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ABSTRACT

This research was based upon the rationale that occupational information is an educational essential. The subjects were Occupational Work Experience (OWE) students who were randomly assigned to individual guidance from either a computerized occupational information systems, a counselor-based information system, or to a control group. The groups were post-tested on the Assessment of Career Development (ACD) to determine which group learned the most information. The results demonstrate a hierarchical learning effect--computer group learned more than the counseled group, which learned more than the control group. Only the treatment effects were significantly different between the groups since there was no interaction of IQ and treatment. (Author)

COMPARISON OF COMPUTER-BASED VS. COUNSELOR-BASED OCCUPATIONAL INFORMATION SYSTEMS WITH DISADVANTAGED VOCATIONAL STUDENTS[1]

by

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COMPARISON OF COMPUTER-BASED VS. COUNSELOR-BASED OCCUPATIONAL INFORMATION SYSTEMS WITH DISADVANTAGED VOCATIONAL STUDENTS

Baer and Roeber (1964) have referred to occupational information as an educational essential and an essential for making better occupational choices. According to Baer and Roeber (1961), the term occupational information should refer to a broad understanding; job knowledge and job planning and preparation, rather than specific information about certain occupations.

Other researchers and theorists have discussed the importance of occupational information. Norris (1963) refers to the importance of occupational information as a motivator in the elementary school, and Super (1951) discusses the importance of vocational information to vocational development and for implementing a self-concept. Because of this importance of occupational information, there seemed a need for determining whether one of the methods of providing occupational information was more effective than another.

Because of the importance of occupational information, counselors in schools have for many years attempted to teach students the information. Beginning in late 1960, counselors initiated the development of mechanized systems for delivering occupational information (Gallagher, 1969). The computer, because of its facilities for immediate feedback and branching to various topics, became the epitome of these mechanized systems

(Cooley, 1969). The purpose for conducting the following research was to determine whether students could learn more occupational information from a computer than directly from a school guidance counselor. Research from computer-assisted instruction (CAI) presented the rationale for the project. Zinn (1968) and Merrill & Stolurow (1966) have conducted research which indicates that students learn more from computers than they would learn from teachers after short periods of instruction. Since only short periods of instructing students in occupational information were employed in the research, it was hypothesized that the students receiving occupational information from the computer would learn significantly more than the students receiving the information from a counselor.

Subjects

The subjects for the research were disadvantaged vocational students at a large northeast Ohio city high school. These students were all senior high school students (grades 10-12) enrolled in an Occupational Work Experience (OWE) program at the school. Students in OWE have been identified by certified guidance counselors to be lacking motivation for regular classes. These students are provided half-day instruction and are released in the afternoon to work. The students' jobs are part of their credit program at the school.

Seventy-two of these students were identified for the study because they possessed a minimum grade-equivalent read-

ing level of 4.5. These seventy-two students were randomly assigned to one of the three treatments. The seventy-two students were pooled and then randomly assigned to treatments from a table of random numbers. A total of twenty-four students were assigned for each treatment.

Method

The computer group treatment consisted of students assigned individually to an hour each week of interacting with an IBM computer terminal. The computer was programmed with the Computerized Vocational Information System (CVIS) which provides its users with occupational information based upon Roe's Occupational Classification System (Roe, 1956). The first week these students explored job titles and job descriptions from the "social service" and "business contact" clusters; the second week, from the "organization" and "technology" clusters; the third week, from the "outdoor" and "science" clusters; and the fourth week, from the "general cultural" and "arts and entertainment" clusters. The treatment was individually administered. Weekly time schedules were rotated so that no student was scheduled for the same time or day from week to week.

The counseled group treatment was similar to the computer group except that the students were assigned for individual guidance with a guidance counselor from their school. Each student met the same counselor each week. The counselor was given the same list of Roe's job titles and job descriptions that are implemented in CVIS. Both treatment materials were identical

and only the treatment modes were different.

The control group was only post-tested in order for comparisons to be made. An analysis of covariance was used as the statistical procedure. The students' IQ's were utilized as the covariate.

