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Teaching language arts in third grade with HyperStudio, an interactive computer program

Mark Douglas Barrett

TEACHING LANGUAGE ARTS IN THIRD GRADE WITH HYPERSTUDIO, AN INTERACTIVE COMPUTER PROGRAM

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

Interdisciplinary Studies

by

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APPROVED BY:

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CHAPTER 1

INTRODUCTION

The teaching of the language arts has become a source of frustration for many dedicated educators. Comprehension of literature at any level above the recall level is difficult for many students. Desire to read seems to have declined in the age of visual excitement. Textbooks in the content areas are hopelessly out-of-date or have been made unappealing and less demanding in order to avoid protest from various special-interest groups.

In addition to the demands of teaching the language arts curriculum, teachers have had to try to reach students with an increasing number of social dysfunctions that effect their performance in school. In an age when cooperative work skills are becoming increasingly valued, there are many students whose social skills and self-esteem levels are so low that they find it difficult to work in a group situation.

One solution that addresses these problem areas is the use of cooperative groups in a holistic teaching program. Using cooperative teams can help meet cognitive and affective needs: motivation increases, individual differences are accepted and dealt with in order to accomplish a task. By

having ideas shared and valued by peers, self-esteem is improved.

Students who are so motivated to do well need avenues for expressing their ideas and sources of information to support their ideas and point themselves in new directions. High interest avenues that can link information and creative arts to literature have been shown to be effective in stimulating interest in the language arts and the content areas, according to McCarthy (1989).

A tremendously powerful avenue to foster student achievement has developed in the past six years. This avenue is hypermedia, a multi-sensory technology that uses the computer and peripheral devices such as the laserdisc player, video camera, CD-ROM, and voice digitizer. It allows students to link their existing knowledge to the new experiences found in literature.

The hypermedia program used in this project was HyperStudio. HyperStudio was developed by Roger Wagner Publishing, Inc., for the Apple IIGS computer (1 meg minimum memory). It allowed and encouraged the teacher and student to become collaborators in learning. It gave the student the opportunity to access information through several modes and then form links with prior knowledge in ways that made sense to that learner. The program offered an ideal way for students to achieve success in a cooperative venture by opening many opportunities for participation.

The project undertaken used the HyperStudio program as a tool for

improving student achievement in comprehension and writing, both in literature and content area reading. HyperStudio, and a large-screen monitor, was used as a delivery tool to instruct an entire class in a pre-reading activity based upon a story in the Houghton Mifflin Literary Reader. It was also used in two collaborative group lessons. The first group lesson was used in conjuction with a selection from the Houghton Mifflin Literary Reader. The second group lesson was a content area research project in conjunction with the Solar System unit in the third grade science book, HBJ Science by Harcourt Brace Jovanovich, Inc.

CHAPTER 2

REVIEW OF THE LITERATURE

Educators' main goals have been for students actively to acquire new information, reorganize their cognitive structures by linking that information to past experience, form generalizations, and be able to apply those generalizations to many life and learning experiences. The more links between old and new, the stronger the learning will be, according to Jonassen (1988). Morris Bigge (1982) writes that cognitive-field theorists believe that the transfer of learning to new areas will be best when students are able to make their own discoveries and are given opportunities for drawing links between learning and life situations. This search for meaning develops tensions in the learner until the problem is solved satisfactorily. Students emerge with an increased knowledge base, more and better strategies for problem solving, and tested insights when they are active in their own learning.

Howie (1989) relates the problem solving approach to the language arts. She states that reluctant readers may force themselves to read and write if they are faced with a problem of interest to them that can only be solved by reading and writing. Once a problem is solved, students may then integrate the technique used into their repertoire of problem solving strategies.

The teacher must then find a way to raise questions with the material

presented. If student curiosity is not stimulated there will be no reason to reorganize the knowledge structure in a way valuable to the student. The student may "learn" the information for the sake of a class grade, but it will be of little value in life situations (Bigge 1982).

How do we raise curiosity and thus stimulate learning through problem solving? Evidence shows that students become more involved in the learning process when they have input into the decision making. Students become more involved (Hansen 1987), show increased self-confidence (Howie 1989), and have an improved attitude (Weller 1988) when they feel they have control over some aspect of the learning process.

The teacher must develop ways to involve the student in learning and share decision-making with the student. Tools must be used for acquiring and structuring knowledge beneficial to the student (Jonassen 1988).

Hypermedia, which is the joining of a computer with peripheral devices to use text, graphics, and sound together in one presentation, allows a large degree of freedom for the student to search, in a non-linear way, for meaningful concepts and information, either within a teacher-designed structure or as self-directed project. Thus the use of hypermedia involves the student in the lesson. Marchionini lauds hypermedia because

> it offers new ways of learning how to learn---opportunities to diverge from the linear path: to juxtapose text, animation, and sound; to turn the technology back on itself as an aid in reviewing, studying, and producing new interpretations of the content. Such a fluid environment requires learners to constantly make decisions and evaluate progress, thus forcing

> students to apply higher order thinking skills (Marchionini, 1988, p. 9)

Marchionini (1988) sees hypermedia as a way to make a student an active, independent learner. Learners who make decisions are active learners. Writing has always been seen as an active process, but when readers read with a purpose, reading also becomes an active process (Howie 1989). When they choose their own books and read them successfully, it gives them the desire to read more books. They will try repeatedly to read when they feel that they are responsible for their own efforts (Hansen 1987).

Often students see themselves as successful when they earn the respect and admiration of a real audience for their reading and writing. The audience that is most critical to the student is other students. One lesson described by the members of the Center for Technology in Education at Bank Street College (1990) led to increased care in creating a cooperative hypermedia presentation because the group wanted to make the program visually exciting to the audience. The members were also much more careful with grammar and historical fact. They had to learn to summarize information as they presented their project to the class with a hypermedia "stack."

Considering students or other audiences, the learner must learn to adapt his work to different outlooks, language levels, and needs. Therefore, style may change, vocabulary will vary, and tone will differ.

> By exploring the range of audiences, identifying the characteristics of each, and attempting to write appropriately, students fine-tune their writing skills and develop greater control (Howie, 1989, p.21).

Cooperative grouping is the best learning environment for the use of hypermedia. It allows students a chance to interact with other students in the learning process. With hypermedia, as well as with most problem solving approaches, the group whole is better than its individual parts. Often, unwilling learners may assimilate the values of the more academically inclined students. This leads to improved achievement for all the students. Adams and Hamm (1990) found that peer groupings encouraged sharing information, ideas, and strategies. The students with social or learning problems were given assistance in the group that even extended to activities outside the classroom. Johnson, Johnson, and Stanne (1986) found small groups of students using a computer have improved rates of learning over competitive, and individualistic learning situations. Students in cooperative situations, according to Stevens et al. (1987), perform better on main idea skill strategies than individual learners. They also found improvement in writing skills, critical thinking skills, and oral reading skills, especially with mainstreamed students.

Group use of computers in schools, in addition to providing more frequent access to students, also improves achievement in social skills, on-task time, efficiency, mastery of factual material, and ability to answer

problem solving questions (Watson 1991). Shlechter (1990) found that learning is also more resistant to forgetting when lessons are worked with cooperatively on the computer. Peer interaction on the task occurs even when that is not presented explicitly as a desirable outcome to the learners.

Mc Donald (1989), among others, suggests the use of heterogeneous computer groupings. Mixed academic, not computer skill, groups will help with peer acceptance. Students will need to listen to each other, reach consensus on roles and input, and agree on the final output. Peer tutoring will occur frequently in this milieu (Adams and Hamm 1990).

Marchionini describes other potentials of hypermedia for education. One is the different forms of media that can be connected to the computer and used by the learners. Video images can be imported or accessed from laser disc players and CD-ROM drives. Sound also may come from the above or from a microphone in the hands of the user, or sound bites from numerous computer disk sources. Anderson-Inman et al. (1990) point to research that associates poor readers with reading more difficult and more interesting books when they can use speech feedback from outside sources. The ability of laser discs to have two different language tracks enables ESL students to gain knowledge equally with primary language users.

Graphics, either imported from other sources, or created by the user add a visual impact that appeals to students who are not text-based learners (Corcoran 1989). Poor early readers were found by Calvert et al. (1990) to

benefit when animated actions were presented along with vocabulary words. This finding supports the importance of multi-sensory delivery of information in order to reach all students.

Once the information is assembled, it may be woven together by linking the media through the use of connectors called buttons. Learners may enter and exit the material at any point to satisfy their curiosity (McCarthy 1989). Linking of ideas as done with hypermedia is impossible to do with traditional text and even older computer programs (Rickleman and Henk 1990).

