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ABSTRACT

Physicians, psychologists, and anthropologists have developed procedures and models for preparing case studies that meet the needs of their profession. In the field of educational evaluation, procedures for conducting student case studies are not readily available. Although case studies, consisting of descriptions of exemplary educational projects, have been used in the past, little attention has been given to using student case studies as a basis for program evaluation. This paper addresses the purposes for using this methodology in evaluation, describes some procedures for conducting a case study, and illustrates the procedures and findings based on the use of this methodology in evaluating an Experience-Based Career Education project. A completed case study narrative is contained in the appendix as an example of the information provided by this methodology. (Author)

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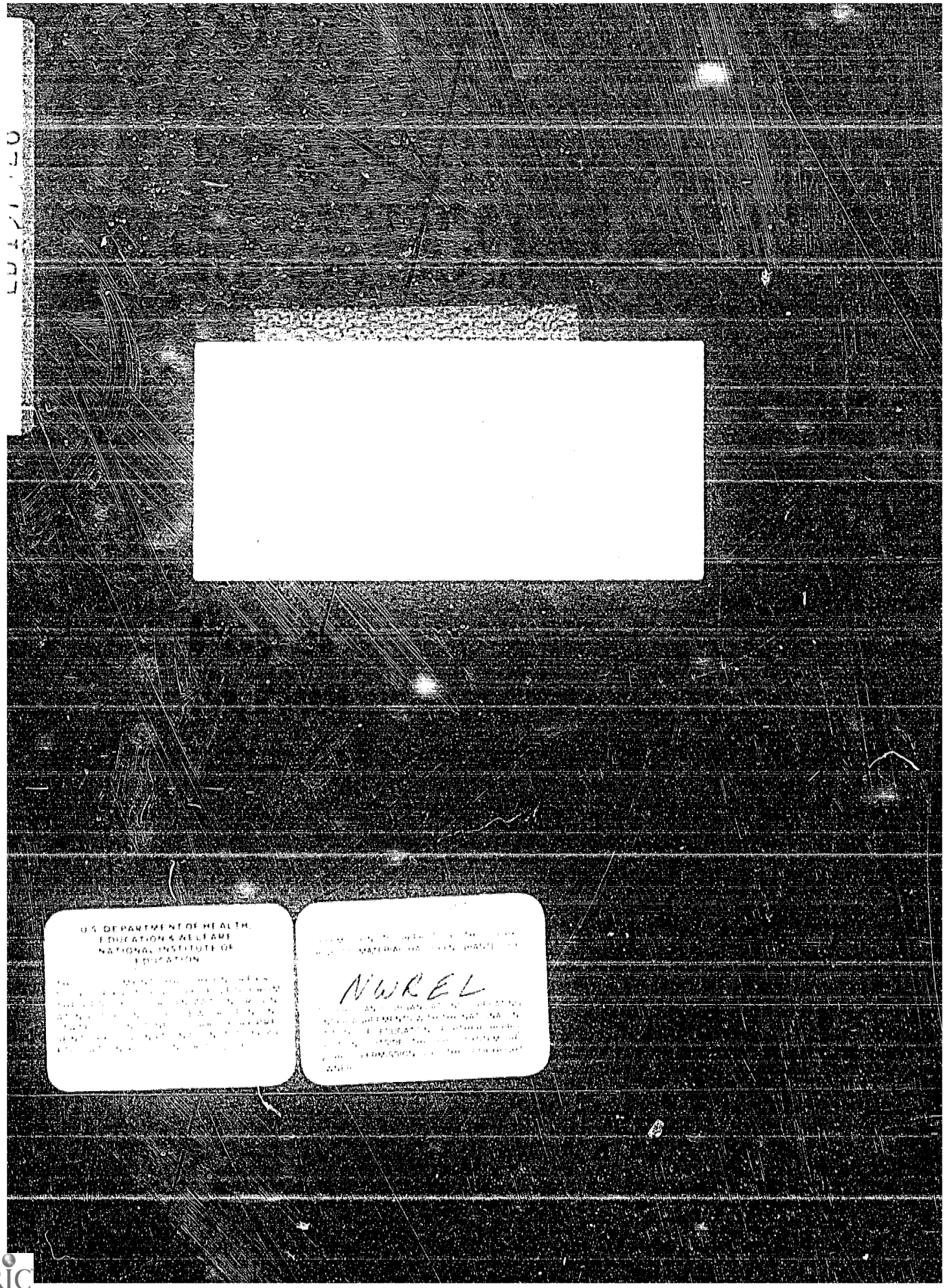
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THE USE OF STUDENT CASE STUDY METHODOLOGY IN PROGRAM EVALUATION

No. 10

Harry L. Fehrenbacher, Thomas R. Owens
and Joseph F. Haenn

Northwest Regional Educational Laboratory

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ABSTRACT

The Use of Student Case Study Methodology in Program Evaluation

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Physicians, psychologists and anthropologists have developed procedures and models for preparing case studies that meet the needs of their profession. In the field of educational evaluation, procedures for conducting student case studies are not readily available. Although case studies, consisting of descriptions of exemplary educational projects, have been used in the past, little attention has been given to using student case studies as a basis for program evaluation. This paper addresses the purposes for using this methodology in evaluation, describes some procedures for conducting a case study, and illustrates the procedures and findings based on the use of this methodology in evaluating an Experience-Based Career Education project. A completed case study narrative is contained in the appendix as an example of the information provided by this methodology.

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THE USE OF STUDENT CASE STUDY METHODOLOGY IN PROGRAM EVALUATION[1]

Compared to the research in the physical and natural sciences, social science research (including research on education) is still in its adolescence (Glass, 1972). One of its growing pains involves the controversy of whether nomothetic (group-statistical) or ideographic (clinical case study) methodologies should be the major tools in finding answers to social and educational problems (Frey, 1973). The advocates of the nomothetic approach argue that only by collecting well-defined data from a relatively large number of individuals can reliable and accurate answers to the research problems at hand be obtained. The ideographic enthusiasts, on the other hand, maintain that only by focusing on individuals and describing in detail the interactions of their backgrounds and experiences can valid answers be obtained.

This paper is based on the assumption that both approaches have merits and can make contributions to social science research; therefore, it does not advocate superiority or exclusive use of either methodology. Rather, it describes how the case-study methodology can function as part of an overall evaluation design.

WHAT IS A CASE STUDY?

Physicians, psychologists and anthropologists have developed procedures and models for preparing case studies that meet the needs of their professions. In the field of educational evaluation, procedures for conducting student case studies are not readily available. Although case studies, consisting of descriptions of exemplary educational projects, have been used in the past, little attention has been given to using student case studies as a basis for program evaluation.

The case study approach in evaluation differs from more conventional group statistical approaches. In the conventional approach, data on a few variables are generally summarized across many or all program

participants. In the case study approach, data on a large number of variables are organized and presented for only a few program participants. Narratives can be prepared describing how a few students work in a program, how they interact with others and what they learned. The differences in approach can provide vastly different information to the evaluation audience.

