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AUTHOR	Thuy, Vuong G.
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ABSTRACT

        This project was a pilot project utilizing computers
and CD-ROM drives and software to implement a combined English as a
Second Language and Family Literacy curriculum for limited English
proficient (LEP) adults. It is intended for teachers, tutors,
volunteers, and program directors who may be interested in using
high-tech for their own ESL/Family Literacy Programs. The project
examined four software packages produced by two companies to see if
they could have a significant and positive impact on the attainment
of English language skills by adult LEP students. Two groups of
refugee and immigrant adult students were studied. Each group
received 6 hours of instruction per week for 15 weeks. The
experimental group (N=15) received two hours of instruction per week
on the material contained in the software; the control group (N=15)
was taught the same material in printed form without the use of
computers. Pre-tests and post- tests were administered to each group.
An analysis of the data indicates that both groups did markedly
better on the posttest, but that the experimental group predictably
improved more than the control group. (KM)

FINAL REPORT
353 SPECIAL PROJECT 98-9010
Vuong G. Thuy

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ABSTRACT

High-Tech for Effective ESL/Family Literacy Instruction is a pilot project utilizing computers and CD-ROM drives and software to implement a combined English as a Second Language and Family Literacy curriculum for limited English proficient (LEP) adults. The intention is that the findings will, hopefully, benefit teachers, tutors, volunteers and program directors who may be interested in using high-tech for their own ESL/Family Literacy programs.

In addition to their own struggle with the mainstreaming process, non-native speakers of English face many difficulties in improving their skills, particularly their command of the English language. Furthermore, parents especially may experience many problems relating to helping their children in the new land. Software designers have developed software which they claim has the ability to successfully aid such individuals. This project examined four such packages produced by two companies to see if they could significantly and positively impact on the attainment of the English language skills of the adult LEP student. These packages were: The Paper Bag Princess and Thomas' Snowsuit by Discis Software, and INFORM and Pronunciation Plus by Proficiency Software. Within INFORM, two specific sections were studied: Classified Ads and The Christmas Season.

Thirty (30) refugee and immigrant adult students were divided into two groups of 15 each. One became the control group, the other the experimental group. Each group received six hours of instruction per week. The experimental group received two hours of instruction per week on the material contained in the software. The control group was taught the same material in printed form without the use of computers. Pre-tests and post-tests were administered to each group.

It was difficult to find equivalent groups, because classes tended to cluster by ethnicity. Despite the best efforts of the researchers, the control group happened to be mostly Cambodians, and the experimental group a mixture of Vietnamese and Chinese. Therefore, any conclusions from the study may be contaminated by the ethnic differences. Another complicating factor was the frequent malfunctioning of the Proficiency software, a problem which was alleviated by the advent of new versions of the software near the end of the project but was problematical during the bulk of the project. An analysis of the data indicates that both groups did markedly better on the post-test, but that the experimental group predictably improved more than the control group. In addition, the latter enjoyed the exposure to the computers and the materials, were able and eager to use the software to study independently, and had enhanced self-esteem and self-confidence because of their exposure to the high-technology equipment .

CHAPTER 1   INTRODUCTION AND STATEMENT OF NEED

Non-native speakers of English face many difficulties in improving their English language skills. They may have difficulty finding a class which goes at an appropriate speed for them. They may be nervous about asking a native speaker of English, even a teacher, to repeat phrases over and over if the rest of the class members (who may be experiencing the same feelings) are not. They may be shy about admitting a lack of English skills. They may have difficulty justifying time spent in class when they could be at work or with their families. Parents especially may experience many problems relating to helping their children become acculturated and learning American history and folktales or aiding them with health or school issues.

Other issues relating to ESL in a Family Literacy context are:

1.1 LEP parents need to develop not only their English language skills but also the required skills both as readers and as providers of literacy activities for their children. Parents can act as role models and demonstrate positive attitudes to education in the process;

1.2 LEP students need a high teacher/student ratio for optimal instruction;

1.3 Individualized or small group instruction is crucial in a multi-level and multi-lingual ESL/family literacy environment which is commonly found in ESL classes;

1.4 A non-threatening atmosphere is necessary;

1.5 Student paced progress, with much opportunity for student choice;

1.6 Contextual, relevant learning.

1.7 Learning through multiple sensory modalities (multimedia).

Computers have been shown to be effective in ESL programs, including those of the Indochinese-American Council (IAC). They can act as teachers in one-on-one or small group settings and can be non-threatening if introduced in an appropriate manner. They may be able to integrate auditory and visual messages and respond immediately to choices made by users. Computers are non-judgmental and highly relevant to today's information-based society. In short, they can answer many of the needs of an ESL program. One drawback of computers, however, is that relatively little sound information can be stored on each floppy disk. A new kind of technology stores data on a **CD-ROM disk.** Such disks hold the equivalent of approximately 700 floppy disks. This allows large amounts of aural, as well as visual, information to be stored and accessed easily. CD-ROM disk drives can easily be attached to computers. While not yet in wide use, they are expected to revolutionize and rejuvenate the use of computers in education at all levels. This project allowed a controlled study of their use in a real-life situation.

TIME FRAME

From September 1 through November 15, 1991 the main thrust of the project was technical: obtaining and upgrading the Apple Macintosh Plus computers, obtaining the CD-ROM drives, integrating the computers with special voice machines which allowed students to record their own voices on the computer, obtaining and learning to use the software (see Chapter 8: Recommendations). Although this set the project start-date back somewhat, it was considered vital that the software run smoothly so as not to discourage any class members, who might already be somewhat computer-phobic. Participants were selected by Jan. 10, 1992. Pretests were given the third week of January, 1992. Classes met for three two-hour sessions each week from February 3, 1992 until May 15, 1992. In addition to the learning the four packages for three hours per week, participating students also studied other ESL materials as well. Post-tests were given at the end of the instruction of each package. All staff involved in the project met to discuss the project on several occasions, including November 23, 1991; January 4 and 25, 1992; February 8 and 28, 1992; March 14 and 18, 1992; April 25, 1992; May 18, 1992, and a final meeting to discuss results on May 23, 1992. The staff input and discussion led to modifications and adjustments to the project, in order to better serve the real needs of the students.

