DREXEL UNIVERSITY

Office of Computing Services
Drexel Jniversity
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TEACHER AND STUDENT MANUAL

GIVING VOICE TO STUDENT WRITING:

EXPLORING THE USES OF SPEECH RECOGNITION AND SPEECH SYNTHESIS IN A WRITING CURRICULUM

ACTIVITIES FOR WORD PROCESSING WITH SPEECH SYNTHESIS

DREXEL UNIVERSITY LITERACY PROJECT

Ben Burenstein

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INTRODUCTION

Giving Voice to Student Writing was a special demonstration project, funded by the Pennsylvania Department of Education, Bureau of Adult Basic Education, through a Section 353 grant. It was designed to explore the use of speech synthesis and speech recognition in writing-based classes held by two Philadelphia literacy providers.

This project sought to examine the use of high quality **speech synthesis** (the computer reads words from the screen, in an understandable voice) and **speech recognition** (the computer responds to verbal commands) in facilitating process writing. It utilized hardware and software that allowed learners to hear and edit their own writings on the computer. The software and hardware were integrated into writing-oriented classes already in place at the Community Learning Center and the Community Women's Education Project.

Teachers at each agency were instructed in the use of the hardware and software. Students wrote stories and listened to the computer read them back. Teachers collected and reported information on the effect of the computer reading to the students.

Speech synthesis proved to be useful for some students in encouraging more editing and better writing. Many were able to recognize and correct more grammar and spelling errors after hearing their stories read back by the computer. Most enjoyed and valued having access to this capability. The teachers unanimously felt that it was worthwhile, especially for certain students. When obtaining new equipment intended to be used in writing curricula, speech synthesizing software and hardware should be considered.

Despite the claims of the creators of the speech recognition program, it proved to take more computing power and time and energy to use than was provided for by this project. While this technology offers promise in the next few years to have a profound effect on how we understand reading and writing, it was not feasible to explore it with the currently available version of the software.

A secondary intention of Drexel's collaboration with these two agencies in the same building was to promote an internal computer support system between them and help build a critical mass of skilled users. This did occur, and they are continuing to use the computers and learn with each other.

As part of fulfilling this grant, this manual was developed for teachers who may wish to integrate speech synthesis into their curriculum. It contains a description of

the technologies used and activities which may be used with speech synthesis in a classroom or individual setting.

I hope you give speech synthesis a try and that you will use some of the activities suggested here. Let me know what works for you, as well as any additional process writing activities you come up with or experiences you have.

PROJECT BACKGROUND

WHO WE ARE

For the past eight years, Drexel University's Office of Computing Services has been actively involved with providing technical support to the Mayor's Commission on Literacy and the administration, staff, teachers, and tutors of computer-equipped literacy sites in Philadelphia and the tri-county area. This support consists of on- and off-site trainings in hardware, software, and curricular uses of computers both in-person and by phone, monthly workshops, and an annual conference. Specialists are available by phone to answer hardware and software questions about technical, curricular, and administrative uses of computers. Drexel's staff has developed expertise in evaluating software programs and making suggestions for integrating them into ABE curricula. Drexel helped the Mayor's Commission on Literacy select and distribute over $130,000 worth of software to Philadelphia's agencies between 1987-1992, and hosted the National Adult Literacy and Technology Conference in 1995. The staff is experienced at conducting seminars and teaching people how to use computers.

Drexel has also conducted numerous direct service programs, including a Section 322-funded program in homeless shelters, a PIC project leading formerly homeless residents to employment in banks, a class for Head Start Parents at the Parent-Child Learning Center, and summer camp programs for Phil-a-Job and the National Science Foundation. In each of these programs we have extensively integrated process writing with computers and desktop publishing, because we believe that reading and writing are intimately connected and that computers and word processing programs offer unique and valuable tools to help learners with their writing.

Drexel University, recognizing the potential benefits of new technologies for its 11,000 students, has initiated many projects which explore and exploit the possibilities of computer based multimedia throughout the university community. Multimedia allows computers to integrate visual information(text, graphics, animation, and video) with sound information (speech, music, and noise). Thus it offers the possibility of providing educational experiences which are relevant to users with a wide variety of learning styles.

COMPUTERS AND MULTIMEDIA IN EDUCATION

An emerging area of educational inquiry that has had an impact on understanding the individuality of the learning process is the concept of learning

styles (Gardner, Howard, "Beyond the IQ: Education and Human Development," Harvard Educational Review, May 1987). Though there are many ways to examine learning styles, one of the most basic analyses indicates that some people learn best through seeing, others by hearing, others by doing. Everyone learns through all of these senses, but each person has unique learning, retention, and communication styles that emphasize the primacy of one of them.

Schools tend to provide educational experiences that may be highly effective for some learners but not so good for others. One reason is that schools may train to a specific combination of learning styles. They may emphasize learning by seeing at the expense of learning by doing or hearing. This may be one reason some learners succeed in school, specifically in learning to read, and others do not do as well.

Good software programs can respond to students' varied learning styles by delivering multimedia instruction using sound and sight to augment written text. Computers are currently used in writing, reading, mathematics, science, and social studies in ABE and GED education, with learners at all age and skill levels and in many settings. They can help provide private, non-judgmental, individualized, self-paced instruction. Typing and word processing skills are valuable for job-seekers. Print-outs can be illustrated and published readily, encouraging students to recognize the link between written and verbal speech. Well-planned on-screen prompting may enhance the development of metacognition.

Numerous projects have attested to the value of word processing in writing curricula (for instance, Project 353 Report on An Instructional Guide for A Language Experience Approach for Computer-Aided Instruction in a Volunteer-Taught Adult Literacy Program, The Center For Literacy, August, 1987, and Project 353 Report on A Message From H.O.M.E., Drexel University, August, 1991). Word processors, spell-checkers, outliners, on-line dictionaries and thesauri can be more responsive to and motivational for some students even where traditional writing tools exist. Such tools can be useful at all stages of the writing process, from pre-writing, through composition, to editing. They can allow learners to focus on thinking and creating, on voice and content, rather than mechanically copying.

In addition to being effective teaching tools and vehicles for delivering information and instruction, there are numerous social and self-esteem reasons why students will attend a class which is computer-oriented rather than more traditional. It is more acceptable to say, "I'm going to study computers," than, "I'm going to reading class." Because the computer is the symbol of the dominant society, it is empowering for learners to associate with it.

DEFINING SPEECH SYNTHESIS

Speech synthesis is a readily available technology on almost any computer manufactured since 1994. For instance, it comes free, bundled with all the new Apple Macintosh computers sold since 1993. It involves both software which provides commands to the computer and hardware which can make sounds.

Computers carry out speech synthesis by examining text. One way text gets into the computer is by a user typing it in. Then the software evaluates the text based on sets of pronunciation guidelines and follows those rules to generate sounds which approximate the typed words. The sounds are then played through speakers or a headphone. Users can elect to hear an entire piece read aloud, or a word, phrase, or sentence at a time, and can frequently control the tone, pitch, and speed at which the words are "spoken" by the computer.

If English was a language where there was great correspondence between the letters and text (such words as "me" or "hello") it would be easier to create software which could synthesize speech which would sound correct and natural. But English is quite complex. For instance, it is difficult for programmers to write rules which enable the computer to recognize the differences in the "ough" sounds in "rough," "cough,", "though," "through," and "drought."

The quality of speech is dependent on the quality of the hardware and software, and the amount of memory the computer dedicates to the task. In previous generations of computers that were slower and could handle fewer sets of rules, the voices sounded robotic and pronunciation was riddled with inconsistencies, without inflection or with strict (and frequently wrong) inflections..

Years of continued work has produced sophisticated software which can deal with many of the variations of typed language and generate high-quality speech sounds. The tones and inflections of the voices seem remarkably lifelike. The clarity and human sound of the computer voice is also improved by readily available, higher quality hardware.

All the speech synthesis software used in the project which forms the basis for this manual is based in two Apple programs called Speech Manager and PlainTalk Speech Manager and PlainTalk. These programs, which Apple distributes without cost, permit the computer to pronounce text in a variety of voices. Depending on the configuration, equivalent software in DOS/Windows/Windows95 might be included with a multimedia package or might need to be purchased separately,

along with speakers. See Appendix 1 for information on speech synthesis hardware and software available now.

