A Case Study of Applying Audio/Video Data Processing Programs for the Improvement of English Listening Proficiency of Adult EFL Learners

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Abstract

Early development of listening ability has been viewed as vital in the field of teaching English as a Foreign/Second Language (EFL/ESL). Both researchers and teachers have thus been greatly concerned with finding some ways to improve the learner's listening competence or better ideas to help learners acquire listening skills in the formal classroom setting. As one way of achieving this goal, my presentation is going to demonstrate advantages of using technologically up-to-date audio/video data processing soft-wares over traditional audio/video players or CD/DVD players. These traditional language teaching aids have been of use and still can be to some extent. But they have been somehow limited in terms of easier retrieval of necessary language input at the teacher's will. For instance, when teachers try to use some part of audio-video tapes by recording or copying for the sake of student evaluation, they have to spend a lot of time and energy doing so. In addition, the audio/video quality often decreases in the process due to some technical problems.

My presentation will show that both Digital Sound Processors (DSP) like Adobe Audition and Visual Data Processors (VDP) like Virtual Dub can be used so as to overcome those ever existing limitations and thus to enhance ways of teaching listening. In effect, as part of a case study, this presentation is going to come up with a few practical ideas of how to apply language teaching materials made by using audio/video data processing programs to teaching listening particularly for adult EFL learners.

What is unique about these 'state of art' soft-wares is that they allow the students to experience the key principles of signal processing technology, which is believed essential part of contemporary engineering education and research. By getting used to language programs like these, students will additionally improve their level of understanding about how the major factors of signal are in fact applied to everyday life..

Introduction

As the accessibility of technology has been increasing at the pace of inconceivable speed, the modes of developing listening skills have become diverse accordingly. Once, the so-called low-tech components used to play a key role in the ordinary language classroom, which involve radio, audio tapes, tape recorders, and rather old fashioned language laboratories. Then video, which Flowerdew and Miller categorize (2005) as mid-tech, has become an important part of language teaching in general and teaching listening in particular. More recently, the high-tech components, critical part of which is the computer and the internet, have rapidly begun to taken on the jobs of teaching and learning assistances that the low and mid tech have provided. Today's language teachers have in fact plethora of instructional aids or technological supports. Never do they seem to have better and more educational resources than now. Kang and Kim (2007) characterize contemporary language learning as electronic learning (e-learning), ubiquitous learning (u-learning), or mobile learning (m-learning). The instructional devices necessary to embody these learning modes are in fact within the teacher's reach.

It has been considered a useful approach to use teaching aids like cassette tapes, visual learning aids like TV dramas or movies, and various forms of second language (L2) resources on the computer in the classroom (Baltova 1994; Herron & Seay 1991; Jo 2002; Ju 1996). While this is true particularly in the foreign language learning context, how-

ever, what really matters in most cases is not whether or not they are available for the teacher, but how the teacher makes the best use of them while implementing the job. Jo reports that teachers tend to avoid using teaching aids not because of lack of appropriate learning tools but because of the difficulty or uneasiness of controlling over the tools (2002). The teacher would want the learners to focus on the video material and would not want them to watch him to solve technical problems of learning machines or programs. So, what is necessary for the teacher would be something that is really 'teacher-friendly' or 'easy-to-use but pedagogically efficient.' It should help the teacher create the language learning environment where the student is readily exposed to authentic language input.

In light of this contention, the Digital Sound Processor (DSP) and the Visual Data Processor (VDP) are believed to provide much more advantages with the teacher and the student as well than prototypical language learning tools mentioned above. While they were originally not produced for the sake of language teaching, I have found that their pedagogical utility is immense in comparison with those traditional ones. For example, they help the teacher to make L2 input more comprehensible for the student at various linguistic levels or to create the language learning environment where exposure to authentic and meaningful language is more likely to occur than in the ordinary classroom without them.