PERSONNEL

The project was planned and organized by Dr. Vuong G. Thuy, Executive Director of the Indochinese-American Council, with curricular and technical input and assistance from Mr. Benjamin D. Burenstein, Curriculum Specialist, Drexel University Office of Computing Services. Dr. Thuy developed the pre- and post-tests. The classes were conducted by the following ESL teachers from the Indochinese-American Council: Ms. Le-Quyen Vu, Mr. Sam Keo, and Mr. Nick Kleinerman. These teachers have had extensive experience in providing ESL instruction to multi-racial, multi-lingual adults. Mr. John Wagner, Vice-President of Proficiency Software, helped greatly with some of the technical aspects of the project, donated over $10,000 worth of software, voice machines and headphones for the project. The family literacy software (The Paper Bag Princess and Thomas' Snowsuit) were donated by Discis Software of Toronto, Canada.

INTENDED AUDIENCE

This research was aimed at helping teachers, administrators, and volunteers working with LEP adults understand not only what is technically required to utilize the computer-CD-ROM combination in ESL and Family Literacy instruction, but also the pros and cons of such use.

FILED COPIES OF THIS REPORT

This report will be on file at: AdvancE, Pennsylvania Department of Education, 333 Market Street, Harrisburg, Pa. 17126-0333; ERIC, Education Resource Information Index, Ohio State University; National Center for Research in Vocational Education, 1960 Kenny Road, Columbus, Ohio, 43210.

CHAPTER 2   STATEMENT OF PROBLEM

For non-English speaking adults and by and large, the English language is difficult to learn, particularly if their primary languages have nothing in common with English and if they are low-literate in their own language, as in the case of Asian immigrants and refugees.. Therefore, the acquisition of the English language can be quite time-consuming and definitely requires high motivation and perseverance on the part of the learner.

The rate of adult students dropping out of ESL classes before obtaining a fairly good command of the English language can be quite high if certain conditions are not met. There are a few reasons for adult learners who are, generally speaking, newly arrived refugees and immigrants to quit ESL classes early:

1. In addition to their own struggle with the "survival" and mainstreaming process, the new Americans are constantly required to support and care for their families. This gives them little motivation, time, and energy to learn the new language;

2. After a while, the adult learner may feel that he/she did not make progress fast enough, therefore he/she may lose motivation and become discouraged;

3. Because of limited resources in terms of funding and manpower, the ESL service provider, generally speaking, cannot provide the individualized instruction or small group instruction which, in the E.S.L. learning environment, facilitate the learning process;

4. Inappropriate placement in ESL level due to lack of space in ESL classes or testing;

5. Irrelevant ESL instruction materials as far as the learner is concerned;

6. Insufficient practice time in class.

Although high-technology promises to help address some of these issues, a diligent search of the literature turned up very little rigorous, independent scientific research conducted on CD-ROM based Computer-Assisted Instruction in ESL and Family Literacy. Thus there is a need to carry out such research with a wide variety of ESL populations. This project is just a beginning.

CHAPTER 3   GOALS AND OBJECTIVES

The purpose of this project was to study the educational effectiveness of CD-ROM based computer assisted instruction in the ESL and Family Literacy curriculum. Specific objectives were:

1. To evaluate whether participants in the experimental group achieve better results by measurable performances in terms of language acquisition (including reading) to be demonstrated by pre- and post-testing, and by comparison with the control group;

2. To examine retention and attendance rates between the two groups;

3. To prepare a training and reference guide designed for literacy and ESL teachers and tutors on using this technology. Ten (10) copies of this guide will be made available to AdvancE of the PDE for dissemination, adoption, adaptation, and/or implementation. Additional copies of the guide will be made available at cost to anyone interested in the interactive approach to ESL/family literacy.

4. To provide a showcase for the new technology and provide free services to interested literacy/ESL teachers in the state of Pennsylvania by presentations and demonstrations at the IAC's Community Service Center in Philadelphia or at statewide adult basic education staff development activities and other PA Department of Education-initiated activities.

All of the objectives were successfully met, except for objective 3. Because the funds allocated to this project were considerably less than those requested, there was neither time nor manpower available to prepare such a guide. Further comments about the need for such a guide will be found in Chapter 8: Recommendations.

CHAPTER 4   PROCEDURES

Thirty (30) beginning/higher beginning ESL students enrolled in the IAC's various ESL programs were recruited for the proposed Special Experimental Demonstration Project . The course of the project was:

(a) Participants were pre-tested during the third week of January, 1992. The pretests consisted of vocabulary questions and comprehension questions taken from the readings. Fifteen (15) participants were placed in the experimental group and fifteen (15) in the control group. Efforts were made to ensure that learners in both groups had equivalent test scores. Each group was divided into two subgroups of seven and eight students each. Each experimental subgroup was taught by a different teacher. Both control subgroups were taught by the same teacher.

(b) Both groups had a total of three (3) two-hour classes per week for 15 weeks. Each class spent one hour having a regular ESL class and the other hour reading children's literacy materials or Proficiency material. Printed copies of the materials were available for both groups (books for the Discis software and printed versions for the Proficiency software). The experimental group had a combination of regular traditional classroom ESL methods and CD-ROM based computer-assisted

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instruction reinforced by additional materials provided by Proficiency to accompany their MacEnglish software.

(c) At the conclusion of the instruction of each package, post-tests and exit interviews were administered and scored.

(d) At the end of the project, participants were asked to fill out a questionnaire (See Appendix 2).

