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ABSTRACT

After an extensive review of the literature concerned with evaluating career objectives, a literature with little cohesion, six areas were isolated as crucial indices of the adequacy of career education. These areas are: (1) self-awareness, (2) career-awareness, (3) decision-making skills, (4) overall school behavior, (5) career competencies, and (6) career attitudes and interests. Measures in all six areas should be obtained for the evaluation of career education programs. Preferably, measures should be obtained through experimental and quasi-experimental designs with pretest data, rather than case study methods. One advantage of using an experimental design is that resulting data is quantitative and may be statistically analyzed. Special emphasis is given to the equality of the control group with the experimental group because of validity problems related to the maturation bias. The importance of research follow-up is also stressed. Guidelines and recommendations are offered to reduce the amount of error in the evaluation of career education programs. (BJG)

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Evaluating Career Education: A Review and Model¹

by

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Evaluating Career Education: A Review and Model

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The purpose of this paper is to (1) examine and review evaluations of career education programs currently in the literature, and (2) to suggest a model or paradigm for conducting such evaluations. The first part of the paper will present past work and the second part suggest guidelines for future work.

I. A Review of Evaluative Studies of Career Education

This review is organized into three sections. In the first, studies are described that employed a control or comparison group with which to compare the results of the group receiving the career education experience. We call this an experimental or quasi-experimental design. (This section is further subdivided to distinguish between those that use both pretest and posttest and those that use posttest only.) The second section of studies includes ones employing only a treatment group but using quantitative data, typically on a pretest-posttest basis, to evaluate the effects of the treatment. We call this a descriptive approach. The third section is like the second in that only a single group is employed but, unlike the second, only qualitative data are obtained. We call these case studies.

Experimental and Quasi-Experimental Evaluative Studies

Pretest-Posttest Designs. The most extensive and complete evaluations include both an experimental or treatment group -- one which receives the career education experience, and a control or comparison group which does not receive the experience. On the one or more outcome measures employed, data are collected at the start of the experience (pretest) and its conclusion (posttest). These designs, as we shall see later on, control for

various forms of experimental bias. Eight evaluations were found that used this approach.

Cochran and Weis (1972) evaluated the effect of career exploration programs on ninth and tenth graders in Dayton, Ohio, at an area vocational high school and a general high school. Students from the two program schools and a control high school were pre- and posttested on the Ohio Vocational Interest Survey, the Tennessee Self Concept Scale, and a staff-constructed Career Plans Survey. Using analysis of covariance, the results showed that students from the vocational school were better informed about career choice and demonstrated more positive attitudes toward their abilities and chances for vocational advancement as compared to students from the control school and general high school. However, changes in vocational interests were more closely related to grade level than to school programs.

Holstein (1972; see also Holstein, 1971 and Olson, 1972) describes the evaluation of an exemplary rural area career education program for Lincoln County, West Virginia. The project conducted a product evaluation for grades 1-6 utilizing an experimental design in which 80 students per grade level were randomly assigned to the experimental group and 80 to the control group. All students in the study were pre- and posttested in (1) language and (2) mathematics achievement using the California Achievement Tests and on a homemade test of (3) occupational awareness. Results, using an analysis of covariance with pretest scores as covariates, showed that career education students outperformed control students on all measures.

Hugueley (1973) used the Gordon Occupational Checklist, Crites' Career Maturity Inventory, and Westbrook's Vocational Maturity Scale to compare changes from pre- to posttest among students experiencing a career education program in the city of Memphis to those not. Results of t-tests

showed consistently greater gains for experimentals over controls on the two maturity instruments with results on the Checklist being mixed across grade levels.

Ovard (1973) studied to see if there were differences in attitudes toward occupations and the work ethic between students enrolled in a career education program (Utah World of Work) and those enrolled in a conventional program. Sixth grade students were pre- and posttested, and their scores were analyzed by chi square to assess differences at the beginning and end of the school year. A teacher questionnaire was also administered at the end of the school year. Findings showed teachers were strongly in support of career education and students were found to show a favorable change in attitude toward occupations and the work ethic.