In the field of engineering, students are generally supposed to have some knowledge about the changing mechanism of auditory signal as well as various types of signals. Because the range of its application is so broad that it is essential for them to understand the nature of the signal processing as well as key signal devices themselves (Cheon, Kim, Lee & Ha 2003; Cho 1998; Choi 2002; Kim 2000). The audio signals can be electronically represented in either analog or digital format. It can be a pedagogical burden for the student to fully understand the underlying principles of signal change. Although diverse digitalized devices representing contemporary engineering technology are inseparable from our everyday life, most of them don't provide any devices or displays that allow the user to see through the nature of the signaling process or the signaling mechanism. In this respect, the programs used for this study are ideal examples that can be used for both language education and for teaching signal alteration for engineering students.

The purpose of this presentation is two folds. First, the focus is placed on providing pedagogical utilities of these processors by expounding the multimedia setting where they have been installed in the teacher's computer. More than anything else, the DSP allows the teacher to make oral data visible so that the teacher can make more meaningful or comprehensible input for the student at his will. The VDP, in contrast, enables the teacher to make his own language teaching materials which are appropriate to the student's need. Furthermore, the student can also actively involve making learning materials as part of the term project. Both the DSP and the VDP are so flexible in terms of data manipulation that they can make the job of language teacher much fun and doable. Thus, the teacher is currently in much better position in that with the help of contemporary technology development, he is able to access to what would be considered impossible even in the near past. Then, the focus is directed to demonstrating to what extent the students feel positive about the class where the DSP and VDP are used regularly. To this end, the result of a brief survey is reviewed, participants of which are the students in my listen comprehension course.

Background Studies

According to Rost (2001), "listening is not only a skill area in language performance, but is also a critical means of acquiring a second language" (p. 7). There have been a number of studies dealing with the topic of listening from a few different professional standpoints. However, few studies have dealt with the DSP and VDP from the perspective of language teaching in general and from that of teaching listening in particular. Instead, the research focus has been placed either on theoretical aspects of listening or practical aspects of teaching listening. Jo (2002), for examples, explains why listening skills rather than just listening need to be taught, and provides useful ideas of how to teach listening. As some critical barriers to improving listening skills, he discusses class sizes, limited accessibility to language labs, the amount of listening time, the lack of teaching materials, and some phobia toward using technological devices like computer. Jo's argument, in a sense, seems to insinuate the need of something like the DSP and VDP with respect that the teacher needs to feel more comfortable about the tasks they accomplish daily.

Many studies dealing with more theoretical aspects of teaching listening have placed a priority of listening over speaking, reading, or writing. (Asher 1966; Brooks 1964; Dunkel 1991; Jo 2002; Kim 2002; Kim 2004; Lee & Cho; Moley 1991; Park & Park 2004; Park 2009; Postovsky 1974; Rivers 1981; Wolvin & Coakley 1983). Several models have been developed to explain how the listening process works. The most widely known models are the bottom-up model, the top-down model, and the interactive model. In one way or another, these models have to account for different types of meaning processed at the time of listening.

As mentioned previously, Kang and Kim (2007) develop the teaching and learning model for English listening skills and vocabulary in a mobile environment using a TV drama. Like other researchers, they believe their model is particularly effective in that TV drama offers authentic language in English-spoken culture as well as makes learning exciting (Bacon 1992; Herron & Seay 1991). Brown (2001) has classified listening activity in the classroom into three kinds: pre-listening, while-listening, and post-listening.

As for using computer technology for language learning, Warschauer and Healey state that three types of computer-assisted language learning (CALL) have appeared since the 1960s: Behavioral CALL, communicative CALL; and integrative CALL (1998). Flowerdew and Miller say that "Nowadays, teachers are encouraged to make learning a process that involves technology. Now, with the expansion of computer storage facilities, it is possible to download sound and video clips, which open up new opportunities for students to develop their listening skills" (2005, p. 178). As they point out, however, "although computers do appear to facilitate language learning in a new dimension, the skill of listening via computer programs has not been researched much yet. This is probably because computers with sound capabilities were not in widespread use until recently. One study, however, has been conducted concerning the effects of computer technology in developing listening skills (Brett 1997). In his comparative study of three media--audio, video, and multimedia--Brett discovered that "...performance on tasks showed more effective comprehension and recall while using multimedia than either audio or video plus pen and paper" (p. 39).

