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ABSTRACT

Phase 1 of the project consisted of a survey of the states to determine the type of model used in the states' evaluation of vocational-technical education. In addition, a search was made of RIE and CIJE to determine the most recent evaluation research studies conducted in each state. Through responses to inquiries and the literature search, the type of evaluation and research studies conducted in each state was determined. The various methods of evaluation used were grouped into the eight categories of self-study, visiting team, follow-up, employer-based, cost-benefit, behavioral objective, nonbehavioral objective, and job placement relatedness. Results are presented as discussions in which the literature on each of the eight identified evaluation methods is summarized. A discussion of process versus product evaluation is also included. Tables indicate the type of evaluation used as reported by the states and also the number of reported research studies conducted in or for the states according to type of evaluation method. Appendixes contain project correspondence and a 19-page bibliography. (NJ)

Evaluation of Vocational Technical Education

PHASE I

a review of the literature

July. 1975

Prepared by: New Educational Directions, Inc.

for: The Indiana State Board of
Vocational Technical Education

28-74-C-1

I. PROCEDURE

In November, 1973, a letter was sent to the State Departments of Public Instruction of the 50 states requesting information on the state's evaluation model for vocational-technical education (Appendix A). A letter and/or materials were received from twenty-two states as a result of that initial mailing.

After a meeting with Dr. Robert Harris at Indiana University in August, 1974, a letter requesting information and materials was sent to four states he suggested as having a system but who had not responded to the November, 1973 inquiry. These states were California, Georgia, Illinois, and Oklahoma, and a response was received from each of these states.

In early October, 1974, a "Probe" was made of the Educational Resources Information Center (ERIC) through Indiana University. A "Probe" is a computer retrieval program developed at Indiana University to search the ERICTAPES of RIE (research reports and studies) and CIJE (journal articles). The result is a computer printout giving an abstract of the most recent 100 research reports or studies and a full citation of earlier relevant reports or studies. The same is true for journal articles.

The following descriptors were used for the "Probe:

1. Vocational education
2. Agricultural education
3. Business education
4. Cooperative education
5. Distributive education
6. Health occupations education
7. Prevocational education
8. Technical education
9. Trade and Industrial education
10. Occupational home economics
11. Program evaluation
12. Evaluation techniques
13. Educational accountability
14. Evaluation criteria
15. Course evaluation
16. Statewide assessment
17. Statewide planning

Anything including a descriptor from #1-10 in combination with a descriptor from #11-17 was printed. A total of 800 research studies and 248 journal articles was identified through this procedure. The next step was to eliminate inappropriate studies from further consideration on the basis of the abstracts provided for the first 100 listed. Abstracts for the remaining studies were located in the "Research in Education" journals at Wabash College and reviewed at that location. Approximately 350 research studies were actually reviewed on microfiche by two NED staff members at Purdue University. In addition, approximately 50 journal articles were examined. Information was written on 112 research studies and twelve journal articles. A bibliography is attached.

During October, 1974, a letter was sent to the Vocational Education Divisions of the State Departments of Education which requested updated materials from states who had responded the previous year. An introductory letter and request for information was sent to States that had not responded to the November, 1973, inquiry (see Appendix B).

In December, 1974, another letter was sent to the Directors of the Division of Vocational Education of the various State Departments of Public Instruction who did not respond to the October, 1974, letter. Mr. Phillip Mann, Coordinator of Evaluation, Indiana Division of Vocational Education, gave us permission to use his name as a reference for the project for this mailing (see Appendix C).

To date, April 1, 1975, some response has been received from 45 of the states. Thirty-four states sent materials and/or evaluation procedures, eight sent a letter stating their involvement in vocational education evaluation, and three indicated the state did not have a system.

II. STATE SYSTEMS

Through responses to inquiries and research studies, the type of evaluation and research studies conducted in each state was determined. Table A presents a summary of the evaluation activities reported in a state through a response to the various inquiries noted above. Since five states did not respond to the letters requesting information, 'no reply' is indicated for those states. The various methods of evaluation used in the states tend to fall into eight categories:

1. Self-study
2. Visiting team
3. Follow-up of students
4. Employer and/or Community evaluation
5. Cost/benefit analysis
6. Behavioral objectives
7. Nonbehavioral objectives
8. Job placement relatedness.

