1994

Computer assisted assessment and computer assisted portfolio development in a whole language classroom

John Joseph Patten

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COMPUTER ASSISTED ASSESSMENT AND COMPUTER ASSISTED PORTFOLIO DEVELOPMENT IN A WHOLE LANGUAGE CLASSROOM

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

by
John Joseph Patten
June 1995
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Date 5/4/95
ABSTRACT

This technology project was based on the work of Marie Clay, who developed a form of reading assessment called a running record. A running record is an assessment tool used to measure an individual's reading skills. This project uses Clay's running record ideas to create an electronic running record and it also incorporates portfolio assessment. This project is not an identical copy to Clay's running records. Some modifications and additions were necessary in order to facilitate computerized running record assessment. This project hopes to make the administering of reading assessment, and the handling of assessment data convenient and efficient by using the capabilities of the computer. Software was developed as part of this project to achieve these goals. The software is titled, The Electronic Running Record Assessment tool (TERRA) and is included in this project.
ACKNOWLEDGEMENTS

I would like to acknowledge the work of Marie Clay in the area of literacy and reading assessment, specifically, running record assessment. Without her work my project would not be possible. I would also like to thank my wife, Ivy, and my son, Sean, for support and understanding during this research project.
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STATEMENT OF THE PROBLEM

The Whole Language Philosophy

The term Whole Language was coined in New Zealand over fifteen years ago. Whole Language is a philosophy for teaching reading and writing. This philosophy is based on the natural manner in which young children learn. Young children acquire new knowledge by building on knowledge they have previously acquired. An example of this natural process can be seen in how children learn to walk. When children begin the process of walking, they start off by crawling. Eventually, they pull themselves up with the help of furniture and begin to take steps. In time, children step away from the furniture and begin walking independently. Throughout this learning process, each child is encouraged in his/her efforts.

This learning process is also evident when a child learns to talk. A young child's first attempt at talking is babbling. The child is encouraged, and his/her utterances then turn into partial words. Eventually, these partial words turn into simple words, then phrases, and then complete sentences.

The Whole Language philosophy is reflective of this type of learning. The philosophy of Whole Language is that children learn based on what they already know. Under Whole Language, learning to read begins with the student telling stories. The student then begins to make marks on paper. Later these marks develop into symbols. The student then reads these symbols back as their story. Finally, the student develops their own rules for these symbols. This learning ultimately develops into an understanding of the reading concepts. Throughout this period of learning, the student is encouraged and praised for their efforts (Barron, 1990).

The Whole Language philosophy provides a set of ideas that empowers
a teacher to provide an environment that makes learning to read easy and natural for his/her students (Freeman, 1992). The curriculum follows the student, rather than the student following the curriculum. The students are constantly encouraged for their approximations. Whole Language does not provide a systematic plan for teaching children how to read and write (Goodman, 1986). There are no primers or leveled workbooks. Whole Language proceeds from whole to part. Some of the more commonly held tenets of the Whole Language Philosophy are:

(a) The student is encouraged to derive meaning above all else. Before the student can develop concepts about language they need to understand the meaning of language (Freeman, 1992).

(b) Language Arts instruction is learner-centered. Lessons begin with what the student knows and builds on that knowledge. Lessons should have meaning and purpose for the students now (Freeman, 1992).

(c) The Whole Language philosophy incorporates the belief that learning is not something a student develops over time, learning is natural and continuous (Short, 1991).

(d) In Whole Language, Language Arts instruction is literature-based. Children are exposed to a wide variety of literature which is read to them, read by them, and read with them in a variety of ways.

(e) The Whole Language philosophy also subscribes to the idea that reading and writing are inseparable companions in the development of language arts skills (Edson, 1991). Reading skills are taught within the context of rewarding material.

(f) Learning is activity-based. The Whole Language philosophy promotes the idea that children learn better when they are actively involved in
structuring their own learning.

The teacher that follows the philosophy of Whole Language will create a classroom that is structured to put the responsibility of learning in the hands of the student. The teacher becomes a facilitator of knowledge as opposed to the source of knowledge.

Assessment in Language Arts Instruction

An important component of the Whole Language philosophy is student assessment. It is necessary for the teacher to keep systematic records of the student’s progress. Proper assessment is key to providing appropriate instructional materials to the student. These materials consist of books that are at a difficulty level that would provide the student with the best opportunity for increasing reading skills. One instrument for assessing student progress in reading is called the running record. A running record is a teacher-administered instrument which records everything a student says while he/she reads. This running record can take as many different forms as there are teachers using it. In some cases it can appear to be a series of check marks across the page with an occasional symbol identifying and error. In other cases the running record can be done on a form with specific spaces for the title of the book, level, number of words, etc.

A second instrument in assessing student progress is called the student portfolio. A portfolio consists of student work samples, teacher assessments, student evaluations, and other samples of student achievement. Often these work samples are saved in a folder and stored in a file cabinet. When a student transfers to another school, the student’s portfolio is sent to the new school.

These assessment tools can have inherent problems. As stated
previously, running record assessment is often different from one teacher to the next. Since this assessment tool is relatively new in the United States, it is not unusual for school sites to develop their own forms of running records. These differences can sometimes cause considerable confusion when interpreting the record. This confusion is compounded when a student transfers from one school site to the next and the student's reading records are sent to the new school where teaching strategies and assessment techniques may be different. Portfolios can also become more of an obstacle in assessment, sometimes literally. Many times portfolios consist of student pages, stuffed into a manila folder. In addition, in a classroom where reading is taught under the philosophy of Whole Language, student reading responses quite often vary in shape and size and can not be easily stored in a manila folder portfolio. Again, when a student transfers to another school, the student's portfolio is sent to the new school. The new teacher does not look forward to hours of sifting through the portfolios of 30-35 students, each consisting of multiple page examples of the student's work. Many times the portfolios end up in a file cabinet, untouched by the new teacher. Many of these problems can be solved through the use of technology.

The Role of Computers

As we enter the 21st century, one of the tools that continues, and will continue, to shape educational institutions, is the computer. This tool which is becoming smaller, and more powerful as time goes by, can aid in solving the problems that hamper effective assessment in Whole Language. The computer has the ability to standardize and simplify the assessment instruments conducted in a Whole Language classroom. The computer also has the ability to store large amounts of student information. It will be possible in the future to
store a student's entire educational history on one transportable computer storage device.

This project was undertaken to use the computer to address the issue of developing better assessment instruments in Language Arts instruction. This project will standardize the running record instrument. It will also facilitate an efficient means of keeping student work samples, and other assessment instruments together, in an electronic portfolio.
REVIEW OF THE LITERATURE

Whole Language Assessment

The key ingredient in a successful Whole Language approach is monitoring student progress through assessment. Whole language assessment is an ongoing part of instruction that centers on process rather than on product. It is in a constant state of change and adjustment, reflecting new knowledge and abilities of the learner (Harp, 1991). Two widely used forms of assessing student progress are running records in reading evaluation and student portfolios.

Running Records

A running record is a tool used to record observations of children's reading behavior within a reading task (See Appendix 1). It requires that a teacher records everything that a student says and does as he/she reads the book the teacher has chosen (Davidson, 1991). In order to perform running records, a teacher must have a wide variety of literature that is leveled. Leveling means ranking reading material from low difficulty to high difficulty. It involves assigning a number to each book in relation to the book's difficulty so that reading materials can be quickly selected to match individual student reading abilities. Leveling books can be done many different ways. For instance, there are Reading Recovery book lists available that have leveled a wide variety of children's books (Peterson, 1990). Or, a simple way to level a classroom library is to divide the books into three groups: difficult, moderate, easy. Then, the process is repeated within these three groups. The process continues until, in the end, the books are in piles consisting of a range of levels. Then it is a matter of assigning a numeric value for each pile of books (Markle, 1994). Providing literature at a level that is appropriate will make it
easy for the student to be successful at getting messages from texts. This will enable the student to develop the higher reading skills necessary for fluency (Clay, 1991). A running record is administered by the teacher to the student. It is a one-on-one instruction setting between the teacher and the student. When done manually, running records can result in various forms and layouts. Nevertheless, a well-administered running record will tell two things: first, what the student is doing well; and, second, what the student needs to work on.