Second language (L2) listening, in fact, follows a very complicated mental process and developing its power is viewed as the most critical factor in the mastery of overall L2 competence. From the pedagogical perspective, this implies that the focus of the teacher's roles should be placed on helping the student with much care. Their task should not be simply letting the student listen to aural materials as in the usual traditional language class. Rather, as Harmer states, "the teacher needs to be active in creating student engagement through the way we set up tasks" (2001, p. 231). The teacher also needs to become an organizer of tasks that are achievable. They also need to offer texts that contain meaningful L2 input and should be a machine operator who are apt at using learning aids in order to be a good organizer of teaching listening.

Research Setting and the Subjects

The setting for this study is a newly built college which is located in a rural area somewhat remote from the urban city of Cheonann, Korea. The students here have gone through very competitive selection processes, and the nationwide percentile rank of their average scholastic test score is upper fifteen percent or so. Most of them are highly motivated to master English.

I have taught one or two English listening comprehension courses almost every semester as an elective ever since 1999. Although the course has been open to all the students in the college, most of the students in the course have by and large ranged from intermediate to advanced level in terms of their English proficiency as reflected in their TOEIC scores (average score of 715). The average class size is about 30 to 45 students per class.

Until spring 2007, I made use of a lot of commercially sold textbooks, including Active Listening (Helgesen, Brown, & Smith 1997), Interaction (Chapman 2002), etc. My usual classroom implementation was made mostly with one of these textbooks in the multimedia language lab, which had not been quite functional in most cases due to some unknown technical problems of all kinds. Although the lab equipped with rather contemporary computers was expected to make a considerable contribution to improving the students' English skills, it hardly satisfied its users. The classes

were too often hindered because of difficulty in maneuvering the hardware system as well as the software program. While the lab was named a multimedia language lab, due to too frequent troubles during the class, the teachers including myself tended to avoid using it or used to complain a lot about troubles technology gave rise to.

It was during the spring semester of 2007 that I happened to see a DSP, which one of my engineering students let me aware of its being in the world. Right after its existence and its high utilities for teaching listening, I have become a big fan of it. Once I got used to using it for my class, the scope of its utility became even wider. In other words, it made me turn my eyes even into the field of VDP, which is essentially compatible with the DSP. In the meantime, the university made a financial support for the textbook-making as part of the school project to enhance the educational quality of the course it offers. I took part in the project in Spring 2008 and I started to use the first outcome of the project in Fall 2008. The main features of this text are mostly based on the functions of the DSP and the VDP.

The Figures 1 and 2 are part of the classroom layout which has been provided by a company specializing in multi-lab construction. The cardinal functions of this multi-lab program are to facilitate interactions between the teacher and the student either individually or in groups and to be quite adjustable with various language teaching aids like the DSP and the VDP. Again, what is unique about this is that the teacher is more likely to feel easy with using the computer and multimedia lab.

Figure 1. Layout of the multi-lab

Figure 2. Student's PC control

As seen in the figures, since the main functions appear in the form of user-friendly emblems, the teacher easily get access to the resources or functions that he wants. In addition, when the teacher wants to let the student do some things, for instance oral presentations, he does not have to move from the seat. Instead, the teacher is able to make the student do the job by clicking the student's keyboard so that what the student has prepared on the computer is directly sent to the rest of the class.