Some simple, pleasant male or female voices are available. Others may be funny (sounding like bubbles were welling behind the voice) or interesting in other ways (trio-harmony voices, sobbing voices, childlike voices). It is also possible with these programs to customize the pitch, speed, and volume of each voice. So learners have the ability to individualize the voices and hear their work read the way they prefer to hear it. In the demonstration project, different students enjoyed listening to their work read by different voices.

Storing and using high quality computer voices takes quite a bit of memory, both hard disk memory and random access memory. For instance, to store a recent high quality male voice takes 2,258,788 bytes. To save space computer programmers have developed *compression algorithms* which keep reasonably good quality while using less memory. The compressed male voice takes only 393,066 bytes.

LITERACY AND SPEECH SYNTHESIS

Until recently, few studies were conducted on the use of speech synthesis with adult learners. One small speech synthesis study, (Lees, Elaine, "Proofreading with the Ears", Collegiate Microcomputer, Nov. 1985) which only studied one learner and used relatively "primitive" technology that the learner had no control over, notes that poor readers frequently have trouble proofreading their work, compounding their problems with writing:

> ...they too readily conclude that what appears on their pages fulfills their intentions, and thus overlook serious errors in their texts. Yet these writers cannot be said to be linguistically incompetent, for many of them talk and listen with great skill and sensitivity. Clearly, they know more about language than their written texts suggest. But ordinary proofreading methods, because they depend solely upon a reader's ability to interpret visible text, do not allow these writers to draw fully upon their linguistic knowledge when they review their work. (P. 339)

The student, when asked to edit a passage he had written from text alone, made three true corrections. When the passage was played back to him and he could hear the words he had written from a mechanical voice, he made seven corrections. Lees attributes this to three factors: (1) The additional auditory input made it possible for him to take in the information through two sensory modes rather than one. He "used the speech system to locate and identify ways in which the audible contours of

his written text differed from those of his intended text." When he heard something which "sounded" wrong, he was able to return to the printed text and make corrections. (2) The auditory input relieved him of the burden of reading while editing. In ordinary proofreading, writers both read the text to themselves and evaluate that text. With speech synthesis he was freed of the responsibility of "performing" the text, and could concentrate on the editing function. (3) The computer controlled the speed at which the text was read. When he proofread by himself, he went too fast, assuming he had things correct because he knew what he wanted to say. The stately, measured pace of the computer (which can be adjusted) helped him spend adequate amounts of time on the material.

Another study (Borgh and Dickson, "The Effects on Children's Writing of Adding Speech Synthesis to a Word Processor," University of Wisconsin, 1986) notes that "regardless of grade level, school, or sex, children did between three and seven times more editing" when the computer read the text back to them than when they edited alone. They state that "the more automatic, overlearned system for processing oral speech with the written symbol system activated a greater depth of processing the written text than otherwise might have occurred."

There is speech recognition software available now which can accept up to 45 words per minutes of dictation, and turn that dictation into text. Speech synthesis software might then turn that text into a computerized voice. What effect might it have on adult education students if they can dictate their writings into the computer, have the machine read it back to them, and then use computer resources to edit it? Speech technologies reinforce the connection of writing to talking. One might theorize that using them would allow learners to concentrate on the important overriding aspects of writing -- thinking, planning, choosing, decision-making -- while letting the computer handle the more mechanical tasks of typing and spelling.

On the other hand, it is possible that speech technologies might hinder and intimidate some learners. Perhaps for some the mental act of writing is in fact related to the physical act, and word processing might have a negative effect on the process.

The Final Report for this project describes the experiences of the teachers and learners who participated. Most valued working on the word processor and said they would use computers again. Not everyone enjoyed the speech synthesis aspect. Some preferred to work with a partner or the teacher. Some, however, found speech synthesis fulfilled their need to hear their work aloud, without having to read it

aloud themselves or entrust it to a classmate. It provided them with a sense of freedom and helped them feel better about their writing, leading them to write more. Teachers and students felt it helped with grammar, punctuation, and preventing run-on sentences. Perhaps it will be as useful for some of the students you work with.

THE WRITING PROCESS AND SPEECH SYNTHESIS

Some of the tenets of the Process Writing approach include:

1. Learner individuality and privacy should be valued. (Respect)
2. People learn to write best when they write a lot. (Fluency) "... the more they write, the more they practice creating written symbols from thought, eventually decreasing the necessity to translate through actual speech sounds."
3. People write most when they write about what is important to them. (Relevance)
4. People learn best when they learn to experience writing as similar to speaking, rather than just "assignments." Content and voice are primary, with understanding of the mechanics of writing-- spelling, grammar, punctuation-- stemming from assignments based on the learners' own compositions. (Relevance)
5. People will learn best from their mistakes if they really care about getting their messages across. (Text-Based Assignments)
6. Peer review and collaboration are useful in enhancing writing. (Social Learning)

Word processing can help implement these tenets (see A Message from H.O.M.E. for examples). Speech synthesis can be integrated with word processing and used in all stages of the writing process: planning, drafting, revising, editing, and proofreading.

In *planning*, word processing can be used to quickly type in ideas, just as with paper. However, in this case, all the text is available to directly use later in the document rather than being laboriously recopied -- students don't need to put them in twice, and any good ideas which don't make it into this piece of writing can be saved for the next. Frequently brainstorming sessions are done on chalk boards which must be erased for other classes or large sheets of paper which quickly fill up a room. With computerized sessions they can easily be saved and recalled at a later date. With speech synthesis students can **listen** as well as read when they go back through their brainstorming session.

Some people enjoy *drafting* their work on computers and others may prefer to draft on paper. Some studies show that if learners can type well they can compose on a word processor far more quickly than with a pen, promoting fluency. They can type as much as they would like and cut what they don't like later. Students who wish to draft on paper may want to enter their draft into a word processor and revise on the computer. Speech synthesis can help by letting them hear sentences as they write them, making sure they hear what they meant to write.

During *revising*, word processing can be enormously useful. It allows writers to easily manipulate text, to change, erase, add or move words, sentences, paragraphs and sentences around, to print out different versions and see how well they succeed in communicating the meaning and feeling of their piece. This can be a great advantage over laboriously recopying by hand. With speech synthesis, students can hear how alternative versions sound.

A word processing program can help during *editing*. A number of computer tools can help improve the way the piece "sounds." Some word processing programs have built-in easily accessible thesaurus and grammar-checking components, which are not only useful for enhancing the student's writing but also helps them learn vocabulary and grammar by experimentation and personal experience. The search and replace functions can be used to learn about point of view (have learners change "me" in sentences to "you"). Again, speech synthesis can help learners experience another dimension to their writing and easily edit to suit what sounds best.

If *peer editing* is used, the computer's functions give students the opportunity to make editing changes suggested by peers, decide how they work, and accept or reject them. Classmates can exchange disks to try their own edits on copies of others' stories. Using speech synthesis to share stories with others could be very beneficial to those who are shy, frightened, or perhaps physically unable to speak themselves. Speech synthesis can make everyone's writing easily to everyone else in the class, because if you want to listen to another person's story, all you do is select the text you want to write.

Speech synthesis can be very useful in spelling and grammar, components of the final stage of the writing process, *proofreading*. It can uncover misspellings which cause mispronunciations. Many word processing programs have spelling checkers which could suggest correct spellings, which users could preview by ear. Users can hear run-on sentences and sometimes can hear where there should or should not be commas as well as other grammatical errors.

Learners engaged in process writing do not ignore the subskills of writing, such as grammar, spelling, punctuation and others. But lessons on these subskills are based on difficulties learners have in their own compositions, not some arbitrary set of lesson plans which dictates that this week we study capitalization, and next week commas. As they struggle to improve their own writings, they learn the subskills in context. It is always remembered that the overarching objective is to think and effectively communicate those thoughts through writing, and that the subskills are just means to that end, rather than ends in themselves. Speech synthesis can help extend this contextual opportunistic learning to those who are stronger auditorily than visually.

