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Integration of technology in the curriculum language arts: Spanish phonemic awareness

Maria Esperanza Haley

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INTEGRATION OF TECHNOLOGY IN THE CURRICULUM

LANGUAGE ARTS - SPANISH PHONEMIC AWARENESS

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A Project
Presented to the
Faculty of
California State University,
San Bernardino

---------------------------------------------------

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education:
Instructional Technology

---------------------------------------------------

by
Maria Esperanza Haley

June 2003
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Approved by:

Dr. Amy S. C. Leh, First Reader

Dr. Barbara M. Flores, Second Reader

Date
ABSTRACT

Having the latest technology in the classroom does not guarantee success. While some school districts provide the proper equipment for the use of teachers and students, they do not always provide the necessary training to use it. Knowing how to integrate available technology is the key to finding that success. This paper is testimony of how I have taken my Instructional Technology training and used it to enhance my teaching ability. It describes how a basic software program was used to create an interactive program to teach Phonics in Spanish to Kindergarten students in a Structured English Immersion Program. This paper validates the importance of acquiring technology skills for integration into the curriculum during the teacher credentialing process.
ACKNOWLEDGMENTS

I would like to thank Dr. Amy Leh and Dr. Barbara Flores for their support and encouragement during this writing process.
DEDICATION

To my husband Vinse, who has missed out on years of home cooked meals and lonely evenings. To my daughter Zabrina, who encouraged me when I could not see past getting through my undergraduate years. To my son Xavier, who thinks I am a role model. To my parents Josefina and Edmundo Perez, who worked hard to see that their eight children became contributing members of the community. Finally, I would like to thank all of the friends who read my papers and gave me support. In particular, I am grateful to an old friend, Michelle Randall, who long ago suggested that I could do this when I had no belief in myself. Thank you all.
<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT .......... iii</td>
</tr>
<tr>
<td>ACKNOWLEDGMENTS ... iv</td>
</tr>
<tr>
<td>LIST OF FIGURES ... vii</td>
</tr>
<tr>
<td>CHAPTER ONE: BACKGROUND</td>
</tr>
<tr>
<td>Introduction ........ 1</td>
</tr>
<tr>
<td>Statement of Problems 4</td>
</tr>
<tr>
<td>Goals ................ 5</td>
</tr>
<tr>
<td>Significance of the Project 7</td>
</tr>
<tr>
<td>Definition of Terms ... 8</td>
</tr>
<tr>
<td>Organization of the Thesis 10</td>
</tr>
<tr>
<td>CHAPTER TWO: REVIEW OF THE LITERATURE</td>
</tr>
<tr>
<td>Introduction ........ 11</td>
</tr>
<tr>
<td>Phonemic Awareness Defined 11</td>
</tr>
<tr>
<td>Spanish Phonemic Awareness 14</td>
</tr>
<tr>
<td>Phonemic Awareness and Reading 15</td>
</tr>
<tr>
<td>The Target Audience 16</td>
</tr>
<tr>
<td>Student Motivation ... 17</td>
</tr>
<tr>
<td>Computer Based Instruction 19</td>
</tr>
<tr>
<td>Summary ................ 23</td>
</tr>
<tr>
<td>CHAPTER THREE: DESIGN, DEVELOPMENT, AND EVALUATION</td>
</tr>
<tr>
<td>Introduction ........ 25</td>
</tr>
<tr>
<td>Design ................ 26</td>
</tr>
<tr>
<td>Main Menu Slide for Phonemic Awareness 32</td>
</tr>
<tr>
<td>Development ........... 33</td>
</tr>
</tbody>
</table>
Design Implementation ........................................ 38
  I. Visual Design Elements ............................... 38
  II. Pattern ............................................ 41
  III. Arrangement ...................................... 43
Evaluation ..................................................... 45
Educational Value ........................................... 46
Student and Teacher Appeal ............................. 46
Use .......................................................... 48
Summary ..................................................... 51

CHAPTER FOUR: CONCLUSIONS AND RECOMMENDATIONS
  Introduction ............................................. 52
  Conclusions ............................................. 52
  Recommendations ....................................... 54
APPENDIX A: TITLE PAGE ..................................... 56
APPENDIX B: MAIN MENU .................................... 58
APPENDIX C: ALIGNMENT .................................... 60
APPENDIX D: SHAPE ......................................... 62
APPENDIX E: BALANCE ....................................... 64
APPENDIX F: SLIDE SAMPLES ............................ 69
REFERENCES ................................................. 81
LIST OF FIGURES

Figure 1. A Continuum of Complexity of Phonological Awareness Activities (Snider, 1995) ..................... 12

Figure 2. Visual Design Elements (Heinich, et al., 1996) ..................... 30

Figure 3. Main Menu Flow Chart ............................ 34
CHAPTER ONE
BACKGROUND

Introduction

Educational technology for the past thirty years has undergone a phenomenal change in the way it is perceived and presented in the area of literacy education. The use of technology was limited to film strip projectors and the use of educational wildlife films in the 1950's. In the 1960's, the use of instructional television through the use of public television stations had its advantages because it could be seen during a scheduled time in a live format. Unfortunately, the issue with scheduling viewing in the classroom was sometimes a major problem. The advent of Sesame Street in the 1970's made great strides in early literacy by getting a new generation phonemically ready for reading instruction. In the 1980's, the trend was more video oriented. Every classroom had access to a television and a video player where instructional programs could be viewed during the scheduled time of the language arts period in the curriculum. The 1990's brought a new medium, which introduced computer technology and software as tools to help students. Unfortunately, this decade gave testimony to the fact that teachers were not as
prepared to embrace technology as their students were. In the 2000’s, we as educators have greater expectations of pushing computer technology to the limit in helping our students become better readers.

The International Reading Association (IRA) and the National Association for the Education of Young Children (NAEYC, 1998) have summarized what the educational community has learned from research and practice concerning the most effective ways to help children become literate.

- Children must be “immersion in a print-rich environment” from infancy to develop “their concepts about print.”

- Experiences in playful activities help children learn about the “processes of reading and writing for real purposes.”

- “Many children acquire phonemic awareness (i.e., basic skills necessary for fluency) as a consequence of learning to read, rather than as a result of a specific instruction and practice.”

