DOCUMENT RESUME

ED 275 991 CS 008 584

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TITLE Building an Anthology of "Interactive Fiction."
PUB DATE Apr 86
NOTE 15p.; Paper presented at the Annual Meeting of the American Educational Research Association (67th, San Francisco, CA, April 16-20, 1986).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Computer Assisted Instruction; *Computer Software; Critical Thinking; Elementary Secondary Education; *Independent Reading; Motivation Techniques; *Problem Solving; *Reading Attitudes; *Reading Comprehension; Reading Instruction; Recreational Reading
IDENTIFIERS Computer Games; *Interactive Fiction; Reading Motivation

ABSTRACT

A study determined whether students with an average interest in reading would become more interested in reading if they used interactive fiction computer games involving a quest or solving a problem in conjunction with required reading. Eight students in grades five through eight participated in a workshop that met 3 hours a day, 4 days a week, for 4 weeks. The students began with the easier games that involve little text reading and gradually moved on to the most sophisticated text-oriented interactive fiction. An observer helped the students to overcome problems in solving the quest so that the students would keep reading. All students were deeply engrossed in these programs, and the only condition that diminished student interest or motivation was an inability, after repeated attempts, to move ahead or solve a dilemma in the quest. None of the students reacted negatively to the considerable amount of reading required of most of the programs. Results suggest (1) students with no more than average interest in reading will spend large amounts of time engaged in interactive fiction that requires heavy amounts of reading if they are successful at carrying forward with the quest and (2) interactive fiction could be used to encourage students to read independently. (A list of the interactive fiction computer programs used in the study is appended.) (SRT)

BUILDING AN ANTHOLOGY OF "INTERACTIVE FICTION"

American Education Research Association Meeting

San Francisco, California

April, 1986

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Abstract

For two years now we have been conducting in-depth (with the help of 4th-8th grade subjects in our campus lab school) analyses of individual pieces of interactive fiction (IF). Our definition of IF is fairly liberal and our anthology includes programs which others might label fantasy adventures. However, part of our task has been to determine the essential elements of this new literary genre. We have found, for example, that all of the titles we have worked with (about 30 to date) involve the player in a quest of some sort. It may be a quest for treasure, a quest to identify the murderer, or a quest to survive. Also, every piece of IF poses frequent problems which the player must solve to continue or advance forward in his/her quest. We have also carefully examined the elements which serve to differentiate among the various programs. In the easiest programs (e.g., "Troll's Tale," "Dragon's Keep") children are given a multiple-choice format to select a response from. At the most difficult level (e.g., "Wishbringer," "Sea Stalker") the program responds to complete sentences, composed by the player, but only if words are spelled correctly and the response is essentially logical. There are several other features which are correlated with difficulty level and a prominent feature of our anthology is the identification of minimum grade levels for particular programs. Finally, we have begun to examine the educational potential of interactive fiction, including its value for learning to make and read maps, solve problems, take notes, and comprehend what one has read.

Introduction

Interactive fiction has, in computer time, a fairly respectable history. Virtually the first recreational use of computers occurred with the development in the 1970's of a program at MIT variously known as "Adventure," "Collossal Caves," "Hunt the Wumpus." The object was to explore a cave, seeking treasure and avoiding or overcoming hazards. The programs recognized and responded to short phrases in English. The first such program to be made widely available was Zork. Developed in 1977 at MIT by students, it was first marketed commercially in 1980 (Adams, 1985, a, b). Today there are at least 50 titles on the market (Swan, 1986). Our own work with interactive fiction is more recent, we first used these programs with students in a summer workshop held at Utah State in 1984.

Before proceeding further we need to clarify what we mean by interactive fiction. We include all programs in which the player must complete a quest of some kind. The player is presented with a series of dilemmas he/she must resolve in order to complete the quest; e.g., finding the treasure, rescuing the maiden, identifying the murderer, and so on. To do this requires the thorough exploration of some well-defined territory, e.g., a forest, a mansion, a town, the land of Oz, an island, etc. Hence, we lump together programs which have been called "graphic adventures" and those called "electronic novels" or "text adventures." At one extreme a program like Zork utilizes no graphics while at another extreme, a program like Dragon's Keep utilizes very little text and virtually no storyline or plot.

Our motives are largely pragmatic. We have found that reading and text comprehension per se is not the most significant limiting factor as far as success with a particular program is concerned. We have found that

students are better off if they learn the basic conventions of the genre in programs with little text and story line.

Let us briefly turn to a discussion of these basic conventions. First, players learn that they must thoroughly explore the territory. And they must keep track of where they've been and the resources/hazards present at each location. To aid one's exploration a map is essential. Many programs, especially those for younger children, come equipped with a map (e.g., Dragon's Keep, Troll's Tale, Winnie the Pooh in the Hundred Acre Wood, Death in the Caribbean). We have found (Forsyth, 1986) that students use these maps and can successfully reconstruct them from memory following completion of the program. For most programs, however, the student must construct his/her own map. Although we teach them how to do this, many elementary age children lack the patience to systematically construct and utilize a map.