A Cleveland, Ohio career development program reported by Sims (1973) used occupational information, orientation, and career exploration to try to bridge the gap between school and earning a living for elementary and high school students in an urban poverty area. The product evaluation consisted of pre- and posttesting of fifth- and sixth-grade treatment and matched control students on a job-information questionnaire with a .85 reliability. Multifactor analysis of variance showed that the treatment schools' students had acquired more job information than the control. A process evaluation consisting of a review of materials produced, interviews of staff, teachers, and administrators and on-site observations yielded the judgment that the program was otherwise not successful in imparting more positive attitudes towards work-related concepts or in expanding job preferences.

A three-year developmental career education program in Cobb County, Georgia is reported on by Smith (1973). The approach fused aspects of

vocational education, guidance, and a broad-based curriculum into a systematic and sequential effort within the elementary, middle and secondary schools. Students in the participating schools and in the control schools were tested at the end of one, two, and three years of involvement in the project. The product evaluation utilized the P.E.C.E. Knowledge Test of Occupations, homemade attitude scales and questionnaires, school records, and standardized achievement tests. The results (using analysis of variance and chi-square) were as follows: (1) no significant difference between treatment and control in knowledge of occupations, attitude toward self and others, attitude toward the curriculum, additional career counseling, number of dropouts with job entry skills, and reduction of dropouts; (2) trends toward lower absentee rate at the senior high school and higher academic achievement for some of the classes in third, fourth, and sixth grades among treatment groups; (3) significant increases for treatment groups in attitude toward occupational education by teachers, number of students applying to post-secondary schools, number of students enrolling in vocational programs in high school, number of students enrolling in work study and parental involvement. Process evaluation using program ratings was highest at the elementary and middle school levels and lower at the secondary levels.

McNulty (1974) studied a Career Opportunities and Practical Experiences (COPE) Program involving juniors and seniors at the Acton-Boxborough High School in Massachusetts. The study included 100 students randomly selected from a larger group of volunteers. The first 50 students were assigned to the experimental group and the last 50 to the control group. The COPE program provided for vocational reality testing in the community with multiple role models and multiple work experiences for

students at an appropriate age for exploration. The process evaluation conducted via an evaluative questionnaire responded to by participating students, parents, sponsors, and teachers revealed a predicted favorable view by the participants. Both groups were posttested on the California Test of Personality and Career Maturity Inventory, and an analysis of covariance was applied to the data. Analysis indicated that, relative to the control group, there were no significant gains in personal adjustment, social adjustment, and vocational development by the treatment group. A positive and significant correlation between scores on the CTP and CMI for all students (N=100) was obtained.

Warren (1974) conducted a study to determine the change in career maturity and job recognition of sixth-, seventh-, and eighth-grade students whose teachers participated in career education inservice classes. The study was completed in four north central Kansas unified school districts. The treatment group involved 407 students and the control group 166 students all of whom were pre- and posttested on the Attitude Scale and Competence Test of Crites' Career Maturity Inventory. T- tests revealed significant differences in mean scores on both parts of the CMI in favor of the treatment group.

The eight studies reviewed above used essentially the same design but a variety of outcome measures varying from academic achievement to career information to career maturity. Career education was found to produce significant effects in contrast to a control consistently but not uniformly across studies and across measures.

Posttest-Only Designs. Nine studies reported here compared treatment and control groups but did not utilize a pretest. This procedure is

vulnerable to certain kinds of bias as described in the second half of the paper.

Boriolo (1972) evaluated the effects of a comprehensive career development program in Hayward, Alameda County, California. The Crites Career Maturity Inventory was administered to treatment students at the end of the program and their results were compared by t-test with students' CMI scores from other California schools. No significant differences (at the .01 level) were found. However, an Occupational Information Survey pre- and posttest of treatment and control groups yielded greater gains for treatment students than for controls at the elementary level and lesser gains for treatment students than for controls at the secondary level.*

An exemplary career development curriculum project involving 2,424 elementary and secondary students, 108 teachers, and 180 parents in Knox County Schools, Knoxville, Tennessee is summarized in detail by Neal (1972). Treatment and control student posttest results revealed no significant difference between the two groups on a Knowledge of Careers test. Nor was there any correlation between work experience of teachers and the students. Randomly chosen parent attitudes were measured by a questionnaire, and both treatment and control parent groups had a favorable attitude toward occupational education. A self-concept inventory for grades 1-3 yielded a higher mean score for the control group; grades 4-6 showed mixed results; and in grades 7-9 the control group means were higher. Sociograms showed some positive changes in treatment students working together.