This ability to link knowledge with student experience should lead education to what Tom Snyder calls the "Land of Aha's." This is where

> the [teacher's] teachings, stored without reference among obligatory piles of facts, begin to come together in sensible form and where things learned on the playground get connected to other things learned in the classroom. It is a place rarely visited within the bounds of school (Snyder, 1986, p.66).

There are some possible problems with hypermedia. One problem is that confusion may ensue when teachers and students, unfamiliar with the non-linear aspects of hypermedia, try to create traditional output (Parsaye et al. 1989 and Marchionini 1988). Another problem relates to a new vocabulary of both words and symbols for all to learn. New strategies for learning will be required to make the most of the new technologies. Educators and students will find it necessary to operate several different electronic components, at least until the computer and its peripherals are packaged in a more user-

friendly way. We may be overwhelmed by the number of decisions needed just to build a hyperlesson. This may distract cognitive resources from lesson content and the relationships that may be gained (Marchionini 1988).

Well-meaning teachers may insert so many ideas of their own into a hypermedia program that students revert to passive non-learners teachers are trying to avoid. Teachers must also realize that the hypermedia lesson is still only one tool at their disposal. Other skills must still be taught and reinforced. Teachers must remind themselves and the learners that the information gained through multimedia research needs to be processed and evaluated to form an overall, comprehensive picture (McCarthy 1989).

Hypermedia, and thus the subject of this project, HyperStudio, is just in its infancy as a teaching/learning tool. Cognitive theory supports its goals. The students who have used it in my class enjoy it. However, little unbiased research has been completed that would point to the best way of incorporating it into the curriculum. Many independently created stacks are being shared or sold to hyper-consumers without empirical evidence that it is equal to or better than traditional, less expensive methods of promoting learning (Jonassen 1988).

CHAPTER 3

OBJECTIVES AND PROJECT DESIGN

Before describing the programs used in this Masters Project it would be helpful to define some of the technological terms used in hypermedia in general and HyperStudio specifically. HyperStudio is a relatively easy program to learn and use, but without some prior explanation the following lesson ideas will make little sense to non-users of this facet of technology.

hypermedia: a program which allows the user to branch from one topic to another in a stack. This may be in a linear or non-linear manner. It may integrate information from laser videodiscs, CD-ROM drives, camcorders, scanners, VCR's, and other computer disks which have text, databases, clip art, and digitized sound clips. Users may actively choose their path through the program.

card: the information, graphics, and objects that appear together on the monitor screen. Imagine the information you might put on an index card to organize a report.

stack: an organized group of cards designed to organize, to explain, or analyze a concept. A stack may have a few cards or many. The user may edit the stack in many ways.

clip art: pre-designed artwork that is used to create visual clues and excitement on a card. Clip art helps the users who doubt their artistic abilities.

sound clips: pre-recorded sounds of up to ten seconds that are used to help create an aural dimension to a card.

digitized sound: recordings from a microphone or tape recorder that are digitized for use and saving on a computer disk.

buttons: areas on the card that activate movement to another card, start an animation, play a sound or video image, or accept input from the user.

clicking: using the mouse to activate a button or execute some other command.

objects: items placed on a card. There are text fields for written work, buttons, and graphic areas for art work.

paint program: a drawing tool that allows the user to add shapes, designs, colors (depending on the computer used), and modify clip art.

home card: the table of contents for a hypermedia program. It is the first card in the program stack.

authoring program: a computer program which allows users to add various objects to a blank screen in order to create a lesson or display which suits their own individual needs.

The first lesson is a whole class lesson that requires a large screen monitor, a laser disc player, and the video disc "Earth Sciences" by Optical Data Corporation for implementation. The particular stack used here was developed for use with the story "An Oak Tree Dies and a Journey Begins" in the Houghton Mifflin Literary Reader for third grade. The concept could be adapted to any introductory reading or writing lesson. This lesson would also be suitable for a small group if a monitor were not available.

The goal of this lesson is to stimulate connecting words and ideas in a pre-reading or pre-writing brainstorming activity. Brainstorming is not a new idea, nor is it solely used with computers. HyperStudio will make brainstorming a far more vital activity to promote understanding of a concept and create sensory images to enhance writing and reading.

This lesson begins with only four cards in the stack; it will be added to as students begin to create their webs or maps. The first card (Appendix A) has the word "storm" printed in large, red letters in the center of the screen. The concept of "storm" is central to the story so it is important that the class discusses it before reading the selection. This is especially true in Southern California, where stormy weather is rarely a problem. The teacher asks what words the children use to describe storms. These words would be added to the card and lines would be drawn to link words that go together (Appendix A). Clip art graphics chosen by the students would be placed near appropriate words (Appendix A).

The class would then go to the next card by clicking on the button "next card". Card 2 (Appendix A) contains different types of storms. Each storm word has two buttons placed next to it. The first button pronounces the word and gives the definition when it is activated. The second button is linked to the laser disc player. When this is activated it plays a segment from the Earth Sciences laser disc showing what that type of storm looks like, how it behaves, and the destruction it causes.

Card 3 (Appendix A) asks for adjectives that describe storms. These words may be repetitions from Card 1 or they may be new words stimulated by the video presentations on Card 2.

Card 4 (Appendix A) has a scrolling text field that takes student input on any personal experiences of violent storms. Several volunteers may be

done during whole group time and then others may add their experiences when time permits.

Any of the words chosen for Card 1 or Card 3 may have a button with sound added by the student. For example, if the word "windy" were used, the student who volunteered the word could add a wind sound to the card.

This activity will generate many more contributions from the class than working on the chalkboard. The easy and quick access to visual prompts from the laser disc is bound to excite the students and inspire all of them to participate with either the words, the sounds, or the graphics.

Any time a card is filled, a new card can be made by using the "new card" option in the move menu. It would be wise to have duplicate cards made prior to the lesson so that the brainstorming would not be interrupted by stopping to make new card. Entire cards can be copied by using the cut and paste options in the edit menu.

The second lesson is also used with the third grade literature series. A laser disc player is used, but it is not required for student use. The framework is one that could be adapted to almost any grade level for group work. The goals of the HyperStudio stack were to link the story "Digging for Dinosaurs" by Aliki to other facts about dinosaurs and the author, develop vocabulary understanding, and allow students to express opinions about the dinosaur and the extinction of animals. There is an opportunity for users to draw dinosaur scenes using the paint program.

The group would open to the home card (Appendix B, card 1) which has the title and author. They would then go to the menu card (Appendix B, card, card 2) by using the "click here to start" button. They would explore the buttons on the menu card in any order they wished and then follow the directions on the following cards (Appendix B, cards 3-6). It would always be possible to return to the menu card by means of the return button (pointing finger graphic). The group would report back to the class after it had completed the exercises attached to all the cards and created any additional cards they deemed important to the understanding of the subject. In working with this stack they might add additional laser disc segments, they might create a map of dinosaur habitats, an artist in the group could make an animation of a dinosaur walking through a forest and eating plants (including sound effects), or the group could start a dinosaur dictionary. When students are in charge of their own learning, the possibilities are endless.

The last lesson is a content area lesson in which student groups do research in the library and then add to a teacher-created template of the Solar System. Each group is assigned a planet, plus they add to a series of cards that look for student input on a variety of issues relating to space exploration.

The home card (Appendix C, card 1) has a map with an animated flying saucer that spins around the solar system when the "click here to start" button is activated. The menu card (Appendix C, card 2) allows students to

pick their work area for the period, either their planet (example on Appendix C, card 3) or one of the thought cards (example on Appendix C, card 4). Students navigate the stack by using the "last card" button which moves them back one card, the "next card" button which moves them forward one card, or the "home" button which sends them to the home card.

As with any HyperStudio stack, these stacks can be navigated in different ways by adding buttons to direct the user to new areas or in different directions not planned for in the original template. Unlike linear programs which are designed to execute specific plans by the authors in the software companies, the HyperStudio program allows for constant revision. It is not a static piece which has an end. The same Solar System stack may be used year after year, with each succeeding class adding and revising to suit their own search for knowledge and making use of the most recent data in the field.

How should the individual teacher use this exciting tool? The teacher should first of all keep in mind what the educational goals of the lesson are. The individual needs of each student and the group dynamics should be carefully considered. The teacher should remember that the first use of HyperStudio will be an unnerving experience for many students who are not used to making decisions on their own learning. They may not have concrete ideas on how to go about teaching themselves and deciding what is valuable and what is not. They should use sound teaching practices in introducing each step of the program's operation and carefully explain your

expectations for their work.

Explain to the students that the program can be difficult and that there are many commands to learn. Reassure them that they are not expected to become experts in using the program and they will have plenty of practice and guidance from the teacher. Promote independent thinking but don't encourage disaster by allowing students to become disoriented in this new technology.

