

Computers and Writing:

A theoretical perspective *

Abstract

This article describes three current ways in which computer technology is applied to composition instruction. The first approach uses drill and practice programs to teach grammar. Another application is to guide students through various steps in the composing process using writing assistance tutorials. Word processing programs, used as a tool in fostering composition and combined with the talents of a knowledgeable teacher, are the final application. A major goal of this article is to describe the explicit or implicit theory underlying each instructional approach.

Susan stares intently as verbs swoop across the screen toward the alligator's mouth. "Aw, I missed it," she mutters to herself. She glances quickly at the new subject (We), deciding not to "eat" the word *is*, which is just about to enter the jaws of the reptile turned grammarian. Unfortunately, she inadvertently touches the sensitive space bar and the alligator obligingly gobbles up another predicate, one that does not agree with the subject. "Shoot, I didn't mean to do that." Susan moans to no one since she is working alone in a cubicle. As she bewails her misfortune, two more "Wrongs" are registered at the bottom of the screen.

The next day Susan and her teacher hold a conference to review progress. "Susan, I'm surprised. Your writing usually is good, but you scored only 7 out of 16 yesterday on Agitated Alligator. Perhaps you need some help in understanding

subject/verb agreement," her teacher says.

"Mrs. Robinson, I knew that stuff. I just couldn't press the keys right."

"Well, that may be so, but I have some worksheets here that will help you understand better. Take these exercises back to your seat, copy the sentences and fill in the blanks with the correct verb. If you do well on these maybe you can go back to the computer tomorrow."

This is one way teachers can use computers to teach composition, and I have observed enough classrooms to conclude that my description is exaggerated only somewhat.

Consider another scene. Becky, a grade six student, has finished the first draft of her most recent story, "Apple City," written on the computer using Magic Slate (Sunburst Communications), a word processing program that expands to meet the sophistication level of the user.

"Hi Becky, how's your story coming along?"

"Pretty good Mrs. Gervais, but I'm having some trouble deciding what's going to happen to Missy next."

"Is Missy your heroine?"

"Yes, she tried to take a bite of an apple where a worm has made his home. His name is Wormy. My lead is pretty good; I get Missy into trouble pretty quick, but now I'm stuck."

"Maybe you got Missy into trouble too quick. Have you thought about slowing down the action a bit?"

"Well, I do that here. Hey, maybe I could put this part in front of the paragraph where Missy gets into trouble at the apple store."

"Why don't you try that? Do you remember how to move paragraphs using the computer?"

"I think so. If not, my computer partner can help me."

"Okay, schedule another conference with me after you complete the second draft so we can hear how the new version sounds."

At the surface level, these descriptions may seem to be just two possible uses of computer technology in the classroom; however, I believe something deeper is involved. Underlying all applications of computers is a view, implicit or explicit, of how the teacher believes learning takes place. In this article, I will focus on one aspect of the language arts - writing - to examine some of the current ways teachers are using computers to develop children's composition abilities in elementary schools.

There are three predominant computer applications in teaching composition. Teaching writing by developing grammar

knowledge is one popular approach. Another is to lead the student through various steps in the writing process using computer-based tutorials. A final school of thought advocates combining the talents of teachers with word processing programs.

Grammar and computer assisted learning

Using the scene described initially, I will examine the use of grammar programs to develop writing ability. There are many such programs on the market, and surveys indicate they are used frequently (Canale, McLean and Ragsdale, 1983). In promoting grammar programs, publishers tend to avoid direct reference to the writing process. Instead, stress is placed on such features as specific skills development, elaborate graphics, instant feedback, and automatic record keeping. Some of these apparent virtues, such as graphics and automatic record keeping, relate to the capabilities of computers. Others, such as instant feedback and the development of specific skills, may appear to be hardware related, but in reality the focus is on learning theory. Behaviourism, most often implied, is the guiding theory for these programs.