- Classroom environments that provide opportunities for children to “express
themselves on paper...with emphasis on communicating ideas rather than on spelling or letter formation, help children understand that writing has real purpose" (Davis et al., 1999, What Research Says About Literacy Instruction ¶ 4).

What this means is that to become literate, children must understand the power and functionality of language (Davis et al., 1999). The way that technology can help is by integrating it across the curriculum and in such a way that it is a "natural tool for meaningful learning" (Davis et al., 1999). It requires:

- That technology be used in a way that provides meaning to the user and has a defined purpose;
- That technology provide instruction which is specific to necessary skills and which is relevant to a "meaningful" purpose;
- That computers be "integrated into an environment that values children as active participants in their learning, and as sources of knowledge and skills they bring from personal experiences;"
That computers be used as a tool to encourage communication with peers by sharing ideas and “contributing their personal knowledge and expertise to the education of all members of the learning community” (Davis et al., 2000, ¶ 6).

Statement of Problems

Integrating technology across the curriculum is the challenge for most educators. The technology classes required for a teacher credential in California in 2002 were two. In the two classes, the students were taught the basics of:

- How to operate a computer.
- Basic word processing programs.
- How to connect a video player to a television.
- How to write a budget for technology equipment.
- A sampling of interactive software applications.

None of the required classes give instruction on how to integrate technology into the curriculum. As a newly credentialed teacher, my challenge was to learn how to integrate technology beyond the use of an overhead projector and video player. This project is the result of application of knowledge gained from my experience in the Master Educational Technology Program.
A second problem I encountered in integrating technology was finding a software program that would help my below basic students raise their phonemic awareness level from below basic to basic or proficient. The software available in the classroom was a click and drag exercise in matching upper with lowercase letters. While the software was interactive, it did not go beyond letter case recognition and it had no assessment component.

A third problem that I encountered was the age of the computers available in the classroom. Currently many California classrooms have five-year old computers or older which can only manage word processing tasks. This was the case in my classroom, which has a five-year old Apple computer. Even if I could find a program that would meet my students’ needs, it would not have enough memory for the current graphic and audio bite requirement.

Goals

For many years, California reading scores have been on the decline. Many legislators blame the quality of educators within the educational system. Educators, place the blame on politicians who are placing so many testing mandates on teachers, that it seems more time is spent on testing than on teaching. Parents blame teachers for not
doing their job and teachers blame parents for not being there to support their children with their studies. Regardless of blame, the problem remains the same. Students are not learning or performing in reading and writing at their grade level.

In the new millennium, we are fortunate to have innovative technology, which makes our task easier. The question I wish to answer is; how can I as an educator use technology to enhance learning? I can say, that I have found ways to use it in my classroom in more ways than a drill and practice tool.

They say that necessity is the motivator for invention, and I found myself designing a tool that would assist me in my efforts to teach Phonemic Awareness in Spanish. I needed to design a product that my students could use and relate to. My goal was to design a tool that would provide support in the way my students were learning letters and sounds and not in a way a software designer, without an educational background, had determined. My goal was to meet the Riverside Unified School District Benchmarks and Standards in Language Arts using technology. Specifically, I wanted to address the reading standard, which is word analysis and systematic vocabulary development.
Riverside Unified School District, Reading Standard 3 states that:

The student uses knowledge of phonics, syllabication, word parts, word origins and context clues to determine the meanings of words.

Concepts about Print:

- 3.1 recognizes that speech can be recorded in writing
- 3.2 recognizes that printed materials convey a message
- 3.7 distinguishes letters from words
- 3.8 recognizes and names all upper and lower case letters

Phonemic Awareness:

- 3.10 hears the sounds in words and distinguishes the sounds that are similar and different between words
- 3.11 orally blends phonemes to form spoken words
- 3.13 isolates initial and ending phonemes of a word. (2000, p.1)

Significance of the Project

Today's technology in education has taken on a new meaning, which goes beyond film, television and video. Technology today allows individualized learning to take place and prepares students for a technologically oriented society. There is a need to expose the early learners in
the use of computer technology during the early stages of
the reading process. My project is significant because it
allows "cognitive development to take place through
interaction with the tools that the culture provides to
support thinking" (Woolfolk, 1998, p. 45).

As a Kindergarten teacher, I am convinced that the
best way to allow interaction with the tools of the
student’s culture is to provide a program, which utilizes
multiple tools. The program created uses visual images,
sound bites and an interactive ability for knowledge to
take place. The use of the personal computer with the
kindergarten age group is an excellent way to introduce
technology in the learning process and to strengthen the
fine motor skills through the use and manipulation of the
touchpad. It allows the student to self-correct and gives
him/her self-confidence. The studies that follow in the
literature review address the learning issues associated
with the use of technology and learning.

Definition of Terms

The following terms are defined as they apply to the
project:
Active Learner - A student who is physically and mentally engaged in a learning activity (i.e. using a manipulative to aid in the process of learning).

CD ROM - Compact Disk Read Only Memory (changes to the CD may not be made or altered). A disk, which contains digitized information for use with a computer.

Constructivist Theory - An active process, that encourages students to discover through hands-on application or to learn through teacher-guided inquiry (Bryan et al., 2000).

Hypermedia - Computer program which uses sound, video, and graphics.

Interactive - A program, that allows the student to become engaged by using various modalities (Trevit, 1995).

Kindergarten Student - A five or six-year old male or female.

Literacy - The ability to read and comprehend print at the appropriate grade level.

Passive Learner - A student who is mentally engaged only (no manipulatives).

PC - Personal Computer

Phonemic Awareness - The ability to recognize and manipulate the sounds in a language (Lally, 2001).
Stand Alone Tutorial - A program or software that is used to teach various tasks without connection to a network or the Internet.

Technology - For the purpose of this project, the term will be limited to the use of personal computers and the appropriate software.