More specifically, a student case study approach to program evaluation, in the opinion of the authors, has the following four characteristics:

1. The individual is the unit of analysis. One or more students are purposefully or randomly selected to be followed through the program. Information gathered about each individual and his or her activities in the program is eventually reported in a narrative history that describes both the student and the program. These descriptions become a basis for evaluation judgments.

2. A variety of information about the individual is important. Because the ultimate strength of a case study is its ability to describe in a holistic way the program "treatment" and its effects on students, it does not simply focus on narrowly defined outcome variables, but instead it includes much descriptive information. Information sources including background data, test scores, self-reports, peer reports, staff reports, parent observations, student products and evaluator observations are considered important for the case study. Of special importance to the development of a chronological case history is the collection of data at different points in time. The integration and cross-validation of this information add strength to the final case study report.

3. A case study must be systematic. Even though a case study may focus on relatively few students, it is important that it be well planned so that it can address clearly some predetermined questions. At the same time, it must be flexible enough to

address serendipities as they arise. By defining in advance primary and secondary sources of information, a systematic analysis and integration of data are facilitated.

4. The objectivity of the case study is important. The objectivity of the case study is determined to a large degree by the independence of the persons conducting the study and also the extent to which they make known their focus and methodology. Objectivity is enhanced by having the evaluators distinguish between descriptive narrative and judgments or conclusions. In order to check for any evaluator biases, a second person independent of the project and of the initial data collectors should review the student case study narrative and any evaluator conclusions drawn.

WHEN IS A CASE STUDY APPROPRIATE?

Can the case study approach make significant contributions to the evaluation of educational programs, and, if so, when is its use most appropriate? This was the question that led to the incorporation of a case study approach into the overall design of the evaluation of the Experience-Based Career Education (EBCE) program being developed by the Northwest Regional Educational Laboratory (NWREL).

EBCE is a full-time alternative educational program for high school students that attempts to integrate a student's knowledge of a variety of careers with the acquisition of cognitive, interpersonal and affective skills. Emphasis is placed on the student's assumption of responsibility for his or her own learning through individually tailored learning activities in the community. Working adults in the community become the student's role models and instructors. EBCE program staff members become facilitators of the learning process.

To evaluate this program, multiple evaluation strategies (including an experimental design, survey techniques and an ethnography) were combined into a comprehensive evaluation design (Owens, Haenn and

Fehrenbacher, 1976). A case study approach was included as part of that design for a variety of reasons:

a) The EBCE program is highly individualized.[2] The case study approach, in keeping with the philosophy and practice of EBCE, also concentrates on the individual student. Thus outcomes directly related to individual needs are easily assessed. For example, it might be an EBCE learning goal to help a shy, withdrawn student become more outgoing and to help an overly aggressive person become more restrained. Changes in these two students would cancel each other cut in a purely nomothetic approach. A case study, because it uses the student as the unit of analysis, can capture this individualization and can estimate the effectiveness of the program based on the experiences of sampled students.

b) A systems approach to learning is employed in the design and operation of EBCE. The learning strategies and management techniques are highly interrelated and interdependent. The holistic nature of the case study approach (Glaser and Backer, 1972) also fits well with a systems approach. It does not reduce the learning processes to independent, isolated parts, but describes the Gestalt as it traces a student's progress, frustrations and challenges throughout the program year.

c) The EBCE program is process oriented. It is the philosophy of the program that the medium really is the message. Therefore, experiential learning is employed to help students learn how to learn. Unlike traditional evaluation methodologies which focus on outcomes, the case-study approach zeroes in on the process of learning. Its primary focus is the student experiencing the learning situation. It describes the student, the situation and the resulting interaction.

d) Because both career education and EBCE are relatively new entities in the field of education, definitive descriptions of neither one are available. Both are evolving and changing. To make ultimate conclusions about their effects is not possible today. To fill the void in the interim, case studies do provide empirical definitions of EBCE. And, to generate working hypotheses, a case study can be a rich source of data.

WHAT ARE SOME SPECIFIC PROCEDURES FOR CONDUCTING A CASE STUDY?

The case study approach is not a hard and fast methodology with inviolable assumptions and universally accepted rules. In fact, a practical "how to do it" guide could not be identified in this evaluation effort. On the following pages is a description of one approach to conducting a case study, the approach used in the evaluation of EBCE.[3]

Suggested Steps

Suggested steps to include in conducting a comprehensive student case study as part of a total program evaluation effort are listed below under the four categories of design, data collection, data analysis and report writing. Illustrations of some of these steps are given in the remainder of this paper.

Design

- Identify the purposes and audiences for the case study.
- Select broad questions around which to organize the study.
- Identify procedures for selecting subjects.
- Develop a data collection plan to include what information is to be collected on each student, when, by whom, how and why.
- Develop specific guide questions to be addressed in reviewing and analyzing each data source.

- Have the design reviewed and revise as necessary.

Data Collection

- Obtain permission from students, parents and staff for data to be collected and used in the study.
- Identify a logistics system for collecting the information.
- Prepare a management plan to monitor the data collection and to record the data in a systematic manner.
- Review file data and student products prior to interviews so that any questions raised by these documents can be discussed in interviews with students, staff or others.
- Develop and pilot test interview guides and other data collection instruments to be used.
- Revise the case study design, as appropriate, based on insights gained from the data being collected.

Data Analysis

- Answer prespecified questions addressed to each data source.
- Locate patterns in attitudes or behaviors of each student.
- Cross-reference information collected from various sources that relate to the same factors to identify discrepancies or collaborative evidence.
- For individual student scores on group administered instruments, identify and use reference points such as the mean and standard deviation for all students in a program.

Report Writing

- Review all case study notes for each subject.
- Prepare an outline for the report.
- Obtain the assistance of a nontechnical writer to edit and reorganize the report.
- Have the subject of the case study review the draft to identify any errors or omissions and to react to the authenticity of the portrayal.
- Write the evaluator's interpretations and reflections on the findings in a separate section from the descriptive narrative.
- Have an independent person review the raw data and the draft to identify any evaluator biases or unwarranted conclusions.

APPLICATION OF SPECIFIC PROCEDURES TO THE EVALUATION OF AN EXPERIENCE-BASED CAREER EDUCATION (EBCE) PROGRAM

Design

Prior to the 1974-75 evaluation of EBCE, a comprehensive case study design was prepared by the NWREL EBCE evaluation unit. This design identified the purposes and audiences for the case studies; broad questions to focus the case studies; a design for selecting subjects; and a data collection plan that included what information was to be collected on each student, when, by whom and a set of specific guide questions to be used in analyzing each data source. The draft case study design was sent to ten educators and evaluation specialists around the country for their review and critique. Based on suggested changes received from this review panel, a revised design was prepared and implemented.