Four other categories are included in Table A;

1. Undetermined: incomplete data
2. In process of developing system
3. No system
4. No reply.

TABLE A

Responses from States

	Self-study	Visiting team	Follow-up	Employer-based Evaluation	Cost/Benefit	Behavioral Objectives	Nonbehavioral Objectives	Job Placement Relatedness	Undetermined: Incomplete data	In process of developing system	No system	No reply
Alabama										X		
Alaska			X				X	X				
Arizona	X	X								X		
Arkansas	X											

TABLE A cont.

	Self-study	Visiting team	Follow-up	Employer-based Evaluation	Cost/Benefit	Behavioral Objectives	Nonbehavioral Objectives	Job Placement Relatedness	Undetermined Incomplete data	In process of developing system	No system	No reply
California	X	X										
Colorado			X				X					
Connecticut												X
Delaware												X
Florida					X	X						
Georgia									X*			
Hawaii	X	X										
Idaho												X
Illinois		X										
Indiana	X	X										
Iowa	X	X										
Kansas									X**			
Kentuckyy	X	X										
Louisiana										X		
Maine	X	X										
Maryland										X		
Massachusetts										X		
Michigan	X											
Minnesota			X	X								
Missi		X										
Missouri	X	X										
Montana										X		
Nebraska											X	
Nevada											X	
New Hampshire										X		
New Jersey									X***			
New Mexico	X	X										
New York												X
North Carolina	X****	X****										

TABLE A cont.

	Self-study	Visiting team	Follow-up	Employer-based Evaluation	Cost/Benefit	Behavioral Objectives	Nonbehavioral Objectives	Job Placement Relatedness	Undetermined: Incomplete data	In process of developing system	No system	No reply
North Dakota	X	X										
Ohio	X	X	X		X							
Oklahoma	X	X	X					X				
Oregon										X		
Pennsylvania		X	X									
Rhode Island	X	X										
South Carolina	X	X										
South Dakota												X
Tennessee		X										
Texas	X	X						X				
Utah	X	X										
Vermont											X	
Virginia	X											
Washington										X		
West Virginia	X	X										
Wisconsin									X			
Wyoming		X										

* Submitted an evaluation of two career education projects in Georgia which were developed at the University of Missouri.

** Submitted the annual evaluation report prepared by the State's Advisory Council for Vocational Education.

*** Submitted an evaluation system for Career Education Projects.

**** The system and instrumentation is in the process of being field-tested.

Table B indicates the number of reported research studies conducted in or for a state and other reports specifying a state. Information collected from the various research studies reviewed that could be determined as pertaining to a particular state was categorized as follows:

1. Self-study
2. Visiting team
3. Follow-up of students
4. Employer and/or Community evaluation
5. Cost/benefit analysis
6. Behavioral objectives
7. Nonbehavioral objectives
8. Job placement relatedness
9. Other
10. General discussion -- evaluation in general, not specific methods.

TABLE B

Review of ERICTAPES and Miscellaneous Studies and Reports

	Self-study	Visiting team	Follow-up	Employer and/or Community Eval.	Cost/benefit	Behavioral Objectives	Nonbehavioral Objectives	Job Placement Relatedness	Other	General Discussion
Alabama	1		1							
Alaska										
Arizona	1	1			1					
Arkansas			2							
California	7	7	3	5	2	2	1			3
Colorado	1									
Connecticut		1								
Delaware										
Florida					2					
Georgia							1			
Hawaii										
Idaho										
Illinois	3	3	2	3	2	1			3	1
Indiana	1									1
Iowa	1		1	1						
Kansas										1
Kentucky	1		2		1				1	1
Louisiana										
Maine										
Maryland	2	1	1							1
Massachusetts		1	2	1	1	3				
Michigan		1	1							

TABLE B cont.

