DOCUMENT RESUME

ED 163 249 08 CE 018 936

TITLE Common Core Curriculum for Vocational Education. Proceedings, #II: Common Core Curriculum Workshop (Fresno, California, March 21-22, 1977).

INSTITUTION California State Univ., Fresno.

SPONS AGENCY Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.; California State Dept. of Education, Sacramento. Vocational Education Instruction Services.

PUB DATE Mar 77

NOTE 102p.; A chart in Appendix A will not reproduce well due to small print. For related documents see CE 018 935-971

AVAILABLE FROM Director, School of Family Studies and Consumer Sciences, San Diego State University, San Diego, California 92182

EDRS PRICE MF-$0.83 HC-$6.01 Plus Postage.

DESCRIPTORS Core Curriculum; *Curriculum Development; Curriculum Evaluation; *Field Studies; Higher Education; Learning Modules; *Performance Based Teacher Education; *Research Design; *Research Methodology; Research Needs; Research Problems; Teacher Education Curriculum; *Vocational Education

ABSTRACT

Proceedings of the second of three workshops held in conjunction with the development of thirty-four core curriculum modules for vocational teacher education are presented. The bulk of this document consists of three workshop presentations given by J. Robert Warmbrod and one presentation by Terry G. Newell. In the first address, "The Application of Research Process to Problems in Vocational Education," emphasis is given to problem selection and the types of research problems, and to types of research (descriptive, correlational, and experimental). In the second presentation, "Research Design: Implications for Interpretation," emphasis is on designing and conducting investigations such that valid findings are revealed. Threats to internal and external validity are discussed. In the third presentation, "Some Research Needs in Vocational Education," two areas of research needs are discussed: (1) teacher education, specifically relating to competency based education; and (2) the evaluation of vocational education programs. In the presentation by Newell, "Field Testing the Common Core Curriculum Modules," field test procedures and materials, analysis of the field tests of all modules and summary of pre/posttest changes are discussed. Included in the appendixes are the workshop agenda, a list of the modules, field test procedures, and lists of workshop participants and field test instructors. (The other workshops are reported in CE 018 935-937; the modules developed are CE 018 938-971.) (JH)

COMMON CORE CURRICULUM #II

for Vocational Education

PROCEEDINGS

COMMON CORE CURRICULUM WORKSHOP

Airport Holiday Inn, Fresno

March 21, 22, 1977

TABLE OF CONTENTS

Funded by: Vocational Education Instruction Section
Education Professions Development Act
California State Department of Education

Project Director: Dr. Gwen Cooke

Assistant to Director: Maurine Vander Griend

COMMON CORE CURRICULUM OF VOCATIONAL EDUCATION
WORKSHOP PROCEEDINGS

Introduction

A grant through the California State Department of Education made it possible to continue the development of additional modules identified as appropriate for a Common Core Curriculum for Vocational Education.

Several sources were used to determine topics relevant and common to all vocational education programs. The topics were categorized and grouped according to possible module titles. The module writers were CSUF teacher educators from the vocational education services of Agriculture Education, Business Education, Home Economics Education, and Industrial Education. The writers selected according to their interest and expertise three topics to develop as competency-based instructional modules for vocational education.[1]

The first drafts of these modules were completed during the fall semester and ready for field review and testing this spring. Invitations to participate in the field testing were sent to all institutions of higher education offering vocational education programs. It is recognized that an instructional modular curriculum allows for a great degree of adaptability in use and in application to any local system of education. However, for field testing the instructors were asked to follow similar procedures (Appendix Bp). The main elements of field testing consisted of (1) instructor rating of the validity of the content; (2) a record of scores for pre and post test completed by student; (3) a student's "an Opinion and Satisfaction questionnaire, with (4) a student background data sheet."

---

[1] See attached list of modules.

During the latter part of March a two-day workshop for module writers and field test instructors was held to give support and feedback to the writers and to clarify some of the questions raised by field test instructors.

The purpose of the workshop was (1) to consider in depth research methods and needs in vocational education as means of strengthening the curriculum for pre and in-service vocational education programs and (2) to assess and give advice on the 29 competency-based curriculum modules.

Instructors from 15 California institutions were involved in the field testing. In addition, all modules were reviewed by the workshop consultant and a specialist in business education.

For those who attended the workshop, we appreciate your support and participation. We hope you will find these proceedings useful in your vocational education programs.

THE APPLICATION OF THE RESEARCH PROCESS TO PROBLEMS IN VOCATIONAL EDUCATION

by Dr. J. Robert Warmbrod, Professor

I begin my remarks by relating an incident described to me by a teacher in an area vocational school in Ohio. A student, Jim, was enrolled in a certain vocational course--let's call it Course A--during his junior year. He showed little enthusiasm for the course or for school in general. His attendance was poor and, as you would expect, his grades including grades in the vocational course, were marginal at best. At the end of his junior year, Jim elected or was counseled to enroll for a different course during his senior year--let's designate this new course as Course B. During his senior year, Jim's attitude, motivation, and performance were about as different from the previous year as possible. He was highly motivated; he performed exceptionally well both in courses and on the job. He attended school regularly and his grades were the highest he had ever earned. In fact, his employer for supervised occupational experience asked school officials at mid-year whether arrangements could be made for Jim to work full-time so that Jim could help train other employees. At the end of the senior year, Jim was recognized as the most outstanding student in the area vocational center.

I begin with this true episode as a means of encouraging you to begin thinking about research in vocational education. I ask you to speculate about these questions: Why did Jim change his behavior? What factors can explain why Jim performed much better in Course B than in Course A? How could we find out why Jim changed his behavior? We might even want to consider this question: Is it important to explain why Jim performed differently in the two courses? I will return to this incident near the end

of the presentation for it illustrates some of the points I want to discuss with you about research in vocational education.

Some persons are somewhat skeptical about the value and use of research in education in general and research in vocational education in particular. Perhaps some of you share that skepticism. On occasion research is characterized as an activity for professors or certain individuals in state departments of education. Some persons claim that researchers spend their time on insignificant concerns with little attention to practical problems. Others, sometimes administrators perhaps, point out that the research process is frequently too slow to provide data for decisions that need to be made today, not three years from now when the project will be completed. Even when the research is completed, there is some evidence that researchers tend to write reports that range from difficult to impossible to understand--at least by persons who are not researchers. We fill our reports with terms like chi square, analysis of variance, multi-stage cluster sampling, level of statistical significance, and the like when those who probably have the greatest need for the research may be interested in questions such as these: What was the problem investigated? What are the valid findings? What are the implications of the findings for policy and program development or revision?

I want to share with you some thoughts about the appropriate application of the research process to problems and issues in vocational education. My position is that research is of utmost importance to those of us in vocational education. It is essential that we understand the process and use it appropriately.

What Is Research?

What is research? We can find a very scholarly written definition in any introductory textbook on research methodology. Instead of reciting a definition of research, I propose that we look at the process from a slightly different point of view. A goal of research that is of major concern to us is that research needs to be directly connected with practice, that is, the new knowledge and new products developed through the research process need to make direct contributions to policy and practice in vocational education programs. We conduct research that contributes to the development of new practices, products, programs, and policies. We install or adopt new programs and policies then conduct research to see if the hoped-for outcomes are actually achieved. In effect, we use the research process to provide data for decision making. The research process can be used to provide information that can be used in formulating and revising policy, in developing programs and instructional products, and in evaluating whether or not the outcomes expected are actually accomplished.

The definition of research that I like is one given by the late Professor H. M. Hamlin of the University of Illinois.

> Research is an unusually stubborn and persisting effort to think straight, which involves the gathering and the intelligent use of relevant data. (American Vocational Journal, September 1966)

Note that research is a process. It is a process that begins with a feeling of perplexity, with a hunch that something could be changed, or with a curiosity about an idea or an event that is not satisfied. The process involves a clear and precise definition of the problem to be investigated, a search of what is already known about possible solutions or answers, and the formulation and testing of alternative solutions. Here is where we collect and intelligently use relevant data. A part of the

process that we slight sometimes is the reporting of the research. It is important that we remember that the research process is not complete until both the process and the outcomes of the process are made public.

You know the research process as the method of science--the scientific method. Some persons perceive the scientific method as a dull, laborious, and infrequently used process. On the contrary, all of us use the process many times each day as we formulate and test alternatives and as we make decisions. John Dewey described the systematic inquiry process as "reflective thinking." I like this description of the method of science.

> People talk about "the scientific method" as if it were some magic computer-like method of solving all of our thinking problems. There is nothing magical about it, but only a slightly formal kind of common sense: What is the question? Shall I seek the answer through experimentation, or reading what different people have discovered? how do my results stack up after considering the negatives as well as the positives? where can I go from this answer so as to evolve my own theory or solution? (Royal Bank of Canada Monthly Letter, February 1971)

Selecting Problems for Research

How do we operationalize, then, this "slightly formal kind of common sense" approach in the investigation of problems in vocational education? How do we apply straight-thinking in a "stubborn and persistent" manner as we design, conduct, and report research?

The beginning point must be the identification and selection of significant and relevant problems and issues. Professor Hamlin, who I quoted earlier, said that "Ideas and concepts are the first requisite for good research. Research without important ideas is busywork." One legitimate criticism of research in education, including research in vocational education, is that it does not deal with important "real-world" problems. You have a unique opportunity to remedy that for you are engrossed in these "real-world" problems every day. Perhaps your dilemma is that of choosing

from an array of problems and issues those that warrant highest priority for study and investigation.

I suggest that an appropriate strategy for selecting significant problems fo research in vocational education is to examine our "sacred cows," that is, those practices and policies that we take for granted. Are we who work in vocational education willing to put our "sacred cows" to the test of systematic inquiry? Occasionally we encounter research on what appears to be somewhat outlandish problems. Congressmen and Senators are known for calling these examples to our attention when they review research projects funded by public agencies. My point is that we should look beyond the title of the research project before making judgment concerning the feasibility and significance of the endeavor. Research that appears to be outlandish or nonsensical may not be as absurd as we think.

Let me illustrate. A few years ago an article titled "Talking Eggs" appeared in a publication of the U. S. Department of Agriculture. The article was a report of research designed to investigate whether unhatched eggs communicate with each other. A skeptical and irate reader wrote the editor of the publication claiming that there were more appropriate uses of public funds than for some scientist to try to find out if eggs communicate with other eggs. The editor asked the scientist to reply to the reader's letter. Here is part of what the scientist wrote:

> You're right, sometimes it seems that some of our scientists are not using good common sense in some of their research. However, modern scientists are trained to look for unusual methods and to use sophisticated tools to solve tough problems. . . For example, anyone using common horse sense would know that you can't get anywhere incubating eggs from turkeys which have not been mated. Yet in 1953, a scientist did just that, and discovered that the eggs hatched resulting in fatherless turkeys. Some people may still wonder about the value of fatherless turkeys, but they have turned out to be of tremendous interest for science. (Agricultural Situation, September 1970)

I use this example in a research methods course I teach. A couple of years ago on the day I had used the example in class, the following headline to a page-one article in the Wall Street Journal caught my eye.

> The Birds and Bees Can't Explain Births
> Of Certain Turkeys
>
> Mother hens can have poults and keep their virtue, too; Is a virus better than sex? Here's a question for you: Can a virgin turkey be a mother?
>
> According to poultry scientists here at Pennsylvania State University, the answer is an unequivocal yes. As a matter of fact, they say, virgin births occur so often in turkey circles these days, they hardly raise eyebrows anymore.

My point is that you are in a position to identify some of the tough and significant problems in vocational education that should be researched. Indeed, some of these problems may even be somewhat unusual--maybe even outlandish. There are also ordinary and routine problems that need investigating. My argument is that research in vocational education is of little value unless the problem being researched is worth investigating. On occasion, graduate students ask how they can decide what problem should be investigated. They imply that the method of science involves some systematic and objective mechanism whereby significant problems for research are identified. Needless to say, they are usually disappointed when I suggest that the selection of significant researchable problems is in large part the application of good common sense and the use of the best advice available from experts. You are some of those experts when it comes to identifying relevant problems and issues for research in vocational education.

Types of Research Problems

Remember, problem identification is only the first step in the process of systematic inquiry. Basically, research problems can be categorized into three groups based upon the purpose to be accomplished by the research, or

stated another way, grouped according to the intent of the investigator. First, there are investigations designed primarily to describe groups or situations. In vocational education, these are studies designed primarily to describe the characteristics, competencies, or performance of persons who are enrolled in or have completed certain programs. A second category of research questions includes concerns such as: What factors tend to accompany certain outcomes of educational programs? Why do things happen the way they do? Here the intent of the researcher is to study the relationship--correlation--between variables. Vocational education studies of this nature frequently involve an investigation of the relationship between outcomes of educational programs and characteristics of students, the nature and type of educational activities experienced, and the nature of the environment or setting in which the educational program is conducted. The third category of research questions includes this type of question: What are the outcomes--effects--produced by a certain program? Here the researcher wishes to establish a causal relationship between certain inputs and the outcomes that are observed.

In research parlance, studies designed to describe groups or situations are usually labeled surveys, or sample surveys; research designed to investigate relationships between variables is correlational research; and when the intent is to establish cause-effect relationships, experimental research is called for.

Research in vocational education is useful only if properly conducted and interpreted. I want to call your attention to some major and worrisome methodological problems usually encountered when conducting research. This afternoon we will take a look at some of these concerns in more detail.

Descriptive Research. When the investigator's intent is to describe accurately, that is, when survey research strategies are being used, data are usually collected by mail questionnaire or interview. An immediate concern that must be dealt with is response rate, particularly when mail questionnaires are used. How can an accurate description of a group or situation result if data are available from one-half or less of those who were asked to respond? The researcher must devise ways of getting sufficient and non-biased responses if the research is to be valid. In an effort to encourage response to a mail survey, one school system printed the following on the envelopes in which the questionnaires were mailed.

> Warning: If you throw this in your waste basket unopened, a capsule of water inside will break, spilling onto a dehydrated gorilla. He will then jump out of the envelope and hug you to death.

In descriptive research it is one thing to get responses, but another equally important concern is the accuracy of the data reported. I will illustrate with this conversation between the turtle and the bug in the Pogo comic strip.

> Turtle: To ease your mind on humans we should take a big fat survey.
>
> Bug: An' then refer the report to a committee?
>
> Turtle: Right. . .then the committee could issue a prognostic preview and Congers could call for a vote.
>
> Bug: Forestallin' the revolution?
>
> Turtle: Sure. . .we'd query all types. . .bugs, mongeese, antelopes, bandicoots. . .all them. . .and find out how many hidden humans there are.
>
> Bug: We'd ask human beans too?
>
> Turtle: To be scrupulous fair, yeh.
>
> Bug (This is the punch line): How could you be sure some of them wouldn't lie about it?

We need to be aware that some persons from whom we request data simply conclude that what is being asked is none of our business; others want to make themselves look good so they tend to answer the way they perceive they are expected to answer; and then there are those who, as the bug says, "lie about it." Perhaps a solution to these measurement error problems is the procedure described in the following discussion between Pogo, the possum, and three rats who are employed as pollsters for the local survey research agency in the swamp.