Winegard (1972) described a comprehensive vocational guidance program in the Indianapolis, Indiana public schools as a possible model for other model cities. Using a (1) student opinion poll, (2) Remmer's Purdue Master

*This latter result was based on a design utilizing both pretest and posttest which fits the preceding subsection.

Attitude Scale, and (3) the LOG Scale, the Occupational Preparation Program posttest only results comparing control and treatment students showed treatment students to have significantly higher morale, more positive attitudes, and a higher level of motivation than controls.

McCaleb (1972; see also 1973) describes Project VIGOR in the Portland, Oregon schools which addressed itself to the objective of changing a conventional academically oriented general education system into one whose curriculum reflected the needs of all students from the primary through the secondary grades, including post-high-school contact and placement assistance, where possible. Evaluation consisted of questionnaires completed by random samples of treatment school students and control school students at the end of the project. Analysis by t-tests and z-tests indicated that the objectives of the project were not met; in many instances, the control group appeared to do better than the treatment group on the limited instruments.

Cunningham (1973) assessed the effect of a community-career education orientation program on the self-concept of fifth grade pupils in New Britain, Connecticut. Extensive resources were committed to a career education program in the elementary school by utilizing the community for field trips and teacher inservice to create a community-school environment for learning. The self-report How I See Myself Scale was used to measure five self-concept variables: academic adequacy, autonomy, interpersonal adequacy, physical appearance, and a teacher-school factor among members of an experimental and nonequivalent control group. Analysis of test scores by t-test to determine the effect on self-concept showed significant differences between the control and experimental groups. The null hypothesis

that the Community-Career Education Orientation Program had no significant effect on pupil self-concept was not supported.

Dennard (1973) measured the effects that one year of Career Education had on selected fourth grade students in Clayton County, Georgia. The treatment group consisted of 84 students and the control group consisted of 86 fourth grade students. Data were collected on the Iowa Tests of Basic Skills, Cognitive Abilities Test, Student Knowledge of Careers, Personal Sketch of Student Career Choice, and Teacher Rating of Career Education. Three null hypotheses were rejected: (1) Treatment students with an I.Q. of 110 or below had higher achievement in knowledge of careers at the end of grade 4 than comparable control students; (2) boys had a greater knowledge of careers than girls after one year of the program; (3) fourth graders in the program had a greater knowledge of careers than those not in the program. There were no significant differences in student attitude towards careers and teacher ratings of career education in the control and treatment schools.

Holden (1973) reports on an exemplary project in Career Education in Fairfield, Chesterfield, and Kershaw Counties of South Carolina. The project contained five components: elementary career orientation, work experience, interdisciplinary program, intensive training, and job placement. A battery of cognitive and affective instruments as well as school records was utilized on a posttest-only basis to measure a variety of student attitudes, knowledge, and participation among career education and control students. Results showed the following: (1) Kershaw and Chesterfield Counties were fairly successful in their efforts to teach elementary school students about careers; (2) work experience students had not acquired a

significantly greater amount of knowledge about occupations; (3) Vocational Interdisciplinary Project students were, in several instances, making greater achievement in mathematics and language arts than would have happened if they had not been enrolled in the VIP Component; (4) the attitudes of the VIP and control students toward acquiring a postsecondary education, obtaining vocational skills, and curricular offerings were generally positive, but not distinguishable from each other; (5) during the second program year, VIP students in Chesterfield County scored significantly higher on the Metropolitan Achievement Tests than did the control group students, whereas during the third year program, the two groups' scores were nearly indistinguishable from each other.