CHAPTER 5   STATISTICAL RESULTS OF THE TESTS OF THE COURSE

Experimental Group E1 is a beginning/higher beginning level group. Experimental Group E2 is a beginning level group. Control Group C is a beginning level group.

Appendix 1 indicates all the test scores from each student for each of the four packages, The Paper Bag Princess (PBB), Thomas' Snowsuit (TS), The Christmas Season (TCS), and Classified Advertisements (ADS). This data is summarized in the charts on the next four pages. This chapter looks at the changes in scores for each group and discusses our interpretation of the data.

In the Paper Bag Princess, (a story on Discis software), Experimental Group 1 (E1) started at a much higher level than Experimental Group 2 (E2) or the Control Group (C). The slope of learning was about the same for E1 and C, but was greatly accelerated for E2, suggesting that this courseware is best for beginning students but is useful to both beginning and beginning/higher beginning students. In the comprehension test, B, where E2 started out higher than the control group, E2 actually reached the same level as E1.
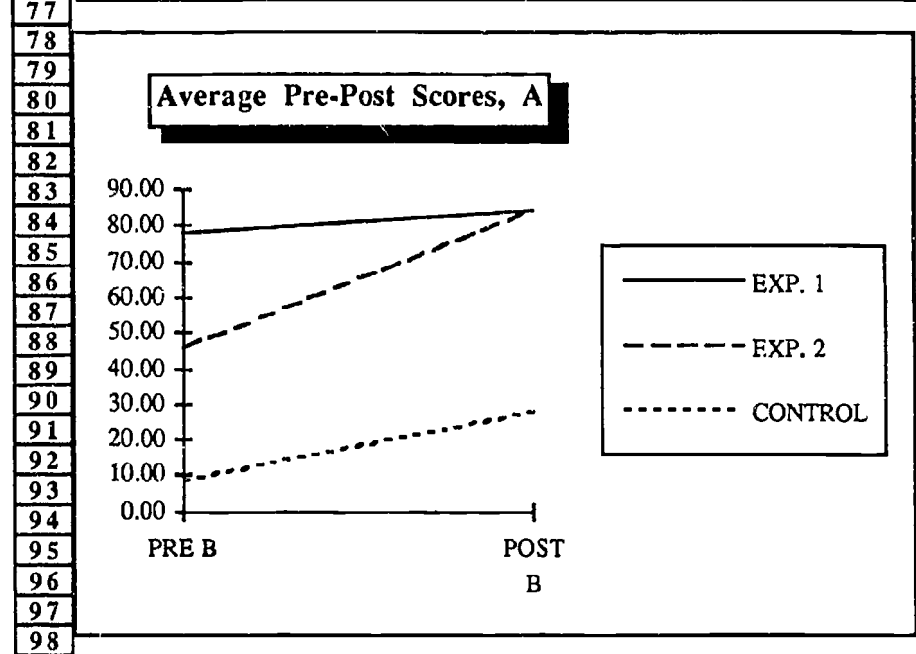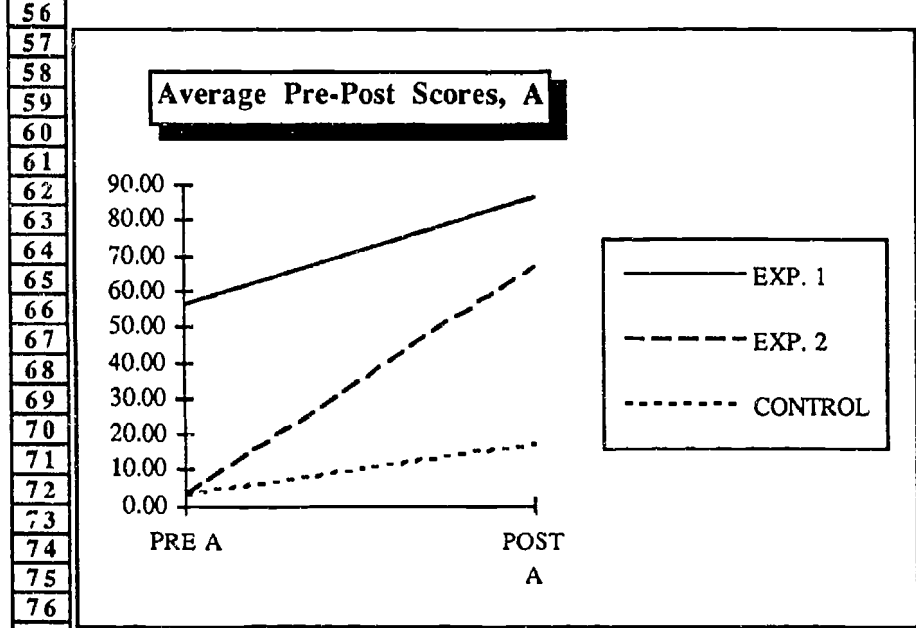
In Thomas's Snowsuit, (a story on Discis software), E1 started at a much higher level than E2 or C. The slope of learning was again about the same for E1 and C, and was somewhat accelerated for E2, again suggesting that this courseware is best for beginning students, useful to both beginning and beginning/higher beginning students, but not so dramatically useful as the Paper Bag Princess.

In Classified Ads, (the Proficiency tutorial on how to use classified newspaper advertisements), E2 started out at a lower mean level than C on both vocabulary and comprehension pre-tests, but far surpassed them by the post-test. E1, perhaps because they had less room for improvement, gained less in comprehension than either E2 or C, and in fact tested slightly lower than E2 by the post-test. This suggests that this courseware too is most useful for beginners. The vocabulary improvement for E1, however, was greater than that of C.

In The Christmas Season, (the Proficiency tutorial on how Christmas is observed in the United States), E2 again benefited most dramatically from the courseware in both vocabulary and comprehension improvement, E1 benefited more than C in vocabulary improvement but less than C in comprehension improvement.