Pogo: So you rats are gonna be pollsters for P.T. Bridgeport?

First rat: Yep. . .altho P. T. don't always play it fair.

Second rat: Yeh. . .last time we run a poll for him if he didn't like our results, he changed the whole thing.

Third rat: Very embarrassin'.

Pogo: I should guess so. . .that'd make the prognostication wrong?

First rat: Well, what was more embarrassin' was it made it right.

Correlational Research. When designing and conducting correlational research, an important concern is the interpretation of the relationships that are described. In essence, we must be careful not to interpret correlation as causation.

Let me highlight this concern by describing briefly a study completed by a graduate student who was investigating this question: What is the relationship between the extent to which high school students participate in a vocational students' organization and their capabilities in leadership, citizenship, and success on the job? The researcher hypothesized that the more a student participates in a vocational students' organization, the more capable a leader and citizen and the more successful on the job

after completing high school. What were the findings? As you might well suspect, the investigator found that the more a student participates in activities of a vocational students' organization (FFA, FHA, VICA, and others) in high school, the higher he or she is rated in leadership and citizenship and the more successful he or she was on the job. Creditable correlational research does not end with that finding and an accompanying interpretation linking in a direct, if not causal fashion, the degree of participation in students' organizations with certain outcomes. The proper interpretation of correlational research requires additional probing. In this study, the investigator also found that the higher a student's grades in high school, the higher the student was rated on leadership, citizenship, and job success. Similar relationships were found for variables like socioeconomic status and the number of years of vocational education completed. The facts are that there are several factors, in addition to extent of participation in a students' organization, that are related to leadership, citizenship, and job success. But note these additional findings. The investigator also demonstrated that students participating to the greatest extent in the activities of a students' organization were those who earned higher grades, were from families with higher socioeconomic status, and had completed more years of vocational education in high school. Remember, each of these factors was also associated with leadership, citizenship, and job success. Note that these additional findings substantially qualify, some would say disqualify, an interpretation that links directly participation in a students' organization and students' leadership, citizenship, and job performance abilities.

My point is that the proper interpretation of correlational research is difficult. A less serious example illustrates the point well. There is a relatively high positive correlation between the salary received by the clergy and expenditure for alcoholic beverages. The higher the salary paid clergy, the higher the expenditure for alcoholic beverages in the community. In the northern states during the summer months, there is a high positive correlation between the monthly number of deaths by drowning and the gross monthly sales of ice cream cones. To describe the magnitude and direction of these relationships is one thing, but to claim that deaths by drowning can be eliminated by a law banning ice cream parlors makes about as much sense as to argue that the salaries of clergy will increase if we consume more booze.

Experimental Research. The findings of experimental research must be interpreted with caution also. If we are to draw valid cause-effect interpretations, we must take special precautions to rule out plausible rival explanations for interpretations that certain factors cause certain outcomes. The difficulty I am calling to your attention is indicated by the following:

> Dear Abby: I have just started to date, and I have a problem which is common to most girls my age. It seems that every time that I go out with a boy, if I let him kiss me on the first date I never see him again. But then if I don't let him kiss me, I will never see him again either. So how is a girl supposed to know what to do? Just wondering.
>
> Dear Just--She can assume that whether she kisses a boy or not on the first date has nothing to do with whether she ever sees him again, and go to work on other possible causes for being a one-date-dolly.

If experimental research is properly designed and conducted, "other possible causes" for the outcomes observed are controlled or discounted; hence valid cause-effect interpretations are possible. As producers and

consumers of research in vocational education, we must insure that in designing and interpreting experimental and quasi-experimental research that precautions are taken to rule out those extraneous or intervening factors that invalidate findings stating that the outcomes observed are caused by certain factors or programs.

Even if the research is valid--that is, the findings are true--we also have to consider the extent to which the findings can be generalized. Stated more directly, we ask this question: To what groups, to what settings and situations, and to what points in time, and to what measurements can the results be applied? In other words, can we extrapolate, or transport the results to other groups, other situations, other points in time, and the like?

I will illustrate with a television and radio commercial with which you are probably very familiar. The early versions of the commercial included this statement: "Two Excedrin are more effective for the relief of pain than twice as many aspirin." When we hear a statement such as this, I suspect that the pain most of us think about is headache. As you might expect, at least one manufacturer of aspirin objected to the commercial claiming that the information in the commercial was not true; in other words, the credibility or validity of the information was questioned. The manufacturers of Excedrin defended the commercial claiming that the information was based upon an accurate and truthful summary of a clinical study done by reputable and expert scientists. They added, however, that the commercial referred to a different kind of pain--not pain suffered by people with splitting headaches but by women who had just given birth! So you see, the validity of information--the validity of the findings of research--is one concern; but another concern with which

we must be aware is whether or not the information is applicable, is generalizable, to groups and environments other than the specific circumstances at the time the research was conducted. Incidentally, the next time you see or hear that Excedrin commercial, note that the phrase "a different kind of pain" has been inserted in the commercial.

Reiteration. Let me reiterate briefly. Basically, research in vocational education is designed to answer one or more types of questions. Some research has as its major focus this question: What are the facts? I label this research descriptive or survey research. Other researchers ask the question: What factors explain--what factors are related to--certain outcomes? Research designed to answer these kinds of questions is correlational research. Still others probe questions like What factors cause certain outcomes? That type of question can only be answered validly through experimental research. My point is that interpretation of the findings of research must not go beyond what is intended by the researcher and what is warranted by the design and conduct of the research. I suggest that we be more cautious in interpreting research then the interpretation indicated by this conversation from a Wizard of Id comic-strip episode.

Wizard (speaking to the King): My studies show a direct correlation between increased taxes and crime rates.

King: What conclusions have you drawn?

Wizard: They can steal it as fast as you can.

Summary

In summary, what does this assortment of comic-strip wisdom and Dear Abby correspondence have to do with the application of the research process to problems in vocational education? I hope it has helped to make clear and illustrate three basic points. First, it is important that we

apply the research process in planning, implementing, and evaluating programs in vocational education. Remember, research--the scientific method--is a process that requires that we beware of our certainties and that we admit that we have doubts. Second, the research process requires that we begin with significant and crucial problems that have import both for the present and the future of vocational education. And third, the process demands that we collect relevant data and that we intelligently use and interpret the data. The research that we conduct and the outcomes of that research will be valid only to the extent those of us conducting and interpreting the research make it so.

Let's return to Jim, the student I referred to at the beginning of this presentation. Why did Jim's behavior in school change so dramatically from his junior to senior year? Was it because Course B was better than Course A? Maybe the teacher of Course B was more effective; maybe Jim's attitude toward school and things in general changed; maybe his parents brought about the change. I do not know what explanations you propose; but if you have formulated some possible explanations, you are involved in the research process. The next step is to collect data to see if your hunch--your most plausible explanation--is confirmed.

I suspect that most of us would prefer an explanation that links the new course or the new teacher to Jim's marked change in behavior. Was the new course in which Jim enrolled his senior year the factor accounting for his change in behavior? The teacher relating the incident was not naive enough to answer "yes." In fact, the teacher was perceptive enough to answer "no." The reason for that response was the teacher knew that Jim was married between the end of the junior year and the beginning of the senior year--a happening prompted, by the way, by the fact that his

becoming a father was imminent. This new responsibility, which undoubtedly Jim took very seriously, was the factor the teacher credits as the prime motive for Jim's change in behavior. In fact, the teacher was very emphatic and indicated that he was well aware that the same results could have been observed had Jim been enrolled in any course in the school. It wasn't the course that made the difference; it was Jim who made the difference.

The lesson is that we look for those "other possible causes" when we design and use research. We must not automatically assume that when we get the results we are looking for that the results are always produced by the factors we expected. Some of our sessions today and tomorrow are designed to increase our competence as researchers and to help us become more discerning consumers of research. That being the case, I am certain that you will neither conduct nor interpret research as described by the following.

> Test 1. Remove the front two legs from a grasshopper and place it on a table top. Give the verbal command: Crawl! Result: Grasshopper crawled.
>
> Test 2. Remove the second set of front legs from the same grasshopper and replace it on the table top. Give the verbal command: Crawl! Result: Grasshopper crawled.
>
> Test 3. Remove the back legs from the same grasshopper, leaving him no legs and replace it on the table top. Give the verbal command: Crawl! Result: Grasshopper did not crawl.
>
> Conclusion: It has been determined beyond all doubt by a series of tests using exacting scientific methods that a grasshopper with all its legs removed can no longer hear!

RESEARCH DESIGN: IMPLICATIONS FOR INTERPRETATION

by Dr. J. Robert Warmbrod

During this session I will build on the general ideas presented during the morning session with particular attention to the design of research and the inter-relationships between design and interpretation of the findings of research. I will attempt to tie this discussion with some of the major points presented during the morning session. Remember, the starting point for research in vocational education is significant and important problems for investigation --"Research without important ideas is busywork". Assuming that we have important problems to investigate, now let's concentrate on designing and conducting investigations such that valid findings are revealed.

I'll begin with another commercial. "Our group had 20 percent fewer (dental) cavities!" All of us have heard this or a similar advertising report of the findings of studies designed to evaluate the effectiveness of toothpaste. When we attempt to interpret this "finding", some questions immediately come to mind: With what other group or groups was "our group" compared? How were persons participating in the study selected? What was the precise nature of the treatment given? What were the ages of those participating? What was the condition of their teeth before entering the experiment? What measurements were made? Who made the measurements?

It is evident that we could make a long list of questions about this particular finding. But the important point is that the answers to these questions have a great deal to do with how we interpret the results of the evaluation of different brands of toothpaste.

Let's take a closer look at these questions. You will note that some of the questions actually raise doubt as to the truthfulness of the finding. How sure are we that a certain brand of toothpaste was the factor which really made the difference in the number of cavities? Perhaps there were factors operating, other than a particular brand of toothpaste, which could help reduce the number of cavities. For example, suppose the persons using the touted brand of toothpaste brushed their teeth three or four times a day; suppose great pains were taken to see that they cut down on their consumption of candy, coke, and other sweet foods; suppose only volunteers were used in the experiment; or suppose boys and girls were selected for the experiment because they had a history of many cavities. Each of these factors could contribute to a reduction in the number of cavities regardless of the brand of toothpaste used; or at best, when the use of a certain toothpaste was accompanied by these conditions, it may be more effective than when used under more everyday conditions.

So one of the crucial questions in interpreting evaluation findings is: Did the treatment--in this case the use of a certain toothpaste--really make a difference? If we can rule out or discount the other factors which may have caused or contributed to the result obtained, then we place a different interpretation on the findings than would be the case otherwise.

Before we leave this example, I call your attention to another dimension of interpretation hinted at by the skeptic's questions. Even if we are satisfied that the finding is legitimate--that is, the brand of toothpaste did make a difference in the experiment or study--parents could still wonder whether similar results will be forthcoming if their children use the recommended brand of toothpaste. The point is that

valid findings in particular settings involving certain groups of people at a particular point in time are not automatically and completely applicable to what might be expected to occur in other settings with different groups of people at some other time. So another crucial question in interpreting evaluation findings pertains to the degree to which the findings can be generalized. To be specific, the appropriate question is: To what groups, settings, situations, or types of measures do the results apply?

I hope the example helps clarify and pinpoint two important questions that must be asked about evaluative studies designed to assess the outcomes of educational programs. Instead of the number of cavities, we are concerned with outcome measures such as change in behavior, ability to perform, and actual performance of persons who complete or leave vocational education or teacher education programs. First, we need to assess the extent to which the outcomes observed can actually be attributed to the eduacational program--Did the treatment (educational program) really make a difference? If our curiosity is satisfied on the first question, the second category of suspicions probes this question: To what groups, settings, situations, and types of measures do the results apply?

TO WHAT EXTENT ARE THE FINDINGS VALID?

Some Preliminary Considerations

Before we examine this question in depth, we need to review briefly the comments made earlier about the intent, purpose, or end sought for the research. Interpretation of the findings of research can only be made in terms of what the investigator set out to do. This morning I indicated that, in general, a particular research study can be placed in one of three categories that indicates the major purpose or intent of the investigation. I named those categories descriptive research, correla-

tional research, and experimental research. I'll summarize the salient features of each of these research strategies with the following overhead transparencies.

I. Descriptive -- Survey Research

-- end sought is accurate description of a group or situation

-- questions asked --

what is the status of...?
what are the facts about...?

--advantages

- collect large amounts of data in a relatively efficient manner
- frequently a first step necessary for formulating priorities, revising present programs, or developing new programs

-- limitations

- obtaining a representative (unbiased) sample
- obtaining responses (non-response)
- obtaining accurate responses (measurement error)

-- interpretation possible -- description only

II. Correlational Research

-- end sought is the explanation of outcomes in terms of other factors.

-- questions asked --

I wonder why...?
How can I explain this outcome?
What factors are related to the outcomes observed?

-- major focus is to investigate relationships between variables. attempt to explain observed outcomes in terms of

-- characteristics of participants
-- characteristics of programs
-- elements in the environment (situation)

-- advantages

-- only feasible way of investigating problems of a certain nature
-- helps identify possible program interventions

-- limitations

-- biased sample; non-response; accurate response
-- interpreting correlation as causation

-- interpretation possible

-- association between variables
-- explanatory relationships between variables

III. Experimental Research

-- end sought is to "cause" certain outcomes to occur; test cause-effect relationships

-- questions asked --

What will happen if...?
How does program A compare with program B?

-- advantage--makes possible program assessment that allows interpretation that links, in a cause-effect mode, outcomes with certain processes

-- limitations--requires consideration of two questions

Are the findings true (valid)?
Can the findings be generalized?

Comparison Groups

Another important but related concern which cannot be ignored in interpreting the findings of evaluative studies is illustrated by the question: With what group or groups was "our group" compared? In many instances evaluative studies of vocational education programs do not compare the performance of persons who complete a vocational education program or a certain pre-service or in-service teacher education program with the performance of persons who complete an alternative program, or, for that matter, with persons who complete no vocational education or teacher education program.

In one-group studies of this nature we compare what are construed to be outcomes of the program with what we think the outcomes should be.

Actually, this type of evaluative study is a case study that has as its primary intent the description of characteristics, capabilities, or performance of persons who have been exposed to the program. The evaluator who makes claims other than description for evaluation studies of this nature takes some rather dangerous risks.

A somewhat better alternative is to compare enrollees' characteristics, capabilities, or level of performance after completing an educational program with corresponding measures before they enrolled in the program. This is the familiar before-after study in which we compare enrollees after completing an educational program with themselves before or at the time of enrollment. Evaluators must be alert to factors that will be mentioned shortly which qualify, if not threaten, interpretations that can be placed on the findings of before-after studies.