A local Career Education program was evaluated to measure the effect of the program on academic achievement and career development by Solomon (1973). Forty fifth and sixth grade experimental group students were compared by 40 fifth and sixth grade matched controls from another school. The students were posttested on the Mathematics and Reading tests of the Metropolitan Achievement Tests and the Career Maturity Inventory. No significant differences were obtained on any measure.

The Career Development Exemplary Project (CDEP) examined by Peck (1973) was the District of Columbia's effort to place career development for grades K-9 into the mainstream of their curriculum. A career education assessment battery was administered to the CDEP students and a control group at the conclusion of the project. Results on a recently standardized Self Observation Scale (IDEA) showed CDEP children to have a better self-concept than controls. Results on a project-developed Work Attitude Survey revealed that CDEP students had more positive attitudes toward work than controls.

On the School Sentiment Index elementary career development students revealed more favorable attitudes on most subscales than did controls. The Occupational Values Inventory results for grades 7, 8, and 9 showed that project students were realistic in their career planning. Results on the Career Awareness Development Inventory, developed specifically for this project, indicated that project students (grades 6-9) were able to relate school-learned skills to work situations at a reasonable level of proficiency. An Occupational Preference Survey, designed at Washington State University, indicated that CDEP students had a greater preference for working in association with others than did control students. In spite of the number of successful outcomes, process evaluation revealed sporadic use and implementation of career education materials, limited community involvement, and limited quality of project-developed curriculum guides.

This group of studies, like the preceding ones, shows career education to be reasonably effective as reflected on a series of measures of knowledge and attitudes. It must be kept in mind, though, that because of the absence of a pretest there is no way to be sure that treatment and control students began their relative experiences at equivalent levels on the outcome measures. This must be considered a weakness of this approach.

Descriptive Evaluations

In this section, nine evaluations are briefly reviewed each of which utilized only the treatment group but applied a variety of outcome measures on a pretest-posttest basis. While this approach provides an indication of the initial status of students on each measure, it does not provide a basis for comparison of results such as are provided by a control group.

Rochow (1971) reported on the Vocational Career Development Program in

Pontiac, Michigan. The Occupational Knowledge Test was administered on a pretest and posttest basis to students in kindergarten through grade 6 in project schools. Using t-tests to analyze the data, student posttest means were found to be significantly higher than pretest means. The measurement of students' self-concept with the Fantasy, Ability, Reality Test also resulted in significant gain scores. The Crites Career Maturity Inventory given to sixth graders indicated student gain. An extensive process evaluation was undertaken and is included in the report.

An occupational preparation program presented by Young (1971) in New Orleans, Louisiana involved all levels of community education. Elementary school emphasis was on field trips with experiences to develop realistic attitudes toward work; middle school emphasis was on curriculum dealing with occupational information and guidance; instruction at the senior high school level combined on-the-job training with vocational guidance and job placement. A pre- and post Attitude Towards Work Inventory was administered to project participants only. A significant positive gain (t-test) was found for students in grades 1-8.

An interdisciplinary career assessment program described by Lapinsky (1972) was an experiment in curriculum revision begun in 1969 at Stamford High School, Stamford Connecticut, for the purpose of providing instruction relevant to the needs of 86 slow learners and disadvantaged youth. The cluster concept and correlation of classroom materials to occupational assessment and skill training were essential to the program. For evaluation, a pre- and postexamination was conducted on data gathered from anecdotal and cumulative records, questionnaires, inventories, teacher rating scales, the Mooney Problem Checklist, and the SRA Basic Skills in Arithmetic Test. Much

of the pretesting was conducted after the program was initiated. According to the findings, the program met with above-average success.

Bishop (1973) examined a research and development project in career education for Mobile County and Phenix City Public Schools, Alabama. The results were tabulated from some pre- and posttest scores of a small random sample of program students. The instruments used were the Career Maturity Inventory, a self concept scale, and a semantic differential scale. The limited testing revealed no significant findings. There was an indication that student and teacher attitude toward career education was favorable.