In general, E2 improved most of all on both vocabulary and comprehension tasks, E1 improved more on vocabulary than C, but C improved more on comprehension than E1.

	A	B	C	D	E	F	G	H	I
50	Paper Bag Princess								
51		MEAN	MEAN	MEAN		MEAN	MEAN	MEAN	
52	GROUP	PRE A	POST A	CHANGE	GROUP	PRE B	POST B	CHANGE	
53	EXP. 1	56.67	86.25	29.58	EXP. 1	78.00	84.50	6.50	
54	EXP. 2	3.19	67.00	63.81	EXP. 2	46.00	84.25	38.25	
55	CONTROL	3.13	17.33	14.20	CONTROL	9.13	27.80	18.67	

Average Pre-Post Scores, A

Chart showing lines for EXP. 1, EXP. 2, CONTROL from PRE A to POST A, y-axis 0.00 to 90.00.

Average Pre-Post Scores, A

Chart showing lines for EXP. 1, EXP. 2, CONTROL from PRE B to POST B, y-axis 0.00 to 90.00.

	A	B	C	D	E	F	G
49	Thomas' Snowsuit						
50		MEAN	MEAN	MEAN		MEAN	MEAN
51	GROUP	PRETEST A	POST A	CHANGE	GROUP	PRE B	POST B
52	EXP. 1	67.72	86.44	18.72	EXP. 1	76.00	86.78
53	EXP. 2	16.23	49.47	33.23	EXP. 2	20.33	51.47
54	CONTROL	3.00	13.63	10.63	CONTROL	12.17	33.33
55							
56							

Average Pre-Post Scores, A

EXP. 1
EXP. 2
CONTROL

PRETEST A → POST A

Average Pre-Post Scores,

EXP. 1
EXP. 2
CONTROL

PRE B → POST B

10
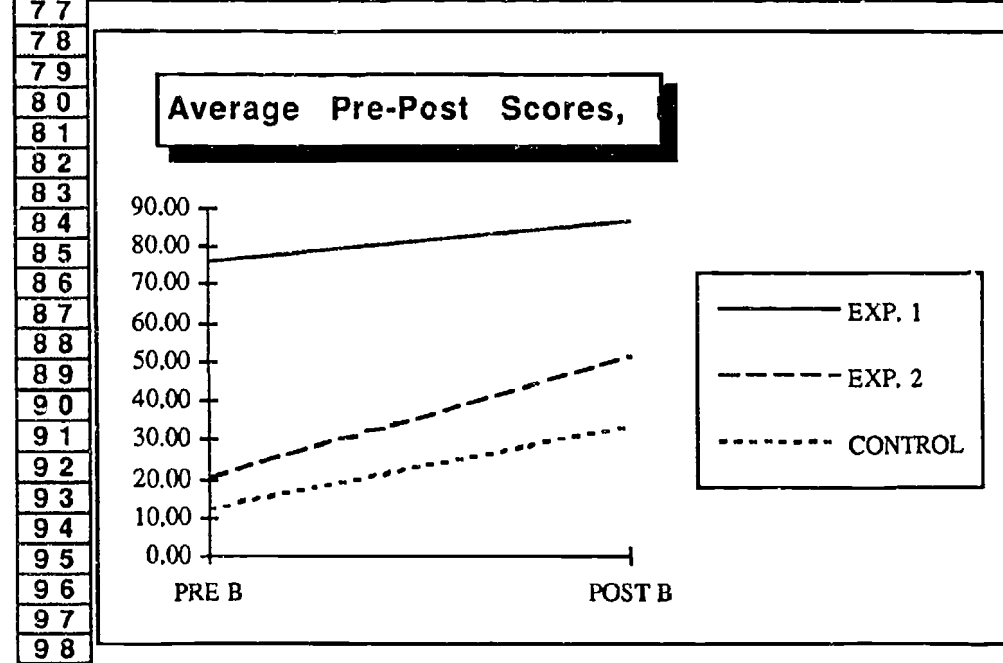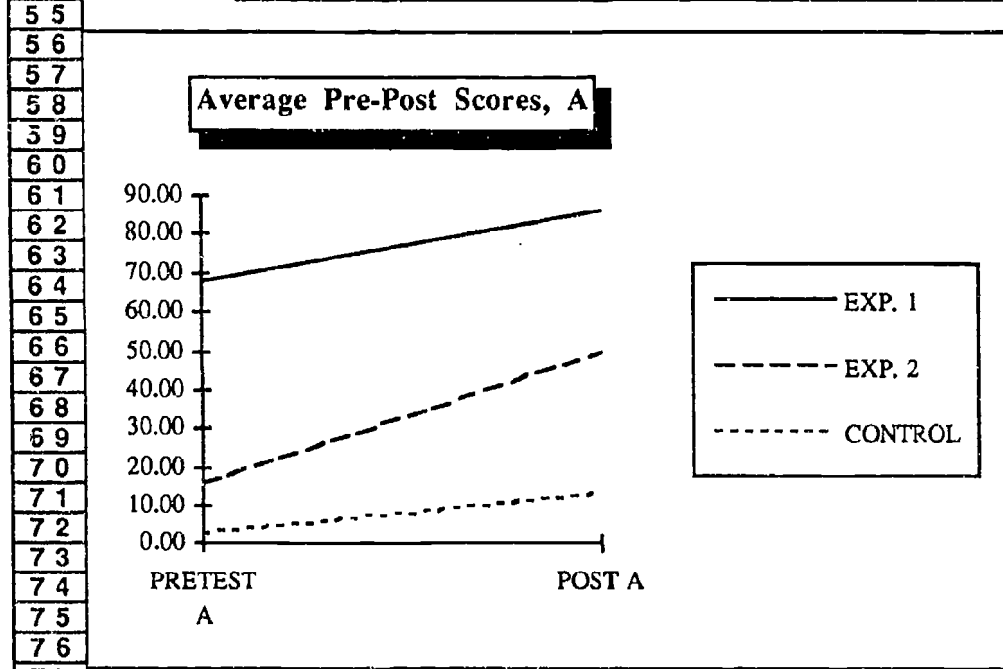
	A	B	C	D	E	F	G	H
52	**Classified Ads**							
53		MEAN	MEAN	MEAN		MEAN	MEAN	MEAN
54	GROUP	PRETEST A	POST A	CHANGE	GROUP	PRE B	POST B	CHAN
55	EXP. 1	29.33	45.33	16.00	EXP. 1	8.50	9.00	0.5
56	EXP. 2	3.40	40.40	37.00	EXP. 2	0.00	9.50	9.5
57	CONTROL	5.20	12.73	7.53	AVE CHG	2.87	5.00	2.133