CHAPTER 4

CONCLUSION

The HyperStudio stacks used for this project provided a high degree of enthusiasm for language arts in my third grade classroom. When we read the story "An Oak Tree Dies and a Journey Begins," the students generated far more ideas than they had with other stories where they hadn't used the program. Students, especially those with concentration problems, spent more time on the concepts and developed them more fully when they were projected continually on the monitor. They were also able to return to a concept, and add to their understanding of it, after they had proceeded through other segments of the lesson.

In order to add graphic images to the stack they had to discriminate between the types of storms they knew. This experience led to a great amount of discussion and questions regarding storms among the groups, and research at the school library to satisfy the group curiosity. The on-going nature of this pre-reading activity provided a high level of interest that carried throughout the reading of the selection.

The Aliki stack, "Digging Up Dinosaurs", provided another avenue for stimulation. Unlike the previous stack, I used this during the entire lesson week. The groups worked most enthusiastically on writing about extinction, and their likes and dislikes about dinosaurs. Drawing dinosaurs was also

popular. Since the group had to do the drawing, there were many revisions in the animals' looks before there was agreement.

The class was extremely interested by the highly realistic laser disc animations. The groups played the two segments over and over again. This interest led to several discussions about the environment of the dinosaurs.

The students enjoyed writing their opinions about space travel and other life forms in the Solar System stack. After the class reviewed several pieces on the monitor, it had lively discussions about the issues involved in space exploration.

The most difficult part of the stack, the one that disappointed many students, was writing about the individual planets. The groups did research on the planets in the classroom and the library. The encyclopedia entries used many technical terms that were confusing to the students. When my students do this stack in the future I will have easier material on hand.

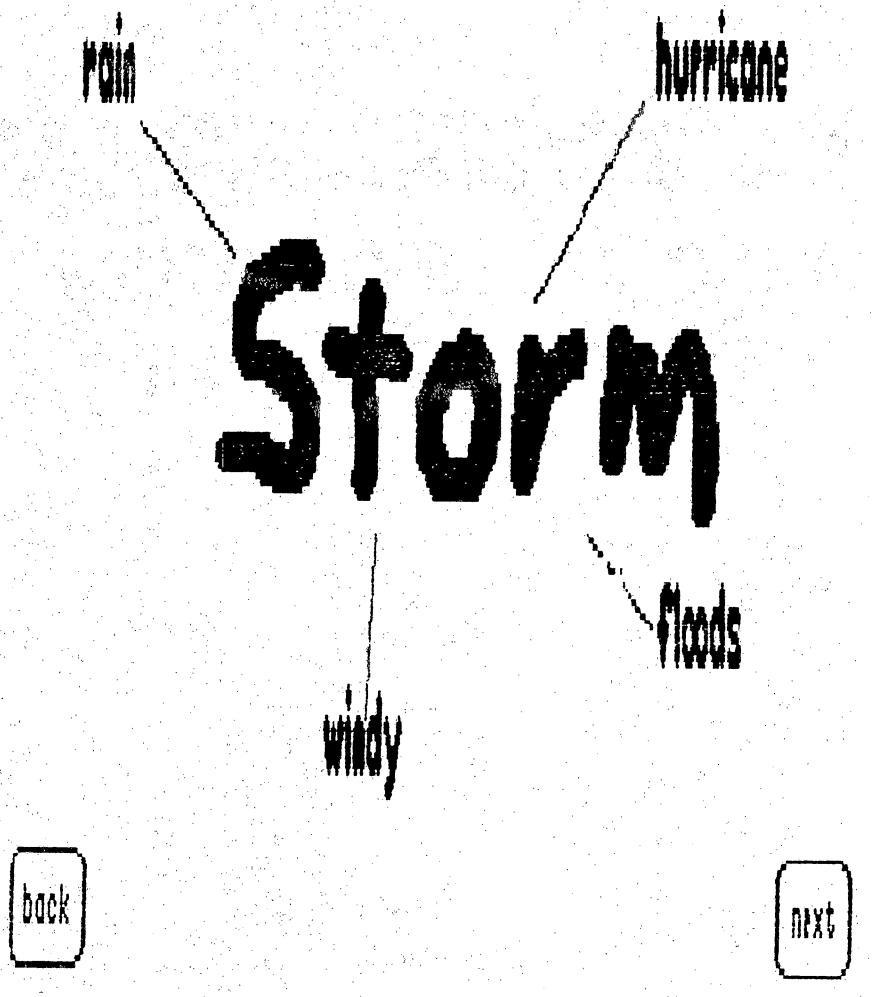
With all three stacks I noted a higher degree of involvement with most students. There appeared to be satisfaction with the ability to choose from different topics on the menu. Group interaction was usually positive, especially after the groups had worked together for awhile. Peer assistance was evident in most of the writing.

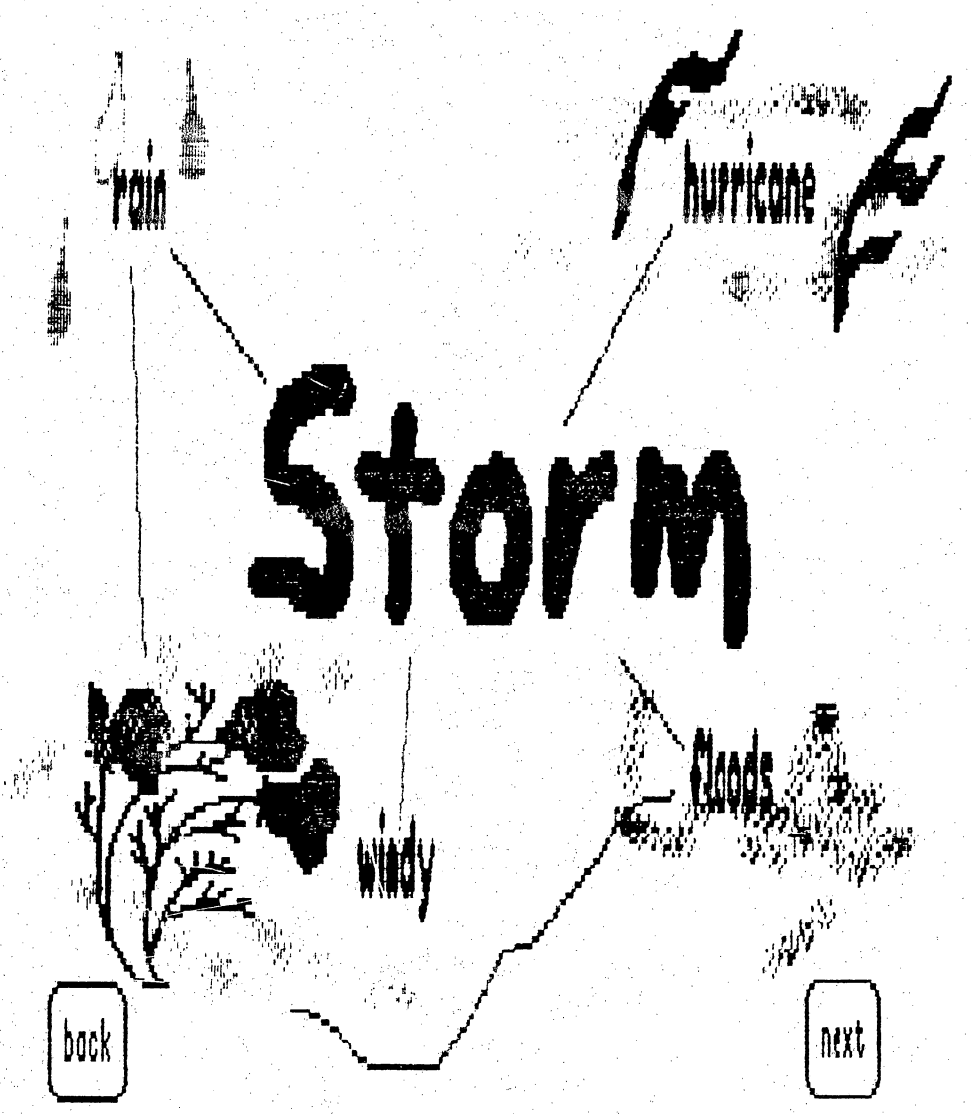
I do not have stacks created for all the stories in the literature book. When we start a new story that does not include the use of HyperStudio the children ask why we can't do all our work with the computer.

