one vowel sound? Were your lips as I described? Did you have a feeling of space in your mouth? In forming your **[o]** would you blend with the other members of your choir ?

<u>Lesson 9</u>

Now let's study **[ɔ].**

At the beginning of Lesson 8, I told you that the only difference between **[o]** and **[ɔ]** is a change in the lips. The vowel **[ɔ]** is pronounced as in the word ***haw***. The jaw is slightly lower for **[o]** and **[ɔ]** than for **[ʊ]**. The back of the tongue is less elevated for both than for **[ʊ]**. The tip of the tongue touches the bottom of the front teeth. There is a slight protrusion of the lips forming an oval for **[o]**; the oval becomes slightly larger for **[ɔ]**, thus dropping the jaw ever so slightly. As I told you at the beginning of the lesson, **[o]** is the ***"oh"*** sound most often used in English; **[ɔ]** is the ***"oh"*** sound most often used in Latin.

Let's speak the vowel sound. Listen: [Demonstrate the spoken vowel.]

Listen again and repeat the vowel. [Demonstrate vowel and cue for response.]

Please sing an **[ɔ].** [Demonstrate and give cue to respond]

Please sing an **[ɔ]** again**.** [Demonstrate and give cue to respond]

Please sing these words after I sing them, making sure that your **[ɔ]** sounds like the **[ɔ]** in ***haw:***

1.   warm
2.   war
3.   horn

Is your jaw lowered slightly? Does the tip of the tongue touch the bottom of the front teeth? Is there a slight protrusion of the lips forming an oval? Is your vowel pure? Where is your voice placement? Keeping these questions in mind, continue singing these words after I do as correctly as you can.
4.   bought
5.   pause
6.   saw
7.   moss
8.   taught

Please sing the words one at a time on your own, taking care to produce every **[ɔ]** vowel correctly.

[Show the 8 words and the IPA symbol.]

Answer these questions. Did your [ɔ] sound like mine? Were your lips more open than [o]? Did you have a feeling of space in your mouth? In forming your [ɔ] would you blend with the other members of your choir ?

If you need more practice, return to the beginning of the lesson.

Your assignment tonight is to practice the [o] and [ɔ] vowels at home. Remember these positions:
1.   Your jaw should be lowered slightly.
2.   The tip of the tongue should touch the bottom of your front teeth.
3.   You should feel a slight protrusion of the lips forming an oval.

Both vowels should be pure. Your voice placement is in the middle. [Sing [o] and [ɔ].]

Practice well!

If you have listened carefully and have mastered the sounds of the [o] and [ɔ] vowels, please complete this assessment.

Listen to these four sounds and identify the [o] vowel and the [ɔ] vowel.

1.   [Sing [æ].]
2.   [Sing [u].]
3.   [Sing [o].]
4.   [Sing [ɔ].]

Which one is [o]? [Pause.] Which one is [ɔ]? [Pause.] Are you sure? [Pause.] If you chose the third sound for [o] you are correct. If you chose the fourth sound for [ɔ] you chose correctly. What were the other two sounds? In words can you find the other two sounds?

If you did not score 100% on the assessment, you need more practice. Return to the beginning of the lesson. If you have listened carefully and have mastered the sound of the [o] and [ɔ] vowels, please proceed to the vowel practice.

Vowel Practice

Practice singing the **[o]** and **[ɔ]** vowel sounds. Remember that as you proceed from left to right, the only difference between the two sounds is in the shape and size of the oval formation of the lips.

[Demonstrate the two vowel sounds.]

Please sing the vowel sounds after I sing them. [Sing the vowels and cue to start.]

Listen as I sing the first two words on the list. [Sing hope and haw.]

Please sing the words after I sing them [Sing hope, haw and give cue to start.]

Proceed with the practice words, moving at your own pace from left to right. If you need to review the vowels individually, return to Lesson 9.