	Self-study	Visiting team	Follow-up	Employer and/or Community Eval.	Cost/benefit	Behavioral Objectives	Nonbehavioral Objectives	Job Placement Relatedness	Other	General Discussion
Minnesota	1							1		
Mississippi										
Missouri		1								1
Montana			2							
Nebraska			1	1						
Nevada										1
New Hampshire										
New Jersey			1	1		1				1
New Mexico	1			1						
New York	1	1	1				1			3
North Carolina	1	1	1			1			1	4
North Dakota										
Ohio	2	3	2	1	2		3			1
Oklahoma					1					
Oregon										
Pennsylvania	1	1			1					1
Rhode Island	1	1		1						
South Carolina										1
South Dakota	1	1								
Tennessee	3	2	4	3						
Texas	1		1					1		1
Utah			1		1			1		
Vermont										
Virginia	1		1							
Washington		1	1	2						
West Virginia	1			1						
Wisconsin	1	1	1							1
Wyoming										
Washington, DC	1	1	1		2					4
Puerto Rico					1					1
No State Identity	1		2				1			3

III. METHODS OF EVALUATION

"Information theorists refer to error in communication as noise. The overall literature on evaluation is extremely noisy, has wide gaps, is difficult to follow, is voluminous and contradictory, and can leave a reader in a state of frustration. (William W. Stevenson and William Gary Ward, 213)

An overwhelming variety of combinations of the various methods of evaluation was found to exist in the available literature. Each method will be discussed below under the general type of evaluation that it represents: process or product evaluation. A select number of the various combinations of methods will then be presented and discussed in more detail.

Much has been written on the pros and cons of process versus product evaluation. Arguments are presented as to why product evaluation is the better approach, why process assessment should be conducted instead of just looking at the product, and why both types of assessments are essential.

Many researchers feel the student should be at the crux of any evaluation. It is argued that there can be the most up-to-date facilities, most innovative teaching methods, a well-functioning administrative body, and every other facet of a program can be "optimal," but if the students cannot find employment where their training will benefit them or where the training can be of direct use in some manner, the program should be modified or dropped from a school's offerings. This is basically the philosophy of the individuals who favor program outcome or product as the sole measure of a vocational-technical education program's success. The heart of the evaluation problem, these people feel, is the congruence between actual outcomes of the program and the objectives of the program. The Missouri Advisory Council on Vocational Education (137) favors product evaluation, which ". . . would also help to substantively answer the charge that this evaluation is a small North Central." The majority of the accrediting commissions throughout the country appear to concentrate on process evaluation. The council felt the evaluation could be expedited if evaluation would focus more on output and less on process.

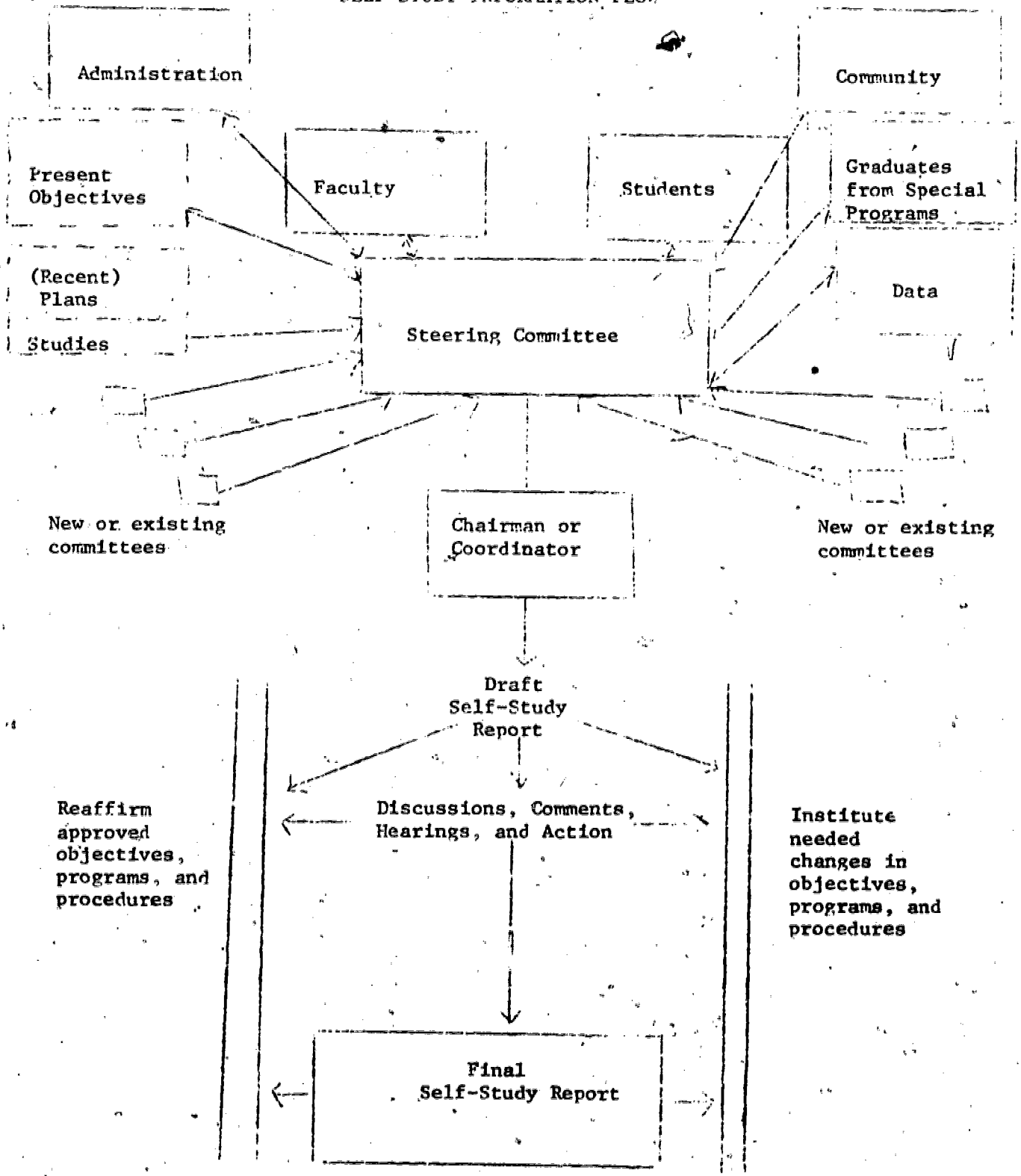
Traditional evaluation has been toward process. Many individuals apparently still feel that this is the route that should be followed. Cornback in The Methodology of Evaluation (196) by Michael Scriven commented, "Evaluation used to improve the course while it is still fluid contributes more to improvement of education than evaluation used to appraise a product already on the market." The Puerto Rico Advisory Council on Vocational and Technical Education (175) states that evaluation should be actually a process rather than a "post mortem" activity. The authors of the Annual Report for EDUTEK, Inc., (12) see both an advantage and a disadvantage to the process approach, "Process evaluation is a necessary and valuable tool by educators, for educators and with educators."