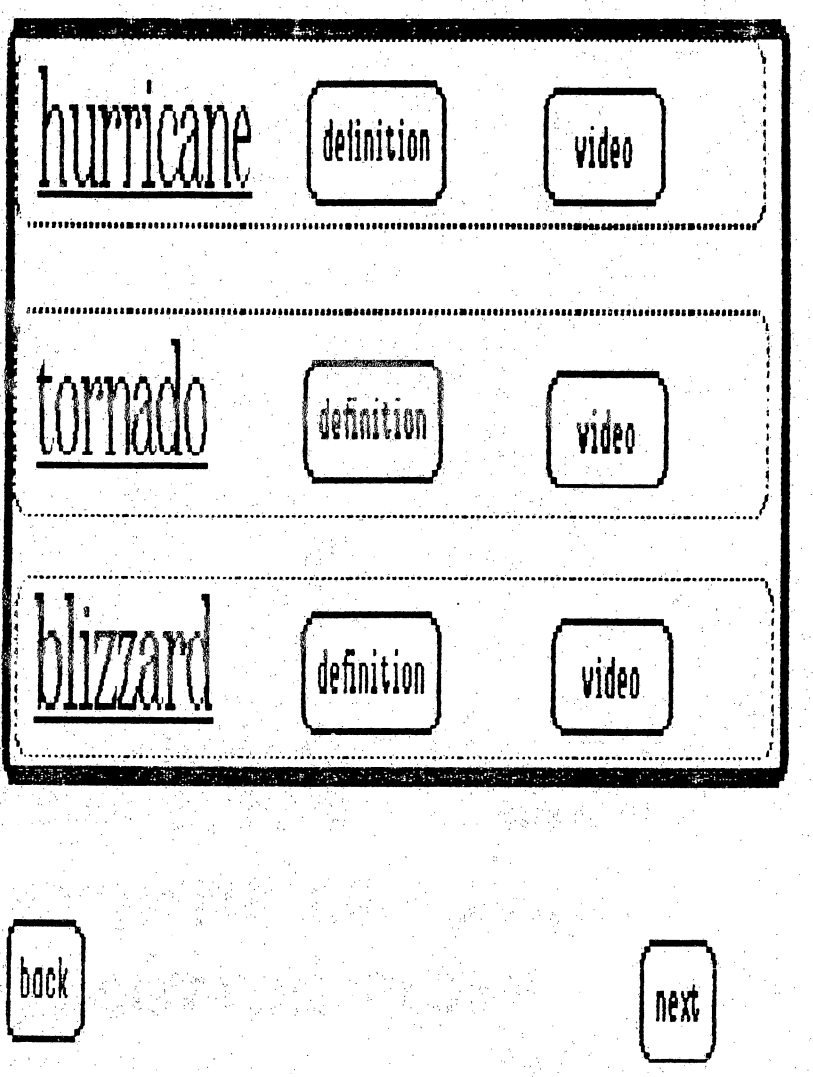
This project was not designed to measure statistical improvement in language art skills through the use of technology. It was successful in involving more students in the reading/writing process. It brought more understanding of literature to students through sharing ideas and giving appropriate outlets for displaying their multi-faceted knowledge.

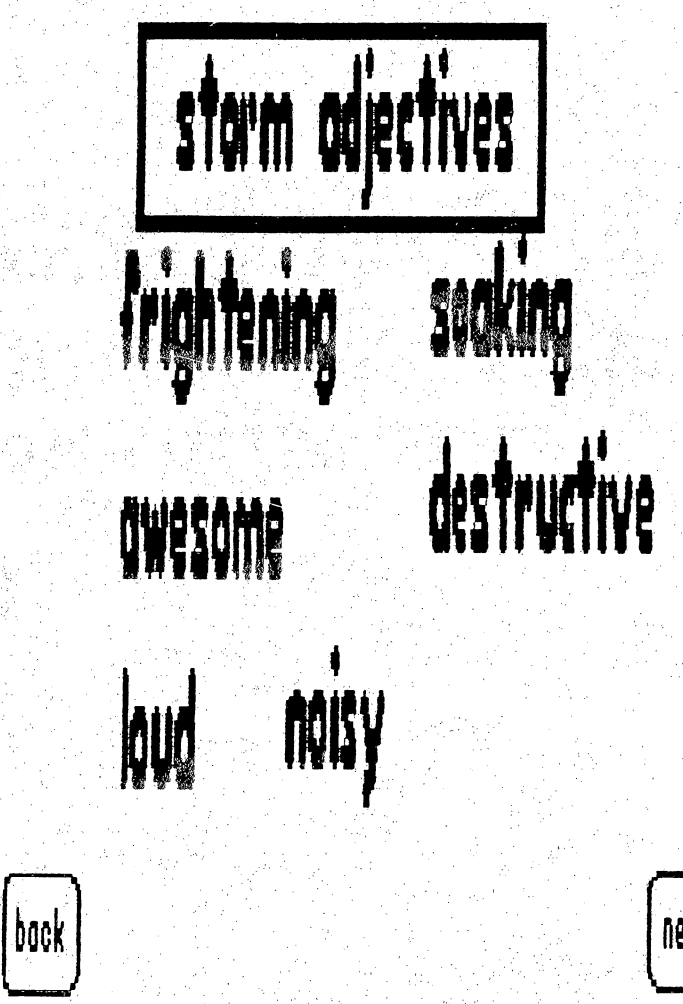
Appendix A:
HyperStudio stack
"An Oak Tree Dies"