Organization of the Thesis

Chapter One provides an introduction to the context of the problem, purpose of the project, significance of the project, and definitions of terms. Chapter Two consists of a review of literature that supports the project. Chapter Three documents the steps used in designing and developing the project. Chapter Four presents the evaluation, conclusions and recommendations drawn from the development of the project.
CHAPTER TWO
REVIEW OF THE LITERATURE

Introduction

Chapter Two consists of a discussion of the relevant literature. Specifically, the literature addresses phonemic awareness and what we know about Spanish phonemic awareness and its relationship to reading achievement. The literature also addresses the subjects or the target audience, the treatment, which details how students are motivated. The chapter concludes with case studies documenting computer-based instruction (CBI) and how it has been used to support reading instruction.

Phonemic Awareness Defined

According to Snider (1995), phonemic awareness is the conscious awareness that words are made up of phonemes or sounds. Contrary to other forms of writing such as a logographic language (Japanese Kanji), the English language is an alphabetic language (Snider, 1995). Researchers have identified five levels of phonemic awareness beginning with the easiest and progressing to the most difficult (Fig. 1).

1. The appreciation of sounds in spoken language as evidenced by recitation of nursery rhymes.
Figure 1. A Continuum of Complexity of Phonological Awareness Activities (Snider, 1995).
2. The ability to compare and contrast sounds in words by grouping words with similar or dissimilar sounds at the beginning, middle, or end of a word.

3. The ability to blend and split syllables.

4. Phonemic segmentation or the ability to isolate individual sounds in syllables.

5. The ability to manipulate phonemes by omitting and deleting phonemes to make new words (Snider, 1995).

It must be noted that although the ability to isolate and manipulate individual sounds is phonemic awareness, it is not the same as phonics. While phonological awareness involves the auditory and oral manipulation of sounds, phonics is the association of letters and sounds to sound out written symbols (Chard et al., 1999). According to Snider, students who lack phonemic awareness probably do not benefit from phonics instruction because if they attempt to memorize visual wholes, they may not understand how to use the letter-sound correspondences. An example of this is when the student segments the sounds in the word cat (c/a/t) and takes a wild guess ("cheetah!") or who produces totally unrecognizable words when using invented writing (Snider, 1995).
Spanish Phonemic Awareness

Spanish phonemic awareness develops in stages. According to Denton et al. (2000), phonological awareness skills seem to progress from:

1. The ability to discriminate between similarities and differences of sounds in words (necessary for understanding speech), to
2. A sensitivity to rhyme and alliteration
3. An awareness of separate syllables in words
4. The ability to isolate onsets and rimes within words or syllables, and
5. The awareness of individual phonemes

When compared, there seem to be numerous similarities between the developmental stages of phonemic awareness in English and Spanish. Both languages develop phonemic awareness by discriminating, comparing, and contrasting beginning, middle and ending sounds. They both have sensitivity and appreciation for sounds in spoken language. This can be very useful in teaching students to read since both languages follow the same alphabetic principle.

Another aspect that English phonemic awareness and Spanish phonemic awareness have in common is their importance. According to Chard, et al. (1999), if
children understand that words can be divided into individual phonemes and that phonemes can be blended into words, they are able to use letter-sound knowledge to read and build words. Many researchers have concluded that phonological awareness in kindergarten is a strong predictor of later reading success and that there is a strong relationship between phonemic awareness and reading success, which persists throughout school (Chard, et al., 1999).

One aspect that is different in Spanish phonemic awareness is that since it is phonetically regular and predictable, the syllable is an important unit in reading. Reading instruction is often based on the recognition and spelling or syllable units as opposed to single phonemes (Denton, et al., 2000). The ability to read the syllables as a unit allows the student to read with fluency.

Phonemic Awareness and Reading

Snider (1997), suggests that there is a cause-effect relationship between phonemic awareness and reading achievement. Likewise, Denton, et al. (2000), suggests that phonological awareness abilities have demonstrated to be a better predictor of student’s success in learning to read in Spanish than IQ. She notes that if phonemic
awareness is not learned early, the student may have severe reading difficulties in later years. A benefit to having good phonemic awareness skills in Spanish is that it will help the student in developing phonemic awareness skills in English and will facilitate learning to read English words (Denton, et al., 2000).

An added benefit to phonemic awareness knowledge is that "children who discriminate and manipulate phonemes with ease learn to read and spell more successfully than peers who do not have these skills" (Groff, 2001, p.300). Groff (2001) also notes that kindergarten children who produce more phonologically accurate invented spellings than their peers learn to read better in first grade.

The Target Audience

The knowledge of the importance of phonemic awareness in early education, particularly kindergarten, makes the proposed project more meaningful. The target audience for the project are five and six-year old kindergarten students. The group is made up of Hispanic children from a lower, middle class socioeconomic neighborhood. They are bused from a racially mixed neighborhood to a predominantly, white middle class school. The students targeted for the project are learning to read in their
native language, which is Spanish. On a scale of below basic, basic, proficient, and advanced, the students are required to be in the proficient level by the third trimester. While this project is an excellent resource at the beginning of the school year, it becomes a more aggressive tool when students begin school during the second and third trimester and have not had previous instruction in phonics.

Student Motivation.

In order for learning to take place with technology, not only must it be available but also students must first be motivated to use it. And in order to use it, research on self-regulated learning capabilities, which have been linked to motivation and achievement in school settings, must be reviewed (Miller, 2000). Many studies have been conducted with the Constructionists theory in mind which is "...the belief that learning is a process of becoming physically engaged with materials-to manipulate objects and build physical artifacts (representations) of understanding" (Bryant, et al., 2000, ¶ 12). If students are psychologically engaged in the task (i.e., expending considerable mental effort) and are properly motivated,
hypermedia applications may be an effective solution to assist the teacher (Bryant, et al., 2000).

Many schools are using technology options to help at-risk student readers. One such program is the TOARR, Technology Option for At-Risk Readers. It uses specialized reading software plus a host of motivating reading activities to encourage students to read (Schetz, et al., 2000). This program addresses the students' needs with more individualized training of at-risk readers. The program was started in the 1998-1999 school year, in an elementary school in Southwest Virginia, and served students from kindergarten through 5th grade. Schetz, et al. (2000) lists the program's three objectives as follows:

- To provide an efficient and effective method of daily individualized reading instruction to improve reading deficits in the areas of naming, syntax, and comprehension.
- To provide a motivating instructional format to learn "content" and "non-content" words and accurately use them in reading stories and books chosen from the school library.
To provide a resource for the purpose of using existing school technology to meet diverse reading needs.