Practice words

[o]	[ɔ]
hope	haw
obey	saw
omit	warm
police	horn
polite	bought
home	pause
comb	war
know	taught
pillow	moss

If you are comfortable with these words, proceed to the following vowel test.

Vowel Test

Sing the following words taking care to form the vowel carefully and accurately.
1.   **omit**
2.   **polite**
3.   **warm**
4.   **home**
5.   **saw**
6.   **pause**
7.   **awe**
8.   **comb**
9.   **pillow**
10.   **horn**

Congratulations on completing these nine vowel lessons. Continue to work on these basic pure English vowel sounds. Singing them beautifully takes much practice, concentration, and determination. As you sing, always remember to LISTEN. A singer must be a good listener as well as a singer. YOUR keen listening ear makes for beautiful singing. Listen to what you are doing and to what others around you are doing. Hopefully, the result will be beautiful music. What could be any better than that?

Review
Answer the following questions. If you cannot answer a question, go back to the lesson and review. The lessons are given for your reference.

Lesson 1
1.   What is the International Phonetic Alphabet?

2.   What is a forward vowel?

3.   What is the feeling of "space in the mouth"?

4.   Sing the vowel sound of the word ***beet***, keeping in mind the placement of the tongue, jaw, and lips.

Lesson 2
5.   Sing the vowel sound of the word ***bit***, keeping in mind the placement of the tongue, jaw, and lips.

Lesson 3
6.   Sing the vowel sound of the word ***bet***, keeping in mind the placement of the tongue, jaw, and lips.

7.   What is the physical difference as you move from **[i]** to **[ɪ]** to **[ɛ]**?

Lesson 4
8.   The English language has _____ forward **"a"** sound(s) and _____ backward **"a"** sound(s).

9.   Sing the vowel sound of the word ***bat***, keeping in mind the placement of the tongue, jaw, and lips.

Lesson 5
10.   Sing the ***dark ah.***

11.   What is a dark vowel?

12.   Sing the vowel sound of the word ***father***, keeping in mind the placement of the tongue, jaw, and lips.

13.   Sing **[æ]** and **[ɑ]**. What creates the difference between these two sounds?

<u>Lesson 6</u>
14.   Sing the purest of vowel sounds.

15.   Sing the vowel sound of the word ***boot***, keeping in mind the placement of the tongue, jaw, and lips.

16.   How are the lips shaped for **[u]** ***"oo"***?

<u>Lesson 7</u>
17.   Sing the vowel sound of the word ***book***, keeping in mind the placement of the tongue, jaw, and lips.

18.   What is the physical difference between **[u]** and **[ʊ]**?

<u>Lesson 8</u>
19.   What makes the physical difference between **[o]** in ***hope*** and **[ɔ]** in ***haw***?

20.   Sing the vowel sound of the word ***hope***, keeping in mind the placement of the tongue, jaw, and lips.

<u>Lesson 9</u>
21.   Sing the vowel sound of the word ***haw***, keeping in mind the placement of the tongue, jaw, and lips.

<u>Introduction</u>
22.   What is a pure vowel?

23.   True or False: The formation of vowels may vary slightly from person to person due to physical differences in individuals.

IPA Vowel Reference List

[i]   beet

[ɪ]   bit

[ɛ]   bet

[æ]   bat

[ɑ]   father

[u]   boot

[ʊ]   book

[o]   hope

[ɔ]   awe

Vowel Tutorial Script
CD-ROM tutorial
Carol Morgan Jordan
Revised 6/27/02

TUTORIAL POWERPOINT SLIDES

Pure Vowel Study

Course Instructions:

1. This course is 9 lessons in pure vowel singing sounds.

2. Complete one lesson per day and review.

3. Practice session summaries at the end of 3, 5, 8 and 9.

4. Each lesson requires your verbal and singing response .

5. Use the keys below to navigate the program.   Click on a button to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels
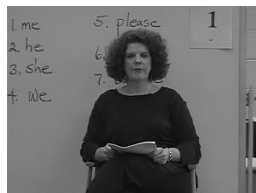
Pure Vowel – Speech Sound

Sustained without a change in the sound and without a movement in the tongue, lips or jaw until the air flow ceases.