The teacher uses the running record for multiple purposes. At the time the running record is being administered by the teacher, it helps to determine if the book is too difficult or too easy for the student. In either case, the teacher may tactfully suggest a different book because the student needs to be reading at his/her instructional level. The instructional level is the level at which a student reads and can acquire reading fluency skills. Secondly, a running record will provide clues to the types of cuing systems the student uses to read. There are three basic queuing systems used when reading. The first one is visual cues. The student who uses visual cues looks at the illustrations on the page and gets meaning from them. This student may also be familiar enough with some words and letter combinations that just seeing them creates word recognition. The second cue is meaning. The student that uses meaning cues does self-evaluating as he/she reads. The student asks the question, “Is what I'm reading making sense?” Many times a student that is very dependent on using the meaning cues while reading will substitute words in the text that are different, but mean the same thing. The third type of cueing strategy is graphophonics cues. The student that uses graphophonic cues is concentrating on the sound/symbol connections. A good reader will use these three cues and others to get messages from text. This type of information can
be obtained by the teacher while the running record is being administered.

The running record is not completed when the student finishes reading. Instead, it is used to go back over and point out to the student what he/she is doing well, making note of all the "good reader" qualities that the student demonstrated while reading. Some of these good qualities may be related to the cueing systems described earlier. The running record may also be used for going back over a particular passage and re-reading until text makes sense to the student. Furthermore, at the completion of the students reading, and after commenting on what the student does well, the teacher may use the running record to ask the student to turn back to a passage that gave them difficulty. This enables the teacher to give the student instruction on some of the strategies he/she may use when encountering a difficult passage in another book (Pinnel, 1990).

Finally, at the completion of the running record, the teacher makes comments on the document as to the student's progress and the ways instruction is to proceed for that particular student. The document then becomes part of the student's language arts portfolio and is used by the teacher for evaluation purposes.

The typical running record document consists of these elements (Figure 1). At the top of the document is usually the student's name (1). Accompanying the student's name is the age of the student (2). Below this information is the date the running record was administered (3), and the title of the book (4) and the book's level (5). The body of the document (6) usually consists of a series of check marks. Each check mark on the document represents a word that the student read correctly. There is a one-to-one correlation between the words read correctly by the student and the check marks created by the teacher on the
Figure 1. Sample running record administered in a K-6 elementary school.

Errors in the student’s reading (Figure 2) are denoted by the teacher drawing a line and writing what the student said on top of the line and what was actually written on the page under the same line (1). If a student happens to correct a previous error while reading, the teacher administering the test puts the letters “sc” after the error on the running record document (2). These letters stand for “self-correction.” Occasionally a student will repeat a word or go back to the beginning of a particular sentence. This is usually denoted on the running
record by an arrow going from the last word read by the student to the beginning of the passage that the student began rereading (3). Also, if a student simply repeated a word while reading, the letter "R" is written on the running record after the check mark, or error mark to signify the student repeated that particular word. If a student inserts words while reading, an arrow symbol is inserted between the two words in the passage and the word the student inserted is written above this arrow. If a student completely omits, or skips a word while reading, the teacher draws a straight line and adds a dash above the line to signify a word that has been omitted (4). Words that are read correctly are denoted with a check mark (5).

The running record document has a section that is dedicated to error analysis and comments. As shown in Figure 3, this section includes the number of words in the text selection (1), the number of errors the student made (2), the number of self-corrections the student made (3), and the error rate (4), which is determined by the number of words over the number of errors and converting them into a ratio (See appendix 2).

Figure 2. Running Record data depicting wrong word errors, self corrections, correct words, unread words, and tally columns on the right margin.
The running record also includes the self-correction rate (5), which is determined by adding the number of errors and the number of self-corrections and dividing them by the number of self-corrections (Appendix 2). This figure is then converted to a ratio. An accuracy percentage is also reported on the running record (6). It is used to determine what the student’s accuracy was when reading the selected text. Ideally a child should be reading at his or her instructional level. The instructional level is an accuracy rate between 90 and 95% (Pinnel, 1990)(Appendix 1). Accuracy rate is determined by setting the number of errors over the number of words in the selected passage. This is then multiplied by 100. Finally, the result is subtracted from 100 to determine the accuracy percentage rate.
Running records should be administered to every student at least once every month. The typical time it takes to administer a running record is between ten and twenty minutes. The running record document then becomes part of the student's Language Arts portfolio.

The Student Portfolio

The student portfolio is an essential part of reading assessment. It helps make the teacher find the best each student has to offer. There are theoretical and pragmatic reasons for using a portfolio for assessment purposes. These are:

1. Sound assessment is anchored in authenticity. Good assessment should grow out of authentic reading. A student reads for many different purposes; thus, the assessment of that reading should mirror the diversity of material. The assessment must include not only how the reader, the text, and context influence reading but how they interact and construct meaning for the reader.

2. Assessment must be continuous and it must chronicle the student's development. Reading is a multifaceted process. Thus, reading assessment should also be multifaceted. There should be a variety of assessment instruments that examine different concepts and demonstrate reading in a variety of situations.

3. Assessment must provide for both teacher and student assessment. This collaboration between student and teacher fosters the bond and establishes them as partners in learning. (Far, 1992). It is when the teacher and student collaborate in assessment that the greatest benefit is achieved (Valencia, 1990).
The student portfolio includes samples of the student’s work, running records, literature logs, the teacher’s observational notes (anecdotal records), students periodic self-evaluation, and other instruments used in assessing the students abilities, and documents chosen by the teacher and by the student. In his article, Shepard (1994) pointed out the need for better assessment when he wrote,

“In the United States today, standardized testing is running amok. Newspapers rank schools and districts by their test scores. Real estate agents use test scores to identify the ‘best’ schools as selling points for expensive housing...Occasionally school boards issue a mandate that ‘all students must be above the national norm,’ which, absurdly, is the same as requiring that 100 percent of students be above the 50th percentile.”

What is needed, according to him, is assessment that is designed to support instruction. It is informal, teacher-mandated, adapted to local context, locally scored, sensitive to short term change in student’s knowledge, and meaningful to students. It provides immediate feedback; and it incorporates tasks that have instructional value in themselves. The student portfolio is one assessment instrument that meets these requirements.

Computers in Whole Language

Up until a few years ago computers in whole language instruction was practically non-existent. Most computers in the classroom were used in language arts programs as drill and practice instruments or as word processing tools. Up to this point there has been very little computer software available for teachers in the area of computer whole language assessment. The closest thing to computerized student assessment, has been those programs that keep track of student grades. They keep a record of how the student has done on exams and give each student a percentage or ranking compared to the rest of the class. These programs promote the antithesis ideology to Whole
Language, i.e., students are basically the same and their performance should be judged on some standardized norm, usually just tracking how students perform on standardized test.

As computer technology has improved and the use of computers has become easier, some software has been developed in the area of computer assessment. An example of such a program is called the Grady Portfolio. Grady Portfolio is a program that does not try to turn the student into a statistic (Aurbach & Associates, 1992). It is used in much the same way a manila folder would be used for a whole language portfolio. It can record basic information about the student including the student's photograph. It can be used to record anecdotal remarks on the student. It can record a student reading aloud and speaking. It can also save examples of students writing through scanning their work on a scanner. The Grady Portfolio was created with the understanding that portfolio assessment represents student progress more accurately. This belief is also supported in the process of student assessment in whole language. The Grady Portfolio is a good tool for storing different types of student work. These samples of work can include digitized written samples, recordings, and even digitized video. It is an all purpose electronic portfolio creator. Their Grady Portfolio falters in that it is too general. It does not provide any integrated assessment.