The design employed was the "post-test only control group design" recommended by Campbell and Stanley (1963). Because of the design employed, the students were only post-tested at the completion of the experimental treatments.

Three questions regarding the validity of the study were considered: (1) Was it the treatment that accounted for the differences (internal validity of the design)?; (2) Were the statistics appropriate?; (3) To whom can the results be generalized (external validity of the design)?

Because of the nature of the design (randomly divided post-test only control group design), all aspects of internal validity were achieved (Campbell and Stanley, 1963). Stanley and Campbell (1963) also suggest that appropriateness of analysis of covariance (ANCOVA) as the statistical tool for this design if the five assumptions of ANCOVA are met: (1) random assignment; (2) normal distribution; (3) homogeneity of variance; (4) independence of replication; and (5) no interaction of covariate and treatment. All five assumptions were tested and achieved for this research.

Regarding external validity, the investigator cautions the reader that the results are limited to disadvantaged senior high school students learning occupational information and that

these students were aware of other groups receiving the occupational information from other modes. The reader should be aware of the nature of this group before generalizing to similar groups. Lindquist (1953) refers to the responsibility of the reader to generalize to similar groups. The reader should be alerted that the counselors at this particular school usually teach occupational information to students in groups rather than individually. This unfamiliarity of the counselors with this individual treatment may be a limitation to the study.

Instrumentation

To evaluate which group of students learned more occupational information, an achievement instrument measuring knowledge of occupational information was required. The Assessment of Career Development (ACD) was selected as the criterion for the study. Three subscales of the ACD were then selected as the dependent variables for the research; these three subscales were: (1) Knowledge of Occupational Characteristics (Characteristics); (2) Knowledge of Occupational Preparation Requirements (Preparation), and (3) Career Planning Knowledge (Planning). Test-retest coefficients of reliability (Characteristics r = .65; Preparation r = .54; and Planning r = .64) were sufficient for group analyses for all three subscales (Thorndike & Hagan, 1969). Content validity was established through expert judge validity, operational definitions, and proportional analyses of job titles between the three ACD subscales and the Roe Classification Systems (Edwards, 1972). Reading scores for each

student were obtained from the student's scores on the Iowa Test of Basic Skills. Each student had to read at the fourth grade level.

Additional instrumentation was necessary to control for IQ. The Otis Quick Scoring Test of Mental Abilities (OTIS) was administered to each of the students in their last year of junior high school. Each student's IQ score on the OTIS was used as the covariate for this study.

Results

The results of this study indicated highly significant differences. The mean scores for each group on each dependent variable are given in Table 1. There were significant F ratios among the three groups on all three dependent variables. The post-hoc analyses were performed using the alpha/N shrinkage technique which permitted the researcher to make these multiple comparisons and still covary the effects of IQ.

INSERT TABLE 1

On all three subscales, "Characteristics," "Preparation," and "Planning," the students in the computer group scored significantly higher than the students in the counseled group and control group ($p > .001$). The students in the counseled group, however, scored significantly higher than the students in the control group on all three variables ($p > .001$). These were significant main effects results (treatment effects), since

there were no significant interaction effects of IQ and treatment.

INSERT TABLE 2

Conclusions, Discussions, and Recommendations

The results of this study demonstrate that a computer-assisted occupational information system can teach occupational information better than a counselor-based occupational information system. The results also indicate that both systems can effectively teach occupational information since both groups learned significantly more occupational information than the control group.

There are a number of possible explanations for these results. One explanation may be that computers have demonstrated that they can teach facts better than teachers (Freedman, 1967; Bushnell, 1966). A second explanation may be that the interaction of the students with the computer program, question and answer, provided a practice effect for taking the ACD. The third explanation may be the counselors' unfamiliarity for providing occupational information individually since the counselors in this school usually provide this type of information in groups.

The investigator has made the following recommendations for future research: (1) determine whether the results would be similar for motivated and non-vocational students; (2) investigate the results of this study using an affective rather than cognitive criterion; (3) investigate these results longitudinally; and (4) replicate the study.