Mrs. Jordan

English – A, E, I, O, U

1. Pronounce vowels correctly

2. Sing with proper air flow

3. Learn position of jaw, tongue and lips   Click on a button to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Slide 1

Lesson 1 [i] beet

Jaw is relaxed

Tongue is behind lower teeth

Lips gently parted
[i]

Roof of mouth is raised

(Surprise – raises roof of mouth)

Speak and respond:

[i] [i] [i]   [i]   [i]   [i]

[i]
beet

Bright   Middle   Dark   Click on a button
                                               to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
                IPA Vowels

Slide 2

Lesson 1 [i] beet

Choose the [i] sound you think
is correct.

If you chose the 2nd sound, you were correct!

Assignment:

Study the [i] vowel sound by saying and
singing the words privately.   Click on a button
                                        to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
                IPA Vowels

Slide 3

Lesson 1 [i] beet

[i]

beet

International Phonetic Alphabet (IPA)

Each symbol stands for 1 sound

Developed by the International Phonetic Association
in 1886

Each lesson shows the IPA symbol for that vowel sound.

                                        Click on Forward
                                        start lesson 2

Exit ← 1 2 3 4 5 6 7 8 9 R →
                IPA Vowels

Lesson 2 [I] bit

Forward Vowel:

[I]

A vowel sound that forms a
high arch in the mouth.

bit

Click on a button
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 2 [I] bit

[I]

Jaw is relaxed
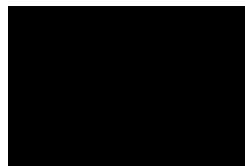
bit

High arch of tongue is slightly back

Lips rounded and gently parted

Feeling of space inside mouth

Click on a button
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 2 [I] bit

Surprise

The difference between [i]
and [I] is the position of the
tongue in the mouth.

[I]

[I]   [I]

[I]   [I]

bit

Feel the sides of your tongue touching
your back teeth.

Click on a button
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 2 [I] bit

[I]

bit

it   sit
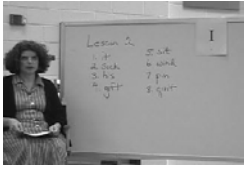
sick   wind

his   pin

gift   quit

Click on a button
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 2 [I] bit

Select the correct sound for [I].

If you picked the last one you were correct!

[I]

Practice the words in your study book.
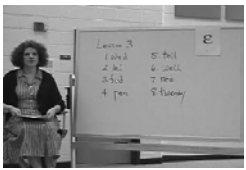
Remember to listen.

bit

Click on a button
to continue

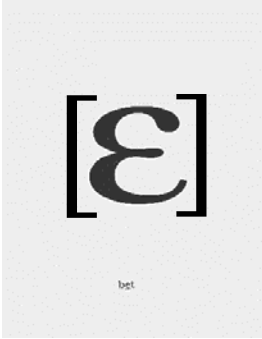Exit ← 1 2 3 4 5 6 7 8 9 R →
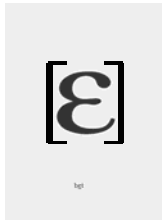IPA Vowels

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Lesson 3

Another Forward
Vowel

bet

[ɛ]

bet

Click on a button
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 3 $[\varepsilon]$ bet

$[\varepsilon]$

bet

Listen for $[\varepsilon]$

$[\varepsilon]$ $[\varepsilon]$ $[\varepsilon]$

Jaw relaxed and lowered

Slightly high arch of tongue move back in the mouth

Lips are unrounded

Lower jaw drops

Feeling of space in the mouth

Lesson 3 $[\varepsilon]$ bet

$[\varepsilon]$

$[\varepsilon]$ $[\varepsilon]$

1. wed   5. tell

2. let   6. well

3. fed   7. red

4. pen   8. twenty
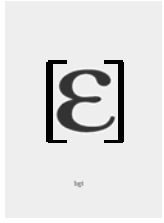
Lesson 3 $[\varepsilon]$ bet