Second, players must "keep track of" various things. In Winnie, there are 20 objects scattered around the wood. Each belongs somewhere else. As a player explores he/she must remember where objects are located so that when he/she runs into a likely "owner," he/she can retrace his/her steps to fetch the object and deliver it to its proper owner/place. Again, in the simpler programs, the computer assists with this record keeping, the player can call for a log of objects found/treasures located/suspects interrogated, etc. In more difficult programs, the player must either develop a phenomenal memory or use a pencil and paper.

Third, each program has its own problems to solve. In Death, in order to get down the side of a cliff, one needs a rope. The only way to get a rope is to take the rope from a child's swing one just happens to pass on the way to the cliff. There may be messages in code, the chronological order in which events occur is often important, logical syllogisms are

endemic and so on. Undoubtably, the most challenging aspect of interactive fiction for those who progress beyond the novice level is the problem-solving. The Infocom series which includes Zork, as well as Wishbringer and Seastalker which we have used in our workshops, publishes a hint book with each work of interactive fiction. There is at least one monthly newsletter devoted to assisting players with the solutions to knotty problems (Questbusters, edited and published by Shay Adams) and 40 people a day call Spinnaker's hot-line for clues to solving problems in one of their many works of interactive fiction.

Fourth, there are several basic procedures for "interacting" with interactive fiction. For several of the most basic programs (Dragon's, Troll's, Winnie) the player is given a 2 to 4 item multiple choice list of options. A typical list in Winnie would be:

Talk to Owl
Leave Owl's House
Take
Drop

The player moves the cursor to his/her choice with the space bar, then makes the choice by pushing the "return" key. At the next level of difficulty, players must type in two word commands like "Go North" or "Take Key." Directional commands can often be abbreviated (e.g., Go North=N). A few programs, like Swiss Family Robinson, provide the player with a list of the vocabulary words that the computer will acknowledge as appropriate at that time. Indeed each program contains something called a "parser" which is a mechanism for sorting the players input into categories (verb, object, adjective, etc.) and making the appropriate response. Those with limited vocabulary respond with a phrase like "I don't know how to. . ." when the player has typed in a verb not contained in the vocabulary. In most programs the player must learn the vocabulary through trial and error. In

very advanced programs such as those published by Infocom, the parser accepts (understands?) whole sentences. Next to the problem-solving, the greatest source of frustration for our students surrounds the difficulty in making the right choice of words to "get the computer to do something."

A final consideration concerns time. The simpler games can be completed in under 1/2 hour even by children in the primary grades. The harder programs may take 20 hours or more to complete. The more recently published programs all have a "save" feature that allows you to set aside your "quest" and return at the point where you left off. However, not all students have enough "staying power" to continue the quest for hour after hour.

Given all these considerations we have organized all our classes in such a way that we present a developmental progression to the students so that: (a) they learn the basic conventions in simple-to-use programs, where the problem-solving and vocabulary difficulties are minimized, (b) we provide direct coaching and encouragement in the use of maps and note-taking, (c) we have a large program library (see Appendix A) which makes it relatively easy to match each student's ability and interest with the appropriate program. (However, we wish there were more programs available with the same difficulty level as Winnie.) In the next section we turn to the question of why one would want to use interactive fiction in an educational setting and offer some ideas on how to do this.

Using "Interactive Fiction" to Enhance the Reading Activity of Reluctant Readers

Among those interested in helping children learn to read, it is clear that half the task is to teach children how to read while the other half involves getting children to use that ability often enough to become fluent

readers. To do this we need to develop readers who enjoy reading to the extent that they utilize their reading ability often enough and in ways that contribute to continual growth in this important skill. However, children cannot be taught to love to read. Children must be helped in learning that reading is just one more means of doing and enjoying those things that they want to do and enjoy. We don't read just for the sheer joy of casting our eyes across printed symbols. We read for what the results of reading means to us personally. Unfortunately, for many children they have not had the opportunity to find in the books they read personal satisfaction to the extent that they choose reading as a recreational or free time activity.

We believe that students are more likely to become fluent readers if they are exposed to "real" texts written for real purposes and that are highly motivating and interesting to children. We believe that interactive fiction could offer students who are reluctant readers a new motivation and interest to use their reading ability for personal satisfaction. The "genre" is characterised by combining sophisticated programming with the traditional tools of the storyteller to create engrossing fictional worlds. Some people maintain that interactive fiction, even in its infancy, marks a new literacy form. That claim is debatable, but there is no doubt that these sophisticated, interactive games involve the reader in activities that clearly require and enhance the use of the reading behaviors that many current reading theorists would emphasize as important and essential in developing reading comprehension strategies (Smith, 1983; Rumelhart, 1980). Consequently, we wanted to conduct an exploratory study to determine if students who had little or no interest in reading as a recreational activity would play computer games that required extensive reading.