Average Pre-Post Scores, A

Average Pre-Post Scores, B

11
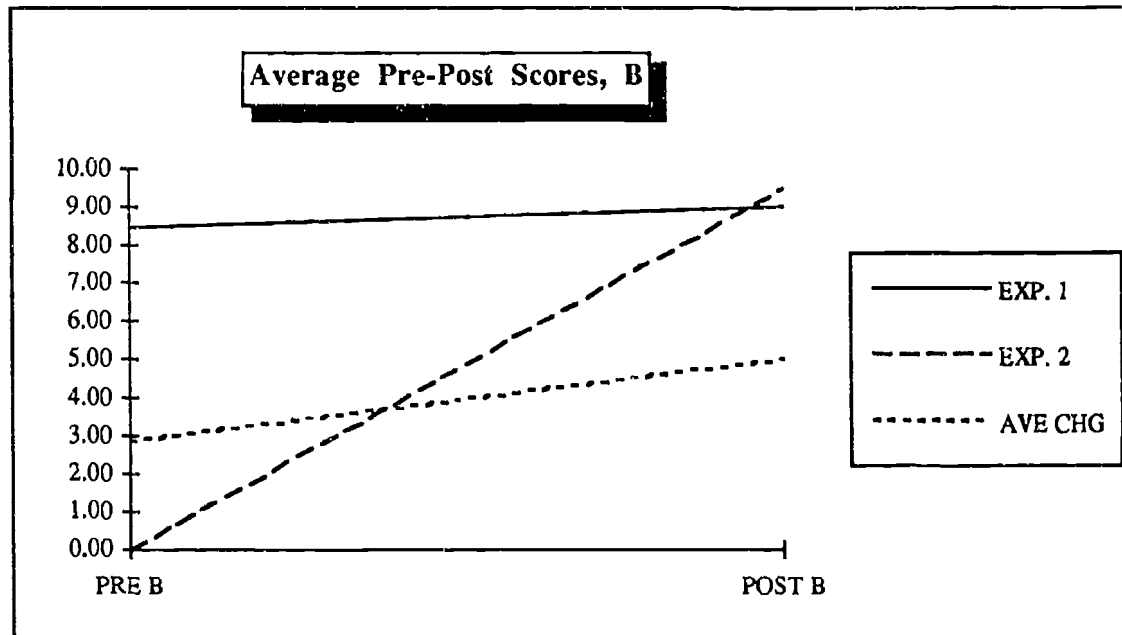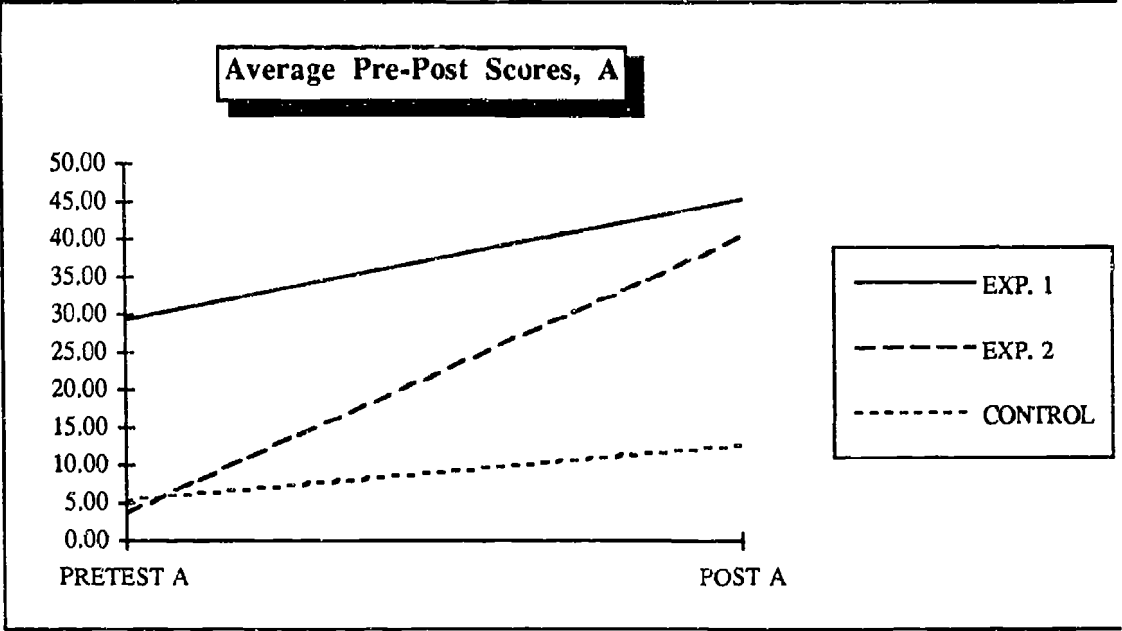
MEAN GROUP	MEAN PRE-TEST A	MEAN POST A	MEAN CHANGE	MEAN GROUP	MEAN PRE B	MEAN POST B	MEAN CHANGE
EXP. 1	25.50	35.00	9.50	EXP. 1	9.00	9.50	0.50
EXP. 2	11.71	36.36	24.64	EXP. 2	1.86	8.86	7.00
CONTROL	8.42	15.29	6.88	CONTROL	3.83	6.25	2.42