$[\varepsilon]$

bet

wed   tell

let   well

fed   red

pen   twenty

Remember, the consonant sounds
should not affect the vowel sound. $[\varepsilon]$

Lesson 3 $[\varepsilon]$ bet

$$[\varepsilon]$$

Select the correct sound for $[\varepsilon]$.

If you picked the first one you were correct!

Review lessons 1, 2, and 3 if needed to focus on the correct pronunciation of $[\varepsilon]$.

Click on a button
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Practice Session 1

$[i]$ $[I]$ $[\varepsilon]$

$[i]$ $[I]$ $[\varepsilon]$

beet	bit	bet
me	it	wed
he	his	let
she	sick	fed
glee	gift	get

$[i]$ $[I]$ $[\varepsilon]$

Click to continue
with practice words
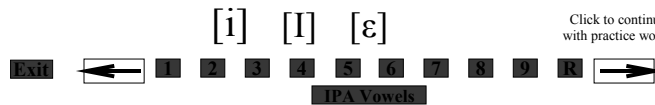
Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Practice Session 1

$[i]$ $[I]$ $[\varepsilon]$

please	sit	red
we	wind	well
breathe	pin	pen
team	quit	twenty

$[i]$ $[I]$ $[\varepsilon]$

Click on a button
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels
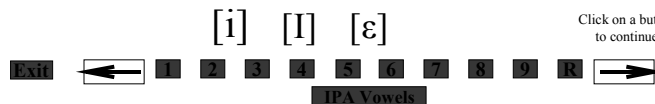
Vowel Test – Lessons 1, 2, 3

Sing the following words, taking care to form the forward vowel carefully and accurately.

[i]   [I]   [ɛ]

1. shed	6. team
2. his	7. she
3. breathe	8. pen
4. hen	9. wind
5. pin	10. sick

Exit ⬅ 1 2 3 4 5 6 7 8 9 R ➡
IPA Vowels

Vowel Test - Answers

[ɛ] 1. shed	[i] 6. team
[i] 2. his	[i] 7. she
[i] 3. breathe	[ɛ] 8. pen
[ɛ] 4. hen	[I] 9. wind
[I] 5. pin	[I] 10. sick

If you scored over 90% on the test, proceed with Lesson 4.

If you scored less than 90%, identify your problem vowel and review the lesson number shown in parenthesis beside the word.

[i] [I] [ɛ]

Click on Forward
start lesson 4

Exit ⬅ 1 2 3 4 5 6 7 8 9 R ➡
IPA Vowels

Lesson 4   [æ]   bat

English has 1 forward vowel A and it has 1 back vowel A.

[æ]

bat

The sounds for these vowels are very similar. Only slight movements of the tongue and jaw separate them.

Click on a button
to continue

Exit ⬅ 1 2 3 4 5 6 7 8 9 R ➡
IPA Vowels

Lesson 4   [æ]   bat

This sound does not exist in German
or Italian but is important in English.

bat   bat

The jaw is relaxed and slightly lowered.

The tongue high point is forward in the mouth.

The tip of the tongue touches the lower front teeth.

The sides of the tongue do not touch the upper teeth.

The lips are unrounded and more open.

bat

bat

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

[æ]

bat

Lesson 4   [æ]   bat

1. cat

2. hat

3. man

4. can

Click forward
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

[æ]

bat

Lesson 4   [æ]   bat

1. cat   5. sad

2. hat   6. hand

3. man   7. lamp

4. can   8. fashion

Click forward
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 4   [æ]   bat

[æ]   [æ]
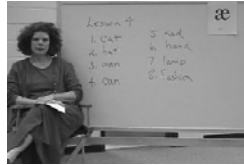
Select the correct sound for [æ].