The major concerns in interpreting evaluation findings are whether or not a comparison group is used and the nature and characteristics of the group or groups with whom the outcomes of vocational education programs are compared. If we are to move beyond description with any degree of assurance that outcomes can be attributed to the educational program in which students participate, some provision must be made for the use of comparison groups, or control groups if you prefer the parlance of experimentation.

Alternative Explanations for Outcomes Observed

The main concern in evaluating educational programs is to determine what outcomes accompany or are produced by the programs. The research strategy is to identify some factors which have the potential for affecting program outcomes that, in turn, might be mistakenly interpreted as outcomes produced by the educational program. We are concerned with factors which

threaten the truthfulness (validity) of research findings. These possible threats offer plausible alternative explanations to the hoped-for conclusion that the educational program produced (caused) the outcomes observed.

Contemporary History (Current Events). One possible alternative explanation has to do with happenings in the students' environment, other than the educational program, which might contribute to favorable ratings on the criteria used to assess program effectiveness. The risk is that the findings of the evaluation will be attributed to the educational program when, in fact, other events or experiences of students while enrolled in the program may have directly influenced outcomes. This possible threat to valid findings is labeled contemporary history, that is, events other than the educational program occurring from the beginning of the educational program to the time outcomes are assessed which may influence outcome criteria independently of the educational program. The threat of contemporary history is real to a valid interpretation of findings yielded by evaluation studies which do not involve comparison groups.

An example will help clarify. Take the case where the occupational performance of students completing a nonvocational high school curriculum is being compared with the occupational performance of high school students completing a vocational curriculum. Suppose a sizeable proportion of the nonvocational students had part-time jobs during the time they were enrolled in high school. That work experience would surely influence their occupational performance after graduating from high school. So that bit of contemporary history is a threat--an alternative explanation--to a finding indicating significant differences or lack of significant differences between the two groups in occupational performance.

General social and economic conditions influencing employment are an important part of contemporary history when vocational education programs are evaluated in terms of enrollees' labor market performance. This threat to valid interpretation of evaluation findings is particularly applicable to data from follow-up studies, especially when the follow-up data are collected several years after students complete the educational program. Statements attributing occupational success solely to a vocational education program completed some three to five years earlier are, without doubt, generally invalid. Some investigators rightfully maintain that the effectiveness of an educational program is most clearly seen in the first job held after graduation, for in subsequent jobs it is difficult to differentiate the relative influence of the educational program from the influence of employment experience and other events occurring since the completion of the educational program.

Normal Growth and Development. I propose that any program designed to teach children nine to eighteen months of age to walk will be highly successful. This illustrates another possible threat to a valid interpretation of research findings. It is obvious that most children between nine and eighteen months of age are going to learn to walk whether they participate in a formal training program or not. We must be alert to those situations where outcomes which we like to attribute to an educational program are not simply the result of normal maturation and growth of students. Maturation poses a threat that cannot be overlooked in long-term educational programs. Over a period of two or four years students are going to change considerably in physical, psychological, and emotional attributes which contribute to occupational success whether they are enrolled in an occupational education program or not. We must be on guard

not to attribute these normally occurring changes to outcomes produced by an educational program. For example, an evaluative study attributing eighteen- to twenty-year-old students' favorable attitudes toward work to an educational program could be questioned since it is about that age when many persons begin work to buy a car or establish a family and home. I suspect that natural growth and development is a more serious threat to valid evaluation findings in vocational education than many of us realize.

Disregarding Persons Who Do Not Complete the Program. Frequently, evaluative studies only involve persons who have successfully completed the educational program being assessed. If a considerable number of persons entering the program leave or drop out during the program, then it is obvious that an evaluation which involves only those who successfully complete the program may give a less than accurate (valid) picture of the outcomes of the program. With few exceptions, it can be argued that persons who fail to complete the program successfully are also very likely to be persons who would be least successful in occupational performance. The point is that evaluative studies which only involve students who complete a program run the risk of misinterpretation if there has been considerable mortality of enrollees during the conduct of the program. So outcomes attributed to the program may, in effect, be due in large part to the fact that measures are only made on persons who are most capable as demonstrated by the fact that they completed the program.

Measurement and Observation. We know that the results of evaluative studies can be influenced by the type of measurements and observations used as well as by the persons who make the measurements and observations. In many respects it is difficult, if not virtually impossible, for persons responsible for the conduct of a program to evaluate the program objectively.

There is always the temptation to use outcome measures which we think will indicate success; there is always the temptation, when ratings involve a great deal of judgment, to error in the direction that is favorable to the program. Generally, former enrollees have a tendency to respond on questionnaires or during interviews in a manner which they perceive we want them to respond, which usually is favorable to the program.

You and I would probably be somewhat suspicious of the finding about the effectiveness of the brand of toothpaste if we knew the finding was the result of the manufacturer's research. We would be more likely to believe the finding if we knew the test was made by an independent testing agency. So it is with evaluation in vocational education. Let's be careful to design evaluative studies so that the outcomes we claim to result from vocational education are not the result of biased and incomplete measurement and observation.

Extreme Cases. As a general rule, the more extreme we are on one measure today, the less extreme we will be tomorrow or sometime in the future on the same or a related measure. For example, students who score extremely high or extremely low on a test one day, will tend to regress downward or upward on another test another day. One factor operating to produce that result is statistical regression. There are two situations where evaluators should be very sensitive to statistical regression as a possible threat to valid findings. When educational programs are provided students who score at the low end on criteria used in selecting participants, the students have no way to go but up. Researchers must be careful not to credit this improvement in performance or achievement solely to the effectiveness of the program for it is likely that statistical regression has been a factor also. The other situation involves evaluative studies

where vocational education students are matched with college preparatory students on variables such as academic achievement or I.Q. scores. Statistical regression works in a very subtle fashion in these cases to produce, almost invariably, significant differences between the two groups on subsequent tests regardless of the treatment received by students in each group.

Test-wiseness. By taking tests we learn how to achieve higher scores on subsequent tests. When evaluative studies involve testing of students before and during the educational program, students may be learning how to achieve higher scores on tests at the end of the program because they become more test-wise. This tends to happen with attitude tests particularly and with achievement and performance tests when enrollees are not in an environment where testing is a common occurrence. Evaluative studies involving only one group of students where the same or similar tests are given before and after the educational program are particularly vulnerable to this possible alternative explanation for a finding that the program produced the outcomes described.

How Students Are Selected. When outcomes of vocational education programs are compared with outcomes of alternative programs, care must be taken to avoid attributing differences in program outcomes to differences in programs when, in fact, differences in outcomes may be influenced more by differing characteristics of students enrolled than by differences in the nature, type, or duration of the educational program.

We know that there are characteristics of people that are positively related to performance, particularly performance in the labor market, regardless of whether an individual receives specific preparation or not. Some of these characteristics include general level of ability, aptitude

for certain areas of endeavor, interest, socioeconomic status, prior experience, and the like. So, if students electing vocational education courses differ on some or all of these characteristics from students not electing vocational courses or from students electing alternative avenues to occupational preparation, evaluative studies comparing the capabilities or performance of persons completing vocational programs with persons completing other programs are misinterpreted when differences or lack of differences in outcomes are attributed solely to the nature of the educational program. In these cases, the fact that students completing the programs have different characteristics offers a real and direct threat to the interpretation that can be placed on the evaluation findings. Differences or lack of differences in program outcomes could be influenced, or perhaps accounted for by differences between the groups of students on characteristics which are positively related to occupational performance.

Generally, vocational education stands to gain more than it loses when this threat to the validity of findings is controlled or accounted for in evaluative studies. When compared to students in the academic curriculum, for example, vocational students usually rank lower on several of the characteristics (e.g.,general ability, certain aptitudes, socioeconomic status) which are related positively to occupational success. So if the contributions of these factors to occupational success are removed or accounted for in the case of students completing the academic or a nonvocational curriculum, logic supports the argument that the benefits from vocational education may be greater than some evaluative studies have indicated.

My point is this: Evaluative studies comparing the outcomes of vocational education with alternative programs that ignore or overlook

the fact that enrollees in the various programs may also differ have high potential for yielding findings which may not be valid.

Differing characteristics of enrollees in educational programs being compared are a real threat to the valid interpretation of evaluation findings, since the evaluator rarely has any control over which students elect what program. Enrollees "self-select" themselves into vocational education or some other program. The same attributes, interests, and aspirations which lead students to select or not select a particular curriculum may also be the characteristics which enhance or impede occupational success independently--or in spite of--the curriculum in which they enroll. The "true experimenter" takes care of this problem through random assignment of students to educational programs which, within known statistical limits, achieve equality of groups prior to enrollment. Researchers in vocational education rarely have this option.

The question "Are the research findings true (valid)?" pertains to the internal validity of the design. I have listed and discussed briefly several types of threats to interpretations of research findings that indicate that the treatment (the program) makes a difference. These threats can also be labeled as plausible rival explanations for the outcomes observed, or if you prefer, what Abby calls "other possible causes." I hope one strategy is clear. If research in education and vocational education is to be interpreted such that the findings are internally valid, the minimum requirement is that a design be used that involves a control or comparison group, or the researcher must resort to other strategies, particularly statistical techniques, to control or account for extraneous variables.

TO WHAT EXTENT CAN THE FINDINGS BE GENERALIZED?

Once the interpreter's curiousity has been satisfied about the validity of research findings, the next concern has to do with the extent to which the findings can be applied (generalized) to other groups, situations, measures of outcomes, and times. The assumption here, of course, is that the findings are valid, that is, the findings describe outcomes which we are reasonably sure resulted at least in part from the educational program being assessed.

To What Groups (Populations) Do The Findings Apply?

Characteristics of Students or Trainees. In generalizing findings about the relative effectiveness or ineffectiveness of certain educational programs, care must be taken not to assume that results produced when students with a particular set of characteristics are enrolled will apply to another set of students with different characteristics. Findings resulting from studies of persons with particular characteristics can be generalized only to populations of persons of which the persons studied are representative samples.

Nonresponse. A severe limitation to the generalizability of evaluation findings resulting from follow-up studies is nonresponse. This is particularly true when data are collected through mail questionnaires. In many cases, a sizable number of persons fail to respond. Unless there is evidence to the contrary, it can be assumed that respondents differ substantially from those who did not respond, especially on some variables which are crucial to the outcomes measured. The result is that the findings cannot even be generalized with any degree of confidence to all persons enrolling in or completing the educational program.

To What Settings, Situations, and Measures do the Findings Apply?

Frequently, well designed studies are conducted in a particular school system. So the user of the findings must be alert to the temptation to assume that a successful program in one situation will be similarly successful in a completely different situation or setting.

Test Sensitization. Results yielded by evaluative studies involving many tests before and during the educational program may not be applicable to situations where a massive testing program is not used. Tests prior to and during an educational program sensitize students to the content of the educational program. Similar results might not be forthcoming in situations where students are not sensitized to what is to come.

Hawthorne Effect. We know that people react differently when they are aware that they are participating in a special program or when their actions and activities are being monitored. It is not uncommon for better designed evaluative studies to accompany new programs and pilot programs. In these cases, it is very likely that those participating in the program, teachers as well as students, are aware that they are being evaluated. Evaluative results produced in these situations and settings may not be representative of what could be expected in similar settings with similar students and teachers who are not being monitored or are not aware that they are participating in a special evaluative effort.

Multiple Treatment Interference. In generalizing the results of research in vocational education we also need to pay attention to the extent to which the persons (subjects) involved in the research have been involved in previous experimental or pilot programs. If the treatment or program that is being assessed is one of a series that the

students have been involved in, the results--even though they are internally valid--may not be generalized safely to situations where the students have not been involved in a series of experimental or pilot programs.

Description of Program. The interpreter of research findings is helped a great deal in applying results if the researcher has described in a thorough manner the nature of the program offered. This enables the user of the findings to make some rather clear-cut decisions as to what other types of vocational education programs the results might apply.

I can illustrate the point with an example. Assume that we have a valid study indicating that graduates of a high school vocational program are very successful in obtaining well paying jobs for which they were prepared. To what extent would you apply that finding if you knew that a part of the program was an aggressive placement service cooperatively sponsored and operated by the school and the state employment service? That particular aspect of the program--a placement service--could very well be a main factor contributing to the high placement rate of graduates. Knowledge of this sort about the nature of the program is extremely helpful, if not essential, for making decisions about the extent to which research findings can be generalized.

Outcome Measures. Care must be taken not to assume that valid findings pertaining to one set of outcome measures will also hold true for another set of outcome measures. For example, findings regarding the economic benefits of vocational education cannot necessarily be generalized to findings that would result if noneconomic outcomes measures were used as evaluative criteria. Researchers should design studies which include measures pertaining to all appropriate objectives of the educational program or programs being assessed.

SUMMARY

I have listed some possible alternative explanations for research findings which state or imply that the outcomes do, in fact, result from the educational program being assessed. These factors, or threats to internal validity, can produce results which may be mistaken for outcomes produced by the educational program being evaluated. It behooves the researcher as well as the user of research findings to be aware of these possible threats to valid findings. Research studies that do not involve comparison groups are particularly vulnerable.

In addition to making decisions about the internal validity of research findings, the interpreter must also make some decisions about the extent to which the findings can be applied to other groups, situations, measures, and times. I have discussed some factors which should be considered in making decisions about the generalizability of research findings. Researchers label the questions about generalizability as threats to external validity.

We must not accept without question the findings of research studies. We must not assume that just because we observe certain outcomes accompanying educational programs that the outcomes always and completely result from--or are caused by--the programs. We must be aware of the threats to valid interpretation and generalization of research findings. If all we can do is describe the competence and performance of persons who have completed and left programs, let's admit it and make no further claims. If we can show a high degree of relationship between outcomes and program inputs, let's try harder to see if there really are functional relationships. If we claim that a particular program produces certain outcomes, let's demonstrate that we are aware of and have attempted to

account for other factors that could produce or qualify the claims we make.

The next time you read a report of research in vocational education or education, ask these two questions: To what extent did participation in the program produce the results observed? If you are satisfied on that score, then ask: To what populations, situations, measures, and periods of time can the findings be applied?

SOME RESEARCH NEEDS IN VOCATIONAL EDUCATION

by Dr. J. Robert Warmbrod

During this session, I want to discuss research needs in two areas of vocational education. First, I want to share with you some thoughts about research needs in the area of teacher education. Specifically, I want to relate that discussion to the strategy or concepts of competency-based teacher education. Next, I will comment concerning research, or systematic inquiry, pertaining to the evaluation of vocational education programs. Even a casual reading of the Education Amendments of 1976 indicates that evaluation and accountability are major mandates in the new federal legislation for vocational education.

The two major areas--teacher education and evaluation of vocational education--are not independent. In fact, they are highly interdependent. I will not belabor that point for I think the connection between the two areas of concern is evident.

Research Needs in Teacher Education

I couch my comments concerning research needs in teacher education in the context of competency- or performance-based teacher education. As background for the comments that follow, perhaps I should indicate what I see to be the rationale, strategy, and components of competency-based teacher education. It is from this point of view that I identify certain problems needing research by vocational educators as well as by others in teacher education.