Gibson (1973) directed a three-year continuous occupational information project for grades 1-12 in Henderson County Schools, Kentucky. Results on a staff-developed self-concept inventory, the Comprehensive Tests of Basic Skills, Ohio Vocational Inventory Survey, General Aptitude Test Battery, and Barclay Classroom Climate Inventory led the evaluators to conclude that the school curriculum had changed from a traditional subject-matter orientation to a more life-centered one.

Hammond (1973) conducted an evaluation of a planned career education program for rural students in grades 7-10 in Harrington, Maine which provided a variety of experiences and knowledge to form a basis for future educational and occupational choices. Paired t-tests were performed on pre- and posttest results of project school seventh and tenth graders taking the Occupational Knowledge Test. Results showed significant gain in mean scores of seventh grade students but not tenth grade students. Significant correlations were obtained between scores on the Logge-Thorndike Intelligence Test and the Occupational Knowledge Test for both seventh and tenth graders.

A career education project was evaluated by Jorgensen (1973) in Petersburg City and Radford City, Virginia which aimed at the development and implementation of elementary level career awareness and an improved guidance, counseling and placement service. Results on a pre- and post-homemade career awareness test by K-8 project students indicated no significant increase in occupational knowledge by participating students.

Lewis (1973) evaluated a career education project in Batesville-Leesville, S.C. and used PERT to conclude that the required program activities had been carried out. However, pre- and posttesting of occupational orientation produced inconclusive results.

The purpose of a study by Lowe (1973) was to examine selective effects of a career education program on upper elementary students in Calhoun County, Michigan. The Career Development Battery and the Occupational Aspiration Scale were administered to a representative sample of 200 fourth-, fifth- and sixth-grade students in the project. Results of analysis of variance prompted the following conclusions: In the sample studied, no sexual differences existed on knowledge of occupations, awareness of occupations, and future occupational aspirations; teacher implementation of the career education concept caused differences in student gains on occupational knowledge and occupational awareness; and no effects on occupational awareness of students were due to parental occupational prestige level.

Like studies using the more complete designs, these nine studies employed a variety of outcome measures and documented, in most cases, significant gains by students enrolled in career education programs. A variety of attitude and knowledge measures were employed on a pretest and posttest basis, but significant gains are difficult to evaluate in the absence of comparison data.

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Case Studies

Many career education programs meet the requirement for evaluation by administering a questionnaire to students to solicit their opinions and feelings toward the program and possible recommendations for improvement (Krueck, 1972; Kunzman, 1973). Other evaluations are broader in scope in terms of those whose opinions and reactions are solicited. Questionnaires are distributed not only to students but to teachers, parents, and community members in an effort to estimate support; the overall impression of the evaluator reading the responses is reported (Jacobs, 1971; Mietus & Stilling, 1971; Nelson, Gage, & Walter, 1971; Carlson, 1972, 1973; McKinney, 1973). Some evaluations focus on a description of the process of the program -- for example, the degree of utilization of program materials by teachers (Moskowitz, 1973) -- rather than on the outcomes. Other evaluations use little if any instrumentation (Berg, 1972), and still others use extensive instrumentation but only summarize the results qualitatively (Willis, 1973 a, b) rather than providing any statistical analyses.

The prototype of the case study evaluation relies on the use of an outside evaluator or team of evaluators. This person (or persons) will usually spend from one to five or more days observing the program and talking to students, teachers, and possibly parents and community members. Information will also be gleaned from written documents and conversations with the program director. The impressions of the team members are then written up in the form of a narrative which may or may not be organized around a given set of questions or a prescribed outline (Jenkins, 1971; Educational Management Services, 1973; Klaus, 1973; Nerden, 1973; Riley, 1973; Schuermann, 1973; Shelford, 1973). Within the narrative, the evaluators

report their conclusions concerning the effectiveness of the program usually in terms of their judgment of whether the project has met its objectives.

Invariably case studies find the programs evaluated to be successful, and the above studies -- clearly more favorable than unfavorable -- were no exception. Whether this accurately reflects the strengths of career education or the vulnerability of the case study approach to subjectivity and bias cannot be determined, but, at any rate, the results of case studies such as these must be interpreted with caution.