[æ]

bat

If you picked the first one you were correct!

[æ]   bat

Lesson 4   [æ]   bat

Assignment: Practice the words in your study book

[æ]

The jaw is relaxed and slightly lowered.

[æ]
The tongue high point is forward in the mouth.

The tip of the tongue touches the lower front teeth.

The lips are unrounded and more open.

[æ]

Lesson 5   [ɑ]   father

[ɑ]

Back Vowel
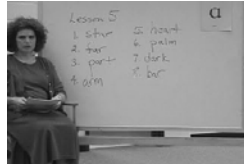
father

The back vowel sound is made with the high point of the tongue in the back of the mouth.

First back vowel is: [a]   father

Lesson 5 [ɑ] father

father father father

The jaw is relaxed and slightly lowered.

[a]

The arch of the tongue is in the back of the mouth and the tip touches the lower teeth.

Lips are open in a slightly relaxed and oval position. father

father

Surprise! father

[a] [a]

Click forward to continue

Exit 1 2 3 4 5 6 7 8 9 R

IPA Vowels

---

[a]

Lesson 5 [ɑ] father

The consonant does not affect the sound of the vowel.

father

1. star	5. heart
2. far	6. palm
3. part	7. dark
4. arm	8. bar

Click forward to continue

Exit 1 2 3 4 5 6 7 8 9 R

IPA Vowels

---

[a]

Lesson 5 [ɑ] father

A feeling of space in your mouth?
Practice these words on your own.

father

1. star	5. heart
2. far	6. palm
3. part	7. dark
4. arm	8. bar

Click forward to continue

Exit 1 2 3 4 5 6 7 8 9 R

IPA Vowels

Lesson 5   [ɑ]   father

father

Select the correct sound for [a] .

[ɑ]

father

If you picked the second one you were correct!

[æ]   bat

[a]   father

Homework: study the vowel sounds: [a]   Click forward to continue

Exit   ←   1   2   3   4   5   6   7   8   9   R   →
IPA Vowels

Practice Session 2

[æ]	[ɑ]
bat	bar
bat	bar
cat	far
hat	part
can	arm

Slight movements in the jaw and tongue create the difference between [æ] and [ɑ]   Click forward to continue Practice Session 2

Exit   ←   1   2   3   4   5   6   7   8   9   R   →
IPA Vowels

Practice Session 2

[æ]	[ɑ]
sad	star
hand	palm
lamp	heart
fashion	father

Continue your practice of [æ] and [ɑ] vowel sounds.   Click forward to continue Practice Session 2

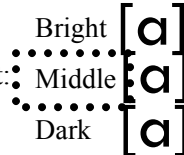Exit   ←   1   2   3   4   5   6   7   8   9   R   →
IPA Vowels

Practice Session 2

[æ]   [ɑ]

Bright [ɑ]

Was your voice placement: Middle [ɑ]

Dark [ɑ]

After you are comfortable with these sounds
proceed to the test for æ and ɑ

Vowel Test - Answers

[ɑ] 1. bar (5)   [ɑ] 6. dark (5)

[æ] 2. hat (4)   [ɑ] 7. star (5)

[ɑ] 3. heart (5)   [æ] 8. fashion (4)

[æ] 4. lamp (4)   [æ] 9. apple (4)

[æ] 5. cat (4)   [æ] 10. sad (4)

If you scored over 90% on the test, proceed with Lesson 6.

If you scored less than 90%, identify your problem vowel and review
the lesson number shown in parenthesis beside the word.

Lesson 6

Reminder:

Sing the words as you hear them.

Learning to sing pure vowels requires that you practice
out loud by singing.

The next vowel is the purest of all the vowel sounds.

Lesson 6   [u]   boot

[u]

boot

1. hoot

2. too

3. moon

4. soon

Are my lips rounded?

Is the high arch of the tongue in the back of my mouth.