Subjects

EBCE students were first stratified into three groups: juniors, entering seniors and returning seniors. Within each of these groups students were divided into categories of those considered by the EBCE staff as above average, average or below average in terms of demonstrated performance during the first six weeks of the school year. Since resource constraints led the evaluators to limit the total number of case studies to six, a decision was made to randomly select students only from the above average and below average categories within each of the three groups. It was felt that this design would create an accurate representation of the students in EBCE. This stratified random selection resulted in choosing four boys and two girls.

Data Collection

Multiple data collection strategies were used in this study to allow the evaluators to obtain a cross-validation of information about each of the students. These methods included (a) observations of selected students at employer sites three times during the year, (b) interviews three times a year with the student's employer

instructors at the time of observation, (c) parent interviews once a year, (d) indepth student interviews four times a year, (e) informal discussions with program staff and (f) a review of student projects and other documents. A total of 23 records was identified as secondary sources of data for each student and a set of guide questions was prepared for analyzing or reviewing each source. These records included employer evaluations of students, student products, test scores and staff evaluations.

For example, in reviewing the exploration packages written by each student after he or she had completed a career exploration at a job site for two to five days, the evaluator responded to the following questions: 1) What information has the student learned about the occupation? 2) Does the student tend to put the same information comments in each package? 3) Is there any indication that the student is becoming more perceptive in his or her later job explorations? 4) Is there a relationship between types of jobs explored and student reaction to them? 5) How well is the student able to match personal interests and values with those of the job? 6) How does the EBCE project staff member evaluate the student's individual exploration packages?

Data Analysis and Synthesis

Because case studies can result in the accumulation of vast amounts of data that become difficult to analyze and integrate, the EBCE evaluation staff felt it important to establish focal points for the case studies prior to data collection. These focal points were used to organize and reduce data and include:

1. Student decision points (e.g., Why did the student choose EBCE over other alternative programs?)
2. Role relationships with peers, staff and employers (e.g., How do the student's relationships with the EBCE staff compare with former relationships with the regular high school staff?)
3. Student ability to see relationships in what they are experiencing (e.g., Do the students perceive their experiences at the employer site fitting in with what they are doing at the learning center?)

4. Student ability to match personal qualities with career demands (e.g., How do the students perceive their current ability in Basic Skills in relationship with those skills required for the job they are exploring?)

5. Student ability to relate current learning to future vocational and educational plans (e.g., How do students' learning experiences fit into their plans for the future?)

In addition to organizing data around prespecified focal points, evaluators also sorted and analyzed data to detect patterns of attitudes or behaviors in each student. These patterns were then further investigated to determine how they relate to the student's background and what impact, if any, the EBCE program had on them. For example, one student (see the case-study narrative on Mike in the Appendix) entered the program with behavior indicative of low self-esteem and little self-confidence. The evaluators focused on these behaviors and on program activities that might affect them.

Because the case-study approach does not lend itself to traditional data validation techniques, it relies heavily on the judgment of the evaluator to select pertinent data for inclusion in the report, and to disregard less pertinent data. This opportunity for evaluator bias must be recognized and steps taken to minimize it. In this EBCE evaluation, as case-study data were assembled, the reliability and validity of the information were assessed by comparing evaluator observations with those of employers, parents, staff and the student and with data collected by other evaluation methodologies. For example, in Mike's case study, shown as an Appendix, his test scores appear to be in agreement with both staff and employer informal assessments, and thus all these data sources are strengthened as valid indicators of Mike's ability. Mike's confidence about his math ability does not have to stand alone in this case study.

After the narrative was synthesized for each student studied, one final kind of empirical data was collected. The students were asked to read the draft of their own case study and to reflect on the accuracy of fact and of interpretation. In all cases in the evaluation, the students found that the narratives did reflect their experiences and few, if any, changes were suggested.

Evaluators' Reflections

When the case-study narratives were complete, judgments by two evaluators about the program's interactions with each student were then offered. In order to provide a balanced interpretation of the data, a visiting evaluator from out-of-state was asked to review the raw data and interpretations of the case study in a critical manner, looking specifically for the writers' biases and any unwarranted conclusions. All questionable conclusions or omissions were challenged. If they could not be supported by empirical evidence, they were dropped from the report. For an example of evaluator conclusions about an individual student's participation, see the last page of the Appendix, "Evaluator Reflections." More generalized conclusions about the EBCE program were also formulated by the evaluators after reflecting on all six case studies.

Editing

The written narratives and evaluators' conclusions from case studies may get written at a level that is too technical for a general audience of parents or educators. In order to guard against this, it is useful to have a noneducator serve as a reviewer and editor of the case study reports. A newspaper journalist was employed as a consultant to help reorganize and edit the case study reports prior to their final typing.

WHAT ARE SOME OF THE FINDINGS OF A CASE STUDY?

Evaluators who are familiar with the results of an experimental design or survey type of evaluation which describes the methodology, reports the data and draws conclusions based on statistical tests of significance may find the case study report somewhat disconcerting. Case-study data cannot be easily sorted, reduced, and then fed into a statistical formula for a decision on their significance. Instead the evaluator presents the data from the study in the form of case-study narratives. Each narrative is a summarized account of each

student's participation in the program. This narrative, and the evaluator's familiarity with the student and the program, serve as the basis for tentative conclusions about the student's experience in the program.

These narratives (descriptions) and conclusions (judgments) are then available to the evaluation audience to consider along with other information in making decisions about the program.

HOW EFFECTIVE IS THE CASE STUDY AS AN EVALUATION TOOL?

The conclusion from this experiment is that a case study is a useful complement to a total package of methodologies in the evaluation of a program like EBCE. It provides an empirical description of the "treatment" in a traditional pretest-treatment-posttest design. This documented description of what the program "is like" is useful in interpreting experimental findings as well as giving an evaluation audience the vicarious experience of "being there."

As discussed above, both EBCE and career education are new. Because of this, systematically formed and tested hypotheses about the processes and effects of these innovations are not available. A case study, rich in anecdote and detail, can generate useful working hypotheses. These hypotheses can then be tested in other ways such as the reanalysis of experimental data or by the addition of new items on survey instruments. For example, early in the year the case study data collection effort uncovered the fact that while many students had not decided to follow a given career as a result of their EBCE experience, most students had definitely ruled out certain careers. To determine the generalizability of this finding, a question was added to a midyear interview conducted with a larger sample of EBCE students. The findings indicated that while some students were not choosing definite careers, they were utilizing their career choice skills by rejecting certain careers. Several items getting at this concept were included in a student end-of-year questionnaire given to both EBCE and control group students thus allowing the

evaluators to determine if there was a significant different between groups on this variable.