Average Pre-Post Scores, A

Average Pre-Post Scores, B

12
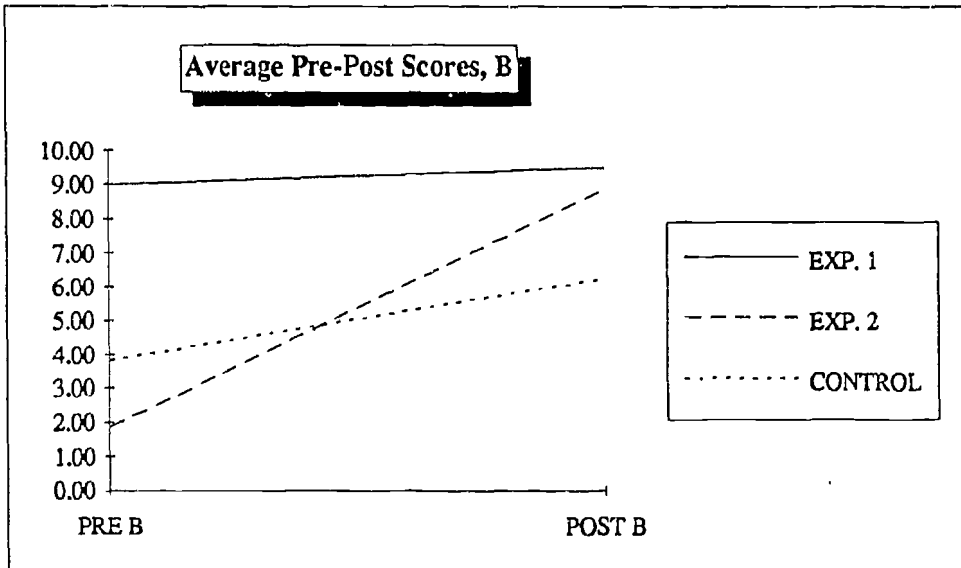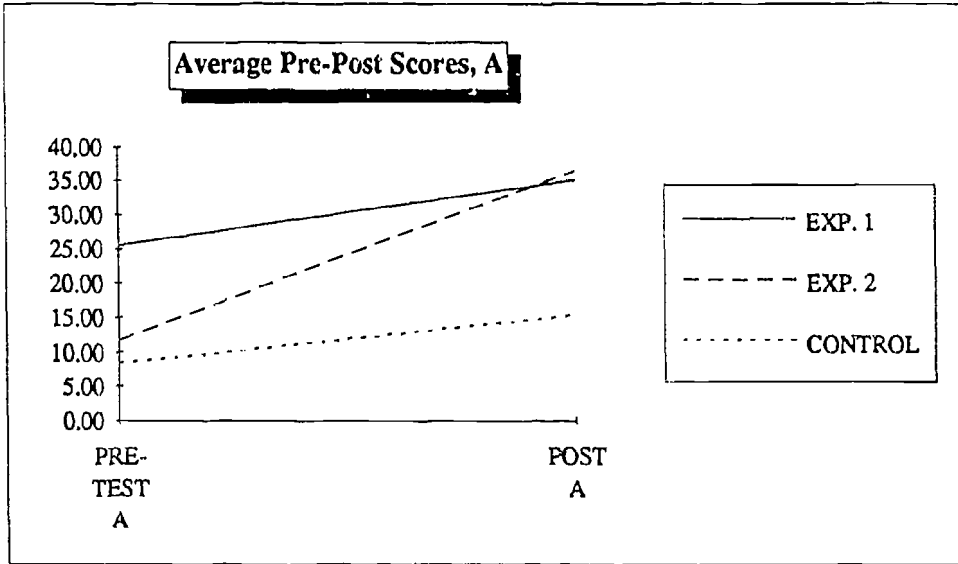
The reports from students in their exit interviews were interesting. In Control Group C, all of the 14 learners (100%) interviewed said they liked the Proficiency materials, which they used in printed form. 12 of them (87%) liked the Discis materials. Half (50%) preferred Proficiency, and half (50%) Discis. None of the students said that anything should be changed or added in either the Proficiency or Discis materials. They said unanimously that they would recommend the software to friends. It should be noted that the group which preferred Discis were all beginning learners, and therefore they may have felt constrained not to criticize the programs. The learners said that they would choose to work with the software approximately 3 hours per week.

The experimental groups, E1 and E2, whose interviews were considered together, were much less unanimous in their choices. 12 of 15 (80%) of the respondents said they liked the Proficiency materials, but 3 (20%) did not. More than half, 8, said they did not like the Discis material. We infer that it is because some of the students in E1 were at a higher level, and did not value the cultural or literary experience of the Discis material, which was designed specifically for children, as much as they did the practical information on Proficiency. About the Proficiency material, positive learners said, "I learn about American culture," "I learn new vocabulary," "I want to practice conversation and grammar at the school." On the negative side, one said, "I came here to practice conversation. I can read book or listen to the radio or TV at home." About the Discis materials, one learner said, "They are for the children," another, "(they should) make the story more serious and challenging for adults." Of the 8 who liked both programs, 5 preferred Proficiency, and 3 Discis. Several had suggestions for changes they would make: more grammar, synonyms or antonyms, more word definitions (on the Proficiency program), "more stories for older people (on Discis)" and suggestions for more user control, to speed it up or make it slower. (In fact, the Disci software does have the ability to do these things, but apparently not in an intuitive way so that learners could easily figure it out). 10 of the 12 (83%) who answered question #6 indicated that they would recommend the course to friends, but two (17%) said they would not. Like the control group, the learners in the experimental groups said that they would choose to work on the material approximately 3 hours per week.