The students were pre and post tested during the course of the program. The results of the program are encouraging because it indicates that the majority of the students did well enough to move to the next level of reading instruction according to the results of the post test, administered during the last month of school. For example, many students began with Level One, and were recommended for Level Two at the end of the study (Schetz, et al., 2000). The students who learned the words in the program sequence and used the program regularly made the most progress. Students who used the program less frequently and with minimal supervision made moderate progress (Schetz, et al., 2000).

Computer Based Instruction

A study, which examines the effects of “self-regulated learning strategies on achievement and motivation in learner-controlled and program-controlled computer based instruction,” is also encouraging (Eom, et al., 2000). Eom reports that a major advantage of computer-based instruction (CBI) over traditional forms of
instruction has potential to allow students to proceed through instruction at their own rates. Learners may adjust instruction to be controlled by their own needs and preferences in CBI. Many learning theorist have suggested that learner controlled preferences produce a better learning outcome than traditional (Eom, et al., 2000). The study lends support to the notion that learners who are high self-regulators perform about as well under learner control program control CBI conditions, whereas learners who are low self-regulators are likely to be adversely affected by computer-based instructional materials that are learner-controlled (Eom, et al., 2000). What this means is that learners with poor study skills cannot show improvement unless they are taught the proper skills to learn with technology. Poor study skills will yield poor students.

A second study investigated the impact of a computer-based balanced reading instruction approach on the early reading abilities of first-grade students identified by their teachers as having great difficulty learning to read, and/or identified with a physical and/or educational disability by their school system. The study specifically studied the effects of the Intellitools Reading Program on:
• Onset-rime word decoding skills
• Phonemic awareness skills
• Sight word recognition skills
• Developmental writing and spelling skills of first-grade students.

The students were observed for 16 weeks and were given a balanced approach to reading instruction and anchor stories, sight words, onsets, and rimes. The students were allowed to compose simple sentences using IntelliKeys keyboard overlays (Howell, et al., 2000). The results of the sixteen-week period of intervention are encouraging because of the magnitude of literacy learning within such a relatively short intervention period. Although the authors had confidence that the program would assist otherwise struggling readers in their efforts to learn how to read, such dramatic effects in the abbreviated intervention period were not anticipated (Howell et al., 2000). For instance, even though the experimental group students started far behind the criterion group in the use of onsets, they were able to demonstrate substantial and significant gains by the end of the study (Howell, et al., 2000). These effects were also observed in the word identification subtests, where a
significant gain in word identification was achieved without any rote drill and practice or repeated exposures to words in isolation (Howell, et al., 2000). Instead, children were able to use strategies learned from their experiences to decode words instead of the letter-by-letter process. While this study was limited to a sixteen-week period, it gives credibility to the supposition that integrating technology with early literacy can make a difference.

A third sample of computer assisted learning is a study of the collateral effects of WiggleWorks (1994-1996). This is an interactive literacy program, in two settings: a cohort study comparing random samples of grade 1 and 2 students before and after software implementation and a longitudinal sample tracing students from kindergarten to grade 1 (Ross, et al., 2001). The results indicate that grade 1 students using WiggleWorks over a six-month period outperformed a matched control group on all reading and writing measures (Ross, et al., 2001). Both studies were of short duration and there was only one computer per classroom. In addition, both investigations examined only student literacy effects of the program without attending to other student outcomes (Ross, et al., 2001).
Summary

Phonemic awareness appears to play a vital role in learning to read and write. When proper instruction is given, students will have the proper techniques necessary to decode the alphabetic language. The English language and Spanish language both share much in common when it comes to learning phonemic awareness. Researchers have demonstrated that students taught phonemic awareness in Spanish are successful in transferring letter-sound relationship to English words and ultimately become successful readers in both languages.

The studies presented regarding the use of technology demonstrate that learning theories have to be taken into consideration when making decisions about its use and the supporting software. The Constructivist theory provides a good foundation that is conducive to learning. The TOARR technology option for at-risk readers addresses an approach to teaching the students that I am most interested in helping. This approach provides daily, individualized reading instruction to students who are at-risk for reading problems.

The computer-based learning and learner-based study is also important because it shows two different learning styles and addresses issues about the study skills
necessary to succeed. There are many types of learners and this study demonstrates why one group may do better than the other.

The last two studies address concerns in literacy learning with the use of computer technology and the software to accomplish the task. These studies show promise, given the appropriate amount of time to administer and support their implementation.

Based on the literature review, my expectations were that my students would move up a level through the use of computer technology using a phonemic awareness software program. By the end of the first trimester of instruction my students would move from the below basic to the basic level of letter and sound recognition. By the end of the second trimester of instruction, my students would then move from the basic to the proficient level.
CHAPTER THREE
DESIGN, DEVELOPMENT, AND EVALUATION

Introduction
Chapter Three documents the steps used in developing the project. Specifically, it addresses what I planned to do and how I accomplished the task. My proposal was to design an interactive phonemic awareness program that would be easy for teachers and students to use. It would not require additional computer skills on the part of the teacher in order to use it. And it could be used with a software program already available with most Microsoft Windows programs in personal computers. The only knowledge required of the teacher, was that he/she be able to perform basic functions like pointing and clicking through the use of a computer mouse. Students would not need any specific skills since part of the learning exercise was/is to learn and acquire fine motor skills.

The phonemics awareness program would be created, through a series of slides, using the Microsoft PowerPoint program. The slides would be used as a stand-alone tutoring tool to assist the teacher in reinforcing letter identification (name of the letter) upper and lower case
letter identification, and letter-sound identification. The student would view the slides by clicking on a button to go to the next slide. The slide would have audio and would provide the student with the name, and sound of the letter. The phonics program would have an assessment series of slides at the end of the tutoring session that would provide immediate feedback if a student made an error. The feedback from the slides, would allow the student to review his choice and make the correct one. There would be over one hundred slides created for the program, which means that the beginning student would not be able to cover more than one section at a fifteen to twenty minute sitting. The speed in which the student could complete all sections of the phonemic awareness program would depend on the student’s acquisition of knowledge. Finally, this chapter also addresses the visual design goals, and process followed during the development of this project.