Mrs. Robinson would probably respond negatively if asked whether or not behaviouristic principles guided her teaching, and I believe this would be a sincere answer. I once asked a teacher who used a variety of drill and practice grammar programs if he thought behaviouristic principles should guide instruction. "Absolutely not," he responded vehemently. "You can't teach kids the same way you teach pigeons." I'm certain this teacher believed he was using computers to teach writing in a creative, useful manner.

The Ontario study, cited previously, shows that drill and practice programs are used frequently by teachers, while at the same time they call for more creative uses of computer software. Rubin and Bruce (1984), surveying 317 language arts computer programs, found most dealt with language at the letter or word level, an indication that developers are interested in the trees of language, not the forest. The contradictions in these reports indicate a gap between research and practice. Research shows that teaching grammar in isolation does not enhance general composition ability (Weaver, 1979; Braddock, 1969). Moreover, the value of behaviouristic perspective in teaching humans generally, and language specifically, is highly suspect (Chomsky, 1959).

When Mrs. Robinson uses Agitated Alligator, Susan receives messages about the writing process. The clearest of these messages is that writing can be developed through grammar mastery. As mentioned above, this is a suspect notion, but an analysis of the program reveals more difficulty. First, this

program does not teach the student subject/verb agreement; it tests. Next, the student must demonstrate that she knows "about" the grammatical arrangement; it is assumed she knows "how" to apply it in a realistic writing context. A third problem is speed. In this program, as the student progresses, the verbs move toward the alligator's mouth at ever-increasing speeds. Thus, not only must mastery be achieved, it must be demonstrated at the level of automaticity. Automaticity as a virtue has advocates in developing the reading process (Lagerge and Samuels, 1974), but I know of no corresponding theoretical application in writing.

The problems discussed in the previous paragraph relate to the underlying psychological tenets of instruction; however, other difficulties exist. For example, the much touted arcade format used in this program means that Susan's psycho-motor abilities play a role in her performance. Susan may know the correct subject/verb agreement, but if her reflexes fail she is marked wrong. In a second instance, she touched the space bar inadvertently. Result? Wrong again. The consequence of her poor reflexes was further instruction...or shall I say further testing?

In summary, computer-based grammar programs, using a drill and practice format, are common in today's schools. Unfortunately, they are not congruent with our current understanding of how to foster the writing process in children. Stressing accuracy and speed in showing mastery of grammatical conventions, these programs most often test the student. If teaching is available, it consists typically of a short tutorial, and the underlying learning principles guiding these programs are based on behaviourism.

Writing assistance programs

Attempts to use computers to help students in composing are not new. Wresch (1982) describes an early program by Page (1968) that could evaluate essays for traits such as sentence embedding and word choice. The fact that the essays had to be transferred, line by line, to punch cards is probably why we had to wait for the microcomputer for further developments in this area. Indeed, the micro has led to a flurry of new programs designed to assist writers in composing. Often using the idea of a five step writing process approach - prewriting, writing, revision, editing, and publication - software developers created programs to aid students with one or more of these areas.

Many of the early writing assistance programs were designed to assist university level students in the prewriting step (Burns, 1984). The choice of this audience was influenced by several factors, not the least being the need to be a good reader to proceed through the program. Some of these early programs used

a technique similar to ELIZA, developed by Weizenbaum in the 1960s. This program mimicked a procedure used by nondirective psychotherapists, taking words and sentences from the user and converting them into questions.

Despite the shortcomings of these programs, and there are several which I shall discuss, continued development makes computer-based writing assistance a valuable tool in fostering children's composing abilities. Unlike grammar programs, where students manipulate the language of others, writing assistance allows real writing. Moreover, the instruction available, often presented as a tutorial, is closer to our current understanding of how the writing process can be fostered productively.