The DSP and the VDP

As for the DSP, I used to use the free trial version of Cool Edit for a while until the lab was equipped with Adobe Audition. Similarly, regarding VDP, I have used Virtual Dub, which is a free utility available on the internet. The school has a more sophisticated licensed processor similar to this, which is Adobe Premier. However, I stick on Virtual Dub because it is easy and simple to use. As mentioned previously, they both were not made for the sake of language education originally. The first was mainly for the music business in general or the music recording industry in particular, and the other for film making industry.

When it was distributed first, the Cool Edit was considered as cripple-ware. But its current version, which is Adobe Audition, is really useful and flexible. It is capable of working with multiple tracks with support for real-time non-destructive process. It also has plug-in functions such as noise reduction and sound equalization. The major improvements of its rather newer versions include pitch correction, frequency space editing, a CD project view, and basic video editing and integration with Adobe Premiere. While more sophisticate capabilities are available with the very up-to-date version, they are just considered way too much for language teaching.

Only a few key functions are viewed essential for our purpose of providing effective ways of teaching listening: that is, (1) visualizing sound with easily transformed waves; (2) segmenting part of sound along its corresponding wave; (3) retrieving oral data instantly at the teacher will; and (4) editing oral date, which include copying, cutting, and pasting it. The functions, (1), (2) and (3) are thought to be particularly useful for classroom implementation while the function (4) is essential for the construction of one's own teaching material as well as for the construction of listening.

What follows are some of key features that I believe are really necessary for the nonnative teacher of English who is concerned with improving the quality of foreign language education.

Figure 3. Open, Copy, cut, and paste

Figure 4. Open audio from Video

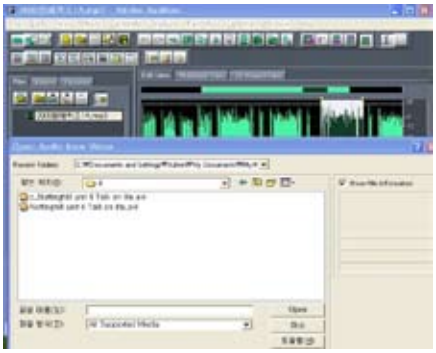

Figure 3 and Figure 4 show that just like a word-processing software, this DSP, which is Adobe Audition, has the useful functions of opening, coping, cutting, and pasting MP3 files with ease. Just by placing the cursor at some point of the sound wave and then clicking or pressing the play button at the bottom of the left corner, one can make the audio file instantly active. The white section over the sound wave in Figure 3, which is part of a given MP3 file, displays that only this part is active in terms of those repeating, coping, and cutting. Moreover, it is possible to record voices in the new blank file through the microphone as well as all sorts of audio data from the computer by pressing the button with a red mark at the bottom of the left corner.

To reiterate, as the teacher has a handy tool for editing sound or voice files, he is able to make his own teaching materials first, and to construct listening tests with much ease. As seen later in section of the survey analysis, let alone the teacher, students whom I have shown these functions get quickly interested in the program and reveal desire to use it later on. Particularly in this respect, Figure 4 displays that the user can extract audio data out of diverse video files with the Adobe Audition.

Figure 5. A Quiz Sample

Figure 6. Full sentence

Figure 5 is a sample quiz file that I made this semester, which appears very compressed. This means that the file contains more information than the file seen in Figure 6. This figure contains information of just one full sentence, but reveals more specific linguistic information with pedagogical utility. In the same vein, Figures 7 and 8 render even more detailed segmental and suprasegmental information that is hard to catch with usual attention. The tonic clause in Figure 7 refers to a kind of meaningful sound unit which in turn constitutes a larger meaning unit like sentence. Assimilation and Elision in Figure 8 refers to a phonological phenomena in which sound change arise because of phonological contacts between neighboring sounds in the sentence. What is useful about this DSP is that it allows the teacher to spot the specific location of elision and thereby to increase the student's level of understanding about the diverse features of spoken language use.