IMPLEMENTING SPEECH SYNTHESIS IN YOUR PROGRAM

To effectively implement speech synthesis in your site, you must plan which hardware and software you will use and how you will use it. This section of the manual will give guidelines for this process. The next section will offer a set of exercises which you can use. The exercises give examples of using speech synthesis used in a variety of educational approaches. With planning, you can adapt it to match your teaching goals and styles.

EDUCATIONAL CONSIDERATIONS

The demonstration project took place in two agencies which use writing extensively, to help learners express themselves and their understandings about their communities and their lives, and to improve their ABE and GED skills. In deciding how to fit speech synthesis into their curriculum we evaluated where learners got to write, and tailored activities to fit into those needs.

Think about how student writing fits into your program, and then about how speech synthesis will work with writing.

Do you use process writing? Do learners write to each other and engage in peer editing? Do students publish their work in newsletters or yearbooks? If students already use word processing, it may be relatively easy to add speech synthesis. If not, you will need to include an introduction to computers and word processing.

Do you focus on phonics? Do students ever need to memorize sight words? How might the ability to hear words affect their skills at this?

Do you use a combination of these and other educational approaches? You must evaluate your agency's teaching methods to discover how to best use the technology to help you reach your goals.

Look through the section on lessons. Many of them should apply to your approach.

HARDWARE

Evaluate what hardware is available to you to purchase, lease, or borrow which will fill as many of your needs as possible, including speech synthesis. All Apple Macintosh computers sold since 1993 have the capability of speech synthesis and software is bundled with them. Many PC computers have the capability as well, though not all have the bundled software. Look for a PC which is "Sound-Blaster compatible" and which has speakers or a place to plug in headphones. Any

computer with "AV" (for audio-visual) or "Multimedia" in its name is very likely to have speech synthesis capacity.

The quality of speech which comes out of the computer is controlled by the quality and speed of the computer, the way the software is written, and the amount of memory the computer dedicates the task. Though some speech synthesis programs work with less, look for computers with at least 4MB of RAM (Random Access Memory) and a 100MB hard drive. In Macintosh look for computers with at least a 69020 processor, but preferably 68030, 040, or PowerPC. In the PC realm look for computers with at least a 286 processor, but preferably a 386, 486, or Pentium.

The way the speech sounds is also affected by the speaker the sound comes from. Some computers speakers are built in, others need external attached speakers, and others rely on speakers in the monitor to provide sound. You will need to be sure that the speakers you use are shielded from the electromagnetic energy given off by your computer. Many inexpensive speakers are available. Most computers will also have a jack to plug in a headphone, which for some situations will be preferable to speakers.

It is important to have a working **printer** to use with the computer. Students should be encouraged to print out their work to take home or share as often as they like. Unless you are planning to teach them how to incorporate graphic images into their writings the quality of the printer is not particularly important. Any dot-matrix, inkjet, bubblejet, or laser printer is acceptable.

SOFTWARE

You need to choose what software you will use in your class. You can use a commercial word processing program which has speech synthesis built in or a specialized program. Or you may want to use software you already have. See Appendix for software currently available which has this capability.

Ideally, you should choose a word processing program in which speech synthesis is already integrated, such as the ones utilized in this project. (See Appendix 1) It may be a generally available word processing program which has speech synthesis as an added feature, it may be a program specifically designed for teachers which uses speech synthesis as a central feature, or it may come with the speech synthesis package you purchased. All of these varieties of word processing allow you to select text and then issue a simple command (maybe as simple as a mouse click) which makes the computer "speak" the selected text whether it is a letter, word, sentence, paragraph, or the whole document. The Penn State Adult

Literacy Word Processor is specifically designed to allow ready access to speech synthesis for ABLE learners.

Of the two most popular word processing programs used today, WordPerfect 3.5, the current version for the Macintosh, does have speech synthesis built in; the current version of Microsoft Word 6.0.1 does not. Word users can link text to separate speech synthesis programs with a "little" programming, but this extra work shouldn't be necessary.

In previous generations of computers, that were slower and could handle fewer sets of rules, the voices sounded quite robot-like and pronunciation was riddled with inconsistencies. But with the current technology the tone and inflections of the voices are frequently quite lifelike. The more realistic the pronunciation the more useful it will be to you.

The earliest speech synthesis programs had a single robotic voice. As noted in *Defining Speech Synthesis*, above, now many voices are readily available. The Penn State Adult Literacy Word Processor comes with 32 different voices! Also as noted, different voices take different amounts of memory. If you have a limited amount of memory, you will want to load only one or two voices, if possible a high quality male and female voice. On the other hand, if you have enough memory available, you and your students will enjoy experimenting with the different available voices.

Some programs also allow users to phonetically and phonemically manipulate the pronunciation of specific words to make them have sound exact.

Three speech synthesizing word processing programs were placed on the computers put into CLC and CWEP: SimpleText, a program from Apple that comes pre-installed on all current Macintosh computers; the Institute for the Study of Adult Literacy's Adult Literacy Word Processor; and Nisus, a full-featured commercial word processing program. Each program is different and offers advantages either in ease of use or in enhanced features, and Drexel wanted the teachers to be able to choose the program that would be best for them. In all of them, after typing text into the computer, the user selects the text they wish to hear spoken and chooses a "Speak" command. It is an easy to learn two-stage process and most of the students seemed to learn it, after some opportunity to learn how to use the mouse. The computer then generates sounds that approximate a human voice pronouncing words, sometimes well, sometimes poorly. Users can listen to selected text or an entire document.

All the speech synthesis programs used in the demonstration are based in an Apple technology called MacinTalk Pro. This technology which Apple distributes freely permits the computer to pronounce text in a variety of voices. Some of these were simple, pleasant male or female voices. In the demonstration project, different students enjoyed listening to their work read by different voices.

See Appendix I for information on the software used in this project, and software specifications for programs in DOS, Windows, and Windows95.

LOCATION

If you have many computers and copies of the software for users, you might want to have half of the class working on computers at the same time with headphones. If you have one computer for the entire class, you may want to try to keep it in class and use it with headphones, or you may want it to be in a separate room so learners can use speakers and concentrate more. It is very important, though, to decide on their location and make sure that it is appropriate for the needs of the students you work with.

In the demonstration project, two different strategies were used. The Community Learning Center put the computer off to the side of the main classroom. This made computer use readily available but meant finding a way to fit it into the classroom program. CLC students usually needed to use headphones. The Community Women's Education Project put the computer in a room off to the side which allowed students to use speakers and maybe focus a bit more on the computer, but also meant that one of the teachers had to be available to answer questions and go to a separate room.

TRAINING

Before using the software with learners you should allow yourself some time to learn about and explore the software -- at least 2 hour and a half long sessions, or as long as it takes to feel comfortable using it. The teachers involved in this project received a two hour introduction to the Macintosh, a follow-up two-hour word processing training, and a two hour speech synthesis training before participating in the project. If you and your students are familiar with the hardware and software available to you this will shorten the training time. Descriptions of the trainings delivered to staff are included in the Final Report on this project.

RECRUITMENT

In the demonstration project, students in four different classes were given the opportunity to participate in this project. These classes were busy working on ABE and GED skills, and so participating meant either coming back after class as some did, or trying to fit it into the regular class period. Approximately half of those in each class chose to participate.

If there are not enough computers and time for everyone who wants to participate, you will need to decide who in your class will get to use speech synthesis.

LESSONS INCORPORATING SPEECH SYNTHESIS

INITIAL AND ONGOING ASSESSMENTS

Speech synthesis will not be a separate area of study, but will rather be an aid in what you already do in class, so "assessments" of students prior experiences with computers or speech synthesis are not strictly necessary. Nevertheless, it may be of interest to evaluate their sense of the technology. The "Computer Interest Survey" below was used by both CWEP and CLC in the demonstration project.

Ongoing assessments will be useful to help evaluate the reactions of learners to the use of speech synthesis. If they indicate anxiety or displeasure towards the technology you will need to decide whether to suggest they try some alternative approaches or suspend their participation. The Computer Use Log below was used by the Community Learning Center to provide this kind of ongoing evaluation.

