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ABSTRACT

"Your Word Box!" is a computerized reading and language arts implementation of "In Context!", a comprehensive reading method which provides a multi-media approach to teaching children how to read and understand grammar. The method attempts to furnish a rich environment with a wide variety of teaching modes, in a contextual approach combining graphics, text, animation, and human voice. A study employing "Your Word Box!" examined the reactions and achievements of pre-school, kindergarten, first, and second grade children using the program. Results indicated that the program: (1) captured the children's attention because it combined pictures, human voice, and text while allowing them to actively participate with their hands and with verbal responses; (2) satisfied their innate curiosity; (3) provided them with the discovery of organization in verbal material; (4) helped them to distinguish between graphic displays of objects and letters; (5) increased their attention span, powers of concentration, and perception; and (6) presented and reinforced relationships among the learned nouns, verbs, and adjectives. (PRA)

Dorothy M. Loar

# A STUDY OF THE ACHIEVEMENTS OF PRE-SCHOOL, KINDERGARTEN, FIRST AND SECOND GRADE CHILDREN USING A COMPUTERIZED READING AND LANGUAGE ARTS PROGRAM



This study employed Your Word Box!, an Apple IIGS Implementation of In-Context!, a Comprehensive Reading Method by myself, Dr. Dorothy M. Loar. Terry William Loar is the designer and author of the software, graphics, animation and manual.

Before I present a history of the study with pre-school, kindergarten, first and second grade children, it is necessary that I describe the process and the theory of the computerized reading and language arts program.

What is the In-Context! Comprehensive Method? It is a teacher's aid which provides a multi-media approach to teaching pre-school, kindergarten, first and second grade children how to read and to understand grammar. This method attempts to furnish the richest possible environment with the widest variety of teaching modes to enhance the student's learning. It is a contextual approach which combines graphics, text, animation and human voice. That is, words and grammar are learned within the context of pictures and simultaneously spoken stories, spoken and graphically represented sentence text, and as stand-alone entities which are spoken and shown as graphic text, all within the context of the story and picture. The method flows from the general picture and story to the specific word and culminates in the student "owning" the newly learned word. Words are learned within the context and logic of spoken and seen English grammar. The notion of parts of speech is introduced. This method is adaptable to all levels of learning abilities from children to adults and has features which may be used to aid learning disabled students. It provides a great deal of flexibility to the teacher to tailor each learning session to the individual student's needs. It also has options and extra (bonus) programs which make it amenable to be used as a group learning device.

The software includes student performance monitoring, reviews, tests, storybooks and workbooks. The software generates a Student's Performance Report (an Appleworks spreadsheet file) which supplies statistics about the student's history and progress, performance and test results. Individual progress files are maintained for the student on a floppy disk volume. The software prompts the teacher with this information at the beginning of a session so that the student may automatically resume at the proper place or review a previously learned subject. The student's tailor-made environment is propagated from session to session.

Volume I covers three topics: nouns, verbs and adjectives. Each topic has three subjects. For example, Topic III - Adjectives has a) basic adjectives, b) combining adjectives and nouns and c) combining adjectives, nouns and verbs. Each subject has up to twenty-six lessons.

Each lesson has one lesson sentence and up to three lesson words. The lesson sentences and lesson words comprise the Your Word Box! Word List. It includes words which children hear in modern vocabularies. We believe that it is important for children to recognize the words which are used in their daily life and instructional materials in conjunction with those which appear on the standard word lists. The Your Word Box! words are augmented by Dolch Basic Sight Vocabulary and Harris-Jacobson lists of high frequency words.

Each lesson takes from forty-five seconds to a few minutes to run, depending on the lessons, the student's ability and the options selected.