Cross-validation of information ties together case-study data with those from other methodologies. Standardized test scores, affective measures and staff ratings can all be compared to narrative information on the individual from the case studies. Allowing for measurement error, data that deviate strongly for an individual student may be indicators of invalid or inappropriate measures. The usefulness of this cross-validation of data can be seen in the case of Mike, (Appendix). Mike's apparent growth in basic skills as evidenced by test scores was corroborated by observations of community people with whom he worked. His sudden plunge in standardized achievement test scores at the end of his two years in the program, when viewed in terms of his demonstrated change in attitude (i.e., he was seen by staff members as "coasting" out of the program) was probably more validly interpreted as a measure of attitude rather than a decline in basic skills.

The primary strength of the case study then is its ability to provide a holistic description of program processes. It synthesizes vast amounts of information about individuals and about the program and presents it to the evaluation audience in a form that can be interesting and easily understood. It allows the reader to vicariously experience the program and then make his or her own judgments.

One of the weaknesses of the approach involves the uncertainty of generalizing from a very small number of cases. The potential sampling error is high and the representativeness of a small sample is always questionable. Our response to this criticism is that while we cannot guarantee the representativeness of our sample, we have provided enough background information and description of student experiences and outcomes to make the case study useful even if it describes the experiences of a very deviant student.

A second weakness of this approach may be that it relies heavily on evaluator judgment and is thus susceptible to bias. The evaluator not only makes judgments based on the data presented, but also must decide what data must be omitted from the narrative.

Since no two people would produce identical narratives, the case study is very evaluator-dependent. This is a built-in liability of any qualitative approach, and while we don't have an easy solution to it, we have taken steps to minimize it. Two NWREL EBCE evaluators planned and conducted the case studies. The design and instruments were reviewed by a national panel in order to eliminate interview items reflecting a program bias. The development of each narrative underwent extensive evaluation peer review at each stage of preparation. The final draft of each narrative was reviewed by an outside evaluator to challenge any questionable conclusions or omissions.

Perhaps the criticism and weakness most often cited about the case-study approach is that it is not really an evaluation tool, but merely a descriptive one. One can describe processes and outcomes, but cannot say, based on case-study data, that the process is the cause of the outcomes, and that this relationship can be replicated. This is indeed a limitation of a qualitative approach to evaluation. The strength of the case study lies in its descriptive richness, not in the rigor of its causal specifications. Conclusions, based on the case study, are often based on the reader's values as to the importance and reliability of the data in their total configuration. Accepting this limitation, we and others (Cronbach, 1975) suggest that evaluation methodology is not adequately refined as to specify casual connections between processes and outcomes in a natural setting. Until this is possible (if indeed it ever is) the evaluator and reader will continue to make subjective judgments based on the best information possible, and the case study has the potential of contributing significantly to that process.

FOOTNOTES

[1]An earlier version of this paper was presented at the Third Annual Pacific Northwest Educational Research and Evaluation Conference in Seattle, Washington, May 1975.

[2]The previous paper in this series (Owens, Haenn and Fehrenbacher, 1976) presents a description of EBCE in more detail. Further information may be obtained by writing the Project Director, Career Education Program, Northwest Regional Educational Laboratory.

[3]For the complete EBCE case study report, the reader is referred to the FY75 Final Evaluation Report of the NWREL EBCE Program (Owens, Haenn and Fehrenbacher, 1975).

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APPENDIX

MIKE: An Illustrative Case Study

MIKE: AN ILLUSTRATIVE CASE STUDY[1]

Background: Sitting in a classroom at Metro City High School was difficult for Mike in 1972-73. In some classes he was way behind. In math he was always the first to finish a test. "I loved math and could always finish a test in about ten minutes, but I wasn't doing well in my other classes,"[2] Mike explained.

He first heard about Experience-Based Career Education (EBCE) when he was a sophomore. "I really only went to the assembly to get out of one of the classes I didn't like," Mike confessed.

But after listening to the EBCE explanation, Mike was quickly sold on the idea. He not only liked the notion of learning on the job, but also thought the program might allow him to work at his own speed. The notion of no grades and no teachers also appealed to him.

Mike took some descriptive materials home to his parents and they joined him for an evening session at the EBCE learning center to find out more about the program. Now after two years in the program, Mike is a senior and his parents want his younger brother to get into the program.

Early EBCE testing sessions last year verified the inconsistency of Mike's experiences in school. While his reading and language scores were well below the average scored by a randomly selected group of juniors at his school, he showed above average abilities in study skills and demonstrated superior ability in math.[3]

On a less tangible level, EBCE staff members early last school year described Mike as being hyperactive, submissive, lacking in self-confidence and unconcerned about his health and physical appearance when he started the EBCE program. He was also judged to have severe writing deficiencies. Consequently, Mike's EBCE learning manager devised a learning plan that

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[1] All names and references are fictitious in this illustrative case study although the narrative is based on an actual case history.

[2] Unless otherwise indicated, statements in quotation marks refer to comments made by the student during an interview with the evaluator. Pseydonyms were used to replace students' actual names.

[3] When the terms "above average" or "below average" are used in this section it will mean that a student's score was greater than one standard deviation above or below the EBCE group mean for that variable, meaning that less than 18 percent of his peers scored above or below that level.

would build his communications skills (in both writing and interpersonal relations) while encouraging him to explore several career possibilities. Mike's job experiences and projects were designed to capitalize on his existing interests and to broaden them.

First Year EBCE Experiences. A typical day for Mike started at 8:00 a.m., just as in any other high school, but the hours in between varied considerably. When he first arrived at the EBCE learning center, Mike said he usually spent some time "fooling around" with the computer before he worked on projects underway at the center.

On his original application, Mike indicated his career preference would be computer operator. This led to an opportunity in the EBCE program to further explore that area and to learn more about the job. During April and May, Mike's second learning level experience took place in the computer department of City Bank Services. He broke up his time there each day into morning and afternoon blocks, often arriving before his employer instructor did for the morning period. Mike usually spent that time going through computer workbooks. When his employer instructor arrived they went over flow charts together and worked on computer language.

Mike returned to the high school for lunch and a German class he selected as a project. EBCE students seldom take classes at the high school but Mike had a special interest in German since his grandparents speak the language.

Following German class, Mike returned to the learning center for an hour of work on other learning activities and then went to City Bank. "I often stayed there until 5:00 p.m.," Mike said, even though high school hours ended at three.

Mike's activities and interests widened after that first year in the EBCE program but his goal of becoming a computer programmer was reinforced by the learning level experience at City Bank. The start of a new hobby--collection of computer materials--also occurred during the time he spent at City Bank. "My employer instructor gave me some books to read that actually started the collection," Mike said.

Mike's interests in animals also was enhanced by his EBCE experience. Mike has always liked animals and his family has owned a horse since he was 12 years old. By picking blueberries Mike was able to save enough to buy his own colt two years ago. One of Mike's favorite projects during the year related to his horse. The project was designed to help Mike with Basic Skills and to improve his critical thinking skills. Mike read about breeds of horses and how to train them. He then joined a 4-H group with hopes of training his horse for show.