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CHAPTER 7   EVALUATION

POSITIVE RESULTS

Aside from the clear statistical information that learners who participated in the experimental group achieved greater mastery of the material than those in the control group, there were a number of anecdotes which indicate the positive attributes of exposure to high technology.

1) As determined by the questionnaire, adults who used the technology enjoyed the experience. This was determined both from post-study interviews where <u>every single learner</u> expressed an interest in using it more, and from observation of their non-verbal behaviors, which demonstrated increasingly higher levels of comfort with the hardware and software as they proceeded through the project. Retention and word of mouth recruitment can be valuable by-products of using this technology. (In fact, some learners came to register for other classes in the hopes of working on the CD-ROM technology.) In addition, it is the conviction of the researchers that learners who are able to relax and enjoy their task will learn more rapidly and retain more information.

2) The Proficiency programs come with the ability to record one's voice onto the computer and compare it with the sample pronunciation. Learners can watch an oscillograph of their own speech, and compare it with such a graph of the sample speaker. The process is much easier than using a tape recorder because there is no need to rewind in order to listen. The process is triggered by simply using a mouse to click on a word, phrase, or sentence. Thus the link between the written word and the pronounced word is strengthened. Learners valued this experience highly, according to the three participating ESL teachers.

3) There were instances where shy learners (who were reluctant to speak English at all in class) were observed to spend considerable amount of time speaking into the computer. It was unclear, by the end of this project, whether they would have any difficulty making the transition to person-to-person speech when they were ready, but the teachers believe that the non-judgmental aspect of the computer provided great value for these learners. Many of them seemed to enjoy the privacy provided by the computer.

4) Most of the participants come from cultures and social status where they had no access to high-tech equipment. Therefore they were thrilled with the opportunity to work with it in this project.

5) Our research reaffirmed the conclusion of numerous studies that have indicated that computer-assisted instruction (C.A.I.), in general, helps students learn more and perform better on posttests than conventional classroom methods in general (Balson et al., 1985-1986[1]; Terrell, 1990[2], Fletcher, 1990[3]).

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[1]Balson, P.M., Ebner, D.G., Mahoney, J.V., Lippert, H.T., and Manning, D.J. (1985-86). <u>Videodisc Instructional Strategy: Simple May Be Superior to Complex.</u> Journal of Educational Technology Systems, 14 (4), 273-281.

[2]Terrell, D. J., (1990). <u>A Comparision of Two Procedures for Remediating Errors during Computer-Based Instruction.</u> Journal of Computer-Based Instruction. 17(3), 91-96

[3]Fletcher, J.D. (1990). <u>The Effectiveness of Interactive Videodisc Instruction in Defense Training and Education.</u> Washington, DC: Institute for Defense Analysis.

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KEY CONSIDERATIONS BASED ON RESULTS OF THE PROJECT

1) Although the Proficiency programs INFORM and PRONUNCIATION PLUS were presented by its vendor as relatively straightforward, at this stage of its development the technology of the Proficiency software was not quite stable or completely reliable. It is not the intention of this report to in any way discourage further experimentation or use of this software. In fact, by the end of the project most technical difficulties were worked out. Nevertheless, it is important to stress that any programs wishing to implement its use may expect to spend some time getting technical details resolved. As time elapses, and the technology becomes more widespread, it is expected that more reliable software of this nature will become available. The Discis software, which is less educationally ambitious, presented fewer technical problems.

2) The Proficiency software would not be sufficient as a basic ESL course for beginning learners because it is not developmental. They do not lead clearly from one level to another as a series of textbooks (such as Side by Side, by Molinsky and Bliss) might. Because the level and progression was not wholly appropriate to the learners in this project, the instructors found they needed to put in extra effort to keep them motivated. It is the belief of the researchers that materials which make up a curriculum should be tailored by instructors for the specific learners in their class. To fulfill the requirements of this project the teachers had to spend a great deal of time tailoring the curriculum for their students. While there are many dialogue and vocabulary building exercises which would be useful to mid- or high-level students for practice of relevant and common vocabulary and pronunciation, they were certainly not appropriate for beginners without a high level of support activities from the teachers. The teachers commented that for beginners the exercises were "helpful but not relevant." They were helpful because learners got to their listening and speaking skills, even getting the chance to hear themselves saying English words and phrases, but words and phrases were not vital to their lives or needs. Exercises on shopping at the supermarket or asking directions would be more relevant than exercises on American pop music or the cinema, or even Christmas. The section on classified ads was judged useful and relevant by the learners.

The Discis software, although using simpler vocabulary, was still not really appropriate (without considerable support from the teacher) for beginners.

3) The Proficiency software comes with the ability for up to 4 learners to record and listen to their pronunciations simultaneously using combination microphone/headphones. It was thought that this would be useful in encouraging collaborative learning. In fact, learners preferred to work one-on-one with the machine. Because true person-to-person conversation is vital to genuine ESL learning, other opportunities had to be built into the class. These programs, as useful as they may be, are still far from providing a whole and holistic ESL experience.

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4) The drill and practice sections of the Proficiency software were trivial. Much attention should be given to enhancing this aspect of the program, including not only written materials but also computer-based exercises. The Discis programs are intended to be pleasurable and discovery programs, rather than directed curriculum, but the researchers believe that to have such exercises available would allow teachers a choice as to whether or not tø utilize them, depending on their desires. (Discis has begun issuing curricular materials to accompany their CD-ROM programs.)

5) Younger learners (under 25 years of age) appeared more motivated and comfortable than older students. High-school students who attend various programs at the IAC but were not part of this study were *extremely* motivated by the Proficiency programs (when they were given opportunity to work with these programs). The researchers believe this is because of their higher English skills, and greater interest in becoming American, and greater comfort with high technology.