The basic rationale of performance-based teacher education is that teacher behaviors are closely associated with student achievement. In other words, teacher behaviors directly influence what and how much

students learn, how efficiently students learn, students' attitudes toward learning, and so forth. The basic premise is that there is a direct relationship between process (teacher behavior) and outcomes (student achievement).

The strategy of performance-based teacher education generally involves four basic components.

-- First is the identification of those teacher behaviors that are thought to be major determiners of student achievement. These behaviors are labeled by various persons and groups as performance elements, pedagogical performance elements, behavior statements, competencies, skills, or tasks. Regardless of label, the strategy is to specify, in supposedly measureable terms, the behaviors teachers are to exhibit. Some proponents of competency-based teacher education refer to these factors as high inference variables. A part of this step of the process is a determination of an acceptable level of mastery for the performance elements or competencies.

-- Next, the process requires that appropriate experiences be provided the prospective or practicing teacher so he or she can master the competencies claimed to be necessary. At this step in the process, emphasis is placed on modular instructional units, individualized instruction, micro-teaching, internship, field experience, and the like. There are indications that some persons define competency-based teacher education primarily in terms of the nature of learning experiences provided in pre-service and in-service education programs. That is, some claim they have a competency-based teacher education program if they are using, for example, micro-teaching, individualized instruction, or a field-centered in-service education program. I hope we in vocational education are not

buying that narrow and inappropriate definition of performance-based teacher education.

-- The third component in the process is systematic appraisal and assessment of teacher performance in terms of the prespecified competencies. If mastery is achieved, the teacher attempts additional competencies until sufficient competencies are mastered to warrant credentials certifying the teacher's qualifications to teach. If mastery is not achieved, the teacher participates in additional experiences designed to develop the desired level of performance or, supposedly, the teacher is cycled out of the teacher education program, if a prospective teacher, or out of the school, if a practicing teacher.

-- The fourth and very essential component is the validation of the competencies in terms of student achievement or outcomes. In other words, does it make any difference what behaviors a teacher exhibits in terms of what students know and are able to do?

I will take these four components and indicate what I see as fruitful areas for research. In reference to the first component--the identification of teacher competencies--my position is that we probably already have more competencies identified than we know what to do with. The problem now is making sense out of the lists of competencies we have rather than attempting to discover more. Probably the most frequently referred to list is the 380 or 390 competencies identified in the study conducted at the Center for Vocational Education at Ohio State University (Cotrell, Chase, Molnar, 1972). That list is the basis for the instructional modules that have been prepared and field tested by Center staff, which I understand are to be released shortly. There are other lists of competencies.

I propose that we devote time and effort to the analysis and synthesis

of these lists in an effort to identify those competencies that we have reason to believe are potent predictors of students' performance. In other words, let's see if we can identify from this vast list of competencies those that hold promise of being high inference predictors. Some of the competencies are trivial; others are so gross and broad that they are difficult if not impossible to measure. For example, one competency that has been identified is that the teacher "demonstrate personal concern for the student and his/her family."

My question is how do we measure the degree of competence a prospective teacher or practicing teacher possesses for that criterion? When we consider measurement of teachers' level of mastery of the various competencies, we must be aware that there is a tendency to emphasize those competencies that are the easiest to measure. Chances are that the competencies measured most easily may be the factors that are the least important.

So my first research concern is an analysis and synthesis of the competency lists with the goal of identifying a lesser number of highly important competencies that hold promise as potent predictors of student outcomes. Then we can concentrate on the development of instructional strategies that aid teachers in achieving mastery for these particular competencies.

Another fruitful area for investigation relating to the identification of teacher competencies is the possible interaction between the level of professional competence and the level of technical, or subject matter, competence possessed by teachers. Why would we expect the same instructional strategies to be equally effective for teachers who are highly competent technically and for teachers who are not as competent in their technology or subject matter? Maybe the teacher who is highly competent in the content

and skills being taught can use a different set of professional competencies than a teacher who is not as highly competent in the content and skills being taught. On the other hand, there may be little if any connection or interaction between professional and technical competence. My point is that with competency-based strategies we have been dealing almost exclusively with professional competencies with only a slight glance toward the technical competencies. I am suggesting that dealing with one side of the picture almost exclusively may not be a realistic approach.

This leads to another component of the process, namely the assessment of the degree of mastery possessed by those preparing to teach or by those who are currently teaching. In essence, we are dealing with problems of measurement--problems that are the very crux of the research process. How do we measure objectively, validly, and reliably, a teacher's degree of mastery of the competencies that best evidence and theory indicate as being most essential to maximize student achievement? If the strategy of competency-based teacher education is to be implemented, we will be required to pay special attention to the valid and reliable measurement of the extent to which prospective and practicing teachers have mastered the competencies we claim to be the teacher behaviors that influence what students learn. The development and refinement of instruments and techniques for assessing level of mastery can be a major concern for the researcher in vocational education.

Another major area of research in teacher education relates to the fourth component of the competency-based teacher education model--that is, the validation of teacher competencies in terms of what students learn. This is the familiar process-product research. The research question being asked is: What is the relationship between teacher behavior (process)

and student achievement (outcomes or product)? One of the most extensive reviews of a series of these process-product studies is a report by Rosenshine and Furst (1971) which is published in Research in Teacher Education, a report of a symposium sponsored by the American Educational Research Association. Their review of the research enabled them to identify eleven variables--teacher behaviors--that tend to be related to or connected with student achievement. However, the flavor of their interpretation of the process-product research is indicated by this quotation:

> "This review is an admission that we know very little about the relationship between (teacher) classroom behavior and student gains. The results of these studies provide hypotheses upon which to build teacher training models."

McNeil and Popham (1973) in their chapter on "The Assessment of Teacher Competence" in the Second Handbook of Research on Teaching, reach a similar conclusion:

> "...evidence...suggests that practice has been seriously weakened by the false belief that there are scientific conclusions which correspond to good teaching. (We err when we) promote teaching skills that are approximately consistent with scientific conclusions as if these skills were certain, confirmed answers about how a teacher should proceed to effect desirable consequences in learners. Instead, such skills should be regarded as hypotheses to be tested."

These interpretations of the relationship between teacher behavior and student achievement are relatively mild compared to the conclusions reached by others who carefully analyzed the process-product studies reviewed by Rosenshine and Furst. In a paper titled "The Myth of Performance-Based Teacher Education" presented at the 1973 Annual Meeting of the American Educational Research Association, Heath and Neilson (1973) concluded that:

> "an analysis of the research on the relation between teacher performance and student achievement fails to reveal an empirical basis for performance-based teacher education. (The) literature fails to provide such a basis, not because of minor flaws in the statistical analyses, but because of sterile operational definitions of both teaching and achievement, and because of fundamentally weak research designs."

Then they really drop the bomb: "...given the well-documented, strong association between student achievement and variables such as socioeconomic status and race (here they refer to Coleman's research), the effects of techniques of teaching on achievement, as these variables are conventionally defined, are likely to be inherently trivial."

Needless to say, if we are going to build a competency-based teacher education program, research investigating the relationship between teacher behaviors (process) and student achievement (outcomes) is a necessity. We need to investigate what behaviors tend to be accompanied by certain outcomes. This research is complicated and difficult to conduct. It is clearly multivariate. The research probably will have to begin with correlational designs, but if we are going to find out with any degree of certainty what teacher behaviors make a difference, eventually quasi-experimental and experimental designs will be required. This research requires that we accurately describe and quantify not only what behaviors teachers exhibit, but also that we validly and reliably measure what students have achieved. Perhaps an avenue to pursue in assessing students' level of achievement or mastery is what Popham (1973) at UCLA calls "teaching performance tests", which, in effect, are criterion-referenced tests designed to assess students' level of mastery in terms of the learning outcomes specified in the objectives for a particular unit of instruction.

So to summarize briefly, I propose that the so-called competency-based approach to teacher education highlights several priorities for research. First, is the analysis and synthesis of the vast array of teacher competencies that have been developed in an effort to refine the list to a manageable group of high inference teacher behaviors that appear to be potent predictors of student achievement. Next is the problem of measurement and

instrumentation. Specifically, the problem is the assessment in a valid and reliable fashion of both teachers' level of mastery of certain competencies and students' level of achievement of what is taught. And finally, there is the problem of conducting the difficult but all-important process-product research in an attempt to validate teacher competence in terms of student achievement.

Assessing the Effectiveness of Vocational Education

For the remainder of this presentation, I focus on another aspect of needed research in vocational education. That is systematic inquiry designed to assess the effectiveness of vocational education programs. A reading of the Education Amendments of 1976 (Public Law 94-482) makes it clear that the writers of the legislation expect their mandated evaluations of vocational education programs to yield data and information useful in formulating on-going and future policy and program decisions. I have recently had called to my attention a document that lists 28 separate studies and reports mandated in the Education Amendments of 1976.

Let me set the stage by reviewing briefly some of the provisions of the legislation mandating the evaluation of vocational education programs. In order for the federal government to assist states, the Bureau of Occupational and Adult Education is charged to "conduct a review analyzing the strengths and weaknesses" of vocational education programs in at least ten states each year. States, in turn, are directed to evaluate the effectiveness of vocational education programs in providing assistance to local education agencies. This section of the legislation specifically directs each state to evaluate, by using data collected whenever possible, by statistically valid sampling techniques, each program which purports to impart entry level job skills according to the extent to which program completers and leavers (i) find

employment in occupations related to their training, and (ii) are considered by their employers to be well-trained and prepared for employment. Other provisions of the legislation direct the National Institute of Education to undertake "a thorough evaluation and study of vocational education programs", including a review and evaluation of home economics programs.

The language of the act clearly indicates that the results of these evaluations are to be used to make recommendations for the revision, redirection, and improvement of programs and in formulating recommendations for changes in existing legislation and for new legislation. My argument is that valid and reliable data required for formulating policy and program decisions will not be forthcoming unless evaluation studies of vocational education are planned and conducted in as rigorous and disciplined a fashion as can be mustered.

To date, those who have studied evaluation studies in vocational education have been less than complimentary about the methodology, design, and rigor of the research. Moss and Stromsdorfer's (1971) review of both economic and noneconomic studies of vocational education led them to conclude some five years ago "that the methodological issues facing any analysis of the effects of vocational education are formidable...that the current quality of evaluation can be raised significantly by careful attention to proper use of methodology...that the existing analyses, taken as a whole, do not use effectively the methodological knowledge which is currently available."

Professor Reubens (1974) of Columbia University, who authored a paper for use by the Special Task Force to the Secretary of Health, Education, and Welfare in preparing what to some vocational educators was the controversial report Work in America, had this comment about evaluation studies of vocational education programs: "The assessment of current high school vocational

education is beset with conceptual programs, methodological pitfalls, and statistical limitations. It is not unusual for investigators to devote more space to discussions of these issues and criticism of other studies than to the presentation of their own findings."

The Committee on Research and Development in Vocational Education (1976) is sharp and to the point in its appraisal of evaluations of vocational education programs. Here is a sample of their rhetoric: "Research on some important and difficult issues, such as measuring the actual benefits of vocational education, is nearly nonexistent. The literature describing the evaluation of vocational education programs is discouraging; it yields little useful information for vocational educators. The research designs have used analytic procedures requiring simple quantitative input and have failed to encompass many important educational issues. Evaluations have used research methods that are incompatible with the complexity of the learning, teaching, and administrative situations." The Committee on Research and Development in Vocational Education of the National Research Council, National Academy of Sciences, is a distinguished group of vocational educators and social and behavioral scientists, chaired by Rupert N. Evans, that has recently released its assessment of the research and development activities sponsored by the U. S. Office of Education under the provisions of the Vocational Education Act of 1963 and the 1968 Amendments.

In view of the foregoing, it appears that those of us who have interest and expertise in research in vocational education face a difficult and perhaps insurmountable task if we accept the challenge of improving the interpretability and generalizability of disciplined inquiry into the effectiveness of vocational education. Should we give up or try harder? I suggest we opt for the latter. I will sketch the broad outlines of what

I see as some major concerns that merit attention as we attempt to apply methodological rigor to evaluation of vocational education.

Since I have reported how several persons and groups appraise the methodology of evaluation research in vocational education, perhaps I should summarize briefly the general findings reported by those who conduct and review these studies. The Special Task Force to the Secretary of Health, Education, and Welfare (1975), apparently drawing heavily from the resource paper prepared by Reubens (1974) that I cited earlier, concluded that "vocational education in the high schools has failed to give students useful skills or place them in satisfying jobs." Somers (1971) of the Center for Studies in Vocational and Technical Education at the University of Wisconsin, who studied a national sample of vocational students three years after they had graduated from high school, branded as a "half-truth" the notion that vocational education is designed to prepare people for entry into the world of work.

Grasso (1975), using a national sample of male youth from the National Longitudinal Surveys, a U. S. Department of Labor project conducted by the Center for Human Resource Research at The Ohio State University, concluded that an analysis of the relationship between career preparation of youth and a wide variety of career-relevant performance criteria fails to support the case that vocational education is superior preparation for the world of work for male high school graduates who do not go on to college. Some vocational educators are still haunted by Wilms' (1974) headline-making claim "that eight out of every ten graduates of professional and technical-level, post-secondary vocational programs did not get the jobs they trained for ..."

Now we have two interesting sets of generalizations that, at best,

create a dilemma for those who make a serious effort to use evaluation research in policy and program development in vocational education. On the one hand, assessment methodology is described as rarely adequate, beset with methodological pitfalls, and as yielding little useful information. On the other hand, the results of the more extensive and widely quoted studies fail to provide empirical support for vocational education as preparation for employment, particularly at the high school level.

A major concern that must be dealt with if evaulation research is to result in valid and reliable data for decision making has to do with the selection of appropriate criterion variables. Since the outcomes desired are derived from the objectives of the program, it is important that there be some agreement on what is to be achieved through vocational instruction. Until there is some degree of concensus on goals, there is not likely to be a great deal of agreement on the appropriate criteria for assessing outcomes.

A part of this concern is the issue of whether vocational education and general education are considered to be mutual contributors to common educational goals, or whether we perpetuate the vocational education-general education schism that assigns preparation for work to one segment of the curriculum, preparation for life to another segment, and for some senseless reason, assumes that one has little influence on the other. In a previous paper, I (Warmbrod, 1974) have argued that the separation of vocational and general education at least partially accounts for the recurring appraisal that vocational education is less than successful in accomplishing the outcomes claimed by its proponents or in achieving the challenges posed by its antagonists. Two limiting assumptions accompany this separatism. The first is the view that the development of occupational skills

is the exclusive bailiwick of vocational education; the second is a failure to recognize that general education skills are major contributors to occupational competence and success. These two restrictions fairly well scuttle the prospect for discerning the extent to which a specific segment of the curriculum, be it general education or vocational education, impacts on students' post-school behavior. So, evaluations skeptical of the effectiveness of vocational education in achieving a narrow goal of occupational proficiency are practically assured, if it is expected that specialized vocational skills are so pervasive as to override all other factors that influence occupational success. Surely, general education skills, socioeconomic and personal characteristics of students, economic and labor market conditions, and employment practices are among the factors that must be considered when studying the effectiveness of vocational education programs.

