

*Reprint from*

Tennessee Department  
of Education Publication

# TRAILBLAZER

May - June 1969



Professor Chapdelaine and Dr. Andrew P. Torrence, President of Tennessee State University, observe Miss Evelyn Vinson, a CAI technician and student, at the teletype.

# Computer Teaching --

# It's Here Now!

by Professor Perry A. Chapdelaine



Teletype machine receiving from computer

Project Director for National  
Science Foundation Grant

• 5140,410

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TRAILBLAZER

**N**OT TOO many years ago Ugh, the caveman, sat on one end of a log sharing his hard-earned wisdom with Eeek, who sat on the other end. The beauty of this primitive arrangement was the directness by which Ugh could share his personal knowledge with Eeek—much like a full-fledged apprenticeship system.

Modern requirements of mass education placed even heavier demands on those who had knowledge and skill, thus bringing about the day of modern specialist known today as "teacher." Unfortunately, no matter how well meaning or how skilled the modern educator might be, the personal relationship so well exemplified by Ugh and little Eeek somehow gets lost. How can it be otherwise when as many as 40 students now sit at one end of the log, but still only one educator sits at the other.

Crude analogy? Not really! Some modern students of the history of education rank the story of Ugh and Eeek among those educational principles found at the top of the list, along with the invention of the printing press; while others will go so far as to state, with vigor, that there has been no genuine advance in the art of teaching since the development of the printing press. After all, Ugh must still personally assist each Eeek by means of creative classroom experiences which include the transmission of "understandings" as well as "skills."

What does all this have to do with Computer Assisted Instruction in Math Education?

Simply this: Some educators believe that application of modern electronic technologies (including the computer) to the art of teaching is soon to become the first genuine revolutionary educative process since Gutenberg!

Some seven years ago, Dr. Patrick Suppes, Director of the Institute for Mathematical Studies in the Social Sciences, at Stanford University in Stanford, California, began experimenting with ways and means for utilizing the computer in education. He and his associates succeeded in obtaining grants from Carnegie, the United States Office of Education and the National Science Foundation.

Over the next seven years, in cooperation with other public school systems, Dr. Suppes and his asso-

ciates were able to demonstrate the effectiveness and practicality of their ideas.

For convenience, people who began the application of computer techniques divided the educational region into three general modes: (1) drill-practice procedures, (2) tutorial and (3) dialogue.

Very briefly, drill-practice procedures represent computer programs and curriculum materials based upon the well known educational principles of "drill" and "practice". Many such techniques exist—workbooks, flashcards, repetitive vocalizations and so forth. A classroom teacher is, of course, essential to successful use of the drill-practice mode.

Tutorial, on the other hand, represents an attempt to make computer programs and other technologies respond "like a teacher." Work in the tutorial mode is largely experimental as yet. The classroom teacher is not so critical in this mode.

By contrast, the dialogue mode includes the idea that modern technologies might some day grow big enough and sophisticated enough to allow the student to simply request "an analysis and summary" of some abstract idea. The computer of science fiction fame in such movies as "2001: A Space Odyssey" or the television series "Star Trek" responds in the "dialogue" pattern. It can "think" and behave creatively! Unfortunately, scientists and mathematicians have much to learn before such developments move from the realm of science fiction to everyday life. Logicians phrase it this way: "The dialogue approach is not entirely hopeless, as yet!"

At Tennessee State University, we use the more down-to-earth and practical "drill-practice" mode. The National Science Foundation, under Grant GY-5308, contributed \$441,410 to operate our drill-practice mode for two years, beginning July 1, 1968. In cooperation with, and under the able guidance of, Stanford University, we are able to present mathematics drill-practice lessons from the first grade through the first year of college.

Most college students, no matter where they attend, need remedial mathematics and mathematical drill-work. Fractions and elementary algebra, particularly, cause difficulties for freshmen students. We, at Tennessee State University, will start the student at