II. A Framework for Assessing Career Education Utilization Programs

For the assessment of the adequacy or completeness of career education programs (or any other educational programs, for that matter) a framework or category system is helpful. A framework is also useful as a basis for making recommendations for subsequent evaluation research. Such a framework appears in Table 1.

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Table 1

Framework for Assessing Career Education Utilization
Programs (FACE UP)

- I. Design
 - a. experimental and quasi-experimental: experimental vs. control group
 - b. descriptive: one group - quantitative data
 - c. case study: one group - qualitative data
- II. Independent Variable - nature of treatment
 - a. intensity
 - b. duration
 - c. teacher training
 - d. public relations
 - e. quality of materials
 - f. grade level
- III. Dependent Variables - outcomes
 - A. Process
 - a. teaching behavior
 - b. student behavior
 - c. counseling
 - B. Product
 - a. self-awareness (self-descriptions, self-concept)
 - b. career-awareness (knowledge of careers)
 - c. decision-making skills (ability to make decisions and solve problems)
 - d. overall school behavior (grades, school achievement, attendance, attitudes toward school)
 - e. career competencies (salable skills)
 - f. career attitudes and interests (attitudes toward work, career development, interests)
 - C. Follow-up
- IV. Control Variables
 - a. selection bias
 - b. history bias
 - c. maturation bias
 - d. population restrictions
- V. Data Analysis
 - a. descriptive
 - b. inferential

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Design

The first question that is asked about an evaluative study deals with the design. In an experimental or quasi-experimental study, a group or sample of students experiencing the program is compared with a group or sample not experiencing the program or experiencing an alternative program. When assignment to experimental and control groups is on a random basis, the design is experimental; when intact or preassigned groups are compared, the design is quasi-experimental. The advantage of these designs is that it makes possible inferences about cause and effect. That is, you can separate the effect of the program from the effect of other nonprogram variables since the control group experiences these other variables when it is not experiencing the program. These designs are recommended because of this important feature. Without comparison data, who is to say whether the same results might not have been obtained without the program?

Descriptive and case-study approaches lack a control group and are themselves distinguished by the presence or absence of quantitative data. The advantage of quantitative data is that it lessens the subjectivity with which outcomes are described. Both designs, however, are limited in their conclusiveness because of the absence of comparison data. Where data from previous school years can be used for comparison purposes, the design can be more appropriately categorized as quasi-experimental.

Evaluators are urged to use experimental and quasi-experimental designs with the inclusion of pretest data. Where a descriptive approach cannot be avoided, pretests are a must if any conclusions about gains, and hence program effectiveness, are to be drawn. Case studies by themselves cannot be considered reliable or valid sources of evaluative data. A major

deficiency of many of the studies reviewed in the first part of this paper is their reliance on the weaker designs.

The Treatment

The second consideration in examining the evaluative studies is the treatment to be evaluated. The term career education, for example, covers a lot of ground. It covers programs that are experienced daily and others only weekly; some that are experienced in class and others after school. Its programs may range from field trips to skill training. It can operate in elementary school or in high school. The reader must know what is being evaluated. Naturally, the less the intensity, duration, or quality of the treatment the less likely it is to have an effect. Evaluators are encouraged to describe treatments fully but economically; it is not the number of words of description but the amount of important information they convey. The use of a set of descriptors like those offered in Table I (II, a-f) may be helpful for this purpose. The studies reviewed devoted considerable space to the description of treatment (although we afforded little space to it in our summaries). There is no problem with the amount of description; however, the use of descriptors might have helped to communicate it more easily.

Outcomes

The outcome area is a major concern in this paper since measurement is its primary focus. Outcomes can be conveniently subdivided into process -- that is, teacher, student, and counselor behavior in the conduct of the program, and product-student changes that result from the program.

Process. Process outcomes, perhaps the less important of the two

subcategories, deal primarily with the behavior of teachers in carrying out the program, often as reflected in the behavior of students. We might, for example, be concerned about whether teachers encouraged hands-on experience, question-asking, integrating of subject-matter and experience, and so on. While this might be considered either part of the treatment or part of the product, it seems to fall between the two -- that is, neither built into the program nor necessarily part of its learner objectives.