Is my voice placement in the middle.

Click forward
to continue

Lesson 6   [u]   boot

[u]

boot

1. hoot

2. too

3. moon

4. soon

5. do

6. blue

7. food

8. goof

The consonant does not affect the sound of the vowel.

Click forward
to continue

Lesson 7   [ʊ] book

The jaw is slightly lower than for [u].

The high point of the tongue is in the back of the mouth close to the roof of the mouth.

The tip of the tongue touches the back of the lower teeth.

The lips are rounded, but more relaxed than [u].

[ʊ]

book

[ʊ]   [ʊ]   [ʊ]   book

Click forward
to continue

Lesson 7   [ʊ] book

[ʊ]

book

1. hook   5. stood

2. full   6. look

3. pull   7. good

4. push   8. would

Sing these words taking care to pronounce the [ʊ] vowel correctly.

Practice Session 3

[u]   [ʊ]
[u]   [ʊ]

boot   book

hoot   hook

too   took

moon   pull

[u] [ʊ]

Practice Session 3

[u]   [ʊ]

soon   push

do   look

blue   brook

food   good

goof   would

[u] [ʊ]

101

Vowel Test - Answers

[u] 1. boot   [u] 6. moon

[ʊ] 2. book   [u] 7. food

[ʊ] 3. pull   [ʊ] 8. good

[ʊ] 4. push   [ʊ] 9. full

[u] 5. do   [u] 10. goof

If you scored over 90% on the test, proceed with Lesson 8.

If you scored less than 90%, identify your problem vowel and review the lesson number shown in parenthesis beside the word.

[u] [ʊ]

Click on forward
start lesson 8

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 8   [o]   hope

Back vowels in lessons 8 and 9

Jaw is slightly lower for [o] than [ʊ]

The back of the tongue is less elevated for [o] than for [ʊ]

The tip of the tongue touches the back of the front teeth.

A slight protrusion of the lips

[o]   [o]   [o]
       [o]

pillow

Click forward
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

---

[o]   **Lesson 8**   o   hope

pillow

1. obey   5. home

2. omit   6. comb

3. police   7. know

4. polite   8. pillow

Review any lesson you may need prior to proceeding.

Click forward
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 8 [o] pillow

polite

home

[o]

Pay careful attention to the correct production of the vowel.

Assignment: Practice [o] vowels at home.

pillow

Click on forward
start lesson 9

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 9 [ɔ] haw

[ɔ]

awe

[ɔ] haw

Jaw lowered slightly

Tip of tongue touching the back of the front teeth

Slight protrusion of lips form an oval

[ɔ] a pure vowel sound

Voice placement in the middle

Click forward
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Lesson 9 [ɔ] haw

Assignment:
Practice [o] and [ɔ] vowel sounds

[ɔ]

awe

Jaw slightly lowered

Tip of tongue touching the bottom front teeth

Slight protrusion of the lips in an oval

Click forward
to continue

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Practice Session 4

[o] [o]	[ɔ] [ɔ]
hope	haw
obey	saw
omit	warm
police	horn

Review lessons 8 and 9 if needed

Practice Session 4

[o]	[ɔ]
polite	bought
home	pause
comb	war
know	taught
pillow	moss

Review lessons 8 and 9 if needed.

Vowel Test Answers - Lessons 8, 9

[o] 1. Omit   [ɔ] 6. pause

[o] 2. polite   [ɔ] 7. awe

[ɔ] 3. warm   [o] 8. comb

[o] 4. home   [o] 9. pillow

[ɔ] 5. saw   [o] 10.horn

Review

Answer the following questions. If you can not
answer a question, go back to the lesson and review.
The lessons are listed for your reference.

