DOCUMENT RESUME

ED 273 247 IR 012 245

AUTHOR Koohang, Alex A.
TITLE Traditional Method versus Computer-Aided Instruction Method in Teaching BASIC Programming to Vocational High School Students.
PUB DATE [84]
NOTE 9p.
PUB TYPE Reports - Evaluative/Feasibility (142)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Comparative Analysis; *Computer Assisted Instruction; Correlation; High Schools; High School Students; Hypothesis Testing; *Instructional Effectiveness; *Intermode Differences; *Lecture Method; Pretests Posttests; *Programing; Statistical Significance; Test Validity; Vocational Education
IDENTIFIERS BASIC Programing Language

ABSTRACT

The purpose of this study was to investigate the effectiveness of computer-aided instruction as compared with the traditional lecture method of cognitive learning of new curriculum materials. It was hypothesized that students instructed by the computer-aided instruction method would gain higher knowledge of the subject matter in terms of cognitive test scores than students instructed by the traditional method. Subjects were high school students in a vocational education program who were randomly selected and assigned to a control group (n=35) and an experimental group (n=35). Both groups received instruction on one area of BASIC programming in agriculture. The measuring instrument consisted of two identical forms of a test. The content validity of the test was determined by a panel of experts. To determine the test-retest reliability of the test, it was administered to 10 undergraduate students in agriculture education at Southern Illinois University at Carbondale, who retook the same test two weeks later. The Pearson product-moment correlation coefficient was calculated, and the reliability coefficient was considered acceptable. The control group for the experiment received instruction via a lecture by the researcher, whereas the experimental group used the computer program for instruction. The pretest and posttest were administered to both groups prior to and following the instructional treatments. Results of an independent t-test performed on the test results for both groups indicate that the computer-aided instruction method was more effective than the traditional method, but it is suggested that further studies should be done. (DJR)

TRADITIONAL METHOD VERSUS COMPUTER- AIDED INSTRUCTION METHOD IN TEACHING BASIC PROGRAMMING TO VOCATIONAL HIGH SCHOOL STUDENTS

Alex A. Koohang
Curriculum, Instruction & Media
Southern Illinois University at Carbondale

Two instructional methods were used. The experimental group was instructed by the computer-aided instruction method. The control group was instructed by the traditional method (classroom lecture). Identical subject matter and measuring instrument were used for both group. An independent t-test was used to investigate the effectiveness of the computer-aided instruction method when compared to the traditional method on cognitive learning of new curriculum materials. At the .05 alpha level, the research hypothesis that students instructed by computer-aided instruction method would perform better in terms of cognitive test scores than students instructed by the traditional method was retained.

The decade of the 1980's is being called the age of electronic technology. The decision about whether or not instruction in computers is needed has already been made by an automated society. This instruction is essential. The remaining decisions relate to the type of students and the school system. In many cases, microcomputers provide an inexpensive, yet adequate means to meet the needs of school and their students (Legacy, 1984). The microcomputer is a tool that can have a tremendous impact on education and agriculture in the future (ratcliff, 1982; Legacy, 1984). Goldberg (1978) indicated that a computer program might display alternative representations as a chart and as a graph. With the ease of operating today's microcomputers and relative low cost, computers for the first time have become a practical reality for most schools. They are now available to virtually all students. The application of microcomputer technology throughout all levels of society is expanding at a phenomenal rate. More than ever, education needs to keep pace with and take advantage of microcomputer technology in order to educate. The very rate of growth of computer development requires that its technology be applied in the education of its consumer (gaushell, 1982).

The purpose of this study was to investigate the effectiveness of the computer-aided instruction method in comparison with the traditional method on the cognitive learning of new materials presented. The research hypothesis was stated that students instructed by the computer-aided instruction method will gain higher knowledge of the subject matter in terms of cognitive test scores than students instructed by the traditional method.

Literature Cited

Blitz (1972) reported no significant difference in student scores due to the methods of instruction when comparing the effect of CAI to a programmed text approach.

In 1976, Shirey found no significant difference between a treatment group using computer assisted instruction methods and traditional methods of instruction. These studies indicated that the computer assisted instruction methods were as effective as those in the traditional teacher directed approach. Edyburn (1982), in a comparison of microcomputer graphics on reading comprehension, found that students using a computer assisted instruction reading program with graphics did not show a greater increase in reading comprehension.

Lindsay (1982), conducted a four week study with 103 high school students in four introductory typewritting classes of a large urban school to compare the teaching of typing skills on the microcomputer with the electric typewriter. Results showed that the microcomputer was as effective as the electric typewriter in increasing student speed levels considering the factors of sex, age, and class attended. The results also indicated that the microcomputer was as effective as the electric typewriter in increasing accuracy scores when age and class attended were considerd.