As mentioned previously, most assistance programs are designed for high school or university level writers, e.g., SEEN (Schwartz, 1982); Workbench (Macdonald, Frase, Gingrich, and Keenan, 1982); HOMER (Cohen and Lanham, 1984). However, there are now programs designed to help elementary school children choose topics (Tchudi, 1983) and develop editing skills (Levin, Boruta and Vasconcellos, 1983). Quill, developed by Andee Rubin and her associates (Rubin and Bruce, 1984), comes closest to providing assistance in all five of the writing process steps.

Examples of writing assistance programs

To offer a picture of how writing assistance works, I will describe a recent program developed by Shirley Keenan, working out of MECC. This is a good example of a writing assistance program, possessing many virtues. In "Creating a Character Sketch" students choose to write about a fictional character, historical figure, or personal acquaintance. Once a name is selected, students are asked to type in two words describing this person. At this point they begin a journey through a series of topics and subtopics related to writing a good character sketch. For example, the student may select "behavior" as the first major topic. After a major topic is selected, subtopics, such as "how the character acts" or "what the character says," are explored. At each juncture the student may see examples of the characteristic, take a short test to determine understanding, or enter up to six lines of a description. This procedure is repeated for a variety of topics including external characteristics, behaviour, other's reaction, and comparison/contrast. A printout of the student's descriptions provides an outline for a complete character sketch.

Most writing assistance programs provide instruction in one or two areas; Quill comes closest to offering assistance in all five writing process steps. The prewriting phase is aided by Planner, designed to encourage organized note taking. Writing, the second step, is handled by a word processor while a text

editor facilitates both higher level revisions and editing. Publishing is accomplished by a utility program called Publisher which allows for easy formatting of newspapers and books, two ways of making writing public. A final feature is Story Maker, a program developed previously by Rubin (1980) and incorporated into Quill. Story Maker has several uses, but I believe fostering higher level story organization is the most important.

Although the theoretical base for grammar drill and practice programs is clear, various learning perspectives seem to underlie computer-based writing assistance instruction. Grammar programs may differ in technological effects, but their theoretical principles are similar. Writing assistance programs differ in focus and format although two common elements among them are evident. First, most view writing as a cognitive act, which contrasts with the behaviourist approach of grammar programs. Some programs, such as Quill, go beyond an implied cognitive orientation; they explicitly base their components on the work of such researchers as Graves (1983), Flower (1981), and Emig (1977). A second characteristic of writing assistance programs is the tendency for students to engage in real writing, either while working with the program or as a result of it.

Writing assistance goes beyond the limited or non-existent values of grammar programs although shortcomings in the former exist also. Many of these programs present the student with a model of excellence, say a paragraph showing cohesion or a beautifully crafted Haiku poem. Indeed, these may be models of excellence, but typically only one or two examples are presented, so the student may assume this is **the** way to produce a piece of good writing. If the model is followed in a slavish manner, stereotyped writing may be the result.

Few programs allow the student to engage in all five writing process steps. Some could be exempted from this criticism as they may be based on a different model of writing. However, teachers cannot rely on these programs alone to foster students' composing abilities as important steps may be missed. One program may do an adequate job of helping a child select a topic, but this is just the initial step in writing. How the other steps are carried out rests with the skill of the teacher.

Some of the writing assistance given by the computer may not be useful to students. For example, I recently used a program that purported to help with prewriting, brainstorming for ideas to be exact. I wanted to write about my father who died this fall. The first couple of questions were helpful as they made me think about a few of his more endearing traits. The next question befuddled me. "What would you do if you found your father in a church?" asked the computer.

"Well, I'd be rather shocked given he's dead," I typed back.

The computer didn't seem to know what to do with my reply so it tried a different tack. This is a new version of the old saying "Garbage in, Garbage out." The way in which the computer can respond is predetermined so sometimes the questions or comments seem bizarre. I could chuckle at the computer's question, but what about the 10-year old child who wants to write about her cat who just was run over by a car? How would she react to this question?