Design

In designing this project, a new term was learned “visual literacy” (Heinich, et al., 1996). In today’s world, signs overwhelm us, telling us where to go or what to do. The signs do not necessarily have to have words to
convey their message. We are conditioned to decode and to understand their meaning. One such sign is the one found on the door of restrooms. We have been trained to look for the outline of a person wearing a skirt to know that it means the ladies room. We know that a letter or picture inside a red circle with a red slash across it means we are not to do something. In designing this project, visual literacy had to be taken into consideration especially when the project had to engage five-year old children. The design would require me to look at the culture, sex, and age of the student to determine the literacy.

The project would need to contain graphics that were of a realistic nature. Part of my problem was figuring out how much prior knowledge or experiences a five-year old would have. If the graphics were too busy, the student might have difficulty focusing on the message. If the graphics were too plain, the student might not find interest or desire in learning. I knew I had a difficult task, particularly in competition with computer games such as Nintendo.

As mentioned earlier, not only was my task made difficult by the project age group but by the culture. Since most of my students are Hispanic, many of them have
limited vocabulary in their own (Spanish) language. Prior to deciding on what types of graphics I would use, I realized that many of my students did not know the names of the animals on the slides I planned to use. To overcome this, I presented animals that students were familiar with. In their daily chanting of letters, the students had been introduced to animals that begin with the same letter. I chose to use the same animal rather than to add to their vocabulary at this beginning stage.

Because I wanted to maintain attention and engage the students, I used clip art photographs of the animals that matched the letter and sound being taught. I chose photographs, if available, over drawings because they were more realistic. I found that while most students had never been to a zoo, most of them had seen photographs of animals.

In teaching letter sound, I needed to resolve how sound could be taught without having an adult present during the slide presentation. To overcome this problem, I checked the program for sound bites and all available options already in the program. There were very few sounds that I could use for the letter sounds. The only option available was to record the sound by using the
recorder within the program. The only external tool required would be a microphone.

In order to insure that I had all of the elements necessary for my design, I followed the goals outlined by Heinich, et al. (1996) as follows:

Goals of visual design

1. Ensure legibility
2. Reduce the effort required to interpret the message.
3. Increase the viewer's active engagement with the message.
4. Focus attention on the most important parts of the message (Heinich, et al., 1996, p.74).

I took the process of visual design by Heinich et al. (1996) as described in the three requirements listed and incorporated them into my project design:

1. Elements: Selecting and assembling the verbal/visual elements to be incorporated into the display.
2. Pattern: Choosing an underlying pattern for the elements of the display.
3. Arrangement: Arranging the individual elements within the underlying pattern.
The three requirements were then used in an outline and incorporated in the design as follows (Fig. 2).

![Visual Design Elements Diagram]

Figure 2. Visual Design Elements (Heinich, et al., 1996).
I. VISUAL DESIGN PROCESS
   A. Visual Elements
      1. Realistic
      2. Analogic
      3. Organizational
   B. Verbal Elements
      1. Letter Style
      2. Numbering of letter styles
      3. Capitals
      4. Color of lettering
      5. Size of Lettering
      6. Letter Spacing
   C. Elements That Add Appeal
      1. Surprise
      2. Texture
      3. Interaction

II. PATTERN
   A. Alignment
   B. Shape
   C. Balance
   D. Style
   E. Color Scheme
   F. Color Appeal

III. ARRANGEMENT
A. Proximity
B. Directionals
C. Figure-Ground Contrast
D. Consistency (Heinich, et al., 1996, p. 74)

Prior to implementing all of the elements of visual design, I focused on the objectives I needed to meet. Since my project was intended to teach phonemic awareness, I needed to outline what specific areas I would be targeting. For this purpose, I made an outline and flow chart of the contents of the program. I chose the letter and sound identification, the upper and lowercase letters, and the beginning sounds of the Spanish alphabet. Each section of slides would contain an assessment portion. To accomplish this, I used the PowerPoint presentation program by Microsoft. My project would become a presentation program that students could navigate by using buttons and slides. The content of the project is as follows:

Main Menu Slide for Phonemic Awareness

I. Letter Identification (30 Letters)
   A. Letter Name Slides
   B. Assessment Slides

II. Upper and Lower Case Letters
   A. Letter Distinction Slides
B. Assessment Slides

III. Beginning Letter Sounds
   A. Identification of Sound Slides
   B. Assessment Slides

Each section would be distinguished by its own color in order that students not get confused. For example, the letter identification section would be presented with a blue background with white lettering. The upper and lower case section would be presented in a dark violet color with contrasting light lettering. The beginning sound section would be presented in a green color with contrasting yellow lettering so that the letters would be highlighted.

The Main Menu Flow Chart in Figure 3 demonstrates an example of the links that direct each section. Each section is redirected to the main menu after completion. The student may access the remaining sections by clicking on the exit icon (house) and return to the main menu.

Development

In developing the phonics program, I followed the guidelines as outlined in the visual design process noted earlier. I prepared a storyboard by using the PowerPoint
program to see if the phonics program would work as designed. All of the elements of design were taken into consideration and the final outcome is as follows.

The first slide opens with a title page, noting the name of the program, title, and author (Appendix A). A navigational button has been added to proceed to the next slide. The second slide of the presentation contains the main menu (Appendix B), which is the gateway to any section of the program. It contains the name of the program, title and the menu options. It offers the letter identification tutoring and assessment sections, the upper and lowercase tutoring and assessment sections, and
finally, the beginning letter sounds tutoring and assessment sections. These section titles are all placed on buttons. Since the students are not able to read at this stage, an adult must make the study selection. The adult will select the section by clicking on the appropriate button.

If the teacher selects the letter identification tutoring section, the program will proceed to a slide, which will present a letter and a picture of an animal beginning with the letter. The student will click on the letter to hear its name. The student may also click on the picture to hear the name of the animal. When the student is finished with the slide, he will click on a button, which will take him to the next slide until all slides have been completed. Once completed, the student will have the option of taking the assessment section by clicking on the word assessment located below the letter identification button on the menu slide. In the evaluation section, the student will be shown a picture of an animal and three letters. The student will make his selection by clicking on one of the three letters. If the selection is incorrect, he will get immediate feedback from the program telling him to try again. If the student
makes the correct selection, he will hear a sound bite of applause.