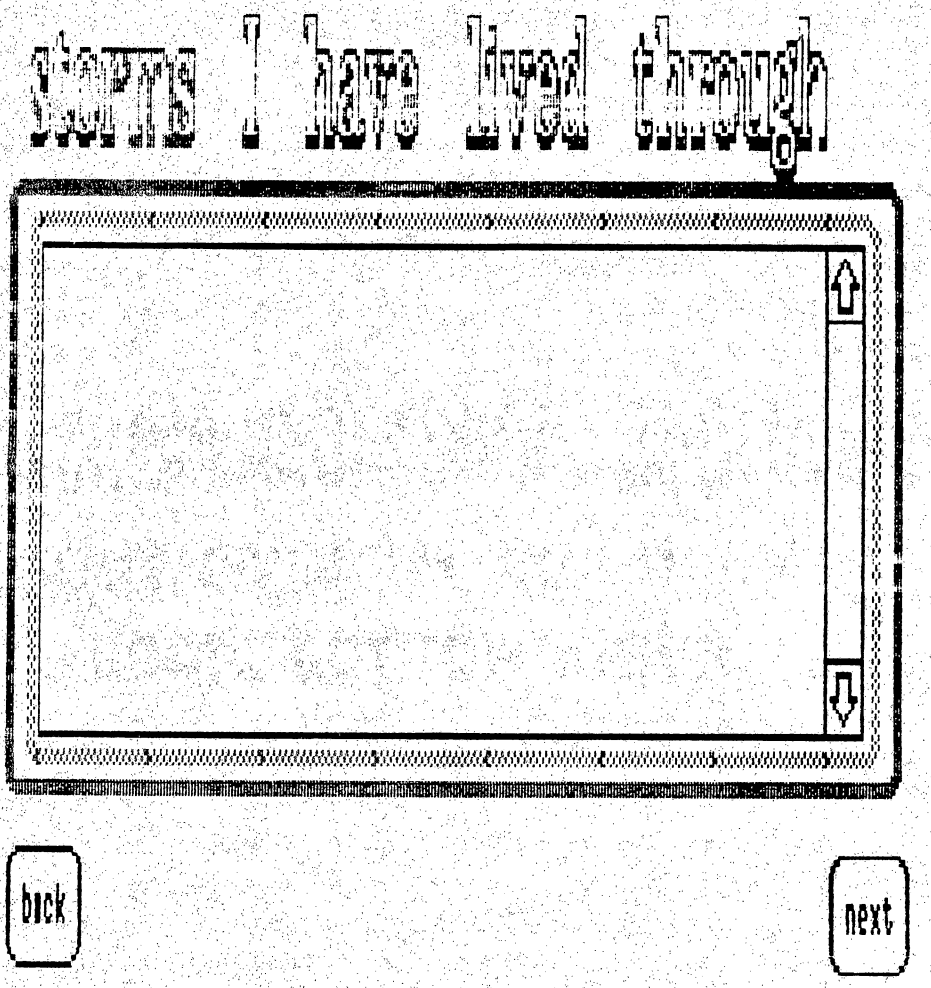
Storm


rain
hurricane
Storm
floods
windy
back
next

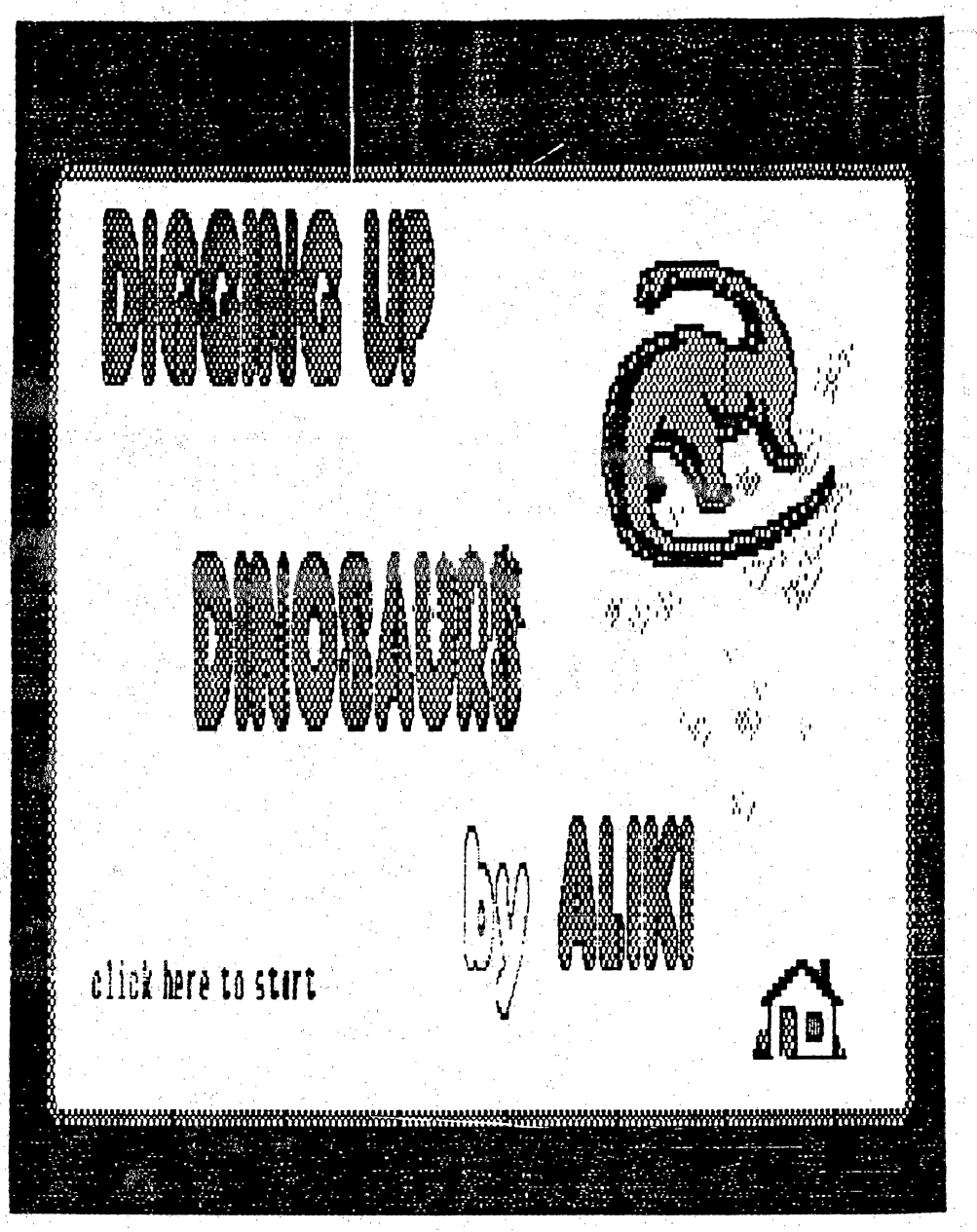

rain
hurricane
Storm
windy
clouds
back
next

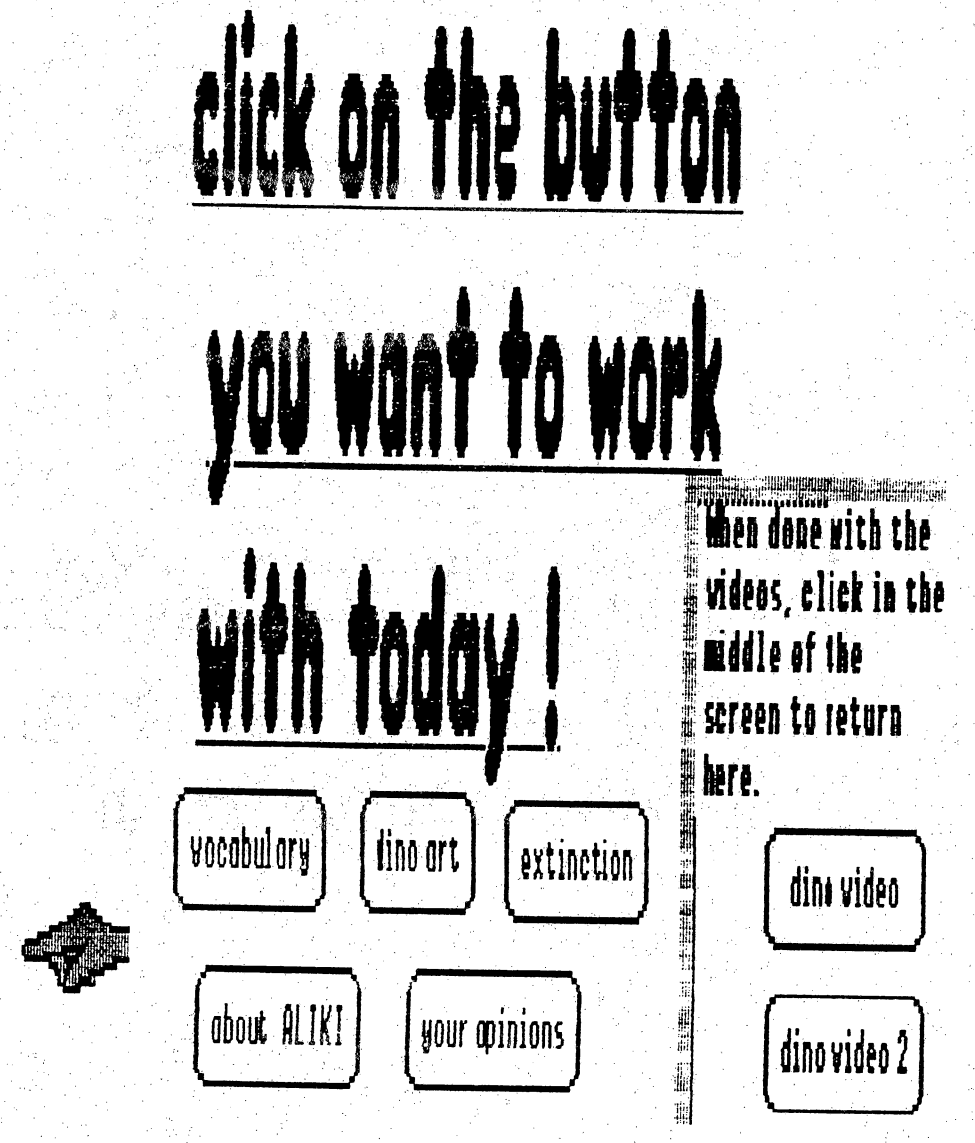

hurricane
definition
video
tornado
definition
video
blizzard
definition
video
back
next