In addition to the people who expound only product or only process evaluation, there are many individuals who feel a mixture of process and outcome evaluation would provide the best and most useful results. William R. Grive (87) indicated, "It becomes apparent that curriculum evaluation and development cannot be separated from the appraisal and evaluation of individual competencies and that neither can be accomplished without an analysis of job requirements and the development of criterion measures based on these requirements."

Robert T. Williams (244) sums up the process versus product approach: "Regardless of whether the evaluation is product-oriented or process-oriented, its value will be largely determined by when and in what form its results reach the decision-maker and by his commitment to include its results in the planning process. I challenge

TABLE C

SELF-STUDY INFORMATION FLOW



you to begin tying evaluation results directly into planning. Do not wait for some researcher to do it for you."

A. PROCESS EVALUATION METHODS

1. Self-study

Self-study is probably the most commonly used and written about method of evaluation in vocational-technical education. Harris W. Reynolds (187) stated, "The best evaluation is carried on by the local district as self-evaluation." The North Carolina Department of Public Instruction (211) indicates that the evaluation/accreditation process of which a thorough self-study is one part, . . . is being removed from its historic position of detached isolation to the mainstream of the ongoing operational routines of instructional planning and educational management. A self-study usually is completed by the various components of the school and a typical self-study information flow chart by Tadlock Associates, Inc. (98) which shows many of the common components is included as Table C. Although this particular scheme was developed for programs for the disadvantaged and handicapped, a similar format could be used for regular vocational-technical education programs and services.

After the decision to conduct a self-study has been made, the school usually appoints a steering committee which will be in charge of the actual evaluation. The individuals directly concerned with the program's (or programs') conceptualization, design, operation, and continuous implementation are the logical persons to be concerned with the evaluation process and should therefore be on the steering committee. In addition to practitioners, it is often considered desirable for students and community representatives to be included on the self-study teams in order to have input from all concerned audiences. These people are generally utilized as chairmen of sub-committees.

Once a steering committee is established, the plans for the self-study need to be made. The first step the committee usually takes is to develop a time table stating what is to be done and when. Table D gives examples of time tables used in three different evaluation systems.