After a graphic and verbal introduction to the subject, each lesson performs the following routine:

a) Displays a story picture and simultaneously speaks the lesson story.

b) Asks the student to manipulate a graphic object which represents lesson word(s). As the object is being manipulated with the mouse, a descrip-

tion of the object is spoken along with a special sound effect or an enhancing spoken description.

c) Displays the lesson sentence and speaks it at normal voice speed.

d) Simultaneously displays and speaks the sentence text, left to right, one word per second.

e) Asks the student to repeat the lesson sentence.

f) Verbally rewards the student.

g) Optionally, asks the student to type in the sentence and gives an appropriate verbal reward.

h) Simultaneously displays and speaks one, two or three lesson words, and, optionally spells the words.

i) Asks the student to repeat (or spell) the lesson word(s).

j) Verbally rewards the student.

k) Asks the student to locate the word(s) with the mouse, or optionally, type in the word(s) from the keyboard.

l) Verbally rewards the student or assists the student if the word(s) are not found.

m) Unconditionally performs a short animation sequence with voice and sound.

n) Tells the student to move the word(s) to his or her "Wordbox" with the mouse. As each word is moved it is spoken.

o) The Wordbox closes and the child then "owns" the word.

p) The lesson word(s) are repeated at a muffled volume from within the Wordbox.

q) The above steps are repeated until the last lesson is completed.

r) At the end of the last lesson a review is given. The Wordbox opens and the words which the child has learned fly out, one at a time,

accompanied by the spoken word.

s) There is a test which may be given after the last lesson. All the subject's lesson words are displayed. Each word is spoken and the student clicks the appropriate word. A "correct" or "incorrect" verbal message is given immediately. The test results are displayed at at the top of the screen when the test is over with an appropriate verbal reward.

t) A wordbook may be presented on the screen at the end of each subject and the student is asked to match, underline or circle the words which are learned. The screen is saved on the student's disk and the teacher may review it at a later time.

u) A storybook is presented to the student at the end of each subject. An unspoken story or poem is displayed one word at a time. (The rate may be set by the teacher.) At the end of each story the child is asked to type a synopsis of the story to determine the student's reading comprehension. The synopsis is then saved on the student's disk and the teacher may review it at a later time.

v) Student performance monitoring is performed throughout the lesson and a report is constantly being generated in the background. The report is saved on the student's disk along with the workbook pictures and storybook synopsis and it may be printed or viewed on the screen later.

w) The teacher may interrupt the processing at any time to change the flow of the session.

x) When the program is initiated it will automatically resume from the point at which the last session was run for each student and will preset the same options that were last used for the student.

There are several options which the teacher may invoke for each subject. They include:

a) Framing each word in the lesson sentence as it is displayed.

b) Spelling (each letter is spoken) each lesson word.

c) Using the keyboard in lieu of the mouse (each lesson word is spoken as it is entered).

d) Choosing selected lessons.

e) Expanding the allowable correct answer area on the screen.

f) Choosing the review, test, workbook and/or storybook either with or without the lessons. (The teacher may want to begin a new session by starting with a review of what was learned in the last session without the lessons.)

One sees that In-Context! as implemented on the Apple IIGS, is a complete reading course and can be integrated into a full school year's curriculum.

The method may also be used for Learning Disabled, Adult Literacy, and English as a Second Language Programs. Although the first implementation is directed at children of 3-7 years of age, it does not preclude its usage in these other environments. That is, the courseware is neither patronizing nor condescending and would not be offensive to adults who are motivated to learn how to read.

**THEORETICAL FOUNDATION OF IN-CONTEXT!**

How would one theoretically implement a reading method on a computer?

1. The connection between the sound of language and the printed look of language must be made in a way that is meaningful to the child. He hears the

structure of language, the logical subject, verb, object sequence. He realizes (without being burdened with definitions too frequently) that nouns are names of things, that verbs are the action involved, and that adjectives describe nouns. The child hears a sentence that is related to something meaningful in his environment and can visualize the things named, the action taken, and the description of the things.

In order to introduce in a meaningful way new vocabulary or different usage of familiar vocabulary, the computer presents a visual background in conjunction with the spoken language. Colors, shapes, actions and modes are closely related to the vocabulary so that no ambiguity occurs. Then the child can relate the printed word to the sound and to the visual image to which it is associated. The more frequently the words are experienced the more available they are in responses in new associative connections. The computer increases the speed of the learning and retention by use of repetition and of meaningful vocabulary.