In the upper and lowercase tutoring section, the student will see an uppercase letter move across the screen from left to right, followed by a lower case letter. The lower case letter will move in the same direction. This section has no sound and the student will be expected to identify at least one of the letters and note the differences in size and shape.

The evaluation for upper and lower case letters is presented by displaying an upper case letter. The student will be required to make a choice of matching the letter with one of the three lower case letters displayed on buttons. The student must make a choice by clicking a button with the appropriate letter. Again, if the student makes the incorrect choice of letter, he will hear a sound bite telling him to try again. If the student makes the correct choice, he will receive immediate feedback when he hears a sound bite of applause.

In the interest of saving time and space, the tutoring section of beginning sounds, contains two animal photographs. Each photograph has the upper and lowercase letter above the picture. The student will be able to click on the letter to hear the sound and on the picture
to hear the name of the animal. The student can click on both letter and picture as many times as necessary to commit both to memory. At anytime during the study session, he will be able to exit the program by clicking on directional buttons at the bottom of the slide.

The assessment for beginning sounds consists of slides, which say the sound of a letter. If the student does not hear the sound of the letter or wishes to hear it again, he will be able to click on a button with a speaker icon. The student will be able to click on the icon as many times as necessary to hear the sound. The student will choose one of three buttons, each labeled with a letter. If the student clicks on an incorrect letter, he will hear a sound bite telling him to try again. If the student clicks on the correct letter, he will hear the letter sound that he first heard when he opened the slide. This section has been design with the expectation that the student will match the sound he first heard with the appropriate letter. When the student has reached the last slide of the assessment, he will see a button with an icon of a house. This is the exit button, which will take the student back to the main menu.
Design Implementation

I. Visual Design Elements

A. Visual Elements. As noted earlier, my approach (Heinich et al., 1996) to designing, developing, and implementing this program was to use the element of realism wherever possible. Because of the target age group (five-year olds), my design had to be as real as possible for my students to identify with. By using a clip art program available through a stationary store, I was able to find most realistic animals presented on the slides. Contrary to Heinich, et al that "...there is ample research to show that under certain circumstances realism can actually interfere with the communication and learning process", I believe that in this case it is very helpful in getting the message across (Heinich et al., 1996, p. 75).

In implementing my program, I did not find it necessary to use analogic visual to “convey a concept or topic by showing something else and implying a similarity” (Heinich et al., 1996, p. 75). It was not necessary, since the slides needed to be very specific. I could not imply anything with five-year olds. Everything had to be spelled out for this age group. I did however use organizational visuals through the use of the menu. The
menu is a flow chart I expect my students to follow. Just as reading begins from left to right, the choices are presented in a progression for completion, from left to right.

B. Verbal Elements. Deciding what type of lettering for the program was easy. The students need to see print that is not fancy or too complicated to interpret. I decided to use the Times New Roman font since it exposes the students to a letter style commonly found in print. They particularly need to become familiar with the letter styles of “a” and “g”. The students are expected to know these letters at each trimester assessment.

In the Upper and Lowercase tutoring slide section, I maintained the heading in the Times New Roman but changed the letter identification to D’nealian Manuscript. The reason for this choice is that Riverside Unified School District has adopted the D’nealian Manuscript for teaching penmanship. I needed to make the connection in identifying the letters and this was the best way to maintain consistency. I maintained only two font styles so that the student would not get too confused.

I used capital letters at the beginning of each word on the caption or title line. The colors used are age appropriate colors that are complementary or contrasting
to the background. The size of the lettering ranges from size forty-four on the title/caption line to ninety-six and one hundred and six in some slides. Because the emphasis is on letter recognition, it was necessary to make the font as large as possible and consistent with the presentation on the slide. The spacing of letters was not an issue since there was plenty of room on all slides.

C. Elements That Add Appeal. I found that the element of surprise made the program more appealing. In the Letter Identification tutorial section, the students are instructed, to pass the pointer over the photograph. They are instructed to click on the photograph when the arrow turns into a hand. When the students click on the photograph, they hear a sound bite, which says the name of the animal. The sound bite is unexpected at first but it’s more of a surprise when the students realize that the voice in the sound bite is the teacher’s.

The texture most utilized throughout this project is the three-dimensional directional buttons to navigate. They are made to look like the real buttons a child would press to perform a task. It makes their interaction much easier when they don’t have to be told to press a button. The students have visual literacy, and can interpret the design with no difficulty.
II. Pattern

A. Alignment. All of the elements on the slides have been aligned on a grid line. The title of the section is centered and with the exception of the navigation buttons, the lettering and graphics align (Appendix C).

B. Shape. Graphics were used from a clip art CD and were trimmed in a rectangular shape. The rectangle and square shapes were chosen because they are most similar to computer buttons a child would be familiar with. The shape size was approximated in each slide but could not be matched because of the graphics content. In the interest of consistency, no curved shapes were used (Appendix D).

C. Balance. Although cautioned against “imbalance” because it might be “jarring”, I felt it appropriate to use it in certain slide sections of the project (Heinich, et al, 1996). The letter identification (Identificación De Letra) section can be described as an arrowhead or wedge. The tip of the arrow is the letter and the picture and title are the arrow span (Appendix E).

The evaluation section of the letter identification (Evaluación Identificación de Letra) slides is also balanced in an arrowhead formation. This time, the arrowhead tip points up. The photograph or graphic is
located on the top while the letters on the bottom form the arrow span (Appendix E).

The upper and lowercase (Letra mayúscula y minúscula) section presents two letters in the middle of the slide stacked vertically. This may be misleading at first since the letters move into the slide from left to right and stop at the center. The capital letter moves in first and stops in the center. This gives the student the opportunity to view and identify the letter. It is next followed by the lowercase letter, which moves from the same direction but stops directly under the uppercase letter (Appendix E).

The evaluation for the upper and lowercase (Evaluación Letra mayúscula y minúscula) section is also balanced as an arrow in the middle of the slide. It presents a letter and three lowercase button options. The tip of the arrow is the letter and three buttons complete the arrow span.