Name _____ Date

_____

Community Learning Center

COMPUTER USE LOG

1) How long did you work on the computer today? _____

2) Did you feel you had enough time to work at the computer? Explain

3) What did you think of working on the computer?

4) What did you think of hearing your piece read by the computer?

5) Did you change your story after the computer read it to you? ❑ Yes ❑ No
If yes, what kinds of changes did you make?

6) Did hearing your piece allow you to recognize mistakes? ❑ Yes ❑ No
If yes, please explain.

7) Would you like to use the computer more? Why or why not?

8) Would you like to use the computer voice more? Why or why not?

10) How do you prefer to work on your stories? Rate 1 (favorite) –> 5 (least favorite)
__ Computer
__ Teacher
__ Alone without assistance or help from the computer or teacher
__ With friend or classmate

__ OTHER (EXPLAIN)

LESSONS

INTRODUCTORY COMPUTER LESSONS

Unless computers are regularly used in your program, before working with speech synthesis students will need to be introduced to word processing. Students will need minimal computer skills to work with the below activities. They will need to learn how to turn on the computer, get into the word processing program, type a little, and save their work. This will be done either by using a keyboard and/or a mouse. The teacher should prepare an easily-understood document describing these procedures and post it by the computer describing how to do these things to help remind students. Appendix B includes an outline of what should be covered in introductory lessons on computers and word processing.

In the demonstration project, Apple Macintosh 6100CD computers were used. Since you may be using a different computer, adapt these lessons as appropriate. Most computers and programs come with some introductory tutorial material appropriate for the students or you may adapt exercises from a variety of sources such as Keystrokes to Literacy by Antonia Stone or the Tutor Training Manual by the Center for Literacy. See Appendix III for Drexel's TipSheets for the Apple Macintosh.

As students work with the computers over the course of these lessons, they will become familiar with many aspects of how to use a word processing program. Word processing can be used in all stages of the writing process, in planning, brainstorming, outlining, drafting, revising, editing and peer editing, and proofreading. It allows writers to easily manipulate text, to change, erase, add or move words, sentences, paragraphs and sentences around, to print out different versions and see how well they succeed in communicating the meaning and feeling of their piece. Nisus, one of the products used in this project, had all of these components coupled with built-in speech synthesis.

Learning how to backup data which you create is part of knowing how to use a computer well. Even if you have serious constraints on your resources, you should be able to use one of the four ways suggested below to make sure that there is an original and a backup copy of every file each student creates so that if one gets lost or corrupted she will have the other copy. Depending on your computer setup, decide how the students should save what they write on the computer:

- Each student can have two floppy disks to which they save copies of their work;
- Each student can save to one floppy disk and to a space on the hard drive;

- Each student can have their own floppy disk and the teacher can have a "class" floppy disk onto which a copy of everyone's file is saved;
- The teacher can save everyone's file to two class floppies.

SEQUENCE OF LESSONS

This manual contains a set of 12 exercises using speech synthesis with word processing. They are given in order from simple to difficult. Each lesson might take from twenty to forty-five minutes, depending on how much time the student and teacher choose to invest. This seemed to be about the time many of the participants in the original project felt comfortable using the computer.

Some activities might be right for you and your class, others may need modification or may not be relevant. Pick and choose, or use the whole curriculum.

The lessons can be as long as you would normally give to a writing lesson. The students in the demonstration project spent as short as 20 minutes or as long as an hour on different lessons, depending on how long they felt like using the computer.

Lessons 1 -6 provide an overview of how to use speech synthesis in writing. Learners discover what it is, how it works, and how it can be used.

Lesson 1 can be an activity for the whole class, since whether they are going to use speech synthesis or not it is likely to be of some interest to them, just as a new technology. The only limit need be that everyone who attends should be able to **see** the monitor and **hear** the voice. You may want to raise the monitor higher and use large fonts so more people can see. It is mostly a demonstration, although there can be some interaction from the students, and of course some may want to try to use it after the demonstration. If they have enough general computer and word processing savvy to explore speech synthesis independently, and there is time available, by all means let them do so. Otherwise, you may want them to wait until after Lesson 2 to use the program.

Lesson 2 could also be a done as a group or individually.

Lessons 3 and 4 are individual lessons which can be done immediately after lesson 2 or could be done another time the students can use the computers. Depending on their typing skill, mood, and interest in the project, students will spend different amounts of time exploring them.

After the fourth lesson it is assumed that the students have basic command of the computer, the word processing program, and the speech synthesis program, but that they can get help from the teacher or some other support person when they need it.

Lessons 7-12 provide a mini-course in Process Writing. Encourage students to take as much time as is necessary but not to linger, to use the speech synthesis as a writing aid more than as a toy, though its entertainment value should not be slighted. Students may be able to do more than one lesson if they have a long enough time.

Following lesson 12 are some sketches for additional projects using speech synthesis teachers could use.

LEARNING TO USE SPEECH SYNTHESIS

LESSON 1: INTRODUCTION TO SPEECH SYNTHESIS

The introduction can be a group lesson.

Gather students around the computer to introduce the speech synthesis technology.

Describe and demonstrate the speech synthesis program.

Open a document which has already been typed in.

> **Most computers allow you to change the size of the text on the screen by enlarging the *font*. You should use at least 18 point type if you can so more people in the group can see.**

Have the computer "speak" the text. The text that you have it speak should demonstrate the strengths of the software but also its difficulties. You should challenge learners to evaluate the quality of the speech compared to human speech, and also ask them how they like listening to text compared to reading it. The text you use should present instances where a speech synthesizing program might reasonably "foul up," such as when pronouncing *st* (from "listen") as s, *ight* as *ite*, *kn* as *n* or *ph* as *f*.

You can also talk about the pronunciation cues we gain from punctuation marks such as question-marks and exclamation points and how the speech synthesis handles that. Another foible of such programs rests in how they pronounce or mispronounce common appreviations such as Dr, St., or Mrs.

Example 1 illustrates many of these issues, but feel free to adapt it to your class.

If you have ESL students you may want to use some words from their native language and see how the computer pronounces them. The way it pronounces some words might provoke laughter, but it can also help the students gain insight into the ways Americans would say words written in their languages. Some speech synthesis programs written specifically to speak foreign languages would be more likely to get the correct pronunciation, and some can even adopt "accents."

After demonstrating how the computer can speak the text which has been typed in, the class should discuss what students think and feel about it. Students should be encouraged to reflect about words they think might "confuse" the computer. They

or the teacher can type these in, select them, listen to them and discuss how they sound. Students' names might be interesting to listen to.

Next have the computer speak an excerpt from any material the class is reading. This could be either material the class is reading together (CLC's curriculum included a unit on the Holocaust, so the example given is from the Diary of Ann Frank) or something specific to one student, like an excerpt from a GED book.

You may want to try poetry or a dramatic monologue if either fits the context of our class.

Have students write using paper and pencil what they think of computerized speech synthesis.

Example 1

What a wonderful day. I see you are all looking at the computer monitor. Thank you for your attention!

This computer can say the words that appear on its screen. When the computer does this it is called speech synthesis. It sounds sort of like a human voice, but also different.

It can speak words that you type in but it doesn't always say them very well.

Some computers can use a lot of different voices. What do you think of this voice?

Computers can do many things very fast, but there are some things that people do that the computer may not do.

People communicate lots of things through the way their voice sounds, and not just because of the words they use. They may communicate their feelings by the tone of voice they use or the way they say things.

For instance people change the pitch of their voices when they ask a question.

> Does this computer change the pitch of its voice when it asks a question?
>
> Did that sound like a question?

When people get excited they speak different.

> Oh wow, I am really, really excited!
>
> This is absolutely fantastic!
>
> Does the computer sound excited?

When people get sad or have other emotions their voices may sound different too.

> I'm very, very sad. I could just cry all day.
>
> Wow, you are hysterically funny. Hah hah hah.
>
> Does the computer sound sad or happy?

Speech synthesis can handle many sounds of speech, but it doesn't always do a good job of expressing emotion.

How does the computer handle words that don't sound exactly like they are spelled?

Rough.

Night.

Knife.

Listen!

Can you think of any words that you would like to hear?
Example: Philadelphia.