Several months later, Mike again focused on animals for another EBCE project. This time he used the local zoo as a resource, interviewing the

zoo manager and doing a thorough study of the Alaskan Brown Bear. Mike also joined an Explorer Scouting Club of volunteers to help at the zoo on a regular basis. "I really like working with the bears," Mike reflected. "They were really playful. Did you know when they rub their hair against the bars it sounds like a violin?" Evaluation of the zoo project, one of the last Mike completed during the year, showed much improvement. The learning manager commented to Mike, "You are getting your projects done faster, and I think you are taking more time than you did at first to do a better job."

Mike got off to a slow start in the area of Life Skills development. Like some of his peers, he went through a period described by one of the learning managers as "freedom shock." When removed from the more rigid structure normally experienced in a typical school setting, Mike tended to avoid his responsibility to the more "academic" side of his learning program. At first, Mike seldom followed up on commitments and often did not let the staff know what he was doing. By the end of the year, he had improved remarkably in both of these behavior areas.

Through the weekly writing required in maintaining his journal, Mike demonstrated a significant improvement in written communications both in terms of presenting ideas and feelings and in the mechanics of writing. Mike also noted an interesting change in his behavior. "I used to watch a lot of TV and never did any reading," Mike said at the beginning of the following year. "I read two books last year and have completed eight more this summer. Now I go to the book instead of the television," he added. Mike's favorite reading materials are science fiction.

Mike also observed a difference in his attitude about homework. "After going to school for six hours I wouldn't sit down and do homework. But in the EBCE program I wasn't sitting in a classroom, so I didn't mind going home with some more work on my journal or projects."

Mike's personal development was also undergoing change. Much of this change was attributed to one of his employer instructors, an elementary school teacher, who told him how important it is in the work world to wash and wear clean clothes. Both she and the project staff gave Mike much positive reinforcement when his dress improved. That same employer also told Mike that she was really interested in what he had to say and therefore wanted him to speak slower so he could be understood.

Mike's school attendance improved while in the EBCE program. During the year, Mike missed only six days. This was better than the average absence for others in the program, which was found to be 12.3 days missed during the year, and much improved over his high school attendance.

Like a number of other EBCE students in his class, Mike went out on exploration level experiences but completed relatively few other program requirements during the first three months of the school year. By April,

however, he was simultaneously working on eight different projects and pursuing a learning level experience at City Bank. By the time Mike completed his junior year he had finished nine of the required thirteen competencies, explored nine business sites, completed two learning levels and carried through on eleven projects. Two other projects were dropped during the year and one is uncompleted but could be finished in the coming year (See Table 1 for an illustration of Mike's learning activities).

On a more specific level, Mike's competencies included transacting business on a credit basis, maintaining a checking account, designing a comprehensive insurance program, filing taxes, budgeting, developing physical fitness, learning to cope with emergency situations, studying public agencies and operating an automobile.

TABLE 1

TIME CHART OF MIKE'S ACTIVITIES IN EBCE
FOR 1973-74

Projects		Sept Oct Nov Dec Jan Feb Mar Apr May Jun
Critical Thinking	1	*Breeds of Horses and How to Train Them*
	2	*German Class at HS*
	3	*Math*
Functional Citizenship	1	*Immigration Laws and Regulations*
Personal/Social Development	1	*Intergroup Relations-- Communication Skills*
	2	*Teaching at Elementary School*
	3	*Shepherding a Comrade*
Creative Development	1	*Beginning Guitar*
	2	*Language Arts*
Science	1	*Zoos--What They Are and What They Should Be*
	2	*Basic Electricity*
	3	*Computer Preparation*
Employer Sites		
Exploration	1	*Automobile Dealership Mechanic*
	2	*Audiovisual Equipment Repair*
	3	*Supermarket Stock Clerk*
	4	*Air Control Manufacturing Accounting*
	5	*Elementary School Teacher*
	6	*Housing Development Inspector*
	7	*City Public Works*
	8	*Junior High School Teacher*
	9	*Bank Services Computer Operations*
Learning Level	1	*Elementary School*
	2	*Bank Computer Service Computer Operations*
Competencies		
Credit	1	X
Checking Account	2	X
Insurance	3	X
Income Tax	4	X
Budgeting	5	X
Physical Health	6	X
Emergencies	7	X
Electoral Process	8	
Government	9	
Individual Rights	10	
Public Agencies	11	X
Employment	12	
Automobile	13	X

A-5

Mike did not achieve the same level of success on all of his job sites. However, his performance consistently improved throughout the year. Mike criticized the exploration packages when he started them in the first months of the program, and although he couldn't pinpoint how, said they could be better. His own reliance on the questions provided in the package was noted by the EBCE staff with a comment that he rarely followed up on any cues provided by the person he interviewed. The packets reflected Mike's disinterest in the exploration portion of EBCE work. They showed little effort and a certain sameness of remarks about his impressions at the various sites.

Mike explored career possibilities at an automobile dealer, an audiovisual repair shop, a supermarket, an air control manufacturer, an elementary school, a housing development corporation, a city public works, a junior high school and a bank services company.

Mike's first learning level experience was at the elementary school. At the end of three and one-half months the two teachers serving as his employer instructors indicated concern about attendance, punctuality, initiative in learning and amount of supervision needed to see that Mike's time was used constructively. Mike did show significant improvement in appropriate dress, personal grooming and quality of work on assignments.

Reports from the second learning level experience--at the computer department of the bank services company--showed a marked improvement. The employer instructor there rated Mike satisfactory in all aspects and by the time of the final evaluation gave excellent ratings in ten categories--attendance/punctuality, adhering to time schedules, understanding and accepting responsibility, observing employer rules, showing interest and enthusiasm, poise and self-confidence, using initiative in seeking opportunities to learn, using employer site learning resources, beginning assigned tasks promptly and completing tasks assigned.

During the latter part of the school year, Mike worked on several projects at once. He worked on a project on basic electricity and took a course on "Beginning Guitar" for project credit.

To improve his communications skills, Mike also worked on an intergroup relations project. This project grew out of an awareness by the staff that Mike liked other students but seemed to lack social interaction with his peers and the staff. Reports at the beginning of the year indicated that he appeared dependent and submissive and was an immature conversationalist. In response to these observations, Mike's learning manager negotiated project objectives and activities with him that would help improve his communications skills and help him solve some of his interpersonal problems. At the end of the year Mike noted a positive change related to his communications skills. "I can now speak up in groups," he said.

Mike's unfinished project related to his own experience and interests. He had moved to the Portland area from Canada ten years previously and frequently returns to see relatives. The project was on immigration laws

and regulations in the functional citizenship area. At the same time, it will help Mike improve his grammar and spelling. Since students have the option of completing a project started during their junior year when they are a senior, Mike had a chance to finish the project this year.