D. Style. The style chosen took into consideration the age group that would be using the program slides. Since most five-year olds prefer bright colors, I chose a dark color and contrasted it with light. I used realistic photographs and drawings that would make the learning experience fun and would form background knowledge. I
used lettering (D’nealian) or font (Times Roman) styles that students need to learn while including familiar print.

E. Color Scheme. I tried to use colors that would harmonize and complement each other. I took the advise from colleagues about not using certain color schemes and tried to stay on the safe side by using colors that students would be comfortable with. The colors I chose are white lettering on blue background for the letter identification and evaluation slides. To distinguish the upper and lowercase and evaluation slide section, I chose white lettering on a violet background. To distinguish the beginning sounds and evaluation slide section, I chose yellow lettering for the headings and black for the beginning sound letters on a green background.

F. Color Appeal. The only way to determine if the color scheme would be appealing was to test it. To do that, I took the phonics project storyboard into the classroom and got the opinion of some of my students. After receiving the thumbs up, I retained the colors originally chosen.

III. Arrangement

A. Proximity. As mentioned earlier, the proximity of the photographs and drawings are established in the
arrowhead/wedge pattern. The picture is clearly labeled with a title, which is located directly below the picture. The display is easy to read and the student will have no problem making the connection between the two. In slides where there are two pictures, each title is located directly below the picture (Appendix F).

B. Directionals. The student should have no problem in determining the eye movement of the slide since most slides have only one picture and title. For slides that have more than one picture, such as the beginning sounds, the eye movement would be the same as reading. Students are taught to read with left to right progression. The expectation is that the student would follow this progression, just as he would read and write his name.

Directional buttons are located on each slide to allow the student to navigate from one slide to the next. The directional buttons are rectangle in shape, contain an arrow/wedge icon, are of a contrasting color and point in the direction of movement. These buttons are located on the left and bottom of the screen for easy access. Each slide contains a rectangle or square shaped button also of the same contrasting color with a house icon. This button is also conveniently centered at the bottom of the slides
to allow the student to exit and return to the main menu at anytime.

C. Figure-Ground Contrast. As noted before, the wording on the slides contrasts well with the color scheme chosen. The lettering chosen is of a light color on a dark background.

D. Consistency. Every effort has been made to remain consistent in the various areas of instruction and evaluation. The main titles are located in a location where the teacher or adult assisting can determine the area of instruction. Every section has lettering and buttons located in the same configuration. Students can expect to move from one slide to the next and view the same pattern. Consistency allows the student to see the differences between sections because of color schemes, lettering and graphics positions.

Evaluation

In evaluating the use of the project, three issues were considered:

1. What was the educational value of the project?
2. How did it appeal to the students and teacher or adults assisting?
3. How easy was it to use?
Since the project continues to be field tested, the evaluation conducted is formative.

Educational Value

The project meets the Language Arts Standards of Riverside Unified School. In particular Reading Standard 3, as follows:

Allows the student to look at a picture, hear the beginning sound of the word and commit it to memory. It allows the student to see that speech can be recorded in the form of the printed word they see under a picture. It allows the student to use the knowledge he/she has learned of phonics to decode words. (2000, p. 1)

The project gives the student practice to "learn and distinguish letters from words and to distinguish upper and lower case letters" (RUSD 2000, p. 1). The student is able to "hear the sounds in words and to distinguish the differences and similarities" (RUSD 2000, p. 1). The student is able to "distinguish beginning sounds and ending sounds and to orally blend phonemes to form spoken words" (RUSD 2000, p. 1).

Student and Teacher Appeal

There have not been any problems achieving student appeal for this project. When asked what they liked about the program, many of the students were surprised to hear a
familiar voice saying letters, sounds, and words. One of the most asked questions was "How did you do that?" Many of the students liked the variety of colors used in the different slide sections. They did not express partiality to any one color.

The program was engaging, and many of the students did not want to stop the program when their time was up. Prior to using the program, many of the students were instructed on the use of the computer mouse. This was accomplished by using a mouse practice program which allowed students click and drag techniques. Since some students will continue to work on their fine motor skills, manipulation of the mouse will continue to be difficult.

The project was demonstrated to Kindergarten teaching peers, the classroom aide and the school principal. Most agreed that the students could utilize it as a learning tool. One teacher offered suggestions for slides that should have motion. She suggested that since reading begins from left to right, letters should enter the screen in the same direction. These suggestions were later incorporated into the presentation.
Use

Since the students and adults were taught how to use the program, there were no problems reported. When asked, the users said that they had no problems and had navigated through it "just fine."

The following issues were assumed in respect to long-term (school year) evaluation of the use of the program:

1. The initial group of students participating in the project would consist of those enrolled during the start of the school year. Because of attrition, absences and other unforeseen factors, not all students originally involved in the program would be available for final evaluation.

2. Since the students using the program were enrolled in a year round school program, their learning would be interrupted every eight to ten weeks for a period of four-weeks. During this period, the students could forget some of the tasks (lessons) learned.

3. The number of students using the phonics program would depend on the number of computers available.
4. The fifteen-minute time allotment could be interrupted, cancelled or determined by fire bells, assemblies, and absences.

Although every effort was made to test the various elements of this project, some of the assumptions made for implementation and evaluation were not realized. Several problems were encountered and resolved as noted.

The assumption that students would receive fifteen minutes of the program instruction daily was not always realized. This was difficult to achieve due to the fact that the number of students using the phonics program daily depended on the number of computers available. A problem that could not be remedied was that there was only one school computer available in the classroom.

The classroom had one Apple computer and the phonemic awareness program was created using a Windows PC program. An Apple version could have been created using Hyper Studio but would have taken additional time to download, cut and paste the required graphics to accommodate one computer. The only PC available in the classroom was the laptop owned by me. The logistics of twenty students on one laptop for fifteen minutes were unrealistic.

One alternative would have been to make several copies of the program on a CD and to use the computers
available in the computer lab, which was located in the school library. A problem encountered with this idea was that each class was only allowed five visits to the lab per month, regardless of PC availability. Even if the allowable visits were increased, the manpower (time needed to turn on, load the program, and turn off the computers) would not have been available.