TABLE D

SAMPLE TIME TABL

COPES Scheduling Guidelines
(self-study and site visit)

Step	Action	Maximum Elapsed Days* From Request
1	College request for assistance on self-appraisal	0
2	Initial planning of COPES subsystem activities with chief college administrator	5
3	Appointment of COPES site visit team	10
4	Orientation and planning visit to college by site visit chairman	20
5	Completion and return of perceptions instruments to COPES service center	35
6	Site visit and oral presentation by site visit chairman	55
7	Written summary of oral presentation	65

*Based on five-day work week.

from: "COPES Guide: Community College Occupational Programs Evaluation System," California Community Colleges, Sacramento, California.

TABLE D cont.

SUGGESTED TIME TABLE

Step	Elapsed Time from Start of Evaluation (in months) 0 1 2 3 4 5 6 7 8 9
1. Notification of evaluation	———
2. Initial conference with administration and faculty	———
3. Implementation of self-study	———————
4. Sub-committee reports	———————
5. Steering committee final reports	———
6. D.P.I. Review of submitted material	———
7. On-site evaluation	———
8. Report of evaluation by D.P.I.	———

adapted from: "Evaluative Criteria for Vocational Technical Programs," by Harris W. Reynolds and others. Pennsylvania State Department of Public Instruction, Harrisburg.

After a time table is designed criteria for the evaluation should be developed (if not already available) and should examine conditions, provisions, and characteristics supposedly found in "good' programs. Most of the studies reviewed had criteria listed under a variety of headings and sub-headings. These included:

1. Administration and Supervision
2. Staff
3. Program Planning
4. Curriculum
5. Instructional Content
6. Adult Education
7. Instructional Materials and Supplies
8. Instructional Activities and Procedures
9. Community Resources and Involvement
10. Public Relations
11. Student Selection and Testing
12. Physical Facilities and Equipment
13. Placement and Follow-up
14. Vocational-technical Student Organizations
15. Advisory Committees
16. Students with Special Needs
17. Occupational Work Experience

Some self-studies covered only a few of these areas while some involved most, if not all, of the above categories.

After the criteria are developed, a rating scale needs to be established for determining the level of competence of each criterion measure. A variety of rating scales was found to be in use, but the most common tended to be a five-point scale as follows:

5 (or 1 or VG) -- superior, outstanding
4 (or 2 or G) -- excellent, well done, above average
3 (or A) -- average
2 (or 4 or F) -- below average, improvement needed, lacking something that is needed
1 (or 5 or P) -- poor, major improvement is needed, grossly substandard, missing
NA (or 0) -- not applicable.

After each individual criterion statement is rated, a summary is usually assigned to each area or program. A different type of rating scale is used in Virginia (91):

M -- Major improvement needed -- critical weakness or inadequacy exists in meeting the minimum standard for the guideline.
I -- Improvement needed -- with minor changes the program could be improved to meet the minimum standard for the guideline.
S -- Program meets the minimum standard for the guideline.
E -- Program exceeds the minimum standard for the guideline.
F -- Program far exceeds the minimum standard for the guideline.
NA -- not applicable.

While it appears this rating scale follows the typical 1-5 scale described above, Virginia State Board of Education designed the rating system with symbolic letters (other than VG, G, A, F, P or 1-5) in an attempt to have the overall program rating so that it is not an average of numerical ratings but considers specific strengths, weaknesses, and needs that are revealed.

The next step in a self-evaluation generally is to conduct the evaluation according to the plan established earlier. In addition to rating criteria in a variety of areas, questionnaires and/or interviews are often used in an effort to obtain input from a variety of sources. This utilization of questionnaires and interviews is most popular when the people looking at the program aspects are all educators within the school. By seeking input from students, business and industry, parents, and other community representatives, a broader pool of knowledge and divergent viewpoints add dimensions to the program evaluation. Rather than using questionnaires or interviewing a sampling of the students and community people, some studies stress community and student representation on the sub-committees that rate individual programs or departments.

A general hearing is sometimes held to review and summarize findings followed by a written report with commendations and recommendations. Strategies for implementing the recommendations to improve the programs should then be undertaken.

2. Visiting Team

Many states utilize and a number of research studies focus on the use of visiting teams as an evaluation method (Tables A and B). The specific methods for the team review are widely varied.