It may be helpful for evaluators to measure process outcomes primarily as a way of bridging the gap between input and output. Processes that are inconsistent with program philosophy and intent are not likely to yield the products called for in the objectives. To measure process, the evaluator will probably require homemade, observational instruments geared to the intentions of the program or to good pedagogical practice. In some areas of educational innovation, such as the open classroom, instruments for measuring process have been developed (for example, see Tuckman, Cochran, & Travers, 1974). Because of the variability in career education programs, such instrument development may be unlikely. Nevertheless, systematic observation of classroom behavior is an important component of the evaluation of career education and should not be overlooked. Unfortunately, systematic process evaluation is absent in much of the work reported in the first part of this paper.

Product. A most critical area in any evaluation under-taking is the determination of products to be measured and instrumentation to be employed for their measurement. Two weaknesses often encountered in this aspect of evaluation are (a) a too limited view of product outcomes and (b) a high variability from study to study in the product measures employed. The previously reviewed studies suffer from both deficiencies.

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Table 1 includes a listing of six product areas with some suggested variables for measurement in each. It would be possible to identify additional areas but the six that seem of paramount importance as reflections of the adequacy of career education are: 1) self-awareness, 2) career-awareness, 3) decision-making skills, 4) overall school behavior, 5) career competencies, and 6) career attitudes and interests. It is recommended that evaluations of career education include measures in as many of the six areas as possible. In addition, if projects include objectives outside of these areas, measures to cover these objectives will also be required.

The self-awareness area includes what students know about themselves and their attitudes toward themselves. The latter, usually referred to as self-esteem or self-concept, can be measured by a variety of existing instruments such as the Tennessee Self Concept Scale, Piers-Harris Children's Self Concept Scale, or Self-Appraisal Inventory.* Measures depicting the degree of self-awareness must typically be designed by evaluators themselves and are usually not included in studies.

Self-awareness might also be studied by having the student describe his or her own talents and characteristics and then, by comparing that information to the same information obtained from tests, arriving at a measure of accuracy. An interview procedure might also be used effectively to determine how well students know themselves. Finally, self-awareness might be taken to mean behaviors aimed at finding out about oneself and could be determined by means of a self-report of behavior wherein students

*The first two are published by Counselor Recording and Tests, Box 6184 - Acklen Station, Nashville, Tenn. 37212. The third is distributed by the Instructional Objectives Exchange, Box 24095, Los Angeles, Calif. 90024.

indicate the kinds of behavior they have engaged in to uncover their own talents and characteristics. Many of the studies reviewed included measures in this area, often homemade.

The measurement of career-awareness, meaning knowledge of career characteristics and requirements, necessitates a cognitive instrument dealing with specific careers. In terms of general career-awareness, the problem becomes one of deciding which careers to ask questions about; in terms of specific career-awareness, the difficulty lies in finding or building tests in the large number of career areas that students might choose to pursue. Instrumentation in this area is also hard to find. Nevertheless, a large number of the reviewed studies included such a measure.

Decision-making skills is probably the most difficult and most overlooked of the recommended product areas. Few if any evaluations (including the ones reviewed) contain measures of it although it is avowedly an important objective of career education. Among existing tests, perhaps reasoning tests came closest, but they are more measures of intelligence than of learned skills. For older students, the Watson-Glazer Critical Thinking Appraisal* could be used in this area. Certainly the area of decision-making skills is one that calls for test development.

Of the six categories, measures of overall school behavior are the easiest to find and are measured in many studies (including many of those reviewed) as a by-product of career education. Most schools routinely administer standardized achievement test batteries, the results of which can be incorporated into a career education evaluation. If the same battery has been used in previous years, pretest data are also available. It is probably easiest when test administration occurs in the spring since

*This test is published by Harcourt Brace Jovanovich.

evaluators usually complete data collection at the end of the school year. Information about grades, attendance, dropping out and disciplinary actions are typically part of the normal record-keeping process of schools. If behavior ratings of students are also routinely made, these may also be included in the evaluation. Finally, measures of attitudes toward school are available (see, for instance, the School Sentiment Index*) and can be easily constructed for evaluative purposes.