What do you think the computer does about words that sound alike but are spelled differently? Let's try some.

To.

Two.

Too.

Know.

No.

They don't sound different at all, do they? Speech synthesis can help you recognize some kinds of spelling mistakes but not others.

When we write we frequently use abbreviations. Instead of writing out the word Mister we write Mr., or instead of writing out the word Street we just write St. Can the computer handle abbreviations? How well did it do?

What do you think of the sound of the voice? Can you understand it? Do you like it?

Please type in someone's name. How do you think it sounds?

Now listen to this, from Anne Frank's Diary of a Young Girl:

> Jews must wear a yellow star, Jews must hand in their bicycles, Jews are banned from trams and are forbidden to drive, Jews are only allowed to do their shopping between three and five o'clock in shops which bear the placard "Jewish shop." Jews must be indoors by eight o'clock and cannot even sit in their own gardens after that hour. Jews are forbidden to visit theaters, cinemas, and other places of entertainment. Jews may not take part in public sports. ...
>
> So we could not do this and were forbidden to do that. But life went on in spite of it all... In spite of everything, I still believe that people are really good at heart.

LESSON 2: USING SPEECH SYNTHESIS AND THE VOICES OF SPEECH SYNTHESIS

In the previous lesson students got to experience speech synthesis but didn't learn how to use it. In this lesson they practice selecting text and making the computer say it. They also learn that the speech synthesis program has different voices and how to invoke them.

The way you select text depends on the computer you own and the word processing program you use. It is exactly the same as selecting text to change a font or to add an underline. This should be covered in one of the introductory lessons. You may use a keyboard or mouse.

Once the text is selected, simply choose the command you wish to invoke from the appropriate menu[1]. Again, this will vary depending on the word processing program that is using speech synthesis. Be sure to select the punctuation mark at the end of the word so you hear the effect that has on pronunciation.

This is an opportunity to discuss ways to use the speech synthesis with your students. *Example 2* illustrates some ways speech synthesis can be used on individual words, sentences, and paragraphs.

When is it appropriate for a writer to listen to a **single word**? Perhaps the best time is to evaluate spelling. If the computer pronounces it differently from how a student expected it to be pronounced, perhaps the student should use a dictionary (either computerized or a book version) to check it. The speech synthesis software can pronounce some difficult words (like Boulevard) quite well. This is also the time to let students know that there will be times when the speech synthesis software will mispronounce words (such as Chevrolet, even after the spell-checker corrects its spelling from Chervolet).

When is it best to listen to a **sentence**? Perhaps to evaluate whether they have used the right vocabulary word. This might be a good time to use a computer or book thesaurus. This is also a good level at which to evaluate whether they have written a run-on sentence or a sentence fragment. In the demonstration project, this was the level at which it was most valuable to students.

The best time for a student to hear a **paragraph** or the **whole document** they have written would be to evaluate whether these larger blocks of text make sense, whether it is **what they want to** say and **how they want to say it**. Another time to

[1] In SimpleText, under the *Sound* menu, select either "Speak All" or "Speak Selection." In

listen to them would be to play them for other people and get their reactions, see whether they comprehend the meaning and feeling that was intended.

Previous to the lesson, type in a selection from something your class is reading or writing. The selection in the example is an excerpt from Martin Luther King's "I Have a Dream" speech. In the demonstration project the computers were equipped with CD-ROM drives from which users could access the voice of King and compare it to the synthesized speech. You could alternately use an example of student writing. With the computers used in the project the teachers could also record (digitize) the voice of a teacher or student right onto the computers and compare it to the computer's synthesized speech.

Listen to the speech with the class in several of the voices. Demonstrate that the voices can easily be changed through menu choices. Discuss each one. Ask students how they feel about all the different voices. Ask which voices might be appropriate for different settings, or which voices they would like their stories read in.

Example 2

I live along Roosevelt Bolovard.

Bolovard. Boulevard.

I drive a Chervolet.

I now you live near here.

Listen to part of Martin Luther King Jr.'s "I Have A Dream" speech. What do you think of it when you hear it from the computer?

> Even though we face the difficulties of today and tomorrow I still have a dream. It is a dream deeply rooted in the American dream. I have a dream that one day this nation will rise up, live out the true meaning of its creed: we hold these truths to be self evident, that all men are created equal.

LESSON 3: EXPERIMENTING WITH WORDS

In this lesson students work hands-on with the computer and the speech synthesis software. They do their own typing and text selection and choose whichever voices they want to use. The teacher provides support whenever requested, especially with opening the new file, suggestions on typing and selecting text, and information about naming and saving the file.

Each student who will participate should put together a personal vocabulary list. The list should have at least 16 words in it. They may want to use words that they would particularly like to learn, such as words for the implements in a kitchen, emotions, carpenters tools, or names of states. They could use words on any spelling lists the class is using, from something they are reading, or from the GED book. Again, it should fit in with some activity your class is doing.

Once the students have chosen the words they will use, you may want to give them a quiz to see how many they can spell before and after they do the exercise. The opportunity to simultaneously see and hear words they are studying should have a positive effect on their ability to spell them later.

Students type in the words from their list. **As soon as they are finished they should name and save the document,** so they don't lose the work they've done so far. Naming and saving methods should be familiar to them from their introductory computer lessons.

After typing in their list they should select their words and listen to the computer speak them one at a time. They are likely to want to experiment with hearing different voices say them and repeat certain words over and over. This exercise allows students to learn and practice computer skills such as typing, selecting text and using menus and minimizes the need for composing at the computer until they are more familiar with what the software will allow. Allow them to spend as much time as possible, since they are laying the groundwork for their future comfort on the computer.

Example 3

Family Words

aunt	brother	child	cousin
daughter	father	grand	husband
in-law	mother	nephew	parent
sister	son	uncle	wife

Painting Words

brush	enamel	flat	indoor
latex	oil base	outdoor	paint
pan	roller	scraper	semigloss
stain	turpentine	varnish	water base

Computer Words

application	backup	boot	CD-ROM
data	default	dialog box	disk
drive	floppy	font	hardware
icon	menu	modem	monitor
mouse	network	save	virus

In this lesson each student is in control of the computer, only relying on the teacher to get started and to provide help when requested.

By this time they may want to be writing their own material in. If so, they may go ahead to lesson 5. However, this exercise will help those who want more practice on typing and using the speech synthesis software.

Students should type in a paragraph of something they have been reading, save it, and listen to the computer read it back to them. Each student should have a different paragraph, even if they are reading the same thing.

While they are typing, they may want to listen to some or all of the words they are typing. They should focus on selecting vocabulary words they are not sure of and listen to them pronounced, possibly copying them to a paper, then looking them up.

Then they should listen to the whole paragraph and see if it "sounds" right to them. They may have mistyped something and, especially if they know the paragraph well, are likely to recognize their mistake and want to correct it. They should do so. Then they should listen to it read back by several different voices and see which they feel is most interesting to them.

After they have the paragraph to their satisfaction, they should "play" it for other students to see what they think of it.

Example 4

The Gettysburg Address

Fourscore and seven years ago our fathers brought forth on this continent a new nation, conceived in liberty and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation or any nation so conceived and so dedicated can long endure. We are met on a great battlefield of that war. We have come to dedicate a portion of that field as a final resting-place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this. But in a larger sense, we cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead who struggled here have consecrated it far above our poor power to add or detract. The world will little note nor long remember what we say here, but it can never forget what they did here. It is for us the living rather to be dedicated here to the unfinished work which they who fought here have thus far so nobly advanced. It is rather for us to be here dedicated to the great task remaining before us--that from these honored dead we take increased devotion to that cause for which they gave the last full measure of devotion--that we here highly resolve that these dead shall not have died in vain, that this nation under God shall have a new birth of freedom, and that government of the people, by the people, for the people shall not perish from the earth.

LESSON 5: IN YOUR OWN WORDS

Students should select something relatively short that they have written by hand previously and saved as part of their regular class work, perhaps something from their permanent portfolio. It may be a recipe, a poem, a short story, or an essay. They then type in and save the piece as a document on the computer. Then they listen to the computer read it back to them, as a whole and as sentences.