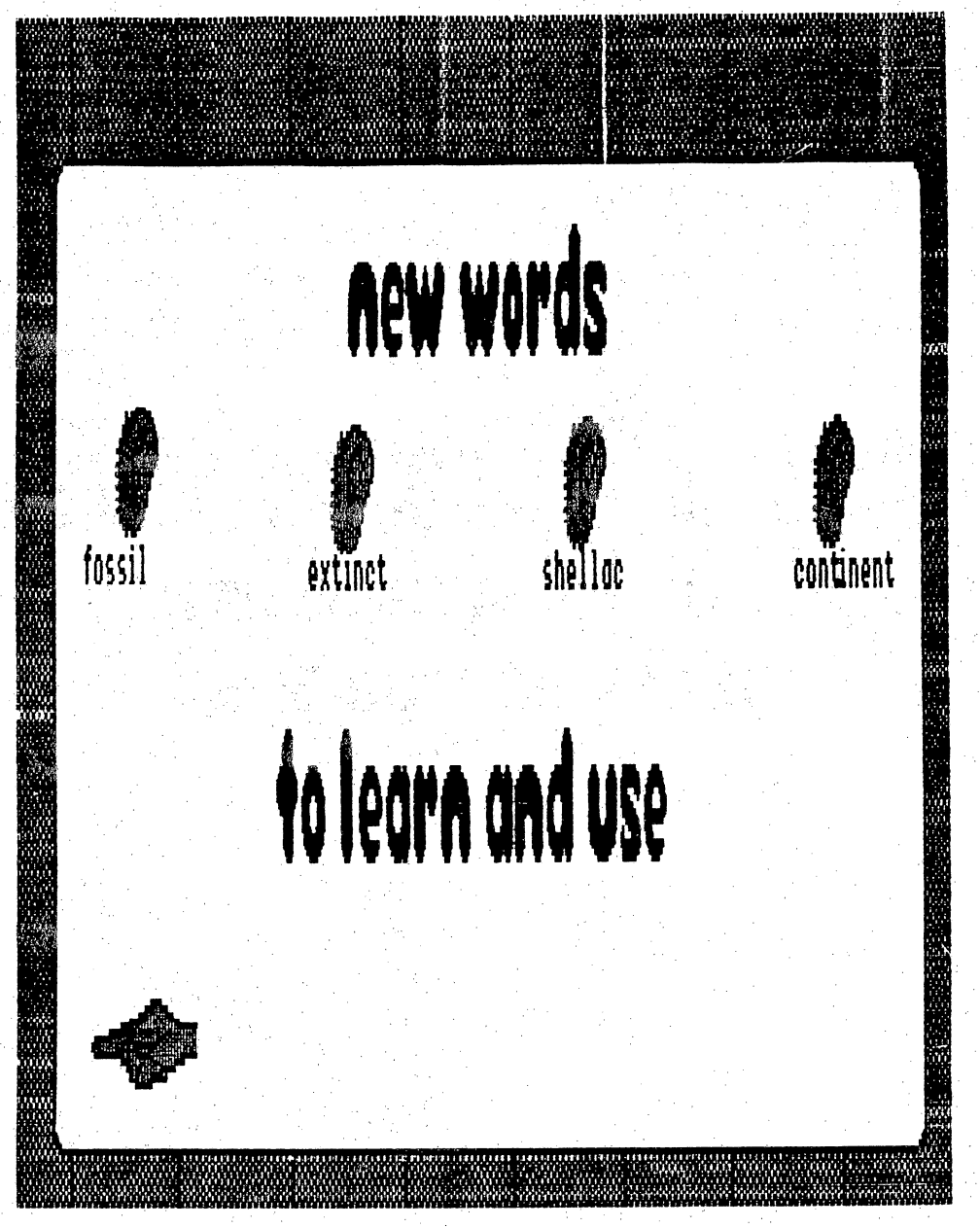

storm adjectives
frightening
soaking
awesome
destructive
loud
noisy
back
next

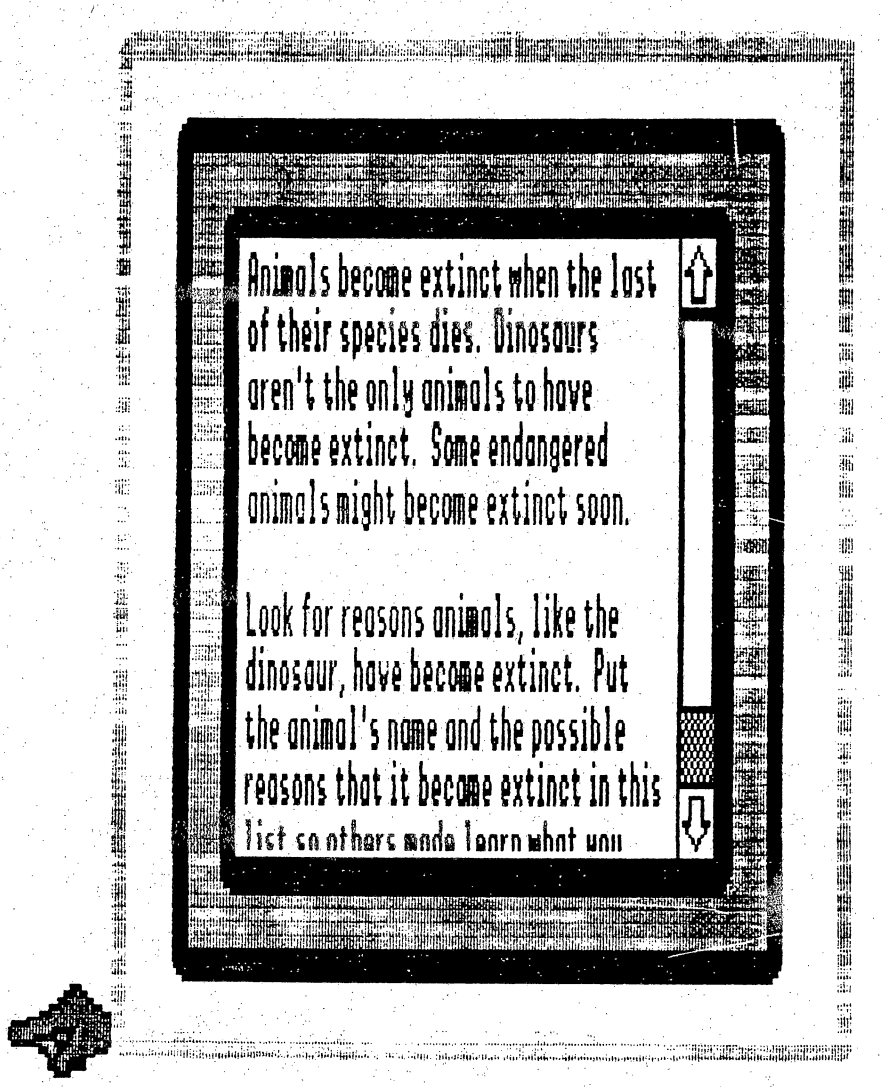

Steps I have Used through
back
next

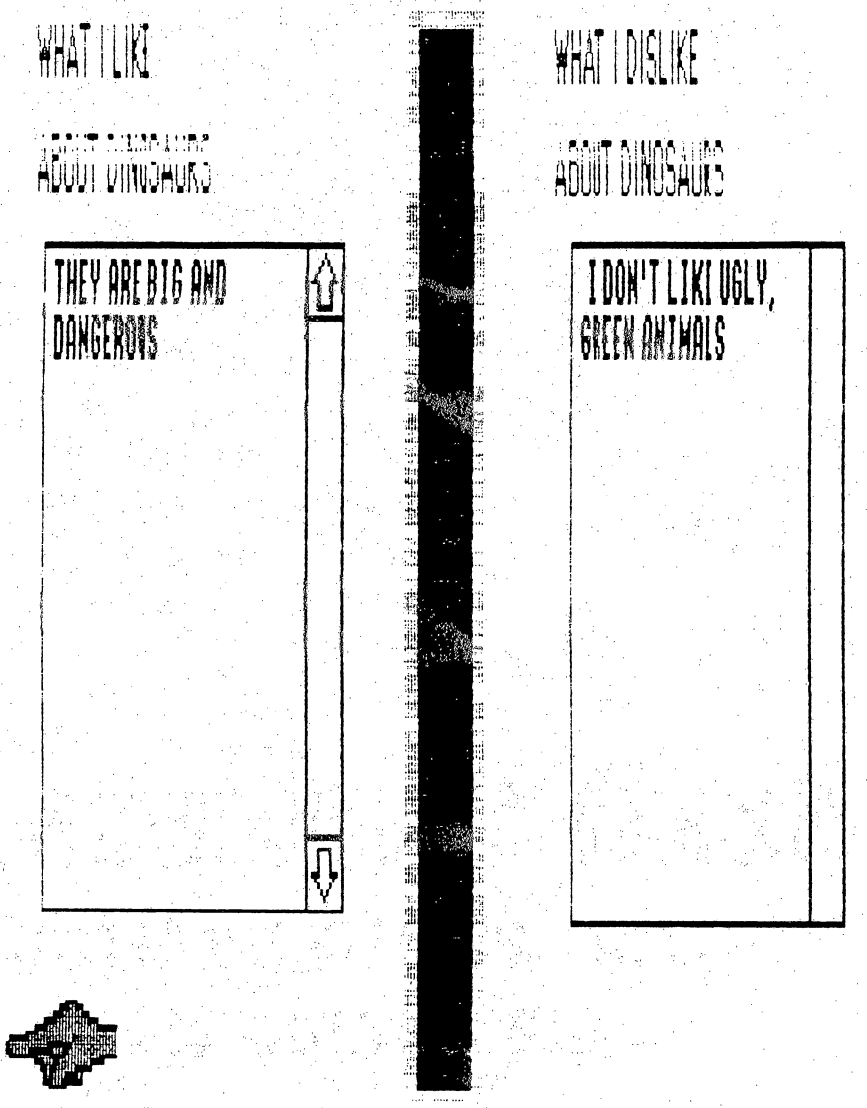
Appendix B:
HyperStudio stack
"Digging Up Dinosaurs"