2. The computer is able to assist in that it has another major effect on verbal learning in the process of verbal mediation. The child talks to himself in a relevant way, sometimes inaudibly or unconsciously, when faced with something to be learned or a problem to be solved. The computer provides this verbal mediation in allowing the child time to think about a solution and then finally audibly verbalizing it. Pictorial mediators also are important in verbal learning, so the computer provides these mediators simultaneously with the attempts at solution.

3. The child's logical understanding of the structure of language, his knowledge of rules is indicated by consistent and orderly answers for grammatical structure. Children of three and four years are aware of parts

of speech and use this knowledge as clues to the meaning of words. For this reason the computer presents the printed word as part of a whole unified concept. The printed word then is not only part of a bigger concept such as one contained in a paragraph or story, but also part of the concept in a complete sentence. The complete sentence is presented by the computer as part of the paragraph or story.

4. The flow of speech accompanies the presentation of the printed sentence so that the child grasps the idea of the flow of the sentence. The computer presents the speech simultaneously with the printed words so that the child can see the left to right progression across the line of printing. A second flow of speech accompanies the printed sentence in its entirety before the child is asked to repeat the sentence.

5. The new vocabulary to be learned, the single word, either noun, verb or adjective is isolated from the sentence. It is necessary to present the word in a meaningful context. The computer relates the new vocabulary to the visual presentation. It is pronounced and the child is asked to pronounce it. To ensure the child's understanding of the repeated word, he is asked by the computer to identify the word which is presented in a small group of words. The repetition of the meaningful word in speaking and in identification hastens the learning and prolongs the retention of the word in the child's sight vocabulary.

6. The computer confirms correct responses to reinforce them. The feedback or knowledge of results increases his verbal learning. This confirmation is immediate to prevent incorrect learning and to encourage the child to progress toward greater success. The confirmation consists of verbal rewards and animated graphics.

7. The program introduces nouns as the beginning sight words which the child must identify. Beginning sight words ought to be names of tangible, concrete, perceivable things or persons. Parts of speech other than nouns, however, become familiar because of repetition in the stories and in the printed sentences. Verbs as sight words to be identified are the next group of words to be learned. The actions are related to the nouns previously learned. Adjectives are the third group of words. The computer presents and reinforces the relationship among the learned nouns, verbs and adjectives.

In Your Word Box! we attempt to provide a congenial and positive environment for the child. We also provide many rewards, even for less than perfect responses. We run the animation sequence regardless of the child's responses, for example. We feel that success (positive feelings) influences attention to self. Hopefully, hearing the rewards and seeing the animation will hold the child's attention in a positive way such that he or she will make more associative links on the encoding of the next set of words.

## THE STUDY

This study with children participants began in the summer of 1989 when a little girl who would enter first grade in August came to my home with her teacher, Mrs. Mignon, and her mother. She went through the demonstration program as we observed. She was delighted to be able to sit before a computer, to listen to the stories about the scenes on the screen, to see the related sentences appear, to hear the voice saying the sentence and asking her to repeat it. She used the mouse to manipulate pictures and to put the noun from the sentence into the Wordbox. Because of her

evident success with the demonstration program it was decided to have Mrs. Mignon's 22 first grade children at Continental School in Green Valley, Arizona as a sector of their computer experience become a component of the study. Mr. McKuen, then the administrator, was most cooperative in my using the program at the school. Using the demonstration program in September 1989 I met with the children, two at a time. We used the speaker instead of headphones so that I could hear the male and female voices in the lessons simultaneously with the children and so that I could observe their reactions simultaneously. They were excited about the computer talking and the animation. The children listened to the stories attentively. They read the sentences well after hearing them spoken. They enjoyed the stories and the animation. They followed directions well. Some children were able to go to the spelling function and the use of the keyboard. There seemed to be no trouble in finding lower case letters on the capital letter keyboard. Some children did the workbook where they circled the nouns in the sentences; also where they underlined two nouns in a sentence. Some children recognized some verbs in the introduction and did the workbook where they underlined nouns and verbs in sentences; also the workbook on adjectives after I explained the meaning to them.