Many career education programs in the advanced grades aim to provide students with salable skills upon graduation. While trade competency measurement is available in some states, it is usually not for entry level skills. The best way to assess high school exit skill levels may be to use ratings of student performance by shop teachers on suitable rating forms constructed for this purpose. What this measure might lack is reliability it would make up for in both appropriateness (i.e., content validity) and usability (i.e., practicality). Little evidence of such measurement appeared in the studies reviewed.

Finally, measures of various career attitudes and interests are available for use and can be located through test compendia such as the Mental measurement yearbook (Buros, 1972). Instruments such as the Career Maturity Inventory and Ohio Vocational Interest Survey** may be used for measurement of career attitudes and interest and, in fact, were in common evidence in many of the evaluation studies reviewed. Interest measures may be dimensionalized by examining discreteness of interest patterns or degree of interests in areas covered in the program. (Awareness of interest would

*This measure is distributed by the Instructional Objectives Exchange.

**The CMI is published by California Test Bureau/McGraw Hill; the OVIS by Harcourt Brace Jovanovich.

be covered under self-awareness.) Descriptions of measures such as those mentioned above as well as lists of instrument reference sources may be found in Tuckman (1975).

Follow-up. The ultimate evaluation of career education programs will be through follow-up of graduates. Longitudinally determined outcomes such as employment status and career adjustment and satisfaction, measured at various postprogram intervals, will tell us much about the kinds of effects that we can expect from career education programs. Perhaps the most economical and, hence, likely way of obtaining follow-up data is to include a question about career education experiences in all general large-scale follow-up undertakings such as Project TALENT. While such data will be retrospective, they will help us determine the long-range effects of career education. Follow-up data were all but absent in the reviewed studies.

Control Variables

It is important to be able to separate the effects of career education from the effects of both selection and history bias in our evaluations. Selection bias refers to outcomes that are more a function of student characteristics such as mental ability than of career education experiences per se. Tuckman and Montare (1974), for example, found that students in the so-called college preparatory program possessed more career information than students in the vocational programs in two school districts. More than likely, this is a reflection of the higher mental ability of the former group than of any specific in-school experiences. To control for these differences, adjustments via either design or statistics must be made. Where experimental and control groups are to be compared, care must be taken to equalize them

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on potentially influential individual differences. To accomplish this, pretesting is mandated. The studies reviewed that use experimental or quasi-experimental designs on a posttest-only basis make it difficult to equalize groups or to assess their differences at the start of the program.

Individual differences can also be somewhat controlled by restricting the population to be studied. Limiting comparisons, for example, to students who are employment-bound allows the range of individual differences to be narrowed and their influence to be lessened. Of course, evaluators doing this must recognize that their ability to generalize will also be limited to the population studied. However, if individual differences will otherwise be uncontrolled, the sacrifice in the ability to generalize is a price well worth paying for increased internal validity.

History bias refers to the influence of other events occurring at the same time as the experience or treatment being evaluated. Students have a wide variety of educational experiences simultaneously making it difficult to isolate the effects of specific career education experiences from other educational effects. Maturation bias is also a potential threat to validity in these evaluations since students are maturing during the treatment period, such maturation producing gains of its own. Both history and maturation bias can be effectively controlled if evaluators utilize a control or comparison group who receive all the same educational experiences as the treatment group except for the treatment and who are the same age as treatment students. Descriptive studies such as those reviewed fall short on this requirement.

Statistics

Where quantitative data are obtained, both descriptive and inferential

statistics should be used. Statistics help the reader determine the extent to which findings are true or spurious. This is true whether one is assessing gains from pretest to posttest using simple t-test results or carrying out more sophisticated analyses or covariance, comparing groups while statistically controlling for individual differences. In all cases, evaluators are urged to analyze their data statistically.

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The use of the above guidelines and recommendations should reduce the error in career education evaluations thereby allowing the results to be a more clearcut reflection of the efficiency of the programs themselves. The reader is also referred to Tuckman (1972) for more detailed information about evaluation.

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