Outside of whole language, computers have been used to assess reading in a more statistical fashion. The following is a brief description of how computers have been used in the past to assess reading. There have been Informal Reading Inventories for the computer, but these greatly resemble the printed form. In this form of assessment, multiple choice questions address the following skill areas: main idea, facts, vocabulary, inference, and sequencing
There are also comprehensive assessment packages for decoding. One such assessment is called The Lindamood Literacy Inventory (Lindmood-Bell Learning Process, 1991). It is a multimedia tool for measuring the cognitive functions of phonological awareness and sub skills of decoding and spelling. A second type of multiple answer assessment instrument is called Make Test (Mountain Lake Software, 1989). It is Macintosh based software that lets the teacher create multiple choice, fill in the blank, true-false, and essay questions. A program which runs under HyperCard called Diagnosing Reading Abilities (Intellimation, 1990) is a simulation to train teachers on proper diagnosing of reading levels. Finally, there is also a program that qualifies as an Expert System to assess reading. An Expert System is software that can be considered a branch of artificial intelligence. It uses simple “if-then” rules to interpret reading data inputted by the teacher. This system is titled CARA (Computer Assisted Reading Assessment) (Southern Micro Systems, 1987). CARA can be used to analyze Informal Reading Inventories. At the conclusion of this diagnosis, a printed report is printed out with findings (Wepner, 1991).

The computer assessment tools described above were used with different philosophies for teaching reading. These tools seem to break down a complex structure, such as reading, into specific, calculated results. Emphasis in these assessment tools is on the result, and not the individual learner. There is no regard for what cues he/she is using to read; how the student feels about reading; or what strengths or weaknesses the student possesses.

Teaching Language Arts with a Whole Language approach has created a demand for competent assessment instruments. These assessments must be easy to administer. They must be sympathetic to restrictions on teachers' and students' time. They must facilitate a means to provide economical record
keeping, and at the same time, make records easily accessible. The following pages describe The Electronic Running Record Assessment (TERRA) project. TERRA is a program that addresses assessment in whole language and takes advantage of the emerging technologies to aid teachers in Whole Language assessment.
THE PROJECT

The Electronic Running Record Assessment (TERRA) program

TERRA was developed to demonstrate how the classroom computer can be utilized for reading assessment purposes. TERRA was created to facilitate reading assessment by the classroom teacher through the use of technology. It was designed to help solve specific shortcomings of traditional assessment in a classroom where reading is taught under the new philosophy of Whole Language.

Goals of the Project:
To generate an assessment tool for reading that will:

A) create an electronic portfolio.

B) utilize the capabilities of the Apple Macintosh computer in...

• calculating automatically the student’s accuracy rate level, self-correction rate, and error rate.

• individualizing a portfolio for each student.

• scanning and storing visual samples of student responses to reading.

• digitizing and storing audio recordings (student readings).

• storing digitized video recordings of student.

• facilitating quick access to student records.

• providing unlimited hard printouts of records

• providing a form of reading assessment that is convenient and extremely portable.
Design of the Project

Prerequisites

TERRA was developed to meet the needs of reading teachers when administering a running record that assesses a learner's reading ability. Prior to this process, the teacher needs to have done the following:

- familiarize themselves with some of the basic tenets of the Whole Language philosophy for teaching reading.
- have a wide variety of leveled reading material.
- have some understanding of the cuing systems a reader uses when reading.
- have some general understanding of the running record assessment instrument.
- have some understanding of how to use an Apple Macintosh computer.
- be proficient in using a computer mouse.

Needs Analysis

Teachers need a way to record student information while administering a running record. It was determined that the simplest way for TERRA to record this information was by using the second most familiar computer input device, the computer mouse. The mouse is the primary computer tool used while the running record is administered. The teacher records text read correctly, and incorrectly, by clicking the mouse button.

Errors by the student are recorded through the use of a palette. A palette on the computer can be described as a small “window” that can be dragged anywhere on the computer screen. On this palette are a series of buttons.
These buttons are used to record the different types of errors the student makes while reading.

Secondly, teachers needed a simple way to input chosen text from selected literature. This was accomplished by creating a specific menu bar item in TERRA’s, top screen, menu bar. The teacher that selects this menu is provided a simple window for inserting their chosen text. When the teacher has typed in the selected text, usually about 100 words, the instrument is saved and may be used over and over again.

Using TERRA effectively required the development of a system for storing the data gathered. It was necessary to store each electronic running record and the data, in an electronic portfolio. Every student would have their own electronic portfolio containing data gathered for assessment purposes. This data included the electronic running records, color pictures of student work, teacher evaluations, student evaluations, recorded samples of student readings, and possibly, video of the student engaged in reading activities.

Finally, in order for the teacher to move from one area in TERRA to the next, a form of navigation was needed. Navigation in the program is accomplished through two major modes. The first is by providing a menu in the programs menu bar that would provide the teacher with a means of moving from one section to the next section. A second mode of navigation is achieved through the use of hypertext in some of the text fields. Hypertext is text that, when clicked on, invoke the computer to jump to different areas in the program. Secondary forms of navigation in TERRA include: the use of the keyboard’s arrow keys, and buttons that jump the user to a specific location.
Organization/Structure of TERRA

The flowchart, as shown in Figure 4, presents a visual diagram for the organization and structure of TERRA.

The following figures: Figure 5, Figure 6, Figure 7, Figure 8, and Figure 9 provide additional information on the organization and structure of TERRA. The symbols in the upper left corner of each entry is a link to the previous page’s flowchart. These symbols are named with abbreviations for the actual screens in TERRA. Below each symbol is a small representation of how the screen appears in TERRA. Next to this image is a short description about the screen.
The Navigation menu is always available in the menu bar. The navigation menu allows access to all parts of TERRA.

Figure 4. The TERRA flowchart shows the organization and branching of the working program.
TERRA Home Stack
From the TERRA Home Stack the user may access the Student List section, the running record creator stack (R/R Creator), and running records that have all ready been created. This is the main stack of TERRA.

Running Record Creator (R/R Creator)
This is the master running record. To create a new running record use the R/R Creator master. Selected text is inserted through the "Insert text." window. The master running record is copied and renamed to reflect the new running record.

New Running Record
The new running record is placed in a folder containing previously created running records.

Previously Created Running Records Dialog
To access previously created running records from the TERRA Home Stack, this dialog window allows the user to select the running records folder and the subsequent running record.

Figure 5. An explanation of the components in TERRA.
Once upon a time there was a little dog. He was lost in the great Sanram forest.

Sample Running Record
A previously created running record. The running record errors palette is featured floating above the running record. The errors palette is used to record the different errors the reader may make while reading. Errors are registered into the running record by clicking on different buttons on the errors palette.

Data Section Of Running Record
This is the data section to the running record. When the running record has been completed, the errors are counted, accuracy rate level is determined, self-correction rate is formulated, and the error rate is calculated. Words that gave the reader trouble are recorded, and words read correctly are noted. There is also a section for teacher comments. The save button in the lower right corner, saves the data to the student's portfolio.

Data Copied to Student Portfolio
The running record data sheet is saved to the student's portfolio.

The Student List
The Student List section allows the user to access student portfolios, create new portfolios, and access previously created running records.

Figure 6. An explanation of the components in TERRA continued.
Previously Created Running Records Dialog
To access previously created running records from the Student List, this dialog window allows the user to select the running records folder and the subsequent running record.