They should decide if they still like the way it sounds. If they desire to make changes the teacher should remind them how to edit using the computer: to add, delete, or move text. After they make the changes they should save the new copy.

They should write or discuss how they feel about working on the computer with the teacher and/or classmates.

One of the tenets of process writing is Respect. The students who participated in this project decided that they did not want their writings used as examples in this section and this wish is being respected.

LESSON 6: HOW DOES THIS SOUND TO YOU?

Students take the pieces they typed into the computer in Lesson 5 and have the computer read it to one or more peers. They may want to compare how a computer reads the text with how another student or the teacher reads it. The group discusses what kinds of writings go well with the speech synthesis process and what they don't like.

PROCESS WRITING WITH SPEECH SYNTHESIS

LESSON 7: BRAINSTORMING

After deciding on a general topic to write about, students enter text into the computer one word or phrase at a time, rather than as parts of sentences. Learners should not become too self-critical during an activity where they are expected to get out as many ideas as possible without evaluation. The emphasis is on the flow of thought rather than grammar, spelling, or punctuation, allowing the student to focus on the subject of the piece rather than on mechanics.

Students should enter words or phrases for at least five minutes, longer if they wish. They put a period and a paragraph after each one. This makes the speech synthesis take a little extra time after each word. Then they should save this first version of their brainstorm. They should name it to indicate it is their first version, something like "DeBrnst.1" (for Delores's) or "Jo1.brn" (for John's).

After entering all the words, student listen to them several times. They should delete any words or phrases that have been entered they don't think work with the idea of writing which is emerging. After they have done this they should have a core of words that appeal to them for use in their composition. They should save this list with a different name such as DeBrnst.2 or Jo2.brn, so that they retain their original for later use.

LESSON 8: DRAFTING A PARAGRAPH

Students use the computer to compose and write a paragraph that they need to write for the class anyway. They listen to words, sentences or the entire paragraph as seems appropriate to them in creating the paragraph.

After engaging in this process, they discuss individually with the teacher, with a classmate, or as a group whether they like this as much as drafting on paper, what parts they feel are easier and smoother on the computer and what parts they feel are more complicated and difficult.

LESSON 9: REVISING A PARAGRAPH

Students revise the paragraph they drafted in the preceding lesson In revision, students decide how they feel about their draft, what they like or want to change. They need to review their material and decide whether to write more or remove some of what they've written or change the organization of their piece. They consider content, focus, and organization. They decide whether it is valuable, interesting, informative, and vigorous enough for them, whether it works as a piece, and whether it is clear, logical, and engaging enough.

They may want to use the speech synthesis extensively, listening over and over to the paragraph as they experiment with revisions, or they may find it confusing to hear too many different versions. Encourage them to use the speech synthesis only as long as it is helpful.

LESSON 10: EDITING AND PROOFREADING

Students edit and proofread the paragraph they revised in lesson 9.

In editing, writers consider how the writing sounds, how the sentences are constructed, and how the words are chosen to create each writer's individual "voice." They decide whether they will use formal or informal English or dialects, and how to use the language. "Correct" grammar is determined by consistency in whichever voice the writer chooses. The use of speech synthesis can help auditorily convey an actual "voice," or embody a variety of voices, to help writers seek this consistency.

Speech synthesis will not help "teach" correct grammar, but many learners are able to recognize problems with text when they hear it which they might have missed just by reading it. They can then try to find the correct way of writing what they intended. The teacher should monitor students' activities on the computer to do informal assessments of their editing skills. These assessments can lead to developing relevant activities or exercises to enable the students to practice the skills they need.

In proofreading, final errors of punctuation, spelling, and standard English are corrected. Speech synthesis can be used in combination with other computer tools such as spelling and grammar checkers.

LESSON 11: SHARING AND PEER EDITING

Students play their pieces for each other in a group or one-to-one, using whatever voices they have decided are most appropriate. Of course students who would rather read them aloud themselves may also do so.

Students respond with their evaluation of the piece. This may be in the form of a discussion or may be an actual form which would be given to each author. See Appendix II for more information on Peer Editing.

Example 5
Peer Editing Form

1. Idea: What is the main idea of this writing? Does it make sense? Can you think of any ways to make it better? Look for terms that need to be defined or questions such as how? why? what kind? so what?--that still need to be answered.

2. Argument: Is the main idea clear throughout the paper, or does it seem to wander? Examine each paragraph to answer this question. What are the problems? Can you suggest additions or changes to help?

3. Paragraph Development. Examine each paragraph for anything that doesn't seem relevant to the main point or for any place the author shifts focus and needs to start a new paragraph. Are there good connections between paragraphs?

4. Is the conclusion more than a repetition of the introduction? Does it introduce new ideas which could be effectively used to improve the thesis of the paper?

5. Mechanics. Did you notice any non-sentences (fragments, comma splices, run-ons), grammer, or spelling problems?

LESSON 12: PUBLISHING A SPEAKING-READING BOOK

After all the stories have gone through all the phases of the writing process and are finished, they are stored on a disk which students can access during any free reading time. Students can thus listen to any stories by any of the authors in the class (with their consent, of course) or any other classes which participate. Users could fill out the peer evaluation forms.

Most current word processing programs have a pagination feature which reports on screen and printed copy what page the user is on. Some have *Table of Contents* features which allow you to click on a place in the Table of Contents and go to that chapter, or *Bookmark* features which make it possible to see a list of chapters. Or students may just need to keep using the "Page Down" key to read different articles.

Some students will listen to every story, others might just want to select one or two. They could read the story on paper, look at it on the computer monitor, and hear the computer say it.

This would be equivalent to desktop publishing an "audio" newsletter on a disk. Different classes which used the same computers could share their disks back and forth, listening to, reading, and perhaps even replying to each other's work.

ADDITIONAL ACTIVITIES

REPLYING TO A BOOK

Students write a response to one of the pieces.

NEW STORIES FROM OLD

Students copy either a whole piece from the group book and use it as the starting point for something they themselves are writing.

GRAMMAR EXERCISES

Any grammar exercises from books, worksheets, or that you have created that your class uses can be put on the computer. See if learners are better able to recognize grammatical errors more easily when they hear them as well as see them.

FIRST LINE/LAST LINE STORIES

The teacher prepares a "first line/last line" story and students fill in the rest of the story. It can be especially interesting when they are two unrelated ideas, such as, "She examined the near-empty drawer to see what she could take....They told her the phone would soon stop ringing." As they type the text moves. This helps students understand an important and subtle aspect of writing, that words are not fixed and rigid, but flexible and moving.

RESUMÉS

Resumes and other template forms can be created on word processing programs and used to provide specific examples of business letters, fliers poster-making, stationery, etc. These can be extremely practical, based on the real and explicit needs of students.

But students rarely hear their resumes read aloud. The computerized voices help them understand how it might sound read by different people.

BUILDING A NEW STORY FROM AN OLD

Take a model author or poet, and type several paragraphs onto disk. Then the students fill in lines, sentences, whatever they wish. Not only does this encourage them to understand more personally the mindset and social condition of the author, but they can more deeply experience the author by expanding her. This kind of activity would be very difficult on paper, but with the computer a student can interpolate anywhere she wishes.

It would be interesting to notice whether groups choose different audible voices for the literary voices of the original authors.

COLLABORATION

Collaborating writers can work together, either simply alternating writing sentences or actually planning and producing a piece. They may want to use different voices for different characters.

APPENDIX I

SPEECH SYNTHESIS SOFTWARE FOR APPLE MACINTOSH AND DOS/WINDOWS/WINDOWS 95 COMPUTERS

SPEECH SYNTHESIS SOFTWARE

All Apple Macintosh computers and some PC computers have had the capability of speech synthesis for a number of years. The quality of speech generation is controlled by the quality of the hardware and software, and the amount of memory the computer dedicates the task. In previous generations of computers, that were slower and could handle fewer sets of rules, the voices sounded robot-like and pronunciation was riddled with inconsistencies. But with the current technology the tone and inflections of the voices are quite lifelike. The clarity and human sound of the computer voice is also improved by higher quality speakers built into the AudioVision monitors used in this project.