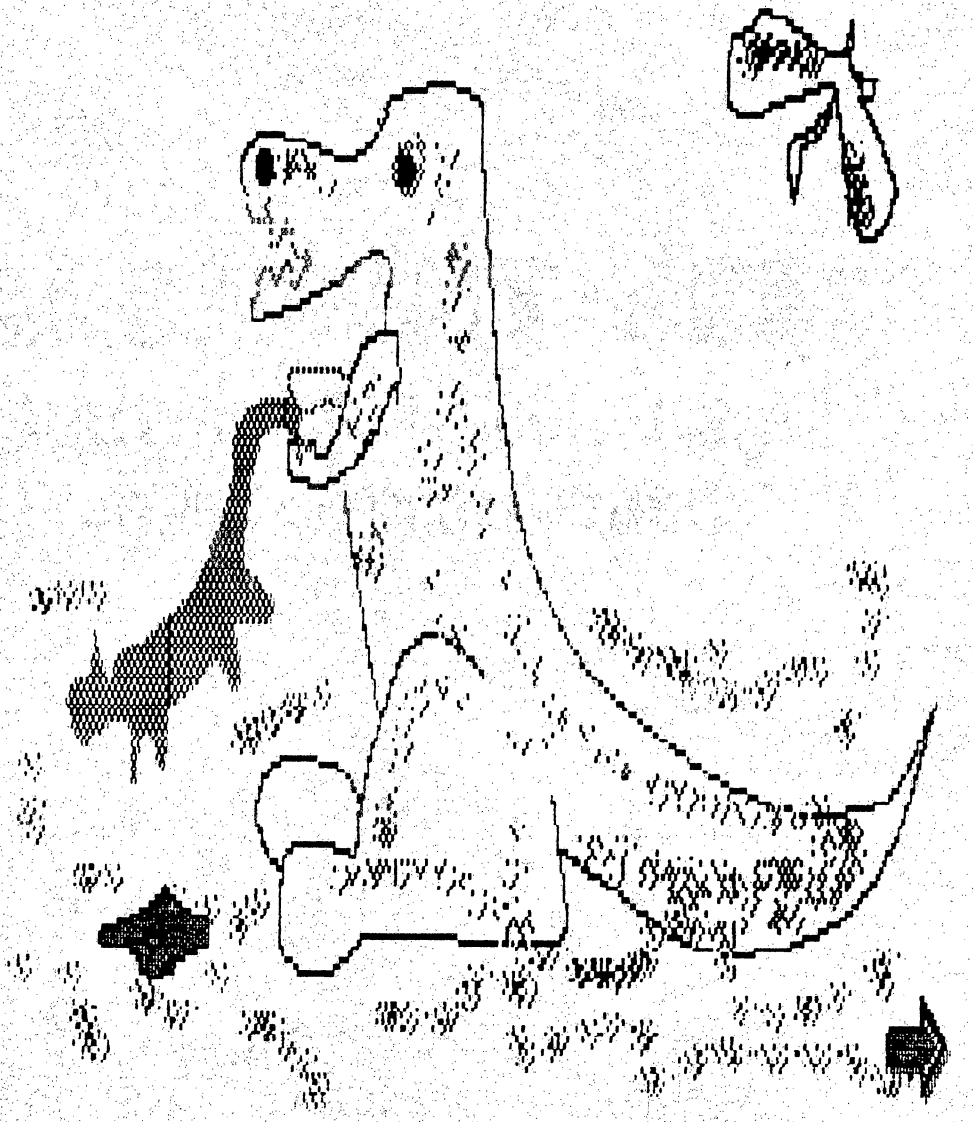

DIGGING UP
DINOSAURS
by ALKI
click here to start


click on the button
you want to work
with today !
When done with the videos, click in the middle of the screen to return here.
vocabulary
dino art
extinction
dino video
about ALIKI
your opinions
dino video 2