New Student Portfolio
This button on the Student List allows the user to make a new student portfolio.

Student List
Individual student portfolios can be accessed by clicking on names in this list.

Help Section Of TERRA
This is the Help section's main card. Users can access specific topics through this main Help section.

Opening a Student Portfolio
Help on opening a student portfolio.

Figure 7. An explanation of the components in TERRA continued.
The TERRA overview

Help on navigating through TERRA.

Information on how to create a running record using TERRA.

Information on using a scanner with TERRA.

Information on recording voice through the use of TERRA and placing it in a portfolio.

Information on importing digitized video into student portfolios using TERRA.

Figure 8. An explanation of the components in TERRA continued.
Information on importing pictures of student work samples can be accessed on this help screen.

Information on how to create a new student portfolio is found on this help screen.

Information on how to administer an electronic running record.

Information on how to use the Errors Palette (Assessment Marks) while giving an electronic running record.

HyperScan
This software program which comes with all Apple OneScanners can be used in conjunction with TERRA.

Figure 9  An explanation of the components in TERRA continued.
Screen Design

TERRA screens are simple and functional. TERRA's screens are designed to provide simple, understandable user interface. There are no fancy animation sequences or catchy sound effects to detract attention from the job at hand. That job is to evaluate student reading skills.

![The opening screen in TERRA.](image)

Figure 10. The opening screen in TERRA.

The screen above, Figure 10, is the opening screen. It contains a simple menu bar at the top that includes some common text manipulation controls and a Navigation menu. Below the menu bar is the TERRA Home Stack window. On this window is the title of the software and four buttons. The button located in the lower right hand corner is isolated from the other three buttons. This is to make it easy to find. This button is used to go to a help section of TERRA. The other three buttons are stacked in order of use, with the top button being used most frequently. These buttons are a Student List button, R/R Creator button, and a Running Records button. The Student List button takes the user to the Student List stack. The R/R Creator takes the user to the
Running Record Creator stack, and the Running Records button provides a dialog window to open previously created running records.

![Student List screen of TERRA](image)

Figure 11. The Student List screen of TERRA

Figure 11 shows the Student List screen. Again, on the top of the screen is the menu bar. This menu bar is the same throughout TERRA. Below the menu bar, are two buttons on the lower left side of the screen. On the right side is a scrolling field. The two lower left buttons are for accessing previously created running records and for adding a new student portfolio. These buttons are titled, Running Records and New Student. The scrolling field on the right is a way to keep track of who has a portfolio, and accessing that student’s portfolios. The directions at the bottom of the field read, “Click name to access portfolio.” Clicking on a name in this field opens that student’s portfolio. Throughout the software there are multiple ways of accessing information in TERRA. On the Student List, besides the two buttons and the scrolling field, the Navigation menu allows for complete navigation.
The Running Record

The first screen in a running record is shown in Figure 12. At the top of this screen is the menu bar. The menu bar is the same except for one menu. The Text Selection menu was added to this screen. However, the Text Selection is only used when creating a new running record. The Text Selection menu provides a dialog window for typing the selected text in the new running record. Below the menu bar is a large text field. This is where the text of a selection is displayed for the teacher. Below the text is the Errors palette. This palette can be moved anywhere on the screen. It can also be hidden by using the palette’s close box in the upper left corner of the palette. In the Errors Palette are seven buttons. Each button records a specific type of mark for student actions during a running record. Below the Errors Palette and the large Text field are two buttons at either corners of the screen. The toggle button on the left is for displaying or hiding the Errors Palette and the button in the right
corner is for going to the second screen of the running record after reading. The field in the middle displays the last word the student read or attempted to read.

![Figure 13. The second screen in the running record. This screen records all data gathered during a running record.](image)

The second screen in a running record (Figure 13) automatically records all data gathered during a running record. This screen has a place for the date the instrument was given, the name of the student, the title of the book read, the level of the selected literature, and whether or not the student has seen the story. The screen also provides a record of all the words the student read with notification next to the words the student erred on or repeated. There is also a list of words that were read incorrectly, plus space for the teacher to type in what the student actually read. This is important information when figuring the types of errors the student is making while reading. There is also a comments section which provides unlimited space for the teacher to type comments about the student's reading. At the bottom of screen, there is a button to go back to the previous screen in the running record and a button for saving the data to the
student's portfolio.

![Student Portfolio](image)

**Figure 14.** The first screen of the student portfolio.

### The Student Portfolio

The first screen of a student portfolio (Figure 14) is used to store information about each student. It is the first screen of an electronic portfolio. The student portfolio can consist of a minimum of one screen to a maximum determined by the teacher and hardware. At the top of this screen is the menu bar. In the window below the menu bar, starting from the top left, is a field for entering the student's name, a field for entering the student's grade, a field for entering the student's age, a field for entering the student's address, and a field for entering the student's telephone number.

In the upper right corner is a curved arrow button. This button is used to return to the Student List.

In the bottom half of the screen are two large rectangles. The rectangle on the right is a large scrolling field. The teacher may enter comments on the students progress in this field. The rectangle on the left holds buttons to view...
further student work. Student additional work may consist of imported pict files, imported digitized video, and recorded sounds. When clicked, the button will display that particular work in a window that will appear on top of the student’s portfolio window. These windows can be easily repositioned on the screen by dragging them with the mouse.

At the very bottom of this screen are small arrows in each corner of the screen. These arrows are actually buttons used to go from one screen in the student’s portfolio to the next.

The Help Screen

This is the TERRA Help ... screen (figure 15). At the top of this screen is the menu bar.

Below the menu bar is the title of this stack. Below the title of the stack is one scrolling field. This scrolling field works in the same way as the scrolling field in the Student List stack. In this scrolling field is a list of help topics. To access these topics click on them in the scrolling field. This action jumps the help stack to a card where the help information is available. In the bottom right corner is a
button. This button will take the user back to the TERRA Home Card. All cards in the TERRA Help section appear like this one, with one exception. Instead of a scrolling field with a list of help topics is a field with helpful information.

TERRA screens were designed with simplicity in mind. They were created in the hope that teachers would be able to spend less time figuring out how to operate the program, and more time assessing readers. The software uses common Macintosh user interface techniques and tries to adhere to the standards and guidelines for Macintosh software design.

Support Systems

The support systems in TERRA consist of the Navigation menu bar, the errors palette, online help, and stack navigation. These systems are necessary for using TERRA and for providing the user with help while using TERRA.

Navigation Menu Bar

![Navigation Menu Bar]

Figure 16. The Navigation menu in the menu bar. The menu is present in all screens of TERRA.

The Navigation menu bar (figure 16) is a support system that is always
available in TERRA. It provides access to all areas in TERRA. It is also used when a student sample is imported into a portfolio, when a recording is imported into a portfolio, when a scanner is used in conjunction with Apple Computer’s program HyperScan, and when digitized video is imported into a portfolio.

The scroll down menu is broken down into two sections. The top section is for navigating to the most common used areas in TERRA. These are: 1. *Open a record...*, which allows the user to open previously created running records. 2. *Open a portfolio...*, which allows the user to open a student’s portfolio. 3. *Student List...*, which takes the user to the Student List screen. The bottom section contains five selections. These five selections begin processes in TERRA. The first process, *Create R/R...*, starts the process of creating a new running record. It opens the R/R Creator (Running/Record Creator) stack. The second process, *Import video...*, starts the process of importing digitized video into a student portfolio. The third process, *Record...*, starts the process of recording sound and importing the recorded sound into a student portfolio. The fourth process, *Import Picture...*, begins the process of taking a previously scanned work sample that has been saved as a pict file, and importing it into a student portfolio. The final process in this scroll down menu, *Scanner...*, begins the steps to use HyperScan with TERRA.