This study has shown the effectiveness of a computer-based occupational information system for teaching vocational information to disadvantaged vocational students. Further study is needed to determine whether there are other significant reasons for adopting costly computer-based information systems in the schools.

References:

Baer, M. F. and Roeber, E. C. Occupational Information. Chicago: Science Research Associates, Inc., 1964.

Bushnel, D. "For Each Student A Teacher," Saturday Review, 49, 1966, p. 31.

Campbell, D. T. and Stanley, J. C. Experimental and Quasi-experimental Designs for Research. Chicago: Rand McNally and Company, 1963.

Computerized Vocational Information System Counselor's Manual, Villa Park, Illinois: Willowbrook High School, CVIS Demonstration Center, 1971.

Cooley, W. W. "Computer Systems for Guidance" in James J. Gallagher (ed.) Computer-Based Vocational Guidance Systems. Washington, D. C.: U. S. Department of Health, Education and Welfare, 1969.

Edwards, A. L. Experimental Design in Psychological Research. New York: Holt, Rhinehart and Winston, Inc., 1972, 42-47.

Freedman, M. I. "The Effectiveness of Machine Instruction in the Teaching of Third Grade Spelling," Journal of Educational Research, 40, 1967, 366-367.

Gallagher, J. J. (ed.) Computer-Based Vocational Guidance Systems. Washington, D. C.: U. S. Department of Health, Education and Welfare, OE-25053, 1969.

Handbook of the ACT Assessment of Career Development. Iowa City, Iowa: The American College Testing Program, 1973.

Lindquist, E. F. Educational Measurement. Washington, D. C.: American Council of Education, 1951.

Merrill, M. D. and Stolurow, L. M. "Hierarchial Preview vs. Problem Oriented Review in Learning an Imaginary Science," American Educational Research Journal, 3, 1966, 251-261.

Norris, W. Occupational Information in the Elementary School. Chicago: Science Research Associates, 1963.

Occupational Work Experience (mimeograph). The Ohio State Department of Vocational Education.

Roe, A. A. The Psychology of Occupations. New York: John Wiley and Sons, 1956.

Super, D. E. "Vocational Adjustment: Implementing a Self-Concept," Occupations, 30, 1951, 88-92.

Thorndike, R. L. & Hagan, E. Measurement and Evaluation in Psychology and Education. New York: John Wiley & Sons, Inc., 1969.

Zinn, K. L. "Instructional Uses of Interactive Computer Systems," Datamation, 14, 1968, 22-27.

TABLE 1

MEAN SCORES FOR GROUPS ON ACD SUBSCALES

Group	N	Characteristics[a]	Preparation[b]	Planning[c]
Computer group	25	41.29	13.04	30.96
Counseled group	27	33.48	10.81	24.85
Control group	20	21.65	5.08	18.48

[a]Highest possible score = 54
[b]Highest possible score = 18
[c]Highest possible score = 40

TABLE 2

F-RATIOS AND MULTIPLE COMPARISONS OF THE COMPUTER GROUP, COUNSELED GROUP AND CONTROL GROUP ON THE DEPENDENT VARIABLES

Dependent Variable 1: Characteristics

Groups Compared	F	Alpha	p*
Computer vs. Counseled vs. Control	48.59	.05	$p < .00001$
Computer vs. Counseled	45.45	.025	$p < .00001$
Computer vs. Control	38.68	.025	$p < .00001$
Counseled vs. Control	41.58	.025	$p < .00001$

Dependent Variable 2: Preparation

Groups Compared	F	Alpha	p*
Computer vs. Counseled vs. Control	38.22	.05	$p < .00001$
Computer vs. Counseled	35.75	.025	$p < .00001$
Computer vs. Control	30.42	.025	$p < .00001$
Counseled vs. Control	32.70	.025	$p < .00001$

Dependent Variable 3: Planning

Groups Compared	F	Alpha	p*
Computer vs. Counseled vs. Control	80.46	.05	$p < .00001$
Computer vs. Counseled	75.26	.05	$p < .00001$
Computer vs. Control	64.84	.05	$p < .00001$
Counseled vs. Control	68.85	.05	$p < .00001$

*indicates a one-tailed test of probability