Lesson 1

1. What is the International Phonetic Alphabet?

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Review

Lesson 1

3. What is "space in the mouth"?

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Review

Lesson 1

4. Sing the vowel sound of the word *beet,* keeping
in mind the placement of the tongue, jaw and lips.

Exit ← 1 2 3 4 5 6 7 8 9 R →
IPA Vowels

Review

Lesson 3

6. Sing the vowel sound of the word bet, keeping
in mind the placement of the tongue, jaw and lips

Review

Lesson 3

7. What is the physical difference as you move from
[i] to [I] to [ɛ] ?

Review

Lesson 4

9. Sing the vowel sound of the word *bat*, keeping
in mind the placement of the tongue, jaw and lips.

Review

Lesson 5

    10. Sing the *dark ah*.

Review

Lesson 5

  12. Sing the vowel sound of the word father, keeping in mind the placement of the tongue, jaw and lips.

Review

Lesson 5

    13.Sing[æ] and [ɑ].   What creates the difference between these two sounds?

Review

Lesson 6

15. Sing the vowel sound of he word ***boot***, keeping in mind the placement of the tongue and lips.

Review

Lesson 6

16. How are the lips shaped for [u] *"oo"?*

Review

Lesson 7

18. What is the physical difference between [u] and [ʊ] .

Review

Lesson 8

19. What makes the physical difference between **[o]** in hope and **[ɔ]** in haw?

Review

Lesson 9

21. Sing the vowel sound of the word haw, keeping in mind the placement of the tongue, jaw and lips.

Review

Introduction

22. What is a pure vowel?

Conclusion

Congratulations!

Continue to practice these vowels

Listen almost as well as you sing

Keep working, listening and practicing

IPA Vowel Reference List

[i]	beet	[u]	boot
[I]	bit	[ʊ]	book
[ɛ]	bet	[o]	hope
[æ]	bat	[ɔ]	awe
		[ɑ]	father

APPENDIX E

ATTITUDINAL ASSESSMENT

Name _____

Circle your group: Group A   Group B

Circle your answers.

Both Groups A and B:

  A. Recalling your vowel learning experience, how confident do you feel about your
      ability to sing a pure vowel sound?

        1.   Very confident

        2.   Somewhat confident

        3.   Not confident

Group A only:

  B. Recalling your vowel instruction, did you enjoy learning about vowels through
      the CD-ROM tutorial?

        1.   Very much

        2.   It's OK

        3.   I do not enjoy this part of choral learning

Group B only:

  B. Recalling daily vowel warm-ups, did you enjoy learning about vowels through
      this practice?

        1.   Very much

        2.   It's OK

        3.   I do not enjoy this part of choral learning

APPENDIX F

SAS OUTPUT OF RAW DATA

Table 3   Prediction of Improvement as function of {ESOL & Treatment Group}
               SAS Output
               The GLM Procedure

Response Variable: Improvement

Source	DF	Sum of Squares	Mean Square	F Value	Pr>F
Model	4	1568.583051	392.145763	10.07	<.0001
Error	45	1752.396949	38.942154		
Corrected Total	49	3320.980000			

	R-Square	Coeff Var	Root MSE	Improvement Mean
	0.472325	125.3085	6.240365	4.980000

Source	DF	Type III SS	Mean Square	F Value	Pr>F
Sex	1	26.969077	26.969077	0.69	0.4097
ESOL	2	282.278051	141.139026	3.62	0.0347
Treatment_Group	1	1129.076170	1129.076170	28.99	<.00001

Parameter Estimates:

Parameter	Estimate	Standard Error	t Value	Pr>[t]
Intercept	0.855210132 B	2.50591671	0.34	0.7345
Sex F	-1.911773172 B	2.29727670	-0.83	0.4097
Sex M	0.000000000 B			
ESOL CL	6.938687392 B	2.75072368	2.52	0.0153
ESOL Exited	-0.245106505 B	1.99484546	-0.12	0.9028
ESOL NE	0.000000000 B			
TreatmentGroupA	9.522452504 B	1.76846790	5.38	<.0001
TreatmentGroupB	0.000000000 B			

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