The Committee on Vocational Education Research and Development (1976) contends that criterion measures inadequately reflect program success when outcomes are measured in terms of initial job placement, which in turn is influenced by factors such as the availability of jobs, social status, personality and intellect of the student, and chance. The committee proposes that additional relevant criterion variables might include job turnover rates, job satisfaction, the socioeconomic mix of students, and changes in students' self-perceptions. Others have proposed that appropriate criteria for evaluating vocational education programs include work habits, values, and attitudes.

Perhaps the most direct way to pinpoint the crux of the issue I wish to highlight is by posing this question: Should vocational education be evaluated as a function of the total school program, or as the unique and exclusive function of one segment of a school's program? Stated in a

slightly different form the question becomes: Is the development of occupational competence in its broadest sense among the outcomes sought from the total school program, or is occupational competence the exclusive domain of those courses and experiences that are labeled "vocational"?

The approach one takes to assessment, including the selection of appropriate criterion variables, hinges on the answer to these questions. If the former perspective is taken, there is a gamut of criterion variables, ranging from specific skill competence to attitudes and values, that are appropriate for assessing the extent to which the total school program is achieving its goal of occupational preparation. If the latter perspective is taken, the range of legitimate criterion measures becomes more narrow, consisting primarily of an assessment of the extent to which the specific occupational skills taught in vocational courses are acquired. To expect one segment of the curriculum--instruction and experiences in courses labeled vocational--to be the major or sole factor that determines whether students get jobs or not, the level of the jobs obtained, wage level, job satisfaction, human relations skills, self-perceptions, attitudes, and work habits is an unreasonable, if not naive, position. To be blunt about it, we in vocational education have helped build a system that assigns accountability for the school's occupational preparation goal almost exclusively to what we term the vocational segment of the curriculum when, in fact, all parts of the school's program--academic as well as vocational--have a stake in achieving the goal of education for the world of work. In effect, the separation of general and vocational education that I referred to earlier--fostered, incidentally, in many cases by vocational educators and the policies they develop and administer--in many respects lets the total school program off the hook when it comes to accountability concerning

the school's goal of occupational preparation. As long as vocational education claims to be the sole input for the knowledge, skills, and attitudes required for occupational competence, it will be vocational education, not the total school program, that takes the brunt of criticism that schools are not accomplishing satisfactorily their functions of occupational development and preparation.

How does this discussion of vocational education as a function of the total school program versus vocational education as the exclusive domain of a segment of the school program relate directly to evaluating the effectiveness of vocational education? The connection is clear and direct. When vocational education is viewed as a function of the total school program, some important issues relevant to the design and conduct of evaluation studies come into focus. First, the target population becomes all completers and leavers of the school, not limited to those who complete or leave a vocational course. Second, the levels of the treatment in the evaluation design become the various mixes of vocational education and general education that students experience. This recognizes that all segments of the curriculum contribute to the occupational education function and will make it possible to investigate what segments of the curriculum contribute to specialized occupational skills and to the more general occupational skills of communication, computation, and human relations. And third, when vocational education is viewed as a function of the school, a variety of criterion measures pertaining to occupational development, decision making, and competence become appropriate. In effect, an evaluation of the school's occupational education goal becomes a part of the evaluation of all the goals and functions of the school.

In this context, evaluation of a school's occupational education

function becomes a complicated and methodologically sophisticated affair. Perhaps an appropriate way to describe the evaluation is something of the magnitude of the Coleman Report (Coleman et al., 1966).

My point is that this type of evaluation is called for if the results are to yield information that makes a maximum contribution to policy and program development. In this context, evaluation of vocational education is seen as the description and explanation of a series of outcome variables in terms of a variety of input variables--initial abilities and motives of students, family and community characteristics and values, school resources and policies, peer groups, and the nature of the instructional program and experiences of students in school and out of school. In addition, when the criterion variables relate to labor market entry and performance, then another set of factors over which the school has little, if any, control comes into play--economic conditions, employment practices, mobility and migration of students, for example.

The evaluation studies being described are difficult and expensive to conduct. I see such studies being commissioned by the U. S. Office of Education, the National Institute of Education, and states where there is interest in a thorough appraisal of the extent to which schools are accomplishing the occupational education goal. The research methodology is probably most accurately described as a naturalistic correlation method with regression analysis and other multivariate techniques the major statistical strategies for attempting to partial out the influence of the various inputs on the criterion measures. In evaluation research of this type, generalizability of results is probably accomplished more readily by replication than by random selection of subjects from a state or national target population.

A realistic approach to evaluation of vocational education does not begin, however, with the type of evaluation studies I have described. We might as well face the facts, we must begin where we are. I doubt if I will get much argument with the statement that most current endeavors purporting to evaluate vocational education fall under the general heading of follow-up studies. In fact, the provisions of the new federal legislation requiring data concerning the extent to which program completers and leavers find employment in occupations related to their training and whether they are considered by their employers to be prepared for employment indicates the continued importance that will be placed on follow-up studies.

In research parlance, most follow-up studies are conducted as one-shot case studies--the exemplar of a lack of methodological sophistication if one wishes to ascribe outcomes to the treatment factor. We need to realize, and decision-makers need to realize, that most follow-up studies, at best, only provide descriptive information. I do not propose that we abandon follow-up studies. Instead, I suggest we clean up their most flagrant deficiencies and build upon them to design evaluation studies that yield more valid information for the decision-maker. Since most follow-up data are collected by mail questionnaire, the resulting data will, in most cases, be questionable unless problems of measurement error, reliability of questionnaire items, and bias due to nonresponse are considered and dealt with. For example, Project TALENT researchers have found that conclusions based on data provided only by mail follow-up questionnaires cannot be safely generalized to the population from which the sample was drawn because of the selected nature of the respondent group with respect to academic aptitude and family characteristics such as socioeconomic status

(Flanagan et al., 1964). Investigation is needed on the concurrent validity of follow-up data generated through mail questionnaires. In other words, how do we know people are not lying to us?

One way to improve follow-up studies is to follow up all school completers and leavers. If that strategy is combined with a description of the nature of the educational program or curriculum pursued by the completers or leavers, then we are well on the way of moving from description only to that of explaining variability in post-school competence and behavior in terms of the general education-vocational education mix experienced by students. At this step of the process, it is important that the treatment variable--type of educational program--be precisely rather than grossly defined. The most common definition is to categorize students as vocational, academic, and general. These broad categories have a great deal of overlap, so more precise definition and categorization is called for. In fact, more precise definitions within the vocational category are essential. There are vast differences among vocational programs in the various occupational areas, differences between programs involving supervised on-job experience and those that do not, and differences between programs in comprehensive high schools and separate vocational schools. If additional input variables for other parts of the system are added to the model, further progress is made toward the more complete naturalistic correlational evaluation strategy that was discussed earlier.

The tasks of evaluation in vocational education set before us are difficult, time-consuming, and expensive. But we do not have to begin from ground zero. There is evaluation research in vocational education in which we can build. There is a vast array of expertise and experience in evaluative research in other areas of education and social and behavioral science

(Glass, 1976; Struening and Guttentag, 1975). For example, the report of a conference held at the Brookings Institution concerning evaluations of the Head Start and follow-through programs, published under the title Planned Variation in Education, treats several of the problems that are encountered in sophisticated evaluation designs (Rivlin and Timpane, 1975). A basic reference may well be the recently published book by Cooley and Lohnes (1976) titled Evaluation Research in Education: Theory, Principles, and Practice.

We need to explore the possibilities for further investigations through secondary analysis of existing data banks such as Project TALENT, the National Longitudinal Surveys sponsored by the U. S. Department of Labor, the National Longitudinal Study of the High School Class of 1972 (National Center for Educational Statistics, 1976), and the National Assessment of Educational Progress. The reports of the First National Assessment of Career and Occupational Development were released in November (National Assessment of Educational Progress, 1976). The next Assessment of Career and Occupational Development will be made in 1979-80. Why don't we explore the possibilities of building into the 1979-80 assessment additional information that is needed for a comprehensive, nationwide assessment of vocational education? The national vocational education data reporting and accounting system that is required by the Education Amendments of 1976 may well be a valuable source of information for specific evaluation studies.

I have attempted to highlight some of the major concerns demanding attention if decision-oriented inquiry is to yield relevant and valid information for use in policy and program development in two areas--teacher education and evaluation in vocational education. I propose that these concerns are and will continue to be major research needs in vocational education.

References

Coleman, J. S. et al. Equality of Educational Opportunity. Washington, D. C.: U.S. Government Printing Office, 1966.

Committee on Vocational Education Research and Development. Assessing Vocational Education Research and Development. Washington, D.C.: National Academy of Sciences, 1976.

Cooley, William W. and Lohnes, Paul R. Evaluation Research in Education: Theory, Principles, and Practice. New York: Irvington Publishers, Inc., 1976.

Cotrell, Calvin J., Chase, Shirley A., and Molnar, Marilyn J. A Foundation for Performance-Based Instruction, Model Curricula for Vocational and Technical Teacher Education: Report No. IV. Columbus, Ohio: Center for Vocational and Technical Education, The Ohio State University, 1972.

Flanagan, John C. et al. The American High School Student. Pittsburgh, Pa.: Project TALENT Office, University of Pittsburgh, 1964.

Glass, Gene V. (Ed.) Evaluation Studies Review Annual, Volume 1. Beverly Hills, Calif.: Sage Publications, 1976.

Grasso, John T. The Contributions of Vocational Education, Training and Work Experience to the Early Career Achievements of Young Men. Columbus, Ohio: Center for Human Resource Research, The Ohio State University, 1975.

Heath, Robert W. and Nielson, Mark A. "The Myth of Performance-Based Teacher Education". Read at American Educational Research Association Annual Meeting, New Orleans, February, 1973.

McNeil, John D. and Popham, W. James. The Assessment of Teacher Competence. In R. M. W. Travers (Ed.), Second Handbook of Research on Teaching. Chicago: Rand McNally, 1973. pp. 218-244.

Moss, Jerome, Jr. and Stromsdorfer, Ernst W. "Evaluating Vocational and Technical Education Programs". In Gerald G. Somers and J. Kenneth Little (Ed.) Vocational Education: Today and Tomorrow. Madison, Wis.: Center for Studies in Vocational and Technical Education, University of Wisconsin, 1971.

National Assessment of Educational Progress. Adult Work Skills and Knowledge, Career and Occupational Development Report No. 05-COD-01. Denver, Colo.: National Assessment of Educational Progress, September 1976.

National Center for Education Statistics. National Longitudinal Study of the High School Class of 1972: A Capsule Description of First Follow-up Survey Data. Washington, D.C.: U. S. Government Printing Office, 1976.

Popham, W. James. "Applications of Teaching Performance Tests to Inservice and Preservice Teacher Education." Paper read at American Educational Research Association Annual Meeting, New Orleans, February, 1973.

Reubens, Beatrice G. "Vocational Education for All in High School?" In James O'Toole (Ed.) Work and the Quality of Life: Resource Papers for Work in America. Cambridge, Mass.: MIT Press, 1974. pp. 299-337.

Rivlin, Alice M. and Timpane, P. Michael. Planned Variation in Education. Washington, D.C.: The Brookings Institution, 1975.

Rosenshine, Barak and Furst, Norma. Research on Teacher Performance Criteria. In B.O. Smith (Ed.), Research in Teacher Education--A Symposium. Englewood Cliffs, N.J.: Prentice-Hall, 1971. pp. 37-72.

Somers, Gerald G. The Effectiveness of Vocational and Technical Programs: A National Follow-Up Study. Madison, Wis.: Center for Studies in Vocational and Technical Education, University of Wisconsin, 1971.

Special Task Force to the Secretary of Health, Education and Welfare. Work in America. Cambridge, Mass.: MIT Press, 1973.

Struening, Elmer L. and Guttentag, Marcia (Ed.) Handbook of Evaluation Research (2 Volumes). Beverly Hills, Calif.: Sage Publications, 1975.

Warmbrod, J. Robert. The Liberalization of Vocational Education. Danville, Ill.: Interstate Printers and Publishers, Inc., 1974.

Wilms, Wellford W. Public and Proprietary Vocational Training: A Study of Effectiveness. Berkeley, Calif.: Center for Research and Development in Higher Education, University of California, 1974.

FIELD TESTING THE COMMON CORE CURRICULUM MODULES

by Dr. Terry G. Newell

The primary goal of the Common Core Curriculum evaluation for 1976-1977 was to field test the newly developed modules. Perhaps "field review" might be a better description of what was actually accomplished since the term "field test" usually implies the use of an experimental or quasi-experimental design. Those designs usually require the use of a control group which receives a traditional approach or treatment; the method used for the field tests reported here was a simple pre-post design with no control group.

Field Test Procedures and Materials

During early December, 1976, a letter requesting expression of interest in participating in field testing of the Common Core modules was sent to all teacher educators in Vocational Education at 20 colleges and universities in California. The teacher educators, in turn, were asked to contact any colleagues who might be interested in field testing the modules. Accompanying the letter was a list of the modules and a short description of the contents of the modules. (See Table 1.)

After further communication, a total of 66 field tests were tentatively arranged. The modules most in demand were those in Series V: Curriculum Design in Vocational Education; Module V-b (Applying Learning Theory) was requested seven times and Module V-a (Curriculum Design) was requested five times. Each module was requested at least once. Individual instructors proposed to field test anywhere from one to five modules.

Ultimately, 35 of the 66 field tests (53%) were completed. These 35 field tests utilized 24 of the 29 newly developed modules and included students from the areas of Business Education, Home Economics Education

and Industrial Education. The most common reason for the noncompletion of field tests seemed to be that the instructor did not have enough class time to use the module or was unable to incorporate the module into the content of a specific class. In a few cases, the class for which the field test was proposed did not reach sufficient enrollment for it to be taught.

Upon confirmation that an instructor wished to field test the module(s), a letter containing instructions, the instructor and student versions of the module, and a mass of ancillary material was distributed. The ancillary material included (1) a content validity questionnaire, (2) Student Opinion and Satisfaction Questionnaires, (3) Student Background Data Sheets and (4) a Student Progress Check List. The instructor was to administer and score the pre and post tests and was to monitor the progress of the student through the module. The specific manner in which the module was utilized was left completely to the discretion of the instructor.

The next section of this report summarizes the field test results of two modules. To make scanning of the tables, the summaries of the student opinion questionnaire and the pre-post tests, somewhat easier, any mean of 3.5 or more and any mean of 2.5 or less, is circled. The reason for this is that a rating of 3.0 indicates a "middle-level" or "acceptable" attitude or opinion about the aspect of the module covered by the item. It should be noted that high ratings are not necessarily "good", nor are low ratings necessarily "bad". Each item has its own anchor points and these anchor points are briefly identified in the table. Additionally, any standard deviation of 1.0 or more is circled to indicate that there is a fair amount of diversity in the responses to the item.