Vinsonhaler and Bass (1972), reviewing computer-based drills that pre-dated microcomputers in the classroom, concluded that CAI drill and practice at the elementary school level was more effective than traditional instruction in raising standardized test scores in the majority of 30 experimental comparisons at ten sites. King (1975) compared the effects of three graphic levels on the learning of the

sine-ration concept of 45 students at a naval training center. Although the performance of the animated graphics group appeared higher, no significant differances were found between tthe three groups on a posttest.

A common procedure was used in each study. The samples selected for the studies were selected from secondary school students. Two groups of students were identified--an experimental group instructed by the computer assisted instruction method and control group instructed by the traditional method. The common research hypothesis was that a difference in learning existed between students instructed by the computer assisted instruction method and students instructed by traditional instructional method were reported in these studies.

Methods and Procedure

A computer program on one area of BASIC programming in Agriculture was developed in the fall of 1983 by the researcher. The computer program consisted of three parts: 1. self teaching; 2. self testing; and 3. assiginment. The measuring instrument consisted of two identical forms of a test. The content validity of the measuring instrument was determined by a panel of experts consisting one professor and two associate professor and one graduate researcher. To determine the test-retest reliability of the measuring instrument, it was adminstered to ten students enrolled in one of the courses in the Agricultural Education Department at Southern Illinois University at Carbondale. Two weeks later the same test was adminsterd to the same students. The Pearson product-moment correlation coeficient was

calculated to determine the test-retest reliability of the measuring instrument. The reliability coeficient was .79, which was considered acceptable.

The sample was randomly selected and divided into two groups--a control and an experimental group from two high schools in two districts in the state of Illinois. The control group consisted of 35 students all whom received the following instruction: introduction, pretest, lecture by researcher, and posttest. The experimental group consisted of 35 students all of whom received the following instruction: introduction, pretest, computer-aided instruction, and posttest. The effectiveness of the computer-aided instruction comparted to traditional method was determined by an independent t-test. An alpha level of .05 was used.

Results & Discussion

The data collected in this study were analyzed to find a significant difference between the two instructional methods at the .05 alpha level. The stattistical null hypothesis tested was "students instructed by the computer-aided instruction will perform the same in terms of co ve test scores as students instructed by traditional method." The results of data analyzed are presented in Table 1. The t value of -.84 for the difference between experimental and control groups on the pretest showed no significant differences in their knowledge of computer. Therefore, the t-test was done on the posttest to determine whether there was a difference in their performance in terms of cognitive test scores. The t value of 1.90

indicated a significant difference between the two groups at the .05 alpha level. Based on the t-test results the researcher rejected the null hypothesis that stated "students instructed by computer -aided instruction method will perform the same in terms of cognitive test scores as students instructed by traditional method."

The computer-aided instruction method was found to be better than traditional method. However, the following recommendation was stated that "further studies should be done with selection of different sample and subject matter."

Blitz, A. (1976) An investigation of the ways in which personality characteristics affect performance on computer-assisted instruction and programmed text. Unpublished doctoral dissertation, University of Oregon.

Edyburn, D. (1982) The effects of two levels of microcomputer graphics on reading comprehension. Unpublished masters thesis, Illinois State University.

Gausell, H. (1982) Microcomputers in education. Washington, D.C.: U.S. Department of Education.

Goldberg, C. (1978) Introduction to computer programming. New York: Harper and Row.

King, W. (1975) A comparison of text and graphic for concept learning. San Diego: Navy Research and Development Center.

Legacy, J., Stitt, T, and Reneau, F. (1984) Microcomputing in agriculture. Virginia: Reston Publishing Company, Inc.

Lindsay, R. (1982) A comparative study of teaching typing skills on microcomputers. Vancouver: Education Research Institute of British Columbia, Report #82:10.

Ratcliff, D. (1982) Using the microcomputer to analyze the high school students supervised occupational experience program records. Paper presented at the National Association for Research in Science Technology, June.

Shirey, J. (1976) The effects of computer-augmented instruction on students' achievement and attitudes. Unpublished doctoral dissertation, University of Oregon.

Vinsonhaler, J. and Bass, R (1972) A summary of ten major studies of CAI drill and practice. Educational Technology, 12, 41-42.

Table 1
t-test Comparison of Computer-aided Instruction Method and Traditional Method.

		N	Mean	SD	t	df	p
Pretest	computer-aided method	35	98.857	3.228	-0.84	34	0.0702
	traditional method	35	99.428	2.355			
Posttest	computer-aided method	35	99.428	2.355	1.190	34	0.0191*
	traditional method	35	98.571	3.550			

*Statistically significant at .05 level of significance.