Of the year Mike said, "It turned out even better than I thought." Things he liked best about the new experience in EBCE were working at his own speed, going to a job and having more freedom.

At the end of the year, Mike's tests showed significant increases in both reading and language skills. In the math and study skill area where he was already above average only slight increases were indicated.

Tests on attitudes, given both at the beginning and the end of the year, indicated positive gains in self-reliance, understanding of roles in society, tolerance for people with differences in background and ideas than his, and openness to change.

Aspirations did not change for Mike. He still wants to go into computer programming after finishing college. "When I started the year I really didn't know too much about computers. I feel now that I know a lot and want even more to make it my career."

Second Year EBCE Experiences: First Semester. Between September and midyear, Mike completed three projects, three exploration levels, a three-month learning level in computer technology and was working individually on programmed ILA materials to improve his communications skills. See Table 2 for a time chart for 1974-75. In addition he was enrolled in an algebra and a geometry class at the high school, attended a Boy Scouts of America Explorer Club class one evening every other week in computers, and worked three evenings a week.

In November both evaluators observed him simultaneously for an hour during his learning level in the computer technology department of an educational research and development laboratory. One evaluator briefly explained the purpose and intent of the observation and asked Mike to go ahead with his normal job site activities. Mike proceeded to organize some notes and materials on a desk assigned to him and spent the remainder of the hour working alone debugging a computer program he had written as part of his assignment. Once during the hour he got up from his desk to ask the employer instructor a question and to get a reference book from him. He also stopped briefly to talk with another employee and to use the computer terminal. During the observation period Mike used as a reference "Teach Yourself BASIC" and BASIC reference cards.[1] He appeared very involved in rewriting part of his program that involved mathematical computations, the use of arrays and scientific notation.

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[1] BASIC is the name of a particular computer language.

TABLE 2

TIME CHART OF MIKE'S ACTIVITIES IN EBCE
DURING 1974-75

Projects		Sept Oct Nov Dec Jan Feb Mar Apr May Jun
Critical Thinking	1	*EBCE For You*
	2	
Functional Citizenship	1	Gypsum and Safety
	2	Field Engineering
	3	A Week With The State Legislature
	4	Where Do I Fit In
Personal/Social Development	1	*What (Can I) Do About Me*
	2	
Creative Development	1	Don't Just Stand There-Do Something
	2	Customer Relations at IBM
Science	1	*Basic Computer Programming*
	2	I Was a Teenage Scientist
Employer Sites		
Exploration	1	Computer Programming At An Educational Lab
	2	Data Recording Machine Repair At Computer Firm
	3	Door Tester At Gypsum Manufacturing Plant
	4	Telephone Company Installation and Repair
	5	Boat Motor Repair
	6	
	7	
	8	
Learning Level	1	Computer Programming At An Educational Lab
	2	Door Tester At Gypsum Manufacturing Plant
	3	Data Recording Machine -- Repair At A Computer Firm
Competencies		
Credit	1	FY74
Checking Account	2	FY74
Insurance	3	FY74
Income Tax	4	FY74
Budgeting	5	FY74
Physical Health	6	FY74
Emergencies	7	FY74
Electoral Process	8	X
Government	9	X
Individual Rights	10	X
Public Agencies	11	FY74
Employment	12	X
Automobile	13	FY74

Mike's employer instructor was interviewed following the observation. He provided valuable insight into the nature of Mike's work, his interactions with the employer instructor and the way in which the employer instructor tailor-made Mike's experiences. The employer instructor stated that Mike had completed a self-teaching course in BASIC computer programming and was working on a long assignment requiring him to convert six-digit whole numbers to alphabetic characters. This assignment also required Mike to develop complex flow charts which he wrote in sentence form on the blackboard, coded in BASIC, and successfully ran on the computer. The purpose of this assignment was to increase Mike's ability to attend to logic and detail. The employer instructor related how he had gotten some background information about Mike from the EBCE employer relations specialist but that more indepth information was obtained from talking with Mike and trying him out on tasks to see what he could or could not already perform. Realizing that Mike had had prior experiences that had acquainted him with the general area of computer technology and the role of a programmer, he decided that Mike's greatest need was to improve his understanding of programming logic. This experience was designed entirely differently than one for an EBCE student last year who received an introduction to the field of computer technology and learned how to keypunch and operate other equipment.

In addition to learning how to attend to logic and detail, the employer instructor also felt that Mike had shown improvement in accepting responsibility for his own work, being dependable, using time more effectively, accepting and using freedom and gaining confidence in attacking problems and completing goals. While Mike was considered well versed in scientific notation, matrices, subscripting and the ability to work with exponentials, the employer instructor felt that, to be a good programmer, Mike would need more mathematics, improved language ability and greater computer logic. It was also noted that Mike needed general improvement in spelling, sentence structure and verbal skills.

Mike's science project, which centered around computer programming, contained problems to be solved, so the employer instructor provided written resources and personal help when needed. (He added that his general approach in working with Mike was to provide resources so Mike could solve his <u>own</u> problems rather than answer his questions directly. Exceptions were made in cases where the employer instructor felt some essential explanation was needed.)

When Mike first started on the learning level he tended to "jump too quickly to a solution. Since then he has improved in attacking word problems and in logical analysis." Mike had told the employer instructor that his experience at this job site had helped him directly as a paid consultant at the high school developing a computer program called COACH, designed to record athletic data. At the time of this interview the employer instructor reported that he had not yet talked with Mike about future career or educational plans.

Mike's employer instructor gave him good ratings (satisfactory, commendable or excellent) on all areas of his Student Performance Review except for two. He was rated as "improving" in "poise; self-confidence" and "quality of assigned projects."

In talking separately with Mike about his learning level experience, Mike described his feelings that the employer instructor was "not a teacher but a mixture of friend and employer." Mike particularly liked the way the employer instructor avoided directly answering questions about programming but instead "showed me how to figure out the answer or look it up." Mike felt he had learned a lot about the logic of programming, vocabulary in computer technology, and what it is like to be a programmer. He indicated that he did everything a programmer must do: write step procedures, debug and run the program, evaluate it and document it. He also kept a list of technical vocabulary he acquired on the job. Having a chance to successfully debug a real computer problem that a fellow employee had encountered "really felt neat." He would like to have stayed longer on this job site but this department was in the process of being phased out.

One of the things Mike still wanted to learn was how a computer works. He was looking forward to learning this soon on his next EBCE learning level. His enchantment with computers had also led him to learn about computer programming and the RPG computer language through an Explorer Scout Club organized for students interested in computers.

When asked what things made him particularly suited or unsuited for a career as a computer programmer, Mike responded by saying that he felt he had good math and typing skills but needed improvement in writing. He added that he had improved a lot in writing legibly over the last year as judged by his comparing the writing in his journal early last year with the present writing. This improvement was attributed by him to help he received from the EBCE tutor last year and to the opportunity in the EBCE program to write slower, while "at (the high school) I had to write faster than my speed." While on this learning level Mike got some insights into the real world of work. He learned that "programming is hard mentally but not physically." Also he recognized "a need for walking around during his lunch hour as a break from sitting."