For one of the modules, the mean content validity ratings of the

module are included. Two consultants rated each module and these and any other content validity ratings obtained at the CCC Workshop were given to the appropriate module author to aid in the revision of the module.

Field Test of Module III-g: Student Organizations

The field test of Module III-g serves as a model of what a well-motivated, competent, interested instructor can do with the Common Core approach. A class of seven graduates and four undergraduates in Home Economics Education covered the module over a six-week time period. The instructor slightly modified the module to meet the specific needs of her class and then provided each student with all the necessary reference material needed to complete the module. The instructor chose specific activities for each lesson which were appropriate for her class and could be reasonably accomplished given the time and resources available. The students, working individually and in small groups, completed all these activities. The instructor kept a good record of the progress of each student, evaluated the quality of the activity and then gave feedback to the student concerning their performance.

The instructor's well-designed use of the module was reflected in the students' opinion of the module (Table 2). They felt mastery of the objective was important; the references were easily available; they liked the module approach and rated the student-instructor relationship as excellent. They did think the module was somewhat too long and there were too many activities, but they also felt that having completed the module, they could meet the behavioral objective.

The instructor's well-conceived use of the module was also reflected by the impressive gain in scores from pre to post test. Starting from a very low mean of 11.0, the students gained an average of 76.1 points,

yielding a post-test mean of 87.1. This significant increase ($t(10) = 31.77$, $p < .01$) coupled with the relative homogeneity ($S = 6.7$) of scores on the post-test, should be construed as positive evidence of the potential usefulness of the Common Core approach and furthermore, provides a goal toward which future field tests may aspire.

Table 2: Summary of Student Opinion and Content Validity Ratings for Module III-g: (N=11)
Student Organizations

Item:	Student Opinion Mean	Student Opinion Standard Deviation	Content Validity Mean
1. How important is mastery of the module objective: Very..... Not at all	(4.1)	0.6	
2. Organization: Excellent.... Poor	3.3	0.7	
3. Length: Too long....Too short	(3.8)	0.7	
4. Vocabulary Level: Difficult.... Easy	3.2	0.4	
5. References Used: Readily Available..... Not Available	(4.6)	0.8	
6. Activities: Too many... Too few	(3.7)	1.0	
7. Pre-Post Test: Too difficult... Easy	3.4	0.8	
8. How well do you meet behavioral objective: Very well.... Not well	(4.0)	0.4	
9. How did you like module approach? Very much.....Did not like it	3.3	0.7	
13. How closely did instructor keep track? Very close....Rarely	(4.7)	0.6	
14. Student-Instructor Relationship Excellent.....Poor	(4.7)	0.6	

Table 3: Results of Pre and Post Test for Module III-g: (N=11)

	Mean	Standard Deviation
Pre Test	11.0	8.9
Post Test	87.1	6.7
Difference	76.1	7.9

$t(10) = 31.77$, $p < .01$

Field Test of Module V-a: Developing a Curriculum Design for Vocational Education.

Module V-a was field tested at three sites. At site one, five graduate students in Business Education were given the module and told to complete as much of it as possible over a two-week period during which the instructor was absent from class. The instructor provided no help to the students. The individual accomplishment of activities was not recorded. Table 4 summarizes the opinions of four of these students. They thought the module was too long, the vocabulary level was too high, there were too many activities and the test was too difficult. The references were not available and they felt they could not meet the behavioral objective very well. Analysis of pre-post scores indicated a modest but significant ($t(3) = 4.49$, $p < .01$) average gain of 14 points. (Tables)

Field testing at site two provides a marked contrast to that at site one; here, eight graduate students in Business Education studied the module over a five-week period. They did one lesson per week, and the instructor monitored the students' progress to some extent. Students' opinions of the module (Table 6) were similar to those at site one; the module was too long, there were too many activities and the test was difficult, but references were now available and they did seem to like the module approach somewhat more than the students at site one. There was relatively little variability across the opinion items, indicating that the students tended to have similar responses to the module.

Pre-post scores (Table 7) showed an average increase of 42 points ($t(7) = 8.07$, $p < .01$).

At site three, six graduate students in Business Education worked on the module over a five-week period. Each student completed one activity

per lesson and the instructor evaluated the quality of the activity and kept track of the students' progress.

Student opinions (Table 8) of the module indicated that, in contrast to the other sites, they thought the module was well-organized, but they agreed with students at the other sites that the module was too long and the test was too difficult. Overall, these students liked the module approach.

On the test, (Table 9) these students gained an average of almost 51 points ($t(4) = 15.5$, $p < .01$). Since all three sites utilized graduate students in the same area, and the pre-test scores of all three groups were similar, the increased gain in post-test scores at sites two and three is probably attributable to the increased instructor effort at these sites.

Content validity was assessed by five raters; they were favorably impressed with the module though they indicated that the references might not be readily available and that the test was difficult. They felt that a student completing the module would meet the behavioral objective.

Table 4: Summary of Student Opinion and Content Validity Ratings for Module V-a: (N=4)
Developing a Curriculum Design for Vocational Education

Item:	Student Opinion		Content Validity
	Mean	Standard Deviation	Mean
1. How important is mastery of the module objective: Very..... Not at all	3.8	0.8	
2. Organization: Excellent..... Poor	(2.2)	(1.1)	
3. Length: Too long..... Too short	(5.0)	0.0	
4. Vocabulary Level: Difficult.... Easy	(4.0)	0.0	
5. References Used: Readily Available.... Not Available	(1.3)	0.5	
6. Activities: Too many....Too few	(4.3)	0.5	
7. Pre-Post Test: Too difficult... Easy	(5.0)	0.0	
8. How well do you meet behavioral objective: Very well....Not well	(2.0)	0.0	
9. How did you like module approach? Very much....Did not like it	(2.5)	(1.1)	
13. How closely did instructor keep track? Very close.....Rarely	(1.0)	0.0	
14. Student-instructor Relationship Excellent..... Poor	3.0	(1.6)	

Table 5: Results of Pre and Post Test for Module V-a: (N=5)

	Mean	Standard Deviation
Pre Test	23.8	9.8
Post Test	52.4	13.7
Difference	28:6	14.2

$t(3) = 4.49$, $p < .01$

Table 6: Summary of Student Opinion and Content Validity Ratings for Module V-a: (N=8)
Developing a Curriculum Design for Vocational Education

Item:	Student Opinion		Content Validity
	Mean	Standard Deviation	Mean(N=5)
1. How important is mastery of the module objective: Very..... Not at all	(2.5)	0.7	5.0
2. Organization: Excellent ..... Poor	(2.4)	0.7	4.0
3. Length: Too long.....Too short	(5.0)	0.0	3.0
4. Vocabulary Level: Difficult.... Easy	3.1	0.8	3.2
5. References Used: Readily Available.....Not Available	2.7	0.9	2.4
6. Activities: Too many.....Too few	(4.5)	0.7	3.6
7. Pre-Post Test: Too difficult... Easy	(4.4)	0.9	3.8
8. How well do you meet behavioral objective: Very well....Not well	(2.3)	0.9	4.2
9. How did you like module approach? Very much .....Did not like it	3.2	0.9	
13. How closely did instructor keep track? Very close..... Rarely	(4.6)	0.5	
14. Student-Instructor Relationship Excellent..... Poor	(4.7)	0.4	

Table 7: Results of Pre and Post Test for Module V-a: (N=8)

	Mean	Standard Deviation
Pre Test	25.5	12.9
Post Test	67.3	13.5
Difference	42.2	14.8

$t(7) = 8.07$, $p < .01$

Table 8: Summary of Student Opinion and Content Validity Ratings for Module V-a: (N=6)
Developing a Curriculum Design for Vocational Education

Item:	Student Opinion		Content Validity
	Mean	Standard Deviation	Mean
1. How important is mastery of the module objective: Very..... Not at all	4.2	0.7	
2. Organization: Excellent..... Poor	4.0	0.8	
3. Length: Too long.....Too short	4.0	0.8	
4. Vocabulary Level: Difficult.... Easy	3.1	0.4	
5. References Used: Readily Available.....Not Available	3.2	0.9	
6. Activities: Too many....Too few	3.5	0.5	
7. Pre-Post Test: Too difficult... Easy	3.8	0.9	
8. How well do you meet behavioral objective: Very well...Not well	3.0	0.8	
9. How did you like module approach? Very much .....Did not like it	3.1	0.4	
13. How closely did instructor keep track? Very close ....Rarely	3.5	0.8	
14. Student-Instructor Relationship Excellent.....Poor	4.2	0.9	

Table 9: Results of Pre and Post Test for Module V-a: (N=5)

	Mean	Standard Deviation
Pre Test	23.2	12.8
Post Test	74.0	14.6
Difference	50.8	7.3

$t(4) = 15.5$, $p < .01$

Analysis of Field Tests of All Modules

A global assessment of the CCC project was attempted by summarizing information from the student opinion questionnaire across all 35 field tests. Table 10 presents descriptive statistics obtained by treating each field test as the unit of observation; that is, for Item one, the importance of the module objective, the mean of 3.53 is the average of all means for this item across all field tests. Relative to other items, the importance of the module objective was highly rated. This implies that the students generally felt the objectives were relevant to their educational goals. The means ranged from 2.3 for Module VII-c (Research Procedures) to 4.8 for Module IV-b (Writing a Project/Budget). The objective of Module V-c (Instructional Strategies) was highly rated at one field site but not at the other two. The modules concerning Cooperative Relationships (II-a,b,c) also received high ratings.

Item two concerned the organization of the modules. The overall mean was 2.8 while the median was 2.6. This indicates that these data tend to have a positively skewed distribution; a few modules such as II-b (Guidance and Counseling) and II-d (Students with Special Needs) received high ratings, but most of the remaining modules received lower ratings.

Item three, length of the module, received an overall mean of 3.62 with a median of 3.40; again there is the indication of a positively skewed distribution. The students felt the modules were generally too long. Only two modules were rated towards the "too short" end of the scale. Module V-a (Curriculum Design) received a rating of 5.0 at two of the three field test sites.

The difficulty of the vocabulary, Item four, was generally rated as "about right." The mean of the standard deviation ($\bar{s}$) was 0.41; this was

the smallest value for this statistic across all items and suggests that relatively little variability in vocabulary difficulty exists among the modules.

Item five, availability of references, received the lowest mean rating of all items (2.32); this was definitely towards the "not available" end of the scale. The mean of the standard deviations ($\bar{s}$) was 0.99 and was the largest value for this statistic. There was much variability in the students' responses to this item. Availability of references was a recurrent theme heard both from students using the modules and from those instructors who conscientiously tried to field test the modules. A perusal of many of the modules indicates that the authors provide a "bibliography" type reference page, but the lessons and activities are not intercalculated with these references. It would seem incumbent upon the authors to indicate specific resources for each lesson and each activity. In some cases where an author wrote more than one module, the same reference page is used in both modules. At best, this might indicate an extensive overlap in material covered by the modules; at worst, it may indicate that the author was simply lazy. Clearly, some major revision needs to be made in some modules to ensure that, before further field testing, the reference availability problem is alleviated.

Item six, the number of activities used in the module, received a mean rating of 3.65 across all modules. Unfortunately, it is not clear whether the student rated this item based on the number of activities they actually completed, or on the total number of activities suggested by the module. It seems more likely that the latter was the basis of the rating. Means ranged from 2.9 for Module V-c (Instructional Strategies) to 4.7 for Module III-e (Disadvantaged Students). The students

generally felt that there were too many activities; but the content validity raters, if anything, indicated that more activities were needed. As originally conceived, students using the CCC modules were to complete all of the activities and the test was designed to assess the successful completion of the activities as well as to assess mastery of the module objective. In only a few instances did the field tested students actually complete all the activities and, in a few cases, it is doubtful that any activities were completed. There is not enough information available from the field test instructors to analyze the relationship between number of completed activities and test performance, but future field tests might try to address this question.

Item seven, test difficulty, received a mean rating of 3.59 indicating that students thought the tests were too difficult. Only the tests for Module II-b (Assessing Trainee Characteristics) and IV-b (Writing a Project/Budget) were rated in the "too easy" direction. In contrast, the content validity raters generally indicated the tests were "about right" in difficulty. Furthermore, many of the field test instructors objected to the format of the tests (they wanted multiple choice items), the wording of the tests (ambiguous), the difficulty in scoring the tests (time-consuming and/or subjective), and the answers provided by the author (wrong). In this evaluator's opinion, the pre-post test is one of the major problems in the CCC approach. In theory, the test is to (1) be used for diagnostic placement such that a student can skip specific lessons or the entire module; (2) assess knowledge of the material covered in the module and (3) ultimately guarantee that the student has mastered the behavioral objective which forms the basis of the module. Such an instrument is extremely difficult to develop. In general, the

tests of the modules are achievement based such that a high score indicates knowledge about material covered in the module. Some authors link the test with the lessons so that the diagnostic aspect of the test might be attempted. However, none of the field test instructors utilized this facet of the CCC. Perhaps such a truly sophisticated use of the modules lies in the future.

Item eight asked the students to rate how well they felt they met the objective after completing the module. The mean response of 2.95 indicated that most students thought they could meet it "adequately". Means ranged from 2.0 for V-a (Curriculum Design) and 2.1 for III-c (Guidance and Counseling) to 4.0 for Module III-g (Student Organizations). At some field test sites, the pre-post statistical analysis indicated that little or no change in scores occurred; yet, students rated themselves as adequately meeting the objective. This item set a rather ambiguous task and, to many students, this type of self-assessment was undoubtedly difficult.

Item nine queried the degree to which students liked the module approach; responses were pretty disappointing. The mean of 2.75 across all field tests does not seem to suggest that students are wholeheartedly embracing this innovative approach to education. A subsequent analysis looks at potential contributing factors to the responses to this item.

Item ten, the extent to which the instructor monitored the students' progress, had a mean rating of 3.07; the median is 3.30. These means, thus, follow a negatively skewed distribution with some field test instructors receiving a very low rating. Indeed, two instructors received mean ratings of 1.0, but another received a mean of 4.7. Clearly, there was marked diversity among instructors.

Finally, Item eleven concerning the student-instructor relationship, received the highest mean rating of all items (3.82). This item was

predicated on the assumption that the CCC modules would be used in their "individualized" format with the instructor meeting with, and guiding, each student. Since this occurred rarely, if at all, this item was probably interpreted by the students as sort of an overall evaluation of the instructor and/or the course. In the context of the field tests, the item is not very useful; but it does suggest that even though the students did not like the module approach, they did not generalize these feelings to the instructor.

Summary of Pre-Test/Post-Test Changes

With one exception, the data from the pre and post tests were analyzed using "two sample" t-tests for dependent groups. These tests indicate whether a "statistically significant" change in the mean scores from pre to post test was observed. In 26 out of 35 field tests, a significant change at the .01 probability level was noted. Thus, in approximately 75% of the field tests, there is evidence that the students really did learn something. This is an impressive result and, although statistical quibbles and more serious design questions might be raised, the conclusion seems undeniable--the Common Core Curriculum approach does work.