Another alternative, which was tried, was to allow two to four students to use the program at the same time. The aide/teacher sat with the group and chose a student to click through the slides. This method allowed more student use of the program but did not allow individual student assessments. In the interest of efficient utilization of time, the workable solution was to allow the most needy students (below basic) to use the program individually. This method was tried but the assumption of the fifteen to twenty-minute time rule, per student use, was difficult to keep. This was partly due to the fact that the teacher’s time to set up the laptop for the students was not taken into consideration. The solution was to set up the laptop prior to the students beginning school and turning it off after the students went home.
Summary

In designing the phonemic awareness program, visual literacy was given serious consideration for the target age group. The project was designed in keeping with the prior knowledge and experiences of 5-year old students. The use of clip art photographs made the task easier to achieve this goal. The issue of sound was resolved through the use of sound bites already in the PowerPoint program and the sounds recorded for the slides.

The goals of visual design were utilized to ensure legibility, which allowed ease in receiving and interpreting the message. The program design allowed the viewers active engagement with the message and it allowed the student to focus on the most important parts of the message.

In the development, the visual design process by Heinich, et al. (1996), was followed to assure attainment of the proposed goals. The elements, pattern, and arrangement were followed meticulously throughout the slide presentation. The design and development allowed the student and teacher the flexibility to focus on areas of instruction to meet the student needs. Although issues with availability could not be easily resolved, the most needy students did gain access to the program.
CHAPTER FOUR
CONCLUSIONS AND RECOMMENDATIONS

Introduction

The need to design a tool to assist my efforts in teaching phonemic awareness in Spanish was the drive for development and production of this project. This program has addressed the California State Standards and Benchmarks as well as the standards adopted by my employer, Riverside Unified School District. In designing and developing this project, there was a realization of the potential for this tool. This tool begins the phonemic awareness learning experience by first teaching phonics. It can do more and the possibilities are endless. Conducting the literature review research made its importance evident.

Conclusions

There is no question that phonemic awareness plays a vital role in acquisition of literacy as noted in the literature review. Although class size reduction has made allowances in the teacher-student ratio, it cannot match the desired one to one ratio. Since that is an unrealistic expectation at this time, computer based instruction needs to be considered. The studies noted in
Chapter Two, indicate that CBI (computer based instruction) has potential because it allows the students to work at their own pace and to control their learning outcome. The WiggleWorks study serves as an example that availability of computers should not be an obstacle to learning. Learning can and did take place with one computer in the classroom. The research presented in the studies demonstrates that English learners are successful in transferring letter-sound relationship to English words and eventually become better readers. In the early stages of learning, the symbols that help these students can be presented with technology. With hands on computer activities the students will construct knowledge through visual, vocabulary, and sound bites. Providing a program that is interactive will utilize the multiple modalities to build knowledge. The student will have the opportunity to have social interaction with the program.

The significance of the project did not change during the design and development. Student access to technology for five-year olds in the classroom continues to be limited and must be expanded. Since technology use will play a role in their daily lives, students need to have as much exposure to it as possible.
Recommendations

Since PC availability seems to be a problem at school, creation of a web site may be considered to allow access to all kindergarten students off site. A parent meeting may be scheduled for a demonstration, which would explain how parents could use the phonemic awareness program. The parents could receive hands on training in the school lab and gain the confidence and experience to help their children. While I realize that many of the students do not own personal computers, access is available at the local public library. Computer assistance is also available by library staff. The main menu in the program, however does allow for easy navigation.

This project will continue to grow, improve and expand as student use is reviewed and evaluated. Another idea for future expansion is to create slides, which contain syllables. Since the “syllable is an important unit in Spanish reading, and reading instruction is often based on the recognition and spelling of syllable units,” it would allow the student to learn to read syllables at first sight (Denton et al., 2000, p. 339). Placing two syllables on one slide to create a word would demonstrate how words are made up. The slide would have the beginning
syllable which would enter screen from one direction while
the ending syllable would enter the screen from the
opposite, thus creating a word. A second slide could
present the word newly created as one unit making an entry
from left to write, allowing the student to read it as a
whole. The expectation would be for the student to begin
to read the words in syllables and eventually with
practice to read the word without hesitation.

Sources for funding of new computers will also be
considered. However, it seems obvious that more funds
need to be acquired for technology integration in the
classroom. Before that can be done, there must be
awareness to the many uses that technology has to offer in
the classroom. Since funding sources need to be tapped
and politicians convinced, it is evident that the
convincing needs to begin now with whatever means
available. This project is an example of how an idea to
resolve a problem using technology can evolve into a
valuable tool with endless possibilities.
APPENDIX À

TITLE PAGE
APPENDIX B

MAIN MENU
Kindergarten
Phonemic Awareness

Language Arts Spanish

Letter Identification

Assessment

Beginning Sounds

Upper & Lower Case Letters

Assessment

Assessment
APPENDIX C

ALIGNMENT
EVALUACIÓN
Identificación De Letra

Escoje la letra del dibujo.

c b m
APPENDIX D
SHAPE
APPENDIX E

BALANCE
IDENTIFICACIÓN DE LETRA

Ff

foca
EVALUACIÓN
Identificación De Letra

Escriba la letra del dibujo.

c b m
Letra mayúscula y minúscula

B

b
APPENDIX F

SLIDE SAMPLES
IDENTIFICACIÓN DE LETRA

Cc

caracol
IDENTIFICACIÓN DE LETRA

Gg

gato
EVALUACIÓN
Identificación De Letra

Esoje la letra del dibujo.

p g q
Letra mayúscula y minúscula

A

a
Letra mayúscula y minúscula

D
d
EVALUACIÓN
De letra mayúscula y minúscula
Escoje la letra correcta.
EVALUACIÓN
De letra mayúscula y minúscula

Escoje la letra correcta:

D
a
b
SONIDOS INICIALES

Escucha el sonido

A a  B b
SONIDOS INICIALES

Espuela el sonido

[Image of an ostrich and a bear]
EVALUACIÓN
SONIDOS INICIALES
Escucha y escoje el sonido correcto

f ch b
EVALUACIÓN
SONIDOS INICIALES
Escucha y escoje el sonido correcto

a e c
REFERENCES