Figure 7. Tonic clause

Figure 8. Assimilation and Elision

As a VDP, Virtual Dub is a free easy-to-access utility. This visual data processor has a cost-effective video capture/processing software. Although it lacks the editing power of the more sophisticated editor such as Adobe Premiere, it appears good enough for the teacher to use for his language lesson. It is mainly geared toward processing AVI files. Along with this utility, I often use another free-ware, GOM Play, which stands for Guruguru Online Movie Player. This free ware is particularly unique in that it is also very much user-friendly or that within a couple of clicks movies or other visual resources turn up on the monitor instantly.

Part of video clips made out of this program is shown in Figure 9 and Figure 10. In most cases, the video clip is played while its different types of input are also actively functional on the same screen. In effect, the teacher is able to provide written input from the word processor, oral input from the digital sound processor, and visual input from the visual data processor simultaneously on the screen, and thereby increase the student's level of understanding.

Figure 9. Video Clip 1

Figure 10. Video Clip 2

Results of the Survey

In the Fall 2008, I briefly surveyed my students in my English listening comprehension courses about how they think

about the DSP and DVP. What follows is part of the survey. As the Figure 11 shows, almost two thirds of the students don't know that DSP's are available in the field. Figure 12 tells that only less than half of the students who know about the processor have actually tried using it. Therefore, more students need to take advantage of this program soon. Many students are quickly aware of its usefulness upon using it for the first time.

Figure 11. Knowledge of Digital Sound Processor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	29.6	33.9	33.9
	No	41	57.7	66.1	100.0
	Total	62	87.3	100.0	
Missing	System	9	12.7		
Total		71	100.0		

Figure 12. Experience of Using Digital Sound Processor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	11	15.5	32.4	32.4
	No	23	32.4	67.6	100.0
	Total	34	47.9	100.0	
Missing	System	37	52.1		
Total		71	100.0		

Figure 13 presents students' preference of the DSP over the traditional language teaching aids. Although 21 out of the 71 students did not answer this question at all, they generally seemed to be in interested in the program.

Figure 13. Preference over Traditional Aids

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	1	1.4	2.0	2.0
	Disagree	4	5.6	8.0	10.0
	Medium	24	33.8	48.0	58.0
	Agree	18	25.4	36.0	94.0
	Strongly Agree	3	4.2	6.0	100.0
	Total	50	70.4	100.0	
Missing	System	21	29.6		
Total		71	100.0		

Figure 14. Planning on Using the Processor After the Class

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	5	7.0	9.4	9.4
	Disagree	3	4.2	5.7	15.1
	Medium	19	26.8	35.8	50.9
	Agree	22	31.0	41.5	92.5
	Strongly Agree	4	5.6	7.5	100.0
	Total	53	74.6	100.0	
Missing	System	18	25.4		
Total		71	100.0		

Figure 14 also demonstrates that students are willing to use the program later on even after finishing the course. Unlike the DSP, however, more students have knowledge about VDP. Figure 15 says that 60.6 percent of the students are aware that such high-tech devices are available. Although this number is twice as many in comparison with that of DSP, only one third of the students have actually made use of the VDP (Figure 16).

Figure 15. Knowledge of Visual Data Processor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	43	60.6	70.5	70.5
	No	18	25.4	29.5	100.0
	Total	61	85.9	100.0	
Missing	System	10	14.1		
Total		71	100.0		

Fugure 16. Experience of Using Visual Data Processor

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	17	23.9	33.3	33.3
	No	34	47.9	66.7	100.0
	Total	51	71.8	100.0	
Missing	System	20	28.2		
Total		71	100.0		

Finally, as seen in Figure 17, students tend to prefer VDP to the traditional language teach tools such as video tape players or CD.