In an effort to generate a more "sensitive" index of the outcome of the field tests than the dichotomous decision provided by the statistical analysis, the evaluator developed his own five-point scale of "field test success". In obtaining this rating, the evaluator "subjectively" considered the magnitude of the t-test, the magnitude of the change from pre to post test, and the initial starting point as indicated by the pre-test. A high rating indicates a large, significant increase from a relatively low starting point. A low rating indicates essentially no increase at all.

Table 11 indicates which field tests fell into each of the five rating classes. Twelve field tests were rated as "highly successful"; in these cases, the students started with relatively low pre-test scores and dramatically increased their scores to a point where the behavioral objective, as measured by the test, would be met. Seven field tests were considered "successful"; in most of these cases, the students started with fairly high pre-test scores but still increased. In these field tests, the class chosen to use the module may have been more advanced than the level for which the module was designed. In those cases, the students might have been able to skip some of the lessons. Six field tests were considered "moderately successful"; here a statistically significant increase was observed, but the actual gain was not very large or the average post-test scores were still well below the top scores obtainable. Two field tests were "marginally successful"; in one case, no statistically significant increase was observed, but this was due to one or two students actually decreasing scores from pre to post test. Finally, eight field tests were rated as "not successful"; no statistically significant change was noted.

For those modules field tested at more than one site, inspection of the table indicates that Module I-a (History, Philosophy) was highly successful at both places. Module II-b (Advisory Councils) was highly successful at one site and successful at the other site. Module III-a (Promoting and Recruiting Students) was moderately successful at one site and only marginally successful at another site. Modules V-a,b,c were tested at three sites; ratings ranged from one to five for these modules. Module VI-d (Safety) was rated well at both sites, but Module VII-b (Evaluating Local Programs) was unsuccessful at two field sites.

It is also possible to match the instructor to the field test success ratings. The instructor who tried to use five modules had one moderately successful, one marginally successful, and three unsuccessful outcomes. Clearly, not enough time was devoted to each module. Another instructor who tested four modules had two highly successful and two unsuccessful outcomes.

Intercorrelations

Using the mean ratings for each item at the 35 field tests, an intercorrelation matrix was generated and is presented in Table 12. A brief description of the matrix follows.

The rating of the importance of the objective (Variable 1) correlated highly with the organization of the module (V2) and the extent to which the students felt they met the objective (V8). Variable 1 also correlated with the students' liking of the module approach (V9). The organization of the module (V2) correlated highly with the availability of references and negatively with the number of activities; i.e., the more activities, the poorer the organization. Not very surprisingly, the length of the module (V3) correlated with the number of activities and the difficulty of the test (long tests were probably rated as more difficult). Vocabulary level (V4) was positively related to number of activities and difficulty of the test.

The availability of references (V5), as previously mentioned, was positively correlated with organization. The extent to which they met the objective, and the extent to which they liked the module approach, also correlated with reference availability. Variable 6, number of activities, was negatively correlated with meeting the objective and with liking the approach. Test difficulty (V7), in addition to relationships with length

and activities, was negatively correlated with meeting the objective.

Variable 8, how well the objective was met, was related to organization, importance of the objective, and availability of references. The degree of enthusiasm for the module approach, V9, was positively correlated with organization, importance of objective, and availability of references. Variable 10, the extent to which the instructor monitored the activities of the students, showed generally weak relationships with all other variables although it was positively correlated with liking the module approach.

Finally, the field test success rating (VII), was poorly correlated with the opinion items. It had a marginal correlation with the length of the module, but that was about all. Apparently, whatever this success rating is measuring is not highly related to the module characteristics.

Stepwise Multiple Regression

One issue that must be considered is why the students liked (or did not like) the module approach in these field tests. In an attempt to discern some order among these, at times, chaotic data, a stepwise multiple regression was performed using Variable 9, the extent to which the module approach was liked, as the dependent variable, and the other items of the student questionnaire as independent variables. Table 13 provides some interesting results and generates a plausible model for indicating the contributing factors to student satisfaction with the module approach.

The first five entering variables in the equation were: (1) organization, (2) monitoring of progress, (3) meeting the objective, (4) number of activities and (5) length of module. Beyond this point, addition of further variables increased the squared multiple correlation less than 1% and the F ratio for significance of the multiple correlation (R) was no longer significant.

Inspection of the table indicates that the two major contributing variables to liking the module approach are organization of the module which accounted for 32% of the total variance, and the extent to which the instructor kept track of the students' progress, which added 6% to the total variance. The remaining three variables generated only small increases in the explained variance.

It would seem most reasonable to generalize from these data that there are two basic factors which ultimately influence the effectiveness and acceptance of the module approach:

(1) Characteristics of the module as typified by the module's organization

(2) Characteristics of the instructor as typified by monitoring progress.

As was indicated in the reviews of the individual field tests, there were times when even the most highly motivated and enthusiastic instructor was frustrated by a poorly organized module with a badly designed pre test and unavailable references. Likewise, even the best, most well-thought module fared badly in the hands of an indifferent instructor who distributed the module with vague instructions and non-existent guidance.

The regression equation treats each of these factors as independent, but, in reality, they are not; there is a module-instructor interaction. Future use of the CCC modules must treat each of these factors as equally important, and it may even be necessary to prepare a module that the instructor completes which has as its behavioral objective the ability to use an individualized instructional method.

SUMMARY

A single group pre-test post-test design was used to assess the effectiveness of the newly developed Common Core Curriculum modules. A total of 35 field tests utilizing 24 of the 29 modules were conducted Instructors were given "free rein" to use the modules in the manner they felt was most appropriate for their particular class. Some instructors carefully integrated the module into the course while others simply gave the modules to the students with little or no guidance.

A significant improvement in scores from pre to post test was noted in 26 of the 35 field tests (75%). Thus, there was strong evidence that students using the modules did gain knowledge relevant to the behavioral objectives for which the modules were constructed.

The reactions of the students to the modules varied widely but, in general, they felt the behavioral objectives were important. Many of the modules were rated as too long with too many activities and with tests that were too difficult. A serious recurring problem was noted: namely, the references utilized by the module were not available to the students.

The students' reaction to the module approach was also varied. Some students found it innovative and challenging while others thought it was frustrating and boring. The reasons for this variability seem to lie in an interaction between characteristics of the module (organization, length, activities) and characteristics of the instructor (extent to which the instructor monitored the progress of the student). Some instructors appeared to confuse individualized instruction with the "self-contained or programmed learning" approach. It needs to be made clear in future use of these modules that they are not self-contained.

Table 10: Summary of Responses to Student Opinion Items for 35 Field Tests of 24 Different Modules

Item	Mean	Median	S	Range	$\bar{S}$	S_s
Importance of Objective	3.53	3.60	0.65	2.3-4.8	.83	.30
Organization	2.80	2.60	0.62	1.8-4.3	.83	.25
Length	3.62	3.40	0.54	2.6-5.0	.76	.36
Vocabulary	3.19	3.10	0.29	2.8-4.0	.41	.34
References Available	2.32	2.20	0.69	1.3-4.6	.99	.25
Activities	3.65	3.60	0.46	2.9-4.7	.86	.31
Test Difficulty	3.59	3.50	0.52	2.3-5.0	.84	.35
Meet Objectives	2.95	3.00	0.46	2.0-4.0	.74	.27
Like Module	2.75	2.70	0.61	1.8-4.0	.80	.24
Monitor Activities	3.07	3.30	1.06	1.0-4.7	.76	.25
Student-Instructor Interaction	3.82	4.00	0.78	2.2-4.8	.84	.35

Table 11: Frequency Distribution of Ratings of Outcomes of Field Tests by Module

RATING				
Highly Successful	Successful	Moderately Successful	Marginally Successful	Not Successful
I-a	I-c	II-b	III-a	II-a
I-a	III-c	III-a	V-c	II-c
I-b	III-d	V-a		III-b
II-b	III-e	V-b		V-c
III-g	V-a	VII-c		VI-a
IV-b	V-c	VII-e		VI-b
V-a	VI-d			VII-b
V-b				VII-b
V-b				
VI-c				
VI-d				
VII-a				
Total 12	7	6	2	8 35

Table 12: Intercorrelation of Student Opinion Items and Success Rating for 35 Field Tests

Name	VARIABLE 1	2	3	4	5	6	7	8	9	10	11
1. Importance of Objective	1.00	.68	-.22	.01	.26	-.38	-.27	.46	.47	.13	.11
2. Organization		1.00	-.08	-.21	.51	-.36	-.26	.51	.56	.08	.11
3. Length			1.00	.41	-.08	.65	.53	-.44	.02	.02	.30
4. Vocabulary				1.00	-.25	.43	.38	-.16	.00	.19	.03
5. References Available					1.00	-.12	-.24	.31	.30	.13	.21
6. Activities						1.00	.45	-.38	-.27	.12	.12
7. Test Difficulty							1.00	-.29	.03	-.15	-.15
8. Meet Objective								1.00	.14	.20	.00
9. Like Module?									1.00	.29	.14
10. Instructor Monitor										1.00	.11
11. Success of Field Test											1.00

Table 13: Stepwise Multiple Regression for Predicting Extent to Which Module Approach was Liked

Variable	R	R^2	increase in R^2	b	β
Organization	.56	.32	.32	.504	.511
Monitoring Progress	.62	.38	.06	.173	.301
Meets Objective	.63	.39	.01	-.170	-.128
Activities	.65	.42	.02	-.393	-.297
Length	.66	.43	.01	.215	.191

$F(5,29) = 4.48$, $p < .01$

SUMMARY AND CONCLUSIONS

Maurine Vander Griend

Serving as listeners and observers were the CSUF department chairmen from Agricultural Industry and Education, Office Administration, and Industrial Arts and Technology. The first observation made was the majority of workshop participants found the group work stimulating and rewarding. One observer said:

> "I observed that very positive and very good responses were being made by the field testing personnel present at this workshop. The feeling I got was that everyone came here to do business. The work sessions were very industrious and were most helpful especially to the module writers."

The following comments were heard in the group work sessions. They are in no specific order and the group is not identified. Some of the comments were repeated by several groups and some were heard at every group visited.

One concern dealt with resources--the availability of resources listed by the author. Many references were not readily available to students because they were not in the library and in some cases too many students had access to too few copies. One field-test instructor suggested that the use of references would be more effective if specific chapters or pages of a reference were given with each activity. Lead time to work with librarian, for ordering materials and for duplication of materials would have been very beneficial and some of the outcomes of the field testing might have been different.

When it came to the activities, the field instructors suggested that the activities be headed as "suggested activities" or that they be grouped as those that are essential and those that are suggested. The user should be permitted to adapt activities. Some of the field test instructors who

had completed the review found some activities that were not based on the pre-test or related to the objective.

Several concerns were also expressed about the pre-test for some of the modules. This included comments such as pre-test is too long--representative questions from each lesson sufficient; pre-test deals with too many facts rather than concepts; pre-test is difficult to score; some of the answers need to be expanded; and some questions need clarification. Many field-test instructors said they found the answer key most helpful.

Helpful to the user of modules would be the clarification of the relationship between modules--is there a sequence or does each module stand alone or which ones stand alone or are a part of a series. Accompanying this should be a clear statement of the intent and the intended level of instruction for each module.

It was very evident the modules were field tested under different situations such as for independent study, in a classroom setting for specified number of weeks or as additional assignment. Some field test instructors found that they did not have enough time or allow time for individual student/teacher interaction, especially as these modules are not self-contained. Others found that the modules provided for differential instruction and allowed for a supplementary form of instruction enabling positive growth.

The workshop for teacher educators from all vocational areas was the vehicle for a good working relationship with many teacher educators from many institutions. Several teacher educators stated that they planned to adapt and use much of the material reviewed.

If there is an opportunity to revise and finalize this Common Core Curriculum, there will be available to all institutions usable curriculum material.

Guidelines for the use of these modules or detailed instruction to the users regarding the intent of the module will also be prepared. As with any curricular material these materials will need to be continually revised and updated. This will become the responsibility of each user in his/her own particular situation.

APPENDICES

WORKSHOP
Common Core Curriculum of Vocational Education
Airport Holiday Inn — Mofokal Room
Fresno, California
March 21-22, 1977

PURPOSE:
To assess and advise on 29 Common Core Curriculum — Vocational Education modules.
To identify research needs, design and process related to vocational education.

Monday (March 21)

9:00 Registration — coffee
9:30 Introductions — Gwen C. Cooke
9:45 The Application of the Research Process to Problems in Vocational Education — J. Robert Warmbrod
10:30 Take a Break
10:45 Overview of the Common Core Curriculum — Module writers -

William Bain	Kenneth Moshier
Ann Bauer	Dwayne Schramm
Lloyd Dowler	Gayle Sobolik
Fran Harkins	Gary Winegar

11.45 Field testing of CCC Modules — Terry Newell
12.15 Luncheon
1:15 Group work (review of specific modules) (groups chaired by writers)
3:15 Research Design: Implications for Interpretation — J. Robert Warmbrod

Tuesday (March 22)

9:00 Some Research Needs in Vocational Education — J. Robert Warmbrod
9:45 Take a Break
10.00 Group work (review of specific modules)
12:15 Luncheon
1:00 Summary of Group Work
Panel — Fred Nury, Frank Schroeter, Berle Haggblade, Gwen Cooke
2:00 Informal Questions and Answers
J. Robert Warmbrod Panel members
Terry Newell Module writers
3:00 Next step with project — Maurine Vander Griend
3.30 HAVE A SAFE TRIP HOME...

Consultant:
J. Robert Warmbrod
Professor, Agricultural Education
The Ohio State University

Module Writers:
William Bain
Assistant Director of Vocational Education
Fresno City Unified School District, Fresno
Ann Bauer
Associate Professor, Home Economics
California State University, Fresno
Lloyd Dowler
Professor, Agricultural Education
California State University, Fresno
Frances Harkins
Associate Professor, Home Economics
California State University, Fresno
Kenneth Moshier
Assistant Professor, Industrial Arts and Technology
California State University, Fresno
Dwayne Schramm
Professor, Office Administration
California State University, Fresno
Gayle Sobolik
Professor, Office Administration
California State University, Fresno
Gary Winegar
Associate Professor, Industrial Arts and Technology
California State University, Fresno

Project Evaluator:
Cal Wright Education, Evaluation and Research Inc.