6) Learners commented to be two kinds of physical discomfort which this technology brought about. They found the headphones uncomfortable (as did learners at Jewish Educational and Vocational Services who use similar courseware), and some got headaches after staring at the screen for extended periods. In pursuing technological approaches to education, we must note these difficulties to remind ourselves that one level of individualization a literacy program must perform is to provide alternative activities for learners who express or manifest such difficulties. In fact, Proficiency Software has substantially improved their product to be used with the Macintosh LC computer without headphones. However, if many students use audible computers at the same time and in the same classroom, it could be very noisy and disturbing.

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CHAPTER 8   RECOMMENDATIONS

1) High-technology approaches to ESL and adult literacy should be utilized and integrated into programs where technologically and financially feasible, because they offer the possibility for dramatic improvements in pronunciation practice, vocabulary and comprehension to many students.

2) Such approaches should continue to be evaluated and categorized to find which approaches and which specific materials work best in various settings with different individuals and their needs.

3) Software should be easy to use, both for staff and students. Because of its nature, the Discis software met these criteria. The Proficiency software, however, is a bit harder to use.

4) Software which utilizes a more developmental approach to ESL should be created and marketed so that learners have the option to progress linearly through the material, rather than working with exercises which are approximately at the same level.

5) Some way should be found to synchronize the oscillograph in the Proficiency programs with the learners speech. What is an exciting idea becomes confusing when students cannot directly compare the graphs their voices make with those of the model voice on the disk.

6) Software designers such as Discis should append some instructional materials to their stories. Discis software should develop materials more appropriate to adult behaviors and needs as well.

7) A glossary consisting of key vocabularies and idiomatic expressions with samples showing how they are used would be extremely useful.

8) A study where learners and their children work together on computers should be conducted.

9) The technical support received by the IAC throughout this project from both Drexel University's Office of Computing Services Community Outreach Group and John Wagner from Proficiency was vital to its success. Although the technology to run such programs is becoming more and more user friendly, any agencies wishing to implement a high-technology component must be sure they have some source of technical support.

10) The study clearly indicated that, given specific instructional and information goals, a high-technology system integrating computers, CD-ROM players, and appropriate software utilizing speech, can accelerate the learning process. The study in which both groups used curriculum-referenced tests devised by the IAC, this study indicates that computer-assisted instruction, which focuses on a specific test, can be useful to student studying for that test. However, it does not demonstrate whether students learn to generalize their learned behavior to real-life settings, nor does it demonstrate that they retain the material over a significant span of time. And it is obviously not as flexible as a teacher, who can make judgments based on far more than simple responses on a mouse or keyboard.

11) CD-ROM was presented as quite easy to install and use, yet this was not completely the case. A clear and concise guide to help utilize this resource with new software as it becomes available should be

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prepared to help those who are interested in using CD-ROM/computer technology for instructional purposes.

12) New software should be evaluated by qualified individuals such as the staff of the Office of Computing Services of Drexel University as they become available. Findings should be provided to those programs using high technology for instructional purposes. Not only does this information prove to be a valuable time-saver, it also helps teachers and program directors in their selection of software and hardware to meet the needs of their students.

SHOWCASING THE TECHNOLOGY

The main thrust of this project was to provide opportunities for LEP students to use the technology to facilitate their learning process. Another important part of the project was showcasing the software and hardware to a wide variety of service providers and individuals involved with the ESL and family literacy fields. These demonstrations included some at the IAC community service center and some visits to other sites. Presentations included the Drexel Conference/Mayor Commission on Literacy (MCOL) conference on Computers and Adult Literacy in May, 1992; a presentation to Nationalities Services Center staff; a presentation to the Executive Director of MCOL; presentations to Mr. Ken Wallick and Mrs. Martha Frank of the Pennsylvania Department of Education; a presentation for Ms. Kay Barber from Susquehanna Employment and Training; and numerous informal presentations for a variety of visitors.

Feedback from most of those attending the presentations indicated that it was the first time they were exposed to this technology, and they were most appreciative of the opportunity. Some thought the programs were wonderful, others felt the programs lacked some components which they considered essential to a balanced ESL program. But all were excited by the potential of the technology.

Anyone who is interested in CD-ROM-based computer-assisted instruction in ESL and family literacy may still call the IAC staff at (215)-457-0272 for a free demonstration of software and hardware.

CHAPTER 9   CONCLUSION

This project met its original goals except the preparation of the training and reference guide (see Chapter 3) It is hoped that such a guide will be prepared in the near future when funds allocated for this purpose become available.

Statistically and anecdotally, the learners who used the high-technology software and hardware experienced greater growth than learners who used print-based materials. Retention rates were also higher. Numerous workshops were presented to groups around the state of Pennsylvania, including a presentation at Drexel's annual Adult Literacy and Technology Conference. Nevertheless, there were some difficulties, both technical and curricular, which made it clear that the high-technology software used in this project must still be coupled with a great deal of human-to-human interaction to provide an adequate Family Literacy/English as a Second Language program.

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APPENDIX 1   FULL DATA PRESENTATION

The appendix contains all the pre-and post-test scores for the participants of the study. There are 3 groups: E1 (Experimental Group 1), E2 (Experimental Group 2), and C (Control). For explanation of the skill levels of each group, see page 5. For a summary of the data, see charts on page. 7-10.

Each of the students was given an identification set such as E1 or C. Some students participated in all four lessons, others in just two or three.

Each lesson has data from each of the three groups on two pre-test and post-tests. A-tests were essentially vocabulary recognition tests, B-tests comprehension tests. The bar charts indicate the growth of each learner on a particular test. The line graph indicates the average change for the group on that test.

APPENDIX 2   EXIT QUESTIONNAIRE

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The Full Data (Appendix 1) and Appendix 2
were not included in the copy received by ERIC.
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