MACINTOSH SPEECH SYNTHESIS SOFTWARE

Three speech synthesizing word processing programs were placed on the computers put into CLC and CWEP: SimpleText, a program from Apple that comes pre-installed on all current Macintosh computers; the Institute for the Study of Adult Literacy's Adult Literacy Word Processor, software specifically designed to address the needs of ABLE learners; and Nisus, a high-quality commercial software product. Each program is different and offers advantages either in ease of use or in enhanced features, and Drexel wanted the teachers to be able to choose the program that would be best for them. In all of them, after typing text into the computer, the user selects the text they wish to hear spoken and chooses a "Speak" command. It is an easy to learn two-stage process and most of the students seemed to learn it after some opportunity to learn how to use the mouse. The computer then generates sounds that approximate a human voice pronouncing words, sometimes well, sometimes poorly. Users can listen to selected text or an entire document.

Speech Manager and PlainTalk Speech Manager and PlainTalk

Platform: Macintosh Cost: Free Description: Apple's text-to-speech system extensions that enable applications to perform text-to-speech conversion. The Speech Manager runs on most Macs, but PlainTalk (and the high quality voices) requires a 68020 Mac or better. Availability: By anonymous ftp from: ftp://ftp.support.apple.com/pub/apple_sw_updates/US/Macintosh/system_sw/PlainTalk 1.4.1 This directory contains subdirectories for recent versions of PlainTalk. The current release (PlainTalk 1.4.1) contains the English Text-To-Speech with about a dozen voices. The latest information is available from Apple's WWW page for speech recognition and synthesis: http://www.info.apple.com/apple.speech/

This technology which Apple distributes freely permits the computer to pronounce text in a variety of voices, as described earlier in the manual.

The process writing approach used by both agencies encourages peer review and collaboration, as well as publication and sharing of work. This project aimed to examine how the ability to hear text affects these aspects of writing.

WordPerfect 3.2 for Macintosh

The latest version of WordPerfect for the Macintosh supports speech.

DOS/WINDOWS/WINDOWS95 SPEECH SYNTHESIS SOFTWARE

DECtalk PC, Version 4.2

A set of software components which, when loaded on a DOS personal computer and used in conjunction with the DECtalk PC or the DECtalk Express text-to-speech synthesizers, will provide synthesized voice output of ASCII text sent to it by other PC soft- ware applications such as "screen readers." The interface to DECtalk for commands and text is via a memory resident DOS driver.

DECtalk PC provides the following capabilities:

o Nine pre-defined voices (four male, four female, and one child) and one application-defineable voice

o Speaking rates from 75 wpm to 650 wpm

o Ability to say letters, words, or phrases

o Pause and Stop/Flush speaking control

o Over 1,400 letter-to-sound pronunciation rules

o Internal pronunciation dictionary

o Application-defineable dictionary

o Punctuation control for pauses, pitch, and stress

o Output volume control

Note: Not all of the above capabilities may be used by the software ap-plication program which is controlling the DECtalk PC DOS memory resident driver.

HARDWARE REQUIREMENTS

Those systems, components and peripherals as specified below are supported except as noted:

o IBM[R] PC, IBM XT, and IBM AT[R] or 100-percent-compatible personal computers

o A minimum of 20 KB of system memory available to run the DOS driver for DECtalk

o A minimum of 1 MB of disk storage for required installation and a minimum of 1 MB of disk storage required for use (permanent)

o DECtalk PC text-to-speech synthesizer option board or DECtalk Ex press external serial line text-to-speech synthesizer

DECtalk PC option card specific only:

o XT/ISA/EISA 8/16/32 bit bus, full length option slot for the DECtalk PC option board

o One diskette drive capable of reading 5.25-inch (360 KB) diskettes or 3.50-inch (720 KB) diskettes to load the distribution media

o A system power supply that provides at least 130 watts

DECtalk Express external unit specific only:

o One 3.50-inch (720 KB) diskette to load the distribution media

o One serial line communications adapter capable of operating at 9600 baud, 8 data bits, one stop bit and without parity

SOFTWARE REQUIREMENTS

o IBM[R] DOS V3.3, V4.0. V5.0

o MS-DOS[R] V3.3, V4.0. V5.0, V6.0

GROWTH CONSIDERATIONS

DISTRIBUTION MEDIA

Floppy Diskette

ORDERING INFORMATION

The software license, media, and documentation are included with the DECtalk hardware products. This software is integral to and included with the DECtalk text-to-speech synthesizer producst and is not avail- able separately, except as an update kit for earlier versions.

Update Kits:

DECtalk Express: QA-XA6AB-WW

DECtalk PC: QA-XA6AA-WW

SOFTWARE LICENSING

The DECtalk PC license gives the user the right to use the DECtalk PC software on a single personal computer. This software product is furnished only under a license. For more information about Digital's licensing terms and policies, contact your local Digital office.

Monologue for Windows from First Byte

Description: Monologue, a software program that reads text from the clipboard in Windows 16 or 32 bit applications, can be found as a bundled product with many sound cards and multimedia general purpose computer systems. It is not offered as a separate product at this time.

Monologue can add the element of speech to virtually any text oriented application. Any pronounceable combination of letters and numbers will be spoken clearly. It can be applied to tasks such as eyes-free proofreading, data verification (e.g. spreadsheets), reading E-mail and more. User-changeable parameters provide control over the sound quality by allowing for changes in pitch, and the speed of speech. An exception dictionary saves preferred pronunciation of words and abbreviations.

Monologue works with sound devices that comply with the Windows Sound API. Monologue male "SpeechFonts" are available for US English, British English, German, French, Latin American Spanish, Italian. A US English Female SpeechFont is also available.

Availability: Currently bundled with many sound cards and multimedia general purpose computer systems.

Monologue will soon be available as a stand-alone product. Single user and site licenses as well as Distributor discounts will be offered.

Contact: First Byte, 19840 Pioneer Ave., Torrance, CA 90503

Ph: 310-793-0610 Fax: 310-793-0611

PAM - A Text-To-Speech Application Platform: Windows

Description: PAM is a talking personal assistant and text reader application. It uses the ProVoice TTS package. PAM will verbally advise about appointments and reminder messages at specified times during the day. It can read text files, clipboard text, and text sent in DDE messages. Using the full verbal interface, PAM can be used by visually challenged individuals. Shareware - thirty day free trial.

Requirements: Any Windows sound card, speakers or headphones. Min. memory - 4 megs, 8 megs recommended.

size is approx. 1 MByte.

Price: $US40 for the registered version.

Contact: Tom Slemko, JTS Micro Consulting Ltd

10931 Lytton Road, RR#4, Ladysmith, B.C., Canada, V0R 2E0

Tinytalk

Platform: PC

Description: Shareware package is a speech 'screen reader' which is used by many blind users.

Price: Tinytalk is now $150. There are package deals on Tinytalk with various speech synthesizers.

Contact: Eric Bohlman, OMS Development, 610-B Forest Ave., Wilmette, IL 60091

Ph: (800)831-0272 Fax: 708-251-5793

TruVoice from Centigram

Platform: Windows-NT, Windows 95, Windows 3.1 (limited release), OS/2, Sun Solaris 1&2

Description: TruVoice., an advanced text-to-speech converter, is available for multiple environments. TruVoice converts text into spoken language. TruVoice adds intelligible, natural-sounding speech to sound enabled platforms. No vocabulary restrictions User-definable pronunciation dictionary Accurately pronounces surnames and place names Preprocessor provides e-mail and spreadsheet reading capabilities and expands abbreviations. Multiple languages available: American English, Latin American Spanish, German, French, Italian Flexible pitch, volume and speech rate Intonation support for punctuation Supports

navigational capabilities such as, pause, resume and jump forward / jump back More detailed information is provided in the brochure page on the Centigram WWW pages. A demonstration of TruVoice is available on the Centigram WWW pages.

Cost: Windows versions are $295 for the SDK

Contact: Christine Hansen, Centigram Communications Corporation

91 East Tasman Drive, San Jose, CA 95134

Tel: 408/944-0250 Fax: 408/428-3732

APPENDIX II
PEER EDITING

AN OVERVIEW OF PEER EDITING
HOW TO CARRY OUT PEER EDITING

By Sarah Sedghi and David Wells

Instructional Objectives:

Students will read, edit, and give feedback on peers' "Friendship" composition rough drafts, checking for thoroughness of content (i.e. at least two paragraphs), common sentence errors (fragments, run-ons), and punctuation errors, thereby improving the content and mechanics of the final draft.