**Errors Palette**

![Assessment Marks](Figure 17. The Errors Palette (Assessment Marks). It is used while administering an electronic running record.)
The errors palette is a support system that is used while administering an electronic running record. The errors palette consists of a small rectangular window with seven buttons. At the top of the errors palette are the words "Assessment Marks". Surrounding these words is a gray area used to reposition the palette on the screen. Repositioning the palette is achieved by using the mouse, clicking in the gray area and dragging the mouse to relocate the palette on the screen. The small white box in the upper left corner of the palette is called the close box and is used to close the errors palette. Closing the palette is achieved by clicking the mouse inside the close box. The buttons on the palette record information to the electronic running records data screen.

When the teacher clicks on a palette button with the mouse, information regarding the student's progress is sent to the data screen of the running record. The errors palette was created in HyperCard 2.2 using the PowerTools stack. The PowerTools stack is included in the HyperCard 2.2 software package from Apple Computers. To create a palette using PowerTools, the developer creates a graphic representation of the palette using HyperCard's built in graphic capabilities. This graphic is then imported into the PowerTools stack. Then transparent buttons are created and placed over the button graphics. Next, scripts are created for each button. Complex scripting for palette buttons can be achieved through the use of "handlers". A "handler" is a group of computer commands. This group of commands is stored inside a "handler". When the "handler" is called in a script, all computer operations described in the "handler" are executed. The handler and its accompanying scripts can then be placed in the stack's script. When the palette button is activated, the handler is called and the script is executed. Short scripts can be included directly in the palette button's script. An example of a short script might
be “go next card.” When importing the new palette into a stack, two resources are added to the stack’s resource fork. The resource fork is where information regarding items such as dialog boxes and their contents, fonts, icons, sounds, and pictures are stored. The first resource is the palette graphics resource. It is stored as a PICT resource. PICT file resources are graphic resources. The PICT graphic format is usually the default resource type when working with graphics on a Macintosh computer. The second resource is the palette resource that contains information for creating the palette. It is stored as a PLTE resource. The PLTE resource stores information regarding a palette. This information consists of the size of the palette, the size of the buttons on the palette, and one line of script for each of the buttons on the palette. The stack uses both these resources to create the palette.

Online Help

Figure 18. The home card to the TERRA Help stack. From this screen, help is accessible by clicking on topics in the scrolling field.
The Online Help system of support (figure 18) is available at all times through the use of the Navigation menu in the menu bar. Once at the home card in the TERRA Help... stack, information is accessible to the user by clicking on topics in the scrolling field in the center of the screen. When a topic is clicked on, the stack immediately jumps to the card with information about that topic.

Figure 19. A sample of one of the help screens inside the TERRA Help... stack.

On all the help screens (figure 19) in the TERRA Help... stack, it is possible to print out the information found on the screen. On the help screens, there are small buttons with a picture of a printer inside them. When the button is clicked with the mouse, the information is printed to paper.

**Stack Navigation**

Navigating through TERRA is accomplished through three main modes. These modes of navigation are the menu bar, buttons, and hypertext. As
referred to earlier in the paper, the Navigation menu in the menu bar allows for navigating to all areas in TERRA. When the Navigation menu is clicked on with the mouse, a scrolling list is displayed. Navigating to other sections of TERRA can be achieved by moving the mouse down the list and releasing over one of the selections. The menu bar scripts are accomplished through the use of handlers and standard Macintosh dialog windows, or boxes.

The second mode of navigation in TERRA is through the use of buttons. Throughout TERRA and on every screen, buttons are used provide easy access to other sections of TERRA. These buttons usually will provide clues as to what areas they can provide access to with words describing those places on the tops of them. Also, often these buttons will have icons to provide clues as to their destinations when clicked upon.

The third mode of navigation in TERRA is through the use of hypertext. Hypertext works similarly to how a handler works when it is called. In hypertext, certain words, phrases, groups of words, or whole lines of text, can be used to start a series of commands. In many of the fields there are lines of text, or words, that execute a series of actions when the cursor is over them and the mouse button is depressed. For example, in the Student List section of TERRA there is a field with a list of student names. These are names of students that have electronic portfolios. When the teacher clicks on any of the names present in that list, TERRA instantly sends the teacher to that student’s portfolio. This is one way a teacher can navigate quickly to a particular student’s electronic portfolio.

Development/Authoring Tool

The Electronic Running Record Assessment (TERRA) program was
created using a Macintosh-based authoring tool, HyperCard 2.2 (Apple Computers, 1994). HyperCard 2.2 is a program used to quickly build personal applications. Skulley (1990), describes it as "... the first accessible software erector set". Many people have tried to categorize HyperCard as a programming language. According to Danny Goodman (1990), Apple computers has not completely embraced this definition. Apple believes that HyperCard is a program for all people who are not computer programmers. They believe it is a tool that everyday people can use just as easily as they would use a pencil, ruler, and a piece of paper (Goodman, 1990). One of the most important features about the Electronic Running Records Assessment program is the ease at which a user can modify the program using HyperCard. The classroom teacher could easily customize TERRA.

HyperCard 2.2 was designed to let non-computer programmers create custom applications quickly and easily. HyperCard 2.2 uses the analogy of a "card" to represent a screen. On a "card" information such as graphics and text are displayed. HyperCard 2.2 can be used to create stacks, or display previously created stacks. A "stack" is the name given to a HyperCard application.

When developing a stack in HyperCard, there are certain objects that can be used to define the stack. These objects are: the cards, buttons, and fields. The card is where information is presented to the computer user. It can be thought of as a "window" to the user which displays information. A button is an object that can have multiple purposes. It can be used to navigate through the stack; it can be used to calculate information on the card; or, it can be used to initiate complex, mathematical functions that do everything from show a color picture on the screen, to recording a student's voice in a digital format. The field
works in all the ways a button operates, plus it can display text. This text can be presented to the user, or the user can input text into the field (Apple Computers, 1994)

**Scripting Strategies**

TERRA’s main component is the R/R Creator stack. This is the stack that creates the electronic running record. This stack contains all of the scripts necessary for recording data during a running record assessment. The stack accomplishes this through a scripting technique which uses many different handlers. A handler contains a series of scripts that occur when the handler is called. In TERRA, the handlers are called by a button action, field action, or by a menu.

For example, in the R/R Creator stack, as well as all previously created running records, a handler that is activated through a button on the errors palette records self-corrections that students may make while being assessed. The script looks like this:

```plaintext
on selfcorrect
   put "<--SC)" after cd fld 9 of cd id 4107
   add 1 to cd fld "theSC" of cd id 4107
   subtract 1 from cd fld "errors" of cd id 3957
end selfcorrect
```

The first line is the script’s name of the handler, “selfcorrect”. The word “on” before its name tells TERRA that this is the beginning of the handler. The second line in the script begins the actions that occur when the handler is
called. Line two tells TERRA to put "<--SC" in a field in the data card of the electronic running record. The third line in the handler directs TERRA to add one to a field that tracks self-corrections. The fourth line in the handler subtracts one error from the total number of errors. The fifth line in the handler tells TERRA that the handler has ended. Whenever the "Self-correction" button is clicked on the errors palette, the handler "selfcorrection" is called and those actions described above will be executed.