In September 1990, Mr. McAllister, the new administrator was encouraging in my use of the program. Mrs. Mignon's first grade children began using the completed Volume I of the program. They were divided into high, medium and low groups. The high group was able to skip the Subject 1a which called for identifying the word but not typing or spelling. They began with spelling the noun, typing it and then proceeded to typing sentences. I ran a graphic representation of the keyboard using one of the bonus pro-

grams. The printout showed capital letters using the shift and the lower case letters without the shift. I had them memorize the spelling of the nouns and also entire sentences before typing. They enjoyed this challenge. I found that a few children confused "q" & "p", "l" & "i" on the keyboard. They had no difficulty with verbs but found spelling of adjectives more difficult. They could distinguish between nouns and verbs and they were getting the concept of adjectives.

The medium group started with Subject 1a, read the sentences fairly well after hearing, enjoyed putting picture and noun into the WordBox and remembered the procedures. They had difficulty reading the storybook. They found transition from picture and noun to word alone difficult but became able to type in the noun alone. They advanced to typing sentences and spelled nouns well. They enjoyed the animation, voices and music. Some children confused "l" & "i" on the keyboard; also "d" & "p", "q" & "p", "d" & "b", "n" & "u". They tried to memorize spelling words. After advancing to verbs and to adjectives they memorized the words.

In the low group some children did not know letters but knew pictures of nouns. They did not follow directions well at first. They did not read sentences well after hearing but improved with practice. They spelled and typed nouns in Subject 1b with help on the keyboard, had a little difficulty with capital letters. Then they used the graphic representation to find letters. I encouraged them to spell nouns from memory.

These first graders became second graders with Mrs. Burgess as teacher, in August 1991. They continued with the program with lessons on adjectives. The lowest group were still on verbs. A few new students began at first lesson and were advanced very quickly, memorizing sentences. One physically

handicapped child began at the first lesson, reading and spelling well after hearing, moving the mouse slowly and carefully. Most of the children read the stories well and wrote their own stories and poems. The low group tried reading storybook and writing their own stories with help from me.

In Mrs. Mignon's first grade in 1991 there were 20 children who were grouped into high, average, low and learning disabled. The high group began Subject 1a with attention, following directions well, knowing the keyboard, were familiar with the introductory nouns, reading well after hearing, spelling fairly well. They typed words and sentences, searching the keyboard, some children memorized. They enjoyed using the mouse to move the pictures. They enjoyed voices, sounds and animation and music. They had the concept of nouns, verbs and adjectives pretty well. They did workbooks on nouns, adjectives and nouns, and nouns, verbs and adjectives well.

The average group began on Subject 1a. Some were a little slow using the mouse, knew some introductory nouns on sight. Some did not know letters. One child had repeated first grade and remembered nouns well, listened attentively, read sentences well after hearing, typed nouns well. Some children confused letters "p" & "q", "u" & "y", "b" & "d", "l" & "i" on the keyboard. They tried to memorize word and sentence. They enjoyed voice and animation. They understood noun, verb and adjective. They spelled well.

The children in the low group spoke Spanish primarily at home. They followed directions well, listened to story attentively, used the mouse well after practice, read fairly well after hearing. They did not know some letters, and had difficulty in spelling at first. They did not recognize some words after hearing. They confused "q" & "p", "u" & "n", "b" & "d". They advanced to typing nouns, verbs and adjectives and trying to

memorize words and sentences. The keyboard was difficult at first but they advanced to typing well after spelling the word. They enjoyed animation.