Mike was very willing to share with the evaluator three of his recent journals and the report from a completed project. Most of his journal entries were factual accounts of his EBCE work experiences. They also contained supportive comments to him from his EBCE learning manager in response to his journal accounts. Of interest in his preprepared project on "EBCE for You" was the fact that unlike many others completing this project, his diagram of the EBCE learning center space showed exact footage measurements. In describing the jobs of each of the EBCE staff, most students recorded general statements from a brochure, but not Mike. He and another student teamed up to interview staff members to learn what they do in the EBCE program.

The learning manager's assessment of Mike for this part of the year was that he has been "very enthusiastic about the program and highly motivated to get totally involved in it." This enthusiasm was supported by the fact that Mike missed only two days during the first half of the year. In November the learning manager added that "Mike is on the road to success--he has accomplished the required three projects and has initiated a fourth. He is much more mature in the manner in which he negotiates plans and is a pleasure to work with. Mike is keeping up with his journals and his handwriting is definitely improving!"

Second Year EBCE Experiences: Second Semester. During the second half of the year Mike completed seven projects, all four of the competencies needed for his second year, two explorations and two learning level experiences. He was able to complete all requirements on time to graduate with his class. In doing so, he became the first member of his family to graduate from high school with a regular diploma.

During the second semester Mike took a week off from his learning level to spend time with his district's state representative at the state legislature on a special placement. During that time he chose one bill under study by his representative, researched it and wrote a one-page statement of his opinion about the bill. He also observed the House of Representatives and Senate in action, assisted the office staff in selecting relevant newspaper articles for research and information files and gained an understanding of the components and responsibilities of his Representative's office.

Mike's special placement was not without problems. He failed to give his employer instructor on his learning level "adequate notification and information...so as not to inconvenience him." He also substituted one activity on his project without notifying his learning manager, and had some transportation problems, and stayed an extra week in the capital.

The second learning level Mike completed was as a door tester at a gypsum manufacturing plant. Mike's employer instructor there indicated that Mike "needs to improve" on "adheres to established schedule" (he missed four days at the site), "quality of assigned projects" (he "waited until the last few days to begin EBCE project assignments") and "begins assigned tasks promptly." He was rated as "improving" on "demonstrates appropriate dress/grooming," "seeks feedback concerning performance" and "completes tasks assigned." His employer instructor stated that Mike "showed good aptitude" and showed

> "...good ability and interest in becoming involved when he was here. His dependability (absenteeism) and procrastination in waiting until the last minute to write up his project need improvement. We like (Mike) and hope he will accept our critique as being constructive."

This learning level was immediately followed by another as a customer engineer (repairman) for a large computer company. For the first few weeks at this site Mike spent half of his time out in the field observing customer engineers on call for data recording and associated machine repair. The other half of his time Mike spent observing administrative areas, the dispatch room, and the parts room and taking courses on computer terminals on how to operate the teletype and how customer engineers do their paperwork. After this period he spent almost all of his time out in the field.

Mike was observed with one of his customer engineer field employer instructors one afternoon about one month into his learning level. The first stop was a reserve bank building where a security clearance first had to be granted. Then Mike observed the customer engineer as he tested and repaired a machine which prints magnetic characters on checks. Mike observed and asked questions about machine controls and functions. The machine error was detected with some assistance from Mike. Then, another machine was reported as requiring repair. Mike fed cards into the machine while the customer engineer located and corrected the malfunction. They then returned their attention to the original machine. While the customer engineer continued testing the machine, Mike extracted the machine's manual and repair record from a drawer in the machine and glanced at it. The customer engineer did not have the correct part to fix the machine, so he rigged up a bushing and fixed it temporarily. Upon completing testing of the machine, they took a break and then completed the necessary paperwork.

Meanwhile the customer engineer was paged to another site to repair an 80-column card punch with a malfunctioning card stacker. Again, Mike questioned the customer engineer about the repairs. Upon completing repair of the machine, Mike replaced the keypunch cover and retrieved the incident report (IR) book. After helping the customer engineer to secure codes for the IR, the observation and repair ended.

Mike had the opportunity to work with many different people while at this site. While out in the field, he worked with three different customer engineers. While at the office he worked with different people when he went to various sections. However, he worked with the contact person and primarily with his assigned employer instructor. This employer instructor held the position of Administrative Manager for Field Engineering.

The employer instructor was interviewed immediately following the observation and again at the end of the year following Mike's departure from the site. He stated that through his experiences Mike has gained the specific job-related skill of making engineering changes from on-the-job training. However, he also believed that it would be quite difficult for Mike to be successful in this field because of a lack of adequate basic skills development. In addition, the employer instructor stated that Mike will need at least two years of electronics training, preferably in a trade school.

According to the employer instructor Mike had acceptable appearance, was prompt, and fairly dependable, but more confident than capable. On tests administered by the company at the beginning and ending of his training in the area of vocabulary, mathematics and mechanical aptitude, Mike scored below acceptable levels in all areas. His overconfidence and lack of adequate evaluation of his own work was demonstrated on one test with approximately 33 items when Mike told his employer instructor that he thought he did well but in actuality missed 26 of the items.

Mike's employer instructor believed Mike realistically understand the job of a customer engineer and has shown a definite interest in the area. However, he did not understand his basic skill deficiencies and Mike had not discussed them with the employer instructor. Although he demonstrated a willingness to apply basic skills, he did not show any improvement in this area. He effectively related to adults, "but comes on a little strong" due to his overconfidence. His employer instructor also stated that Mike seemed to understand and trust others and was "pretty impulsive." The employer instructor and Mike only talked on a superficial level about Mike's background, interests and future plans.

Although Mike usually waited to be told what to do and needed to be prodded several times, he generally showed "more initiative than most EBCE students" according to the contact person. He had just "a few minor problems" while at the site, including one time when a customer engineer requested that Mike not be sent out with him.

Student Performance Reviews completed at this site reflected many of the above comments. Mike was rated as "needs to improve" on "quality of assigned projects," "poise; self-confidence" and "learning growth." He was rated as "improving" on "good team worker," "judgment" and "uses initiative; seeks opportunities to learn." He was also rated as "excellent" on "reports to employer site on time." However, the contact person was quite disturbed about Mike's failure to notify him about the two-week special placement with the legislature and the loss of three weeks from the middle of a learning level experience.