A second scripting technique is used in the field of a running record. In order to have a record of words read correctly and words read incorrectly, the field, which contains the selected text for the running record, responds to mouse input when the cursor is over words in the field. Here is the script from this field:

```
on mouseUp
   get the clicktext
   put it & " " after cd fld 9 of cd id 4107
   put it & " " into cd fld 2
end mouseUp

On mouseDoubleClick
   get the clicktext
   put it & "/" after cd fld 10 of cd id 4107
   put it & "/" into cd fld 2
end mouseDoubleClick
```

The first line is the name of the handler, `mouseUp`. The second line of the script tells TERRA to remember the word that the mouse was over when the mouse
button was pressed. The third line in the script tells TERRA to put the word that is in its memory, and a space, on the next line of a field on card id 4107. All cards in TERRA have a unique ID number. The fourth line in the script tells TERRA to also put that word in its memory in the second field of the current card.

The second handler, mouseDoubleClick, is called only when the mouse is pressed quickly twice in a row. Again the second line in this script tells TERRA to remember the word that the mouse was over when the mouse button was pressed. The third line in the script tells TERRA to put the word that is in its memory, and a space, on the next line of a different field on card id 4107. The fourth line of the script tells TERRA to put the word that is still in its memory and a “/” into the second field of the current card. The last line in the script tells TERRA that the script handler has ended. This field will only run one of the scripts depending on input from the mouse when over words in the field.

A third type of scripting technique that TERRA uses is found in the Navigation menu of the menu bar. This scripting technique uses a handler in the stack’s script to create the Navigation menu and also uses an XCMD (external command) resource. HyperCard 2.2 has some built-in limitations. HyperCard can side step some of these limitations by enabling the developer to import specific resources that allow HyperCard to do things it can not do by itself. XCMDs can be developed in many different programming languages. Many XCMDs are available free of charge, or as shareware from different computer bulletin board systems. XCMD resources are imported into a stack by using a resource mover application. These applications can be in the form of a HyperCard stack, such as PowerTools, described earlier, or they can be added by using a specific software development tool, like ResEdit (Apple, 1984-91). An example of an XCMD can be found in the Navigation menus record.
Here is part of the script in the Navigation menu for recording sound in TERRA:

```plaintext
on recsound
    play "*xbuttonsound"
    global thisStack
    global name
    get the name of stack
    put it into firstStep
    put word 2 of firstStep into thisStack
    global name
    set userlevel to 5
    Ask "Give the sound a name:
    put it into Name
    domenu "Open Stack..."
        • soundRecord name,better,10
    domenu "new button"
    set the script of cd button "new button" to "on MouseStillDown" &
    Return & "if the optionKey is down then set the loc of me to the mouseLoc" & return→
    & "end mouseStillDown" & return & "on MouseUP" & return & "play"
    " & quote & name & quote & return & "end mouseUp"
    Ask "Name of button:
    put it into buttonname
    set the name of cd button "new Button" to buttonname
end recsound
```
Line thirteen of this script (*), soundRecord name,better,10, is a handler that calls an XCMD. Using the SoundRecord XCMD (F. Rinaldi, 1991-92), gives user the ability to record digital sound. The SoundRecord XCMD creates this window, figure 20. The window acts just like a standard cassette recorder. Once the sound is recorded, it is automatically saved to the target student's portfolio.

![Figure 20. This recording window is created in TERRA using an XCMD.](image)

The above handler examples and the use of XCMDs are scripting techniques used by TERRA. The handlers are located in buttons, fields, and menu bar selections. The scripting strategies in TERRA provide the user with efficient and simple, user interface control.

**How To Use TERRA**

A user's manual is provided in the appendix of this paper (Appendix C). It contains the same information that is available on-line in TERRA.
Advantages and Limitations of TERRA:

Advantages

There are many advantages to using TERRA, when compared to using running records in a conventional manner. First of all, running records done on a computer, using TERRA, make all running records uniform. Many schools today are doing some sort of running record assessment. A lot of times these assessments diagnose many of the same things. However, the instruments themselves rarely look the same. Portfolios, which running records are a part, are used to keep evidence of student progress and achievement. When a student transfers schools, the portfolio is sent along with the student to the new school. If teachers were using TERRA at both sites, interpreting the running records, in the portfolio, would be easy.

The second advantage to using TERRA over conventional running records is its portfolio capabilities. TERRA generates electronic portfolios for every student in a class. These portfolios may be viewed by themselves, or can be made accessible while using TERRA. Traditional portfolios take up entire filing cabinets for every class in a school. TERRA portfolios are stored in the computer and are limited only to available computer storage space. TERRA portfolios also cut back on the amount of paper necessary for record keeping; and TERRA allows the student to take work home to share with parents, rather than the teacher keeping the work, and storing it for no one to see in a file. TERRA’s portfolios can also be transferred between locations electronically via modem. TERRA provides an easy way for storing video, audio, or pictures inside the electronic portfolio. Storing video and audio in traditional portfolios poses more difficulty in storage of the video and audio tapes. TERRA portfolios do not have this problem.
TERRA also automatically calculates the child's level of accuracy, number of words used in the instrument, self-correction rate, error rate, and the total number of errors. All these figures in a conventional running record need to be calculated out by hand. This sometimes leads to errors on the part of the evaluator. In TERRA this is not a problem because calculations are done automatically.

TERRA also provides a general information section in the student portfolio for each student. The information consists of student's name, address, phone number, age, grade, and name of parents. In the information section, there is also a place where parent comments, or concerns, can be recorded. This can be particularly helpful during parent conferences.

TERRA also simplifies parent conferences by making all student information presentable at the click of a mouse. Teachers will no longer have to scatter students samples on table tops or search through bursting manila folders for particular samples of student work.

Finally, one of the most important features of TERRA is that it can be customized. Through the use of HyperCard (Apple computers) teachers can add or subtract from TERRA. All of the scripting behind the TERRA is accessible for modification. TERRA can be linked to other applications such as data bases, spread sheets, and word processors. The user can determine how much or how little they wish to customize TERRA.

Limitations of TERRA:

TERRA can be limited in its use by the availability of hard disk space. Recording student reading and storing it in TERRA, or storing video in TERRA, takes up megabytes of hard disk storage. A three-minute video stored in
TERRA can take up to 17 megabytes of hard disk storage. Nowadays, the cost of computer storage is dropping quickly. There are 1000-megabyte drives that are available for under $750.00. In the future, this limitation should be eliminated. TERRA will work with just about any computer hard disk set up from 40 MB on up. The user will be limited only in his/her ability to store sound and video by the small hard disk space.

A second limitation is that some of the features rely on the use of other hardware and applications. For example, in order to scan student work into TERRA, you will need a scanner and a scanner software. In addition, if the user plans on using the feature that scans directly to a page in the student's portfolio, he/she will need an Apple ColorOne Scanner or an Apple One Scanner. In addition to scanners, if users of TERRA plan on storing video, they will need a video digitizing card in their computer and a video camera. Some computers, like the Macintosh AV line come equipped with this video digitizing feature. If the computer the teacher is using is not an Apple Macintosh AV, then a separate digitizing add-on card must be placed in the computer.

A third limitation in TERRA is that it is not a cross-platform application. That means that the software will not work on more than one type of computer. TERRA runs only on a Macintosh computer. This can cause problems with schools that are networked together. One teacher on a Macintosh, using TERRA, would not be able to simply send over the students electronic portfolio to another teacher on an IBM computer. However, there is a way around this limitation. The teacher on the Macintosh could customize TERRA. The teacher could add the capability to send portfolio information to a database that is cross-platform capable. The teacher could then send this information electronically to the IBM-using teacher.
TERRA was designed based on the running record assessment developed by Marie Clay in the late 1970s. TERRA is not a exact duplicate of her assessment instrument. TERRA uses many of the concepts of Clay's running records, but also adds things not required in Clay's original running record. An example of an added procedure is the need for teachers to initially type in selected text. The selected text must be typed. TERRA does not have optical character recognition capabilities. Therefore, text from selected literature cannot be scanned.