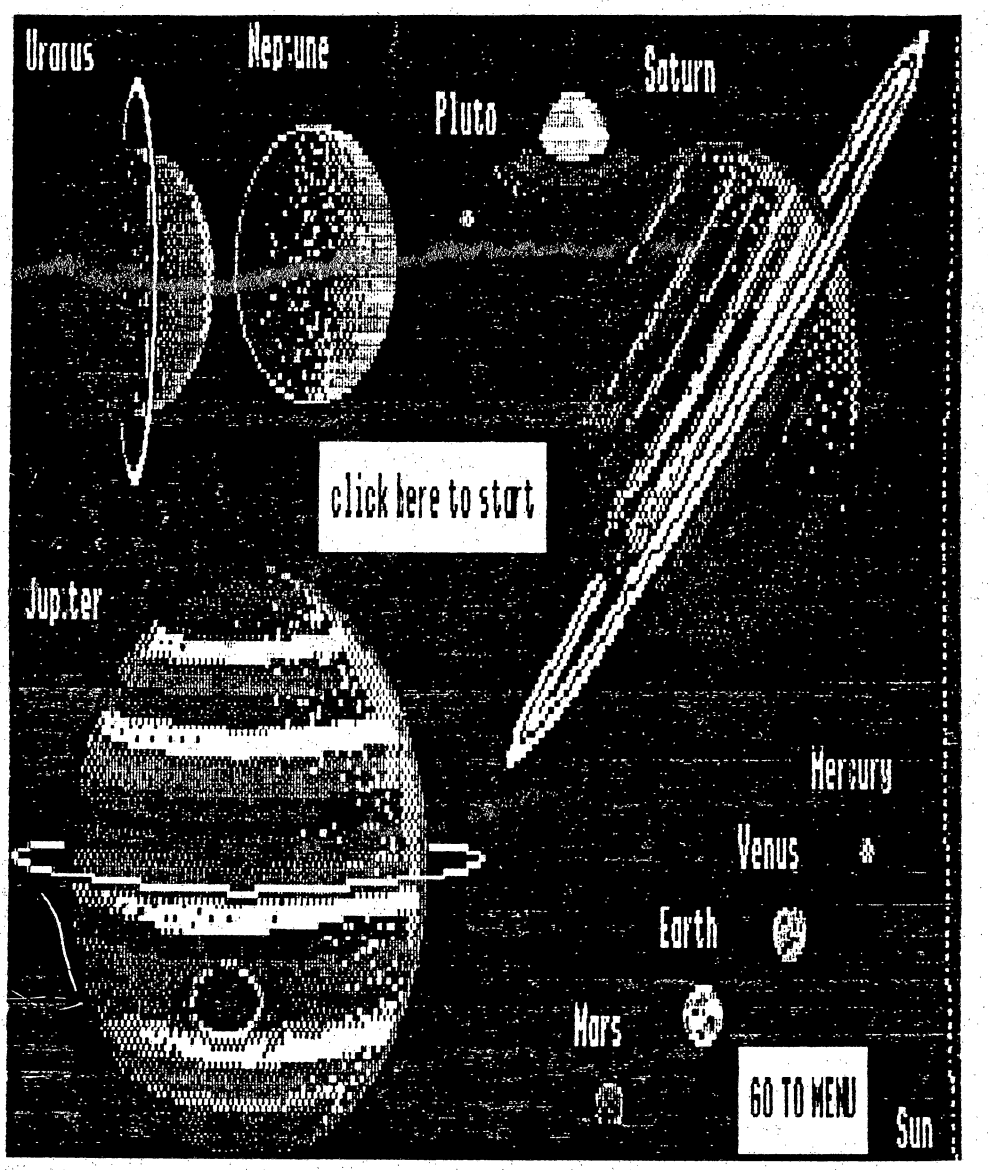

new words
fossil
extinct
shellac
continent
to learn and use

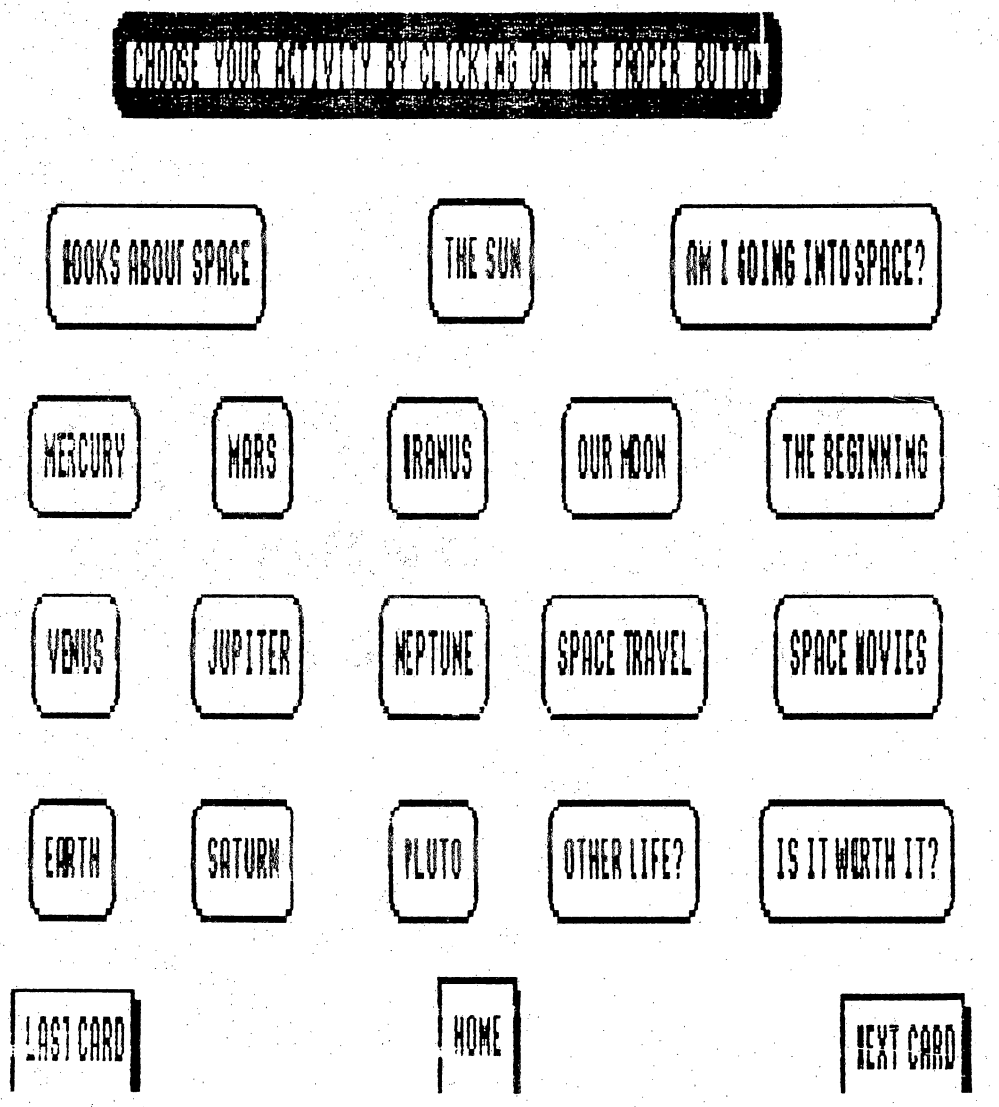

Animals become extinct when the last of their species dies. Dinosaurs aren't the only animals to have become extinct. Some endangered animals might become extinct soon.
Look for reasons animals, like the dinosaur, have become extinct. Put the animal's name and the possible reasons that it become extinct in this

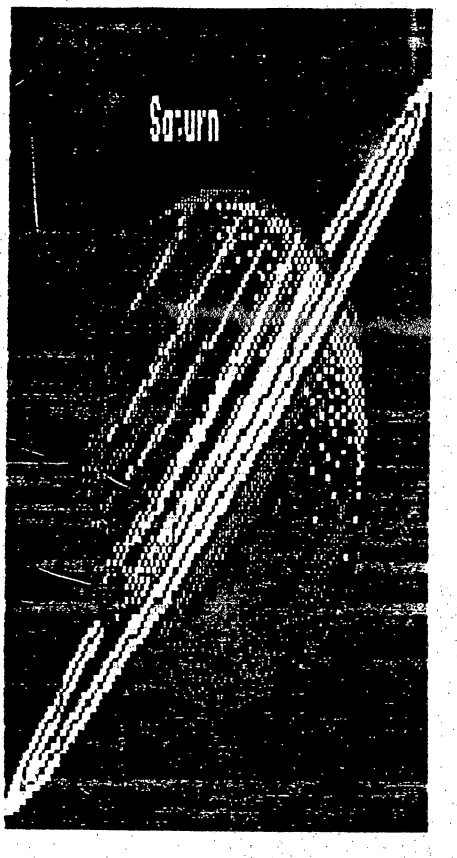

WHAT I LIKE
ABOUT DINOSAURS
THEY ARE BIG AND DANGEROUS
WHAT I DISLIKE
ABOUT DINOSAURS
I DON'T LIKE UGLY, GREEN ANIMALS



Appendix C:
HyperStudio stack
"Solar System"


Urarus
Nep:une
Pluto
Saturn
click here to start
Jup.ter
Mercury
Venus
Earth
Mars
GO TO MENU
Sun


CHOOSE YOUR ACTIVITY BY CLICKING ON THE PROPER BUTTON
BOOKS ABOUT SPACE
THE SUN
AM I GOING INTO SPACE?
MERCURY
MARS
URANUS
OUR MOON
THE BEGINNING
VENUS
JUPITER
NEPTUNE
SPACE TRAVEL
SPACE MOVIES
EARTH
SATURN
PLUTO
OTHER LIFE?
IS IT WORTH IT?
LAST CARD
HOME
NEXT CARD

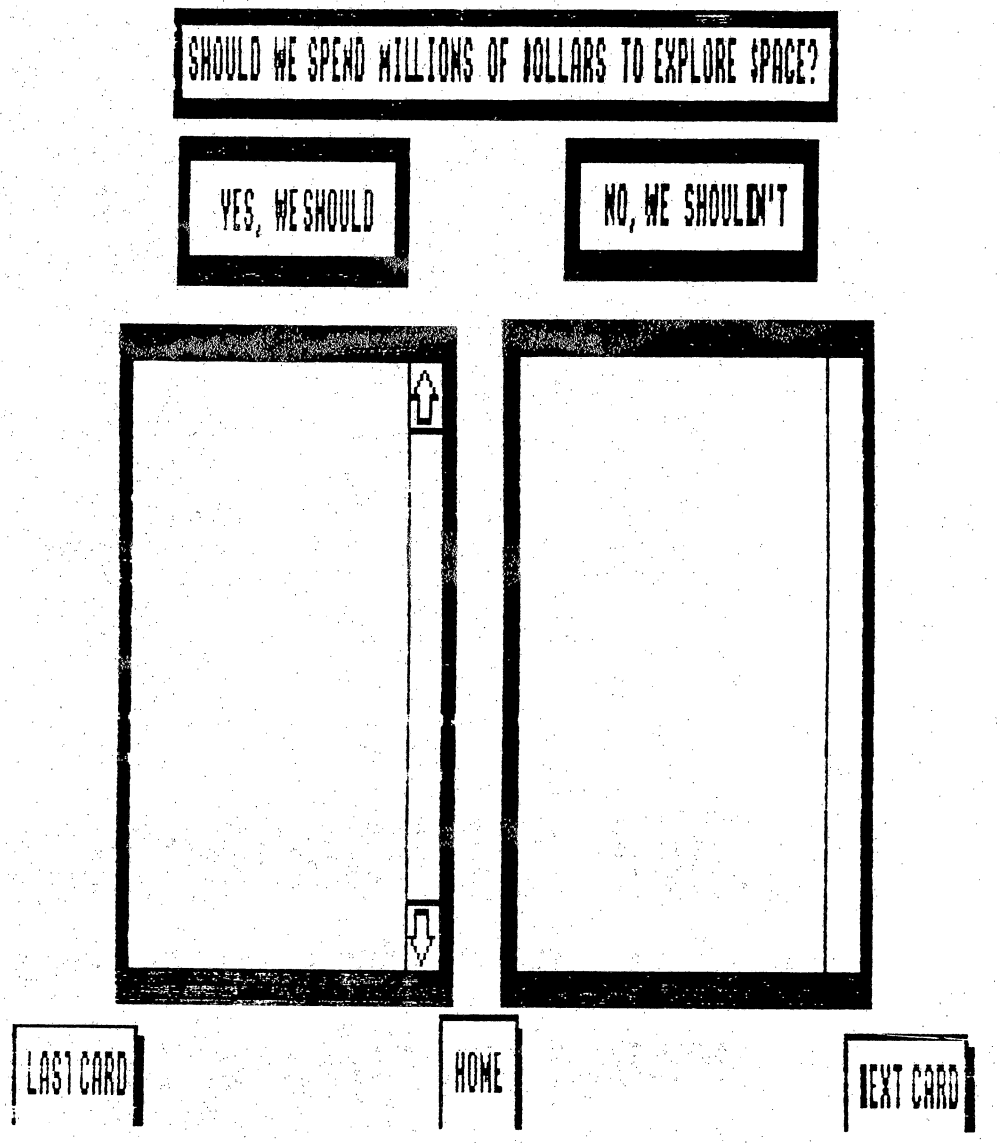


Saturn is the second largest planet. Only Jupiter is larger. Saturn differs from all the other planets beeouse there are thirty three flat rings around it. These rings are made up in swerms of tiny particles that travel around the planet. The gleaming

LAST CARD

HOME

NEXT CARD


SHOULD WE SPEND MILLIONS OF DOLLARS TO EXPLORE SPACE?
YES, WE SHOULD
NO, WE SHOULDN'T
LAST CARD
HOME
NEXT CARD

Appendix D:
HyperStudio
Data Disk

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