Mike was interviewed again in March and at the end of the school year. He felt that his experiences with the computer company made good use of his time and the tasks were very challenging, perhaps giving him "too much to do." He felt that he was treated like an employee most of the time. Most importantly he learned more about the field of computers, especially this company, and learned specifics about the repair of machines and how the customer engineer relates to the customer. He felt he learned some mechanical and electrical skills and how to communicate with people. He learned just about everything he wanted to learn and strengthened his feelings about entering the field of computer programming. He also felt that this learning level built upon his previous learning level in computers at the educational laboratory.

Mike's lack of a realistic assessment was reflected in these interviews. When asked "What things about you make you particularly suited or unsuited for this career?", he responded, "...I get along with people all right...and I have a good mechanical ability...I think most everything you need to do (well on the job) you can learn." While he felt that he had to improve his communication skills and ability to relate to people in March, by the end of the year he felt that he didn't need to change anything about himself in order to enter this career. However, he does believe he needs some math and improvement in his sentence structure.

Mike's Views of EBCE. Mike felt that his EBCE experiences, especially the learning levels, had improved all of his basic skills. He felt that he had the freedom to do the kinds of things he wanted to do while at employer sites. These experiences, according to Mike, have strengthened his vocational choice in the field he wanted to enter and have caused him to look at educational and training requirements plus some other alternatives. For instance, Mike tried to enter the military, figuring it would be a good source of training in the field of computers, but was unable to because of a medical problem.

By going directly to job sites Mike has gotten a feel for the "real world" of work. He said his work at computer repair-oriented sites furthered his conceptions of the patience necessary when dealing with customers and fine degree of precision needed in the repair of equipment. He also discovered how a customer engineer takes a problem, evaluates it and solves it.

When asked about his work values Mike replied, "I figure if I get the right job, I'd work at it and try to do my best...in fact, I'm sure that even though I didn't like the job I'd still do more than I was asked to...I'd work as hard as I could." Although he has always been a responsible person, he feels that his experiences in EBCE have made him more trustworthy. Mike also feels that he is now treated more like an adult because of his own attitudes. In fact, he feels he understands himself a lot more now.

Mike's future plans concern trying to get a job in computer programming at an automobile dealership or computer services company. He had previously done some computer work at the automobile dealership in relationship to a project in Explorer Scouts. He also wants more training in computer programming and has discussed these plans with the student coordinator and an EBCE secretary. His attitude towards learning is that it may not be fun but it is important.

When asked in which areas he made less growth than he had hoped to, Mike responded, "I really made a lot of growth in all areas." He credits the EBCE program for this, finding it more helpful than high school. It gives you the opportunity to "get out and meet more people and get to be able to communicate better with people out in the community."

Most of Mike's experiences at the high school were not too personally rewarding. He did start a geometry class there this year, but had to drop it as he had started late and could not catch up. Although he got along all right with the staff at the high school in the past he felt the teachers there had a "barrier between them and the students." The EBCE staff "treat you on a more individual type circumstance...have the time to talk to you." In EBCE you can "work at your own speed...don't have to be in the classroom."

Mike recommends the program to most of his friends, although some of his friends had already dropped out of school. He stated, "I would have paid to come into EBCE, I think it's really that good of a program...In fact, I've learned more in these two years in EBCE than I have the last four years at the high school." He did not even ask for reimbursement for travel expenses because he said he liked the program so much.

The Views of His Parents. When Mike first told his parents about the program they were concerned about what was going to be involved and whether it was a good program and educational. When interviewed in March, they felt that EBCE has helped Mike to be more mature and know where he is going.

Mike's parents said they were well informed by the EBCE staff in all areas. Mike tended to talk to them about his activities in EBCE, while the only thing he ever talked about at the high school was photography. Mike's career plans have not really changed since he entered EBCE and his parents have not tried to influence him, but EBCE has helped him to rule out mechanic and truck driving as possible careers.

Since beginning the EBCE program his parents have found Mike to be more mature, dependable and enthusiastic. He also became more reflective and concerned about the future. His writing improved and he read more.

There are no areas where his parents felt that EBCE did not help him and they rated the EBCE program highly in all areas.

Test Progress Measures on Mike. Although Mike showed a great improvement in almost all areas of the Comprehensive Test of Basic Skills during the first year of participation, his scores decline considerably during the second year. Especially significant were the declines in Mike's arithmetic applications and study skills scores.

Mike's attitudinal scores all showed a positive gain over the two-year total period, but also tended to decline during the second year of participation. On the semantic differential, Mike scored significantly below the EBCE mean at FY 75 posttest on the community resources, adults, learning and work scales.

Mike showed continued growth over the two-year period on the work, self-reliance, communication, role, and trust scales of the Psychosocial Maturity Scale. He was significantly above the EBCE posttest means on

the work, role, and social commitment scales and below average on only the openness to change scale. The openness to change score also showed a significant decline over the year.

The staff rated Mike on seven student behaviors. At the beginning of the year he was significantly above the EBCE mean on "applies knowledge of his/her own aptitudes, interests, and abilities to potential career interests" and below the mean on "understands another person's message and feelings." At posttest time he was still below the EBCE mean on this latter behavior as well as on "demonstrates willingness to apply Basic Skills to work tasks and to vocational interests."

Over the course of the two years in the EBCE program Mike's scores on the Self-Directed Search (SDS) showed little change in pattern, although the number of interests and competencies did expand. Overall, realistic (R) occupations decreased and enterprising (E) occupations increased as his code changed from RCI (where C is conventional and I is investigative occupations) at pretest FY 74 to ICR at pretest FY 75 (a classification which includes computer operators and equipment repairers) to CEI at posttest FY 75. However, the I was only one point stronger than the R and the CER classification includes data processing workers. Thus, Mike's SDS codes appeared very representative of his desired occupational future.

Evaluators' Reflections. Mike's dramatic declines in attitudes and basic skill scores reflect behavior changes which occurred during the second half of his second year of the program and were detected by a number of people. In February at a student staffing meeting his learning manager reported of Mike that "no progress is seen in this zone with projects... still elusive...coasting right now...may end up in trouble." The prescription was to "watch him--make him produce...find out where he is." However, at the end of the next to last zone in mid-May the report was still "...the elusive butterfly! (Mike) needs to get himself in high gear to get everything completed on time!!!" Since the posttesting was completed before this time, Mike probably coasted through the posttesting as well.

Other data suggesting his lack of concern and involvement during the second half of his senior year was attendance. Although he missed only two days the first half of the year, he missed thirteen days during the second half.

Mike showed a definite change in some of his personality characteristics over the two years he spent in the EBCE program. In the beginning of the program he was totally lacking in social skills and self-confidence. By the time he graduated, he had made great strides in his social skills (although there was still much room for improvement). However, his self-confidence had grown to the point of overconfidence. Indeed the employer instructor on his last learning level spent a good deal of time trying to get Mike to make a realistic appraisal of his own capabilities.

When interviewed after graduation, Mike was working six evenings a week at a restaurant where he worked part time for the last year. He hopes to work there for about a year, working his way up to cook, and then go to a business college for a year to study computers.

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