As with anything new, TERRA takes time to learn and practice. For teachers that are all ready short on time, this could be a major stumbling block to using TERRA. A related problem would be the teachers skills at manipulating the mouse. The primary input device for operating TERRA is the computer mouse. If teachers have limited experience using a mouse, they may have some difficulty using TERRA. This limitation can be overcome with practice.

TERRA also uses a series of palettes. A palette is small window that floats above the primary applications window. It can be moved around the computer screen by clicking on the drag bar at the top of the palette. To a teacher that is inexperienced using floating palettes, navigating these on the screen can pose a problem. This too can be overcome with training and practice.

Finally, in order to customize TERRA, the teacher has to be reasonably knowledgable about using HyperCard. There are may good books available on using HyperCard. Many are listed in the bibliography of this paper. Also, there are a number of good commercial bulletin board systems that have very good HyperCard conference sections. The Internet also has some user groups that one can subscribe to if one has Internet capabilities. These outlets have a
number of skilled users who frequent them and you can usually get an answer to your HyperCard questions with in a day or two of posting them to these user groups lists.

Future Recommendations

• Additions to TERRA could be created for writing assessment and tracking guided reading sessions with the student. These could be easily added to TERRA through the use of additional screen buttons or menu choices.

• A method of reporting student progress could be created using the existing TERRA student data information. The report could be scripted to gather only the information regarded as essential to the specific teacher.

• A network version of TERRA could be created to allow student data input from any computer on a school network to a school wide server. In the case a student transferred classrooms or transferred schools, this student information would be available via the computer and connecting to the school server.

• A system could be set up on the school server to allow parental access to TERRA information regarding their student. This would give the parents the ability to see the progress of their student throughout the school year.
**Appendix A**

**RUNNING RECORD OF TEXT READING**

<table>
<thead>
<tr>
<th>NAME:</th>
<th>DATE: 8-5-73</th>
</tr>
</thead>
<tbody>
<tr>
<td>TESTER:</td>
<td>TRACK/GRADE: 1.0</td>
</tr>
</tbody>
</table>

SAY: "THE NAME OF THIS BOOK IS LUCY'S SORE KNEE. THIS IS A STORY ABOUT LUCY WHO FELL AND HURTS HERSELF. LET'S READ TO FIND OUT WHAT LUCY AND THE CHILDREN DO."

Give the book to the child. Have the child look at all of the pictures. Do not discuss any of the pictures. Do not set any of the language.

As you turn back to the front of the book, SAY: "THIS IS A STORY ABOUT LUCY AND HER SORE KNEE. LET'S READ TO FIND OUT WHAT LUCY AND THE CHILDREN DO."

Have the child read the story.

<table>
<thead>
<tr>
<th>Page</th>
<th>TITLE: LUCY'S SORE KNEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>LUCY FELL DOWN IN THE PLAYGROUND.</td>
</tr>
<tr>
<td>3</td>
<td>LUCY SAID, &quot;I HAVE A SORE KNEE.&quot;</td>
</tr>
<tr>
<td>4</td>
<td>THE CHILDREN WENT TO THE TEACHER.</td>
</tr>
<tr>
<td>5</td>
<td>&quot;LUCY HAS A SORE KNEE.&quot;</td>
</tr>
<tr>
<td>6</td>
<td>THE TEACHER WENT TO THE PRINCIPAL.</td>
</tr>
<tr>
<td>7</td>
<td>&quot;LUCY HAS A SORE KNEE.&quot;</td>
</tr>
<tr>
<td>8</td>
<td>THE PRINCIPAL WENT TO THE NURSE.</td>
</tr>
<tr>
<td>9</td>
<td>&quot;LUCY HAS A SORE KNEE.&quot;</td>
</tr>
</tbody>
</table>

over
Appendix B

Error Rate

\[
\text{Running Records} \quad = \quad \frac{\text{Errors}}{}
\]

e.g., \[\frac{150}{15} = \text{Ratio 1:10}\]

Self-Correction Rate

\[
\frac{E + SC}{SC} = \frac{15 + 5}{5} = \text{Ratio 1:4}
\]

Accuracy Rate

\[
100 - \frac{E}{RW} \times \frac{100}{1}
\]

e.g., \[\frac{15}{150} \times \frac{100}{1} \quad \% \quad = 90\%\]
Appendix C

The following information is the TERRA User’s Manual. This information is also provided on-line in TERRA.

I. TERRA Overview

The Electronic Running Record Assessment (TERRA) program was created to assist in evaluating a reader. It was modeled after the standard forms of running records being used in schools today to assess student reading abilities. TERRA simplifies the process of administering a running record.

Features of TERRA:

• creates an electronic portfolio for every student
• automatically calculates the student’s accuracy rate level, self-correction rate, and error rate.
• individualize a portfolios for each student.
• scans and stores visual samples of student responses to reading.
• digitizes and stores audio recordings (student readings).
• stores digitized video recordings of student.
• facilitates quick access to student records.
• provide unlimited hard printouts of records
• provide a form of reading assessment that is convenient and extremely
portable.

Requirements:
Recommended that teacher has some background knowledge on using running records. Needs to run on a Macintosh computer with a hard drive and at least 4 MB of RAM.

II. Administering An Electronic Running Record

To administer and electronic running record using TERRA, the following is needed:

1. The student being assessed must have a current electronic portfolio inside TERRA. If the student does not have a portfolio, it is necessary to create one for the student before assessing with an electronic running record.

2. An electronic running record must be created at, or around, the student's reading level.

3. The book the selected text was taken from must be available to the student at the time of assessment. The student is instructed to read the book while the teacher assess the student's progress on the computer.

4. Access the running record in TERRA. Be sure to type the student's name as it appears on his electronic portfolio at the dialog prompt. Next, type in the level of the book.

5. When the running record screen appears, open the errors palette.
by clicking on the palette button.

Assessment Procedure:

As the student begins reading, there are two ways to assess the student:

1) In the text field, as the student reads words correctly, click one time on all words read correctly. When a student appears to have trouble with a particular word, double click on that word. This does not register an error, but prepares TERRA in case there is an error. If the student does make an error click the appropriate Errors Palette button to record the error, and continue monitoring the student's reading.

   When the assessment is complete click the Student Data button to proceed to the data screen. On this page everything will be automatically calculated. There will be a space for teacher comments, and a record of all words read correctly, and a list of words read incorrectly. Space is available in the list of erred words, to type what the student actually read.

   When finished, click the Save button in the lower right of the screen. A dialog window will ask you to locate the running record used in the assessment procedure. After locating this file in the
scrolling field, inside of the Running Records folder, the data will be saved to the student's portfolio. At this point TERRA will open up the Student List screen. To examine data in the student's portfolio, click the student's name in the scrolling list and use the appropriate arrow buttons to access data screen.

2) The second assessment technique is essentially the same as the first with one exception. To help those teachers that are not as skilled with the mouse, teachers may skip the procedure of clicking on all words read correctly. This will eliminate the record of words read correctly on the data screen.

   It will still be necessary to double click on the words that a student appears to have trouble with, or when a word is read incorrectly to prepare TERRA for recording an error. If the student commits an error, the teacher clicks the appropriate button on the Errors Palette to record the error.
III. Errors Palette (Assessment Marks palette)

The Errors Palette

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC</td>
<td>Self Correction</td>
</tr>
<tr>
<td>xW</td>
<td>Substituted Word</td>
</tr>
<tr>
<td>No Res.</td>
<td>Omitted Word</td>
</tr>
<tr>
<td>+ V</td>
<td>Inserted Word</td>
</tr>
<tr>
<td>Told</td>
<td>Told student word</td>
</tr>
<tr>
<td>A</td>
<td>Student Appealed</td>
</tr>
<tr>
<td>R</td>
<td>Student Repeated</td>
</tr>
</tbody>
</table>

Figure 21. Description of errors palette for using while administering a running record.