Figure 17. Preference of VDP over Traditional Aids

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Disagree	2	2.8	3.6	3.6
	Disagree	1	1.4	1.8	5.4
	Medium	31	43.7	55.4	60.7
	Agree	22	31.0	39.3	100.0
	Total	56	78.9	100.0	
Missing	System	15	21.1		
Total		71	100.0		

Discussion

Regarding enormous potential of the computer, one can raise such cardinal questions as 'What effects will the computer have on language education?' and 'How does the teacher encourage learners to develop their listening skills via computer?' Flowerdew and Miller (2005) rather specifically say that "keeping up with educational software is a new and demanding role for teachers. Teachers need to become familiar with the computer that their institutions have and that their students use at home" (p. 179). They also argue, in order to comprehend a spoken message, four main types of knowledge are drawn on: phonological knowledge of the sound system; syntactic knowledge of how words are put together; semantic knowledge of words and propositions; and pragmatic knowledge of the meaning of utterances in particular situations. In addition, kinesics knowledge conveyed by the facial and bodily movement of the speaker should also be taken into account (p 30).

Nobody would deny what Flowerdew and Miller (2005) argue in their book. While they mention the need for the software, however, they do not talk about anything related to DSP's or VDP's at all. I believe that the teacher can be found in much better position of fulfilling what Flowerdew and Miller (2005) recommend for the teacher if he is equipped with such effective pedagogical devices as DSP's and VDP's.

To make an emphasis again, insofar as the teacher gets used to these tools, they surely help the teacher enhance the level of language teaching practice by providing effective ways that traditional aids hardly embodied: (1) visualizing sound with easily transformed waves; (2) segmenting part of sound along its corresponding wave; (3) retrieving oral data instantly at the teacher will; and (4) editing oral date, which include copying, cutting, and pasting it. The functions (1), (2) and (3) are thought to be essential for the understanding of the types of knowledge that Flowerdew and Miller (2005) point out as seen above. In addition, the function (4) will give the teacher much more freedom in the

construction of his teaching materials and that of listening tests as well.

Conclusion

This presentation aims to delineate the some key effects that contemporary DSP's and VDP's have on teaching L2 listening. Major features of them have been discussed and claimed that they are far better tools than the traditional ones as far as they are used along with the contemporary technology of the computer.

The price of the processors commercially sold is currently not low enough for the teacher or the institute to buy, however. So this can be the big barrier to applying them to the class without reservation. Then the teacher may solve this problem by trying some free wares or trial versions available on the internet until he gets used to using them.
From the students' written feedback about the listening class where I first used these processors along with the textbook made out of them, I have found out that they particularly like the part that movie clips are used. More specifically most of them like that part because they are able to catch up more natural language input by virtue of those technological devices. Therefore, there is no doubt, I believe, that the students got more benefit from the course than those in my previous classes. In fact, the students' evaluation of the course at the end of the semester has increased in comparison with that of the previous semester. The students have also suggested useful ideas of improving the course: for instance, the amount of tasks they have to fulfill, the rather big size of the class for teaching listening, and students' participation in the form of doing assignment by using the Virtual Dub.

Obviously, this study is limited in that more scientific or experimental approach is required in order to fully understand the effects of applying the DSP and VDP to L2 listening in comparison with the traditional language teaching aids. Later studies may conduct more controlled research in terms of types of tools for language teaching, learners' learning styles, familiarities with the computer, and many other possible variables.

As mentioned earlier, it is essential for engineering students to have solid understanding about signal processing technology, which is ideally embodied in the DSP and VDP. In fact, the professional areas applying the principles of signal processing are countless and the research outcomes in various forms have already been indispensible part of our everyday life. As Karl Marx once put it, it is generally believed that human beings, as tool using animals, constructively and creatively change themselves in the process of using the tool (Dusek 2006). So engineering students who get accustomed to using those rather sophisticated tools like the DSP and VDP are more likely to change themselves and thus to come up with even better ideas for their own major field. Later studies may thus question further 'to what extent students' tool using capabilities of various sorts relate to their future job performance or the ultimate achievement in their life.

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