Workshop Director:
Gwen Cooke
Chairperson, Department of Home Economics
California State University, Fresno

Assistant to Director:
Maurine Vander Griend
Adjunct Professor, Home Economics
California State University, Fresno

Funded by: Vocational Education Instruction Section
California State Department of Education
Part F - Education Professions
Development Act

Field Test Instructors:
L. Joyce Arnston — Saddleback Community College
Ann Bauer — California State University, Fresno
Dr. Bill Wesley Brown — California State University, Chico
Sandra Crabtree — California Polytechnic State University, San Luis Obispo
Dr. D. Gene Davie — University of California, Los Angeles
Dr. Howard Decker — San Jose State University
Dr. Dennis A. Dirksen — San Diego State University
Mary Margaret Eighme — Pacific Union College
Dr. Lawrence W. Erickson — University of California, Los Angeles
Dennis Hampton — California State University, Chico
Dr. James Harper — San Jose State University
Dr. Charles J. Hacker — California State University, Los Angeles
Dr. Irvin T. Lathrop — California State University, Long Beach
Dr. James Leising - - University of California, Davis
Dr. John H. Linn — San Francisco State University
Dr. Daniel C. Lopez — San Jose State University
Dr. Wilmer Meedke — California State University, Los Angeles
Dr. Edmund L. Mennion - - California State University, Chico
Dr. James A. Manos — California State University, Northridge
Dr. Hal Maraters — San Diego State University
Dr. G.W. Maxwell — San Jose State University
James B. Mayo — Fremont-Newark Regional Occupational Program
Karen Owens — Pepperdine University
Dr. Kenneth Phillips — California State University, Los Angeles
Evelyn Price — California State University, Los Angeles
Dr. Larry P. Rainbun — California Polytechnic State University, San Luis Obispo
Dr. Norman Stanger — California State University, Long Beach
Louise Sutton — California State University, Northridge
Homer Sweeney — Fremont-Newark Regional Occupational Program
Dr. Leonard Torres — California State University, Long Beach
Dr. James J. Weston — California State University, Sacramento
Dr. Marylynne Williams — California State University, Los Angeles
Dr. William Winnett — San Francisco State University
Dr. [illegible]eth Zimmer — California State University, Los Angeles

Department Chairpersons — California State University.

Gwen Cooke — Home Economics
Berle Haggblade — Office Administration
Fred Nury — Agricultural Industry and Technology
Frank Schroeter — Industrial Arts and Technology

COMMON CORE CURRICULUM OF VOCATIONAL EDUCATION - 1976 - 1977

Introduction to Vocational Education
- History - Philosophy - Trends - Vocational Education
- Scope, Function and Organization
- Legislation
- Assessing the Job Market and Employment Trends

Cooperative Relationship
- Rationale for Cooperative Relationships
- Advisory Councils
- Cooperative and Work Experience Programs

Students
- Promoting Vocational Education and Recruiting Eligible Students for Vocational Education Programs
- Assessing Students' Personal Characteristics
- Guidance and Counseling
- Assisting Students with Special Needs in Vocational Education Programs
- Assessing the Needs of the Disadvantaged Student
- Developing Student Leadership Qualities in Vocational Education Programs
- Student Organizations

Administration
- Fiscal Management of a Vocational Education Program
- Writing a Vocational Education Project/Budget
- Record Keeping in Vocational Programs

Curriculum Design in Vocational Education
- Developing a Curriculum Design in Vocational Education
- Learning Theory
- Instructional Strategies

Stages and Structure of Curriculum Development
- Curriculum Theory in Vocational Education
- Building Curriculum in Vocational Education
- Curriculum Specifics in Vocational Education
- Safety

Evaluation and Research
- Evaluation Model
- Evaluation Procedures for Local Programs
- Introduction to Research Procedures in Vocational Education
- Research Design in Vocational Education
- Development of a Research Proposal in Vocational Education

CALIFORNIA STATE UNIVERSITY • FRESNO

FRESNO, CALIFORNIA 93740

SCHOOL OF PROFESSIONAL STUDIES
Department of Home Economics

To: FIELD TEST INSTRUCTORS
COMMON CORE CURRICULUM FOR VOCATIONAL EDUCATION

From: Dr. Gwen Cooke, Chairperson
Home Economics Department
California State University, Fresno
Fresno, California 93740
(209) 487-2164

Re: Instructions for field testing modules

1. In the packet is a copy of

-each of the CCC Modules requested. (Modules may come in separate packets.) The instructor's copy includes pre-post tests, answer sheet and a total list of all suggested resources for the module.

-module for students - The instructor will need to make a copy available for each student. This module does not include the pre-post tests, answer sheet and a list of suggested resources for the module.

-Content Validity Questionnaire. After reading the module carefully, but prior to actually using the module, the instructor will fill out the Content Validity Questionnaire.

-Student Progress Check List to be completed by the instructor by filling in those items applicable to the particular module being tested. (Five copies are enclosed sufficient for a class of 30 members.)

-"Ditto masters" of the Student Opinion and Satisfaction Questionnaire to be completed by each student participating in field test.

-"Ditto masters" of the Student Background Data Sheet to be completed for each member by each student participating in the field test.

2. The instructor will administer and score the pre-test. Be sure students put their name, instructor's name and date in the proper blank on the first page of the test. Have students write PRE-TEST at the top of the test.

When scoring the test, the instructor will record the number of points the student received for each question in front of the number of the question. The instructor will total the score and put in front of the students' name on the first page of the test.

3. The instructor will monitor the progress of the student through the module.

Appendix C-2

CONTENT VALIDITY QUESTIONNAIRE

COMMON CORE CURRICULUM MODULES

As part of our evaluation of the CCC project we are interested in the content validity of the CCC modules. Content validity refers to the adequacy of the content of the module as rated by knowledgeable individuals in the area of vocational education. After reading the module we would like you to complete this questionnaire for each module. Circle your response to each item. At the end of the questionnaire there is room for your written comments.

MODULE TITLE_____ NUMBER OF STUDENTS ENROLLED_____

INSTRUCTOR'S NAME_____ CLASS MEETINGS:

INSTITUTION_____ HRS. PER WEEK_____

NAME OF CLASS_____ TIME OF CLASS_____

GRADUATE COURSE_____ DAY(S) OF CLASS_____

UNDERGRADUATE COURSE_____ NUMBER OF WEEKS FOR THIS MODULE_____

Part I: Behavioral Objective

1. Indicate your evaluation of the behavioral objective which forms the basis of the module.

Clearly stated		Adequate		Vague
5	4	3	2	1

2. How important is mastery of this objective for future vocational education teachers?

Very		Somewhat		Not at all
5	4	3	2	1

Part II: The following questions concern the text and narrative summary of the module:

3. Organization of the module

Excellent		Good		Poor
5	4	3	2	1

4. Length of the module

Too long		About right		Too short
5	4	3	2	1

5. Vocabulary level of the module

Too difficult		About right		Too simple
5	4	3	2	1

6. References used in module

Readily available		Available		Not available
5	4	3	2	1

7. Appropriateness of suggested use of references

Excellent		Adequate		Poor
5	4	3	2	1

8. Activities suggested by modules

Too many		About right		Too few
5	4	3	2	1

9. If you were to use this module approximately what percentage of the suggested activities do you think you would use?

100%	75%	50%	25%	0%

10. Range of activities

Too broad		About right		Too narrow
5	4	3	2	1

III: These questions concern the pre test posttest.

11. The module pre-test is:

Too difficult		About right		Too easy
5	4	3	2	1

12. With respect to the number of items in the pre test:

Too many		About right		Too few
5	4	3	2	1

13. With respect to scoring the test:

Too difficult		About right		Too easy
5	4	3	2	1

IV: In general:

14. If a student completes the module and passes the posttest, how well do you feel the student would meet the behavioral objective?

Excellent		Adequate	Marginally	Could Not Meet
5	4	3	2	1

15. Would you use the module in its present form?

Definitely yes	Probably yes	Not sure	Probably not	Definitely not
5	4	3	2	1

Comments:

Text of Module:

Pre/Post Test:

Home Economics Department
California State University, Fresno
January 1977

Appendix C-3

STUDENT PROGRESS CHECK LIST

COMMON CORE CURRICULUM MODULES

MODULE TITLE_____

Activity	Student Code No.___	Student Code No.___	Student Code No.___	Student Code No.___	Student Code No.___
Pre test Date Score					
Lesson 1 started date					
Activity 1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Lesson 1 completed date					
Lesson 2 started date					
Activity 1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Lesson 2 completed date					

Appendix C-4

STUDENT OPINION AND SATISFACTION QUESTIONNAIRE

COMMON CORE CURRICULUM MODULE

Name of Module: _____

After you have completed the module we would appreciate your responses to the following questions. Please circle the number which best indicates your response.

1. How important is mastery of the module objective for future vocational education workers?

Very important		Somewhat		Not at all
5	4	3	2	1

2. What did you think of the organization of the module?

Excellent		Good		Poor
5	4	3	2	1

3. Length of module?

Too long		About right		Too short
5	4	3	2	1

4. Vocabulary level of the module?

Too difficult		About right		Too simple
5	4	3	2	1

5. References used in module:

Readily available		Available		Not available
5	4	3	2	1

6. Activities suggested by the module.

Too many		About right		Too few
5	4	3	2	1

7. The module pre/post test was

Too difficult		About right		Too easy
5	4	3	2	1

8. Look at the behavioral objective which forms the basis of the module. How well do you think you can behaviorally meet that objective?

Very well		Adequately		Not very well
5	4	3	2	1

9. How did you like the module-type approach to learning the material?

Very much		It was O.K.		Did not like it
5	4	3	2	1

10. From which two activities do you feel you learned the most?
1.

2.

11. From which two activities do you feel you learned the least?
1.

2.

12. Can you think of any further activities which might be used in this module?
1.

2.

13. How closely did your instructor keep track of your progress through the module?

Constantly Very closely		Occasionally		Rarely
5	4	3	2	1

14. How would you characterize the instructor-student relationship?

Excellent		Good		Poor
5	4	3	2	1

15. Did you work on any of the activities with other students?

Yes No If so, how did you like that?

Enjoyed it very much		O.K.		Would have rather done activities alone
5	4	3	2	1

Any other comments you might have about the module and/or the Common Core approach would be appreciated. Thank you very much for your help.

Home Economics Department
California State University, Fresno
January, 1977

Appendix C-5

STUDENT BACKGROUND DATA SHEET

COMMDN CORE CURRICULUM MODULES

SEX_____ UNDERGRADUATE STUDENT_____

AGE_____ GRADUATE STUDENT_____

Your usual grade average (please circle)

A A- B+ B B- C+ C C-

Program in which you are enrolled:

1. Designated Subjected Credential in _____ (subject area)

2. Bachelors in: Agriculture ___ Business ___ Home Economics ___
   Industrial Education ___ Vocational Education ___

3. Masters in: Agriculture ___ Business ___ Home Economics ___
   Industrial Education ___ Vocational Education ___

If number three is checked please complete the following:

Agriculture___
Specialized Area:_____

Home Economics___
Specialized Area:_____

Industrial Education___
Specialized Area:_____

Business Education___
Specialized Area:_____

4. The instructor will administer and score the post-test in the same manner as the pre-test. Have students write POST-TEST at the top of the test.

5. The instructor will give the student the "Student Opinion and Satisfaction Questionnaire." The students are not to write their name on the instrument. The questionnaire is anonymous.

6. The instructor will send all Pre- and Post Tests, Content Validity Questionnaire, Student Opinion Questionnaire, Progress Check-List and Background Data Sheet to -

   Dr. Gwen Cooke, Chairperson
   Home Economics Department
   California State University, Fresno
   Fresno, California 93740

7. In some institutions, the same students will be completing more than one module. In this case, the instructor will send complete information for each module (i.e., each student will complete a Student Background Data Sheet for each module).

8. Any comments on the usefulness, problems encountered, etc., would be appreciated.

GCC:cf

Home Economics Department
California State University, Fresno
January 1977

Appendix D

WORKSHOP PARTICIPANTS

L. Joyce Arntson - Saddleback Community College

William Bain - Fresno Unified School District, Fresno

Ann Bauer - California State University, Fresno

Jim Becket - California State Department of Education, Sacramento

Patti Bennett - California State Department of Education, Sacramento

Gwen Cooke - California State University, Fresno

Howard Decker - San Jose State University, San Jose

Lloyd Dowler - California State University, Fresno

Mary Margaret Eighme - Pacific Union College, Angwin

Gus Graham - California State University, Fresno

Berle Haggblade - California State University, Fresno

Frances Harkins - California State University, Fresno

Charles J. Inacker - California State University, Los Angeles

Irvin T. Lathrop - California State University, Long Beach

James Leising - University of California, Davis

John H. Linn - San Francisco State University, San Francisco

Daniel C. Lopez - San Jose State University, San Jose

Wilmer Maedke - California State University, Los Angeles

G. W. Maxwell - San Jose State University, San Jose

Kenneth Moshier - California State University, Fresno

Terry Newell - California State University, Fresno

Ratana Newsome - California State University, Fresno

Troy Nuckols - San Francisco State University, San Francisco

Fred Nury - California State University, Fresno

Evelyn Price - California State University, Los Angeles

Bonnie Rader - California State University, Long Beach

Larry F. Rathbun - California Polytechnic State University, San Luis Obispo

Ed Rudloff -- The Consortium of the California State University and Colleges, Los Angeles

Dwayne Schramm - California State University, Fresno

Frank Schroeter - California State University, Fresno

Gayle Sobolik - California State University, Fresno

Carolyn Souza - California State University, Fresno

Louise Sutton - California State University, Northridge

Leonard Torres - California State University, Long Beach

Ruby Trow - California Polytechnic State University, Pomona

Stan Urbanski - California State University, Long Beach

Maurine Vander Griend - California State University, Fresno

J. Robert Warmbrod - The Ohio State University

James J. Weston - California State University, Sacramento

Kathryn Whitten - California State Department of Education, Sacramento

Marylynne Williams - California State University, Los Angeles

Gary Winegar - California State University, Fresno

William Winnett - San Francisco State University, San Francisco

Appendix E

FIELD TEST INSTRUCTORS

L. Joyce Arnston - Saddleback Community College

Sandra Crabtree - California Polytechnic State University, San Luis Obispo

Dr. Howard Decker - San Jose State University

Dr. Dennis A. Dirksen - San Diego State University

Mary Margaret Eighme - Pacific Union College

Dr. Lawrence W. Erickson - University of California, Los Angeles

Dr. Charles J. Inacker - California State University, Los Angeles

Dr. Irvin T. Lathrop - California State University, Long Beach

Dr. James Leising - University of California, Davis

Dr. John H. Linn - San Francisco State University

Dr. Daniel C. Lopez - San Jose State University

Dr. Wilmer Maedke - California State University, Los Angeles

Dr. James A. Manos - California State University, Northridge

Dr. Hal Marsters - San Diego State University

Dr. G. W. Maxwell - San Jose State University

Evelyn Price - California State University, Los Angeles

Bonnie Rader - California State University, Long Beach

Dr. Larry P. Rathbun - California Polytechnic State University, San Luis Obispo

Louise Sutton - California State University, Northridge

Dr. Leonard Torres - California State University, Long Beach

Dr. James J. Weston - California State University, Sacramento

Dr. Marylynne Williams - California State University, Los Angeles

Dr. William Winnett - San Francisco State University

Dr. Kenneth Zimmer - California State University, Los Angeles