The learning disabled children, a boy and a girl, went to special education class. The girl recognized some pictures of nouns in the introduction, followed directions, had difficulty pronouncing some words, read entire sentence after hearing, enjoyed putting word into WordBox using the mouse. She listened attentively to the story. She clapped hands when she moved the arrow correctly. She needed practice in reading one word at a time and referring to the word in the sentence. She could not spell. She did not know letters but practice helped.

The boy had repeated kindergarten. He listened to stories and followed directions, read the word and sentence after hearing. He identified the word in the sentence. He was very interested in the mechanics of the computer and the disk drive. He enjoyed the animation. He confused "r" & "n", "y" & "g", "q" & "p", "d" & "b". He did not know all the letters. I had him spell nouns, and he improved as he progressed. He pointed to letters before typing, he typed words fairly well; typed sentences but had no patience. He was very restless, moving the computer and the monitor.

The kindergarten children at Continental School had two sessions in 1992. The afternoon session consisted of 14 children. Their teacher was Mrs. Lichten. There were two groups, one consisting of eight children at age level or above and the other six children below age level. They listened attentively to the story as they watched the picture on the screen. They read the sentence after hearing, matched noun in sentence with noun in the box, used the mouse fairly well, followed directions excellently. They spelled words fairly well but not from memory. One child advanced

to typing word and sentence and to spelling nouns. One child with sight problems had difficulty with the mouse at first, put his finger on words in sentence, started to read from right to left but realized his mistake and then read fairly well after hearing. Another child pointed to words in the sentence. They enjoyed voices and animation. In spelling, "p" & "q", "y" & "g" were confused by some. They were delighted in using the mouse in putting the words into the WordBox.

Last but not least were pre-schoolers from Los Ninos del Valle Pre-school in Green Valley, directed by Mrs. Salazar. There were 7 three-year-old children, six four-year-olds and 8 five-year-olds. The seven three-year-old children knew some pictures of nouns in the introduction. They listened attentively to the stories. They understood directions. They used the mouse to move objects on the screen and to put words into the Word-Box. They read the sentences after hearing voice, improving with each les-son. They matched the word under the picture with the same word in the sentence. They laughed at the animation which is a reward for success. They could spell some words.

The six four-year-old children knew some pictures of nouns in the introduction. They listened attentively. They read well after hearing the sentence. They moved the mouse well. They spelled some words. They enjoyed the animation. They recognized the word in the box and in the sen-tence.

The eight five-year-old children knew some pictures and words in the introduction. They read the sentences well. They listened attentively. They pointed to the word beneath the picture. They moved the mouse well. They spelled the words excellently. They enjoyed the animation. They matched the nouns in the box and in the sentence.

In addition to the above findings I have concluded that dyslexic children profit from my program. Prominent brain researchers reported that studies of dyslexic people suggested that the basis of the condition might be a failure of the visual system circuits to keep proper timing. When two visual stimuli were presented in rapid succession dyslexics reported seeing only one image. Normal people saw both. When the same stimuli were presented more slowly dyslexics saw both. It may be concluded, therefore, that a computer program presenting slowly one word in a sentence at a time is indicated. It was found that children with language and reading impairments have a defect in their sense of touch and sometimes seem clumsy. It may be concluded, therefore, that the manipulation of the mouse to move objects on the screen and to move words into the WordBox may strengthen the sense of touch.

**CONCLUSION**

In conclusion, my study has indicated that the computer program has value in that it produced the following:

1. It captured the children's attention because it was intriguing in its important capability to combine pictures, human voice and text and to allow the children to actively participate with their hands and to make verbal responses.

2. It satisfied the children's innate curiosity by providing information about people, places, things and events and by their discovering order and predictability.

3. It provided the children with the discovery of organization in verbal material and with the ability to abstract a simple rule with proper repetition.

4. It helped the children to distinguish between graphic displays depicting objects and those containing letters by having an abundance of graphic displays and sentences and words as stories were being told.

5. It increased their attention span, powers of concentration and perception.

6. It made learning a wonderful challenge as they became aware of more and more vocabulary and the relationships among words.

7. It presented and reinforced these relationships among the learned nouns, verbs and adjectives.

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