We tried to determine the following from this exploratory study: Primarily, do interactive fiction games which require extensive reading provide motivation enough to encourage children to play the games regardless of their interest in reading. Secondly, could we encourage and aid children to progress from games that required less reading to games that were all-text with few illustrations.

The subjects were eight children enrolled in a special summer computer workshop. These students paid a fee for participating in the workshop. Students ranged in grade level from fifth grade to ninth grade. There was one sixth grade girl. The workshop met for three hours a day, four days a week, over a four week period. All students completed the Wisconsin Reading Attitude Inventory Form II (Dulin, Chester, 1976). This is an inventory to assess student interest in reading. Results of the inventory suggested that all of the students had no more than an average interest in reading recreationally.

The children were assigned to particular programs based on their prior experience and expertise. We moved students through a developmental sequence as discussed in the first part of this paper. As children became more skilled we moved them toward more text-oriented interactive fiction. We will discuss two students as individuals as we present our findings. Both of these students were boys entering ninth grade the following Fall. Both students had expressed low to average interest in recreational reading as measured by the Reading Attitude Inventory used in the study. These students were introduced to the advanced electronic novel, Sea Stalker, and asked to play it for the last eight days of the workshop.

The treatment in this exploratory study was simply to encourage the students to continue their interaction with the program for extended periods of time. Encouragement was provided by an observer who gave clues

or suggestions for overcoming problems or dilemmas encountered by students as they engaged in their quest. The primary function of the observer was to not allow the students to get "bogged down" because of their inability to solve dilemmas or problems. No help was offered in reading the text as it appeared on the screen. As students solved or completed a quest, they were given a program at the next level of difficulty in our anthology of interactive fiction.

The findings are presented in the following order: first, general observations regarding all the students and secondly, the specific observation related to the two subjects selected to play Sea Stalker.

It became clear that all students were deeply engrossed in these programs. So much so, that students who had expressed little or average interest in reading would spend as much as three hours a day for two weeks involved in reading activities as they interacted with their programs. The only condition that seemed to cause students to lose motivation or want to stop playing was when they were unable, after repeated attempts, to move ahead or solve a dilemma in the quest. We found that providing clues and suggestions for overcoming these obstacles would help to sustain students' efforts.

If students tired of one game, they would request a change, however, there was never a need to request that students "attend" to their "task." Regardless of the considerable amount of reading that was required in nearly all of the programs, none of the students reacted negatively to this aspect of the programs.

The two ninth grade students whose ability allowed them to interact with Sea Stalker were observed carefully for two weeks. They had expressed less than average interest in reading and had indicated that they would rarely select reading as a free-time activity. Nevertheless, they showed

great interest in Sea Stalker eventhough it required exclusive use of reading strategies and reading ability. These students read for nearly three hours a day for eight days as they attempted to complete Sea Stalker. There was little difference in the amount of engaged time for either student. However, one student required more "clues" and "suggestions" in his efforts at the quest.

It appears from our exploratory study that students with no more than average interest in reading will spend large amounts of time engaged in interactive fiction that requires heavy amounts of reading if they are successful at carrying forward with the quest. We view this as having important implications for encouraging students to read independently.

Research suggests that the amount of time students spend in independent, silent reading in school significantly relates to growth in reading achievement (Leinhardt, et al., 1981). However, the amount of time children spend reading in the average classroom is small. It has been estimated that less than 10% of the time is devoted to silent reading in the primary grades. This amounts to seven or eight minutes per day. By the middle grades this has only increased to fifteen minutes per day (Dishaw, 1977).

Research also indicates that the reading students engage in out of school is consistently related to gains in reading achievement. A recent study (Fielding, et al., in press) of fifth graders has indicated that the average minutes per day spent reading books was the best predictor of reading comprehension, vocabulary size, and gains in reading achievement between second and fifth grade. Unfortunately, most children spend very little time reading during free time. In the above mentioned study of fifth graders, 50% of the children read books for an average of four minutes per day or less, 30% read two minutes per day or less, and fully

10% reported never reading any book on any day. For the majority of the children, reading from books occupied 1% of their free time, or less.

It is clear that the amount of time children spend reading should be a priority of both parents and teachers. Reading books is perhaps the major source of knowledge about sentence structure, text structure, literacy form, and topics ranging from A to Z. However, from the above research it is clear that many students have not developed the desire to read as a recreational activity.

We suggest that these same students who are reluctant readers may be avid computer hackers, video gamers, LOGOphiles or what have you and will respond very favorably to interactive fiction--despite the heavy demands for accurate, comprehensive reading.

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APPENDIX A

INTERACTIVE FICTION IN THE EDITH BOWEN LABORATORY SCHOOL

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