IV. Creating A Student Portfolio

1. Using the Navigation menu, in the menu bar, select Student List... in the scroll down menu.
2. Once you are at the Student List section of TERRA, click on the button that says New Student.
3. A dialog window will open asking you for the name of the new
student. Type in the name and click the "Okay" button.

4. A new portfolio is created for that student and the student's name is added to the list of students.

5. Click on the new student's name to access the portfolio and fill in the student data.

V. Creating A Running Record

To create an electronic running record:

1. Select text from book (selection should be no longer than one hundred words).

2. Start TERRA by double clicking on the TERRA Home card.

3. Click on button or use the Navigation menu in the menu bar and click or select Running Record Creator.

4. When dialog windows appear asking for student's name and level of book, click the Cancel button for both dialogs (you are creating a new running record so this information is not needed at this time).

5. Use the Text Selection menu in the menu bar and select Selection from the pull down menu to enter the selected text. A dialog will open where you may type in the text. When you have finished, click the Okay button. This will then enter the text into the running record.

6. IMPORTANT When you have finished, use the File menu in the
menu bar and select Save As... from the pull down menu. A dialog window will open asking you to type a name for the new instrument. Type the name of the book with a slash and the book's level (ie. "The Red Shoe / Level 3"). This new file may then be dragged into the folder of existing running records.

VI. Opening A Student Portfolio

There are two ways (A or B) to open a student portfolio:

A)

1. Select Student List from the Navigation menu's scroll down menu, or click on one of the many buttons throughout TERRA for moving to the Student List.

2. Click on any student name in the scrolling field on the right side of the Student List window. By clicking on a name, you are taken right to that student's portfolio.

B)

1. Select Open a portfolio... from the Navigation menu in the scroll down menu. A dialog will open asking you, what stack do you want to open. You will need to find the folder called Student Portfolios. Open this folder and click on the student's name. Once the student is selected, click on the Open button.
VII. Navigating Through TERRA

There are a number of ways to Navigate through TERRA.

Here's a brief description of the preferred modes:

- TERRA windows have many buttons. Many of the buttons have descriptions as to where they will take you when they are clicked upon.

- Buttons located in the lower corners of the windows containing arrow icons, will move you through a section in a linear fashion, from one card to the next.

- The Help Home window and the Student List window contain scrolling fields with a list of items. The items in these fields can be clicked on with the mouse to jump to those areas of TERRA.

- In the upper right corner of this screen, a curved arrow is used to take the user back to the Help Home card. Curved arrows will take you back to a section's home card.

VIII. Scanning Student Work into a Portfolio

The scanner is used in TERRA in two ways:

1. TERRA has the ability to open a Scanning program called HyperScan (Apple Computers, 1990). HyperScan is a program Apple Computers developed to work with their OneScanners. In TERRA, by selecting
the Navigation menu and selecting Scanner... from the scroll down menu HyperScan opens up on top of TERRA. From this point you can use HyperScan to scan student work samples into the computer. HyperScan will then allow you to paste these scans directly into a student's portfolio. This is achieved by using the dialogs that HyperScan gives you and eventually selecting the target student portfolio.

2. You may also scan student work with a scanner and save these scans as Pict files. A Pict file is a certain type of graphic file that TERRA can import into a student portfolio. More information about this technique is available in the help section: Importing a student picture sample...

IX. Importing a Student Picture Sample

- Student work samples can be included into a student portfolio. To include a student sample you must:

1. The student sample must be scanned on a computer scanner prior to being imported into a student portfolio. The scan must be saved as a Pict file. A Pict file is a certain type of graphics file that TERRA uses when importing.

(Note: If student created a work sample in a paint program, this
saved work sample could be directly imported into a portfolio following these same procedures.)

2. Once the sample has been scanned and saved as a Pict file, the file should be placed in a folder inside of the TERRA folder.

3. Use the Navigation menu, in the menu bar, and select Import picture... from the scroll down menu.

4. A dialog window opens with a scrolling field. Select the student portfolio and click the Open button.

5. A second dialog window opens with a scrolling field, select the folder that contains the student work sample and select the sample by clicking on it and clicking the Open button.

6. At this point, TERRA will open at the target student's portfolio. A button is created, and a dialog window opens asking you to name the button (it's a good idea to give it a short name and the abbreviated date ie. "Picture 1/2/95").

7. If you are using the HyperCard Player, or the TERRA Home card player, hold down the Option key on the keyboard and click drag the button to the gray rectangle on the left side to the student portfolio. Release the Option key on the keyboard and release the mouse button. (If you are using a full version of HyperCard, simply drag the button to its location and select the browse tool from the Tools menu in the menu bar).
8. To show the sample, click the new button.

X. Recording A Student Reading

• Recording a student reading is possible while using TERRA. To record a student reading:

1. Use the Navigation menu, in the menu bar, and select Record ... from the scroll down menu.

2. A dialog window asks you to name the recording.

3. A second dialog window opens with a scrolling field. Select the student portfolio and click the Open button.

4. A third dialog opens that resembles a tape recorder. When student is ready, click the record button and the computer begins recording student. When student has finished reading, or speaking, click the stop button.

5. At this point, TERRA will open at the target student's portfolio. A button is created, and a dialog window opens asking you to name the button (it's a good idea to give it a short name and the abbreviated date ie. "Student Response 1/2/95").

6. If you are using the HyperCard Player, or the TERRA Home card player, hold down the Option key on the keyboard and click drag the button to the gray rectangle on the left side to the student portfolio. Release the Option key on the keyboard and release the mouse button.
(If you are using a full version of HyperCard, simply drag the button to its location and select the browse tool from the Tools menu in the menu bar).

7. To hear recording, click the new button.

**IMPORTANT**

TERRA's ability to record a student depends on the amount of available RAM in your computer. The more RAM available, the longer your recording time. Consult your Macintosh users guide for more information regarding computer RAM.

**XI. Importing Video Into Student Portfolio**

- TERRA has the ability to import and save digitized video to a student portfolio. The video must be digitized using other software not included with TERRA. Once the video has been digitized and saved, the following procedure will allow you to import the video to a student's portfolio:

1. Use the **Navigation menu**, in the menu bar, and select **Import video...** from the scroll down menu.

2. A dialog window asks you for the name of the digitized video. **(IMPORTANT)** The name of your video must have no spaces. If it does you will need to rename the video file or eliminate the spaces
3. A second dialog window opens with a scrolling field. Select the student portfolio and click the Open button.

4. At this point, TERRA will open at the target student's portfolio. A button is created, and a dialog window opens asking you to name the button (it is a good idea to give it a short name and the abbreviated date, i.e. "Movie 1/2/95").

5. If you are using the HyperCard Player, or the TERRA Home card player, hold down the Option key on the keyboard and click drag the button to the gray rectangle on the left side to the student portfolio. Release the Option key on the keyboard and release the mouse button. (If you are using a full version of HyperCard, simply drag the button to its location and select the browse tool from the Tools menu in the menu bar).

6. To play the video, click the new button.

7. It is a good idea to keep all the digitized video clips in a folder inside of TERRA's folder. This way TERRA will have no difficulty locating the video files when called to play them.
27 February 1995

John Patten  
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255 W. 13th Street  
San Bernardino, CA 92405

Dear Mr. Patten:

Thank you for your recent permissions request. We are pleased to grant you permission to use the Running Record assessment tool in your Masters project as stipulated in your application letter.

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Please note that if you decide to commercially publish your project, you must reapply for permission to use this material. This grant does not include student material or previously copyrighted material reprinted within the above work(s) from other sources.

Sincerely,

[Signature]

Roberta A. Lew  
Permissions and Contracts Coordinator
REFERENCES


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