A final problem with writing assistance lies in editing programs that typically compare the structural aspects of a piece of writing with stored data. In many programs the rules of writing are preordained, and this may cause difficulty. For instance, a student attempting to capture the flavour of a person using an Ottawa Valley dialect may discover his logger sounding like an Oxford Don. A cliché of the writing profession is that good writers know all the rules, and break them regularly. The purpose of editing programs is correction not instruction. Depending on how editors are used, they may confuse rather than enlighten students.

Writing assistance programs appear to be founded on a whole language perspective where students engage in real writing using a five step process approach. And in many instances this is true. However, some programs break the steps of writing into minute segments, presenting them in lockstep manner. In spite of claims to the contrary, close examination reveals these programs to be based on reductionist notions of learning. Further, even quality writing assistance programs contain inherent flaws, and teachers must be aware of their shortcomings.

Word processors and the composing process

Few technological advancements have captured the imagination of writing instructors as the word processor. Initial interest was heightened with the introduction of special word processing programs for children, such as the Bank Street Writer (Scholastic). On first examination, word processing seems to be a perfect tool for fostering composition development, carrying the potential to eliminate many traditional roadblocks inhibiting instruction, but its effective use is highly dependent on the teacher.

Word processing programs, unlike either grammar or writing assistance CAL, combine technology with the talents of teachers in fostering the writing craft. Authors such as Graves (1983) advocate a master/apprentice relationship between teacher and pupil where the student is led through multiple drafts to a polished piece of writing. The computer eliminates the drudgery of handcopying drafts so students are free to concentrate more on revision and editing. As well, since the computer does not

take over all instruction, teachers can work on those areas where human interaction best serves the needs of students.

The values of word processors appear to go beyond the obvious benefit of eliminating recopying. Teachers report children using word processors have a propensity to generate longer stories. The reasons for this include novelty, the prodding effect of the cursor, elimination of the messy page which prompts some children to begin again, the congruency between typing speed and thinking, and teachers' willingness to allow children free selection of topics (Miller, 1984). Another distinction is the ease of revision and editing afforded by help menus. Children show the capacity to revise as early as grade one, and the word processor may enhance this ability (Graves, 1979; Sowers, 1979).

Word processors do not appear to carry along the baggage of a theoretical perspective. At first glance, they seem to be neutral in how the writing process develops or how teachers should foster it. However, as Newman (1984) points out, this is a deceptive notion as there is an implied view of the writer's capabilities built into each word processing program. For example, an Ontario developed program, available in the public domain, permits students only three functions - insert text, delete text letter by letter, and print. This program implies that children are not able to insert text during the revision or editing process. Of course, it could be argued the programmer simply lacked sophistication, but consider the most commonly used program on the market, The Bank Street Writer (Scholastic). What functions does it permit? Which are not present? How accessible are the functions?

Word processors imply a view of the writer by including or excluding certain functions. A second theoretical perspective is applied by the manner in which teachers use them in the classroom. Word processors may be responsive to a process approach such as advocated by Graves (1983), but they could be used to create long lists of words, say derivatives of root words, instead of original stories. Rather than using multiple drafts in writing conferences to develop children's revising and editing abilities, teachers simply may hand back hemorrhaging papers for recopying.

Word processors cannot be praised or criticized in the same manner as grammar or writing assistance programs. Instead, observers must look at teachers applying their theories as to how composition can best be nurtured using word processors. And these observations must be based not on teacher's espoused theories of composition development but on their theories in action. The word processor would appear to facilitate a whole language approach to writing; whether or not it will be used in this manner is uncertain.

Concluding statement

Three applications of technology to the development of children's composing abilities have been described in this article. Each application tends to view children, and how they acquire the writing craft, in a different manner. However, this is not to say these ideas do not contain some overlapping notions. As well, teachers, aware of the writing process, may combine different approaches in an effective manner. For example, Schwartz (1984) advocates using some aspects of a writing assistance approach, supplementing these programs with the values of a word processor under the guidance of a knowledgeable teacher. In my estimation, this position is correct as it places the responsibility for quality instruction in the right place - the teacher.

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