Materials:

1. Overhead projector with marker
2. A transparency showing the criteria to be followed for the writing assignment (the students will have this displayed in front of them while editing)
3. Peer editing worksheets (a handout passed out to every student, outlining things to look for in their peers' compositions). There will be a number of questions to be answered on the worksheet such as "Does your partner's paper contain all required paragraph? Yes ___ No ___, Are there fragments?, Are there run-on sentences? Does the write describe friendship?"
4. Red pens (for editing)

Motivation:

Begin lesson with this exciting declaration "Today, students, you will get to be the teacher! You will get to do what I do and correct and make comments on your partner's papers." Students always find this exciting (you should have seen the look on their faces when I said this the day I did a similar lesson. They were very excited and couldn't wait to start).

Procedure:

1. Students will be seated with their cooperative groups (heterogeneous groups of four). Within the group, students will work in pairs.
2. Students will take out their rough drafts (these are compositions they have been given instructions and criteria for and have completed at home).
3. Students will exchange papers with a partner and take out their red pens.

4. Teacher will pass out and explain procedures for completing the peer editing worksheets.

5. Each student will put his/her name and his/her partner's name on the upper right hand corner of the peer editing worksheet.

6. Each student will read partners' paper once, checking for content/creativity.

7. Each student will read partner's paper a second time, this time looking for and correcting grammar, punctuation, and sentence (i.e. run-ons and fragments) errors.

8. Each student will complete a peer editing worksheet, answering completely all the questions.

9. Partners will then discuss corrections, comments and suggestions for improvement.

10. Meanwhile, the teacher is going around from group to groups and pair to pair, answering questions, giving helpful hints, reviewing instructions and procedures, and making sure students are on task.

11. After papers have been read, edited, and commented upon and peer editing worksheets have been completed, compositions are returned to the writer attached to the peer editing worksheet.

12. Students will take edited rough drafts home and use the peer editing worksheet as a tool for improving and polishing their final drafts. Teacher will review instructions for this.

13. Using editing information/suggestions from peers, each students will complete final drafts of composition at home. Final drafts will be turned in stapled to the peer editing worksheet and the rough draft.

Time Estimates:

In a typical 50 minute period, 15 minutes should be adequate for anticipatory set/motivation and directions and instructions. The first reading of peers' compositions should take 10 minutes. Another 20 minutes will be devoted to re-reading the composition, editing them, discussing changes, and completing questions on the peer editing worksheet. The last 5 minutes of class will be saved for returning compositions to peers and teacher reviewing procedures on re-writing the rough draft and polishing the final draft.

Evaluation:

Possible hindrances to the success of the lesson might include: 1.) Low skill levels within the peer group. Both partners might lack the skill , understanding, and insight to edit and comment on peer compositions (this problem can, however, be avoided if peer groups are selected carefully at the beginning of the year according to the varying skill levels. I would pair high skill people with low skill people, hoping that through the apprenticeship model, the two sill person's skills will improve); 2.) Some students may not have completed rough drafts; 3.) Some students might not receive peers' input very well. They might not be able to handle criticism; 4.) Some peer suggestions and corrections might be inaccurate and/or not well thought out; 5.) The lesson might require more time; 6.) Teacher must constantly supervise and facilitate editing.

Independent work/Follow-up:

Students will complete final drafts of compositions at home (independently), using suggestions and corrections by their partner as a tool. The peer editing worksheet will also be given a homework grade when it is turned in with the final draft (plus, check, minus). This will ensure that when this activity is done next time, students will read peers' papers carefully and complete the peer editing worksheet with care and diligence.

SUGGESTIONS FOR A PEER EDITING FORM

Following is a sample form with the questions and problems I ask the students to address in their evaluation of other students' writing.

Essay Evaluation Form

After you have read the paper, evaluate it by using the following questions as guidelines. Write your comments on the draft, then on a separate sheet write an overall evaluation (about a paragraph) summarizing your comments. Staple this sheet to the front of the draft you are evaluating. BE SURE TO PUT YOUR NAME AT THE TOP OF THIS SHEET.

Please highlight the thesis and topic sentences with a colored pen.

1. Thesis. What is the thesis of the draft? Is it a true argument? (is it an answer to a question, a statement that can be argued for or against, and not self-evident or simply an observation?) Can you think of any ways to make the thesis stronger or better focused? Look for terms that need to be defined or questions such as how? why? what kind? so what?--that still need to be answered.

2. Argument. Is the thesis clearly evident throughout the paper, or does it seem to wander? Examine the theme sentences of each paragraph in skeleton form in order to answer this question. Identify any parts of the argument that either go off point or are weak, and suggest additions or changes to bolster the argument. Can you think of any objections the author might want to deal with?

3. Paragraph Development. Examine each paragraph for anything that doesn't seem relevant to the main point or for any place the author shifts focus and needs to start a new paragraph.

   Comment on how well the author develops the main point of each paragraph. Does the author provide enough specific relevant examples to support his/her assertions? Is there enough analysis and explanation? Can you suggest more evidence to support one of the author's points?

   Look at the transition sentences. Does the writer make strong and fluid connections between paragraphs? Does his or her argument flow easily and logically from one paragraph to the next? From one sentence to the next?

   Is the conclusion more than a repetition of the introduction? Does it introduce new material that should be dealt with in the body of the argument? Does it

introduce new ideas which could be effectively used to improve the thesis of the paper?

4. Tactics. Does the author effectively refute any objections to the argument? If the author merely acknowledges them, how can or she better deal with them? If the objections are unanswerable, how could the thesis be changed to accommodate the circumstances of the objection?

5. Mechanics. Did you notice any non-sentences (fragments, comma splices, run-ons)? Are there any prominent grammatical problems? Do diction and sentence structure enhance or impede communication?

This entry deals with the problems of both over and under- confident student responses to peer editing, as well as with the effectiveness of the technique of pointing out to the peer evaluators the key problems they have failed to note in a fellow student's paper.

Many students initially respond to peer editing by saying that they don't write well themselves, so how can they be expected to critique others. My response is that even if their writing is not up to par, they can be judicious readers. By the second peer editing, at least half the class is comfortable, and by the third, most students look forward to the peer editing sessions.

I also address the opposite problem--that of the student critiquing essays which are at a much lower level than that of the evaluator. (I have occasionally encountered the smart ass who thinks he is too good to take part in such an exercise.) By emphasizing how much my own skills as a writer have grown since I have been critiquing student papers, I encourage them to try to step inside another student's perspective to analyze what that writer intended, as well as to suggest how it might be done more effectively. Here, I stress that good writing involves being able to consider as many perspectives as possible. While this approach is fairly effective, disparity of writing and thinking skills still remains a problem. After the first paper or so, I have a good feel for the individual student's writing level, and I try to arrange the students in more compatible groups if there is a problem.

For two semesters now, I have been returning peer evaluations to the evaluators and pointing out key problems they has missed in their evaluations--for example, failure to note that a paper is mostly plot summary, or that a paragraph's key idea is buried in some inappropriate part of the paragraph. Once I have pointed out such key problems in someone else's work--(which they can usually see more objectively than their own) the students begin to spot such things in their own work. This approach boosts the student evaluator's confidence because s/he sees that others have the same problems that s/he does; it is easier, especially at first when students are a bit shy and low in self-confidence, to discuss problems in someone else's paper.

I find that peer editing is an essential first step to successful essay writing. Without exception, I have found that those who cannot effectively critique another's paper also cannot write a good essay of their own. The additional time involved in my putting a comment or two on the peer evaluator's work is minimal because I do this when I am grading the paper of the student who has been

evaluated, and the latter material is fresh in my mind. In addition, when the evaluator's comments are good, I refer to them when writing my comments on the paper of the student being evaluated. Doing this takes some of the heat off me in critiquing student papers and places the burden on the writer of the essay to follow the revision suggestions made by both me and his or her fellow students.