Generally, the first step in the visiting team evaluation is to select a chairman. There did not appear to be any pattern dealing with the selection of a chairman. One of the next steps in a visiting team evaluation is for the chairman to

visit the school to be evaluated and discuss the entire procedure with the chief administrator and anyone else the administrator desires to include. After such an initial meeting, the remainder of the team is usually selected. This is sometimes done with the school administrator indicating his approval of each team member.

The composition of the visiting team differs considerably from one study or state response to another. Team members are usually chosen from the following list:

1. State Department supervisors for each vocational-technical area
2. Other Division of Vocational-technical Education personnel
3. Personnel from other Divisions of the State Department of Public Instruction
4. Vocational-technical teachers and administrators from other local schools
5. Vocational-technical teachers and administrators within the school
6. Vocational-technical teacher educators
7. State Advisory Council members
8. Local Advisory Committee members
9. Business and Industry representatives
10. Lay public
11. Students -- former and present
12. Other vocational-technical people as needed.

While some studies include people from the State Department of Public Instruction, local schools, and the community, other studies use teams consisting solely of State Department personnel. Out-of-state people as well as in-state individuals are sometimes included on teams.

Some visiting teams, such as Mississippi's (228), are composed entirely of in-state educators. This approach has the advantage that all team members are familiar with strategies and state policy concerning vocational education. Team members also benefit from their observations of various programs by noting ways to improve their home programs.

In other states, public input into the evaluation system is considered essential. A study done by H. M. Hamlin (95), stressed the importance of citizen evaluation of public occupational education rather than educators'. R. C. Stape notes (95), "It is a great misfortune that the best trained evaluators have been looking at education with a microscope rather than a panoramic view finder."

The school often prepares for the team visit by completing certain forms and questionnaires and gathers materials for the team members to review. When the team arrives, there is usually an orientation meeting for team members, team chairman, and chief administrator of the school. After the orientation meeting, the various team members have their specific assignments and they start evaluating various programs and school components through observation, talking with various staff members and students, and reviewing materials provided by the school. Some studies also have the team members interview various community representatives.

A form with criteria for each area being examined is usually used by the team members who assign ratings to the various program aspects. Areas examined and rating scales used are similar to those discussed under the self-study. One (or more) member is usually assigned particular areas to evaluate. After each team member completes a section, he/she generally provides an overall rating for that assigned section and writes commendations and recommendations. When all team members have completed their tasks, overall commendations and recommendations are written. A school meeting is usually held before the team leaves so the team members can provide

an immediate feedback of their findings to either the entire staff or to select administrators and/or faculty members. A final written report is subsequently submitted. The final summary report is usually prepared by the team chairman.

The time allowed for the visiting team evaluation varies with how extensive an evaluation is being done and how much preparation is done by the local school. Table D under the self-study shows some time tables that include visiting teams. The length of time a team is at a school varies with the size of the school and the areas being evaluated· the duration for a team site visit is generally from one day to a week (it also depends on the number of people on the team.)

The team site-visit method of evaluation is costly since the team members generally have to have expenses and honoraium paid. If a local school must pay all such expenses, the total figure could be quite prohibitive.

B. PRODUCT EVALUATION METHODS

1. Follow-up of students

Of the various types of product or outcome evaluation, follow-up of students is the most common method used among the states. The type of information generally sought in such a follow-up is summarized in the objectives as found in the Final Report for the Central Kentucky Vocational Education Evaluation Project (VEEP) (36). They are

1. To acquire data reflecting the number of former students of the Central Kentucky Vocational Education system who (at time of this study) are employed and unemployed.
2. To acquire data on the number of former students in the Central Kentucky Vocational Education region who have moved from the area in which they received vocational training.
3. To determine whether or not graduates of the Central Kentucky Vocational Education system are continuing their education.
4. To determine the reasons former students continue or do not continue their education.
5. To acquire data concerning the time lapse between graduation (exit from) vocational education and acquisition of full-time employment.
6. To acquire data reflecting the success of the Central Kentucky Vocational Education system in educating former students in
   a. occupation of their choice
   b. occupation for which they are qualified
   c. level of attainment they desire.
7. To acquire data concerning the relation of vocational education programs taken to the actual occupation of the former students.
8. To obtain feedback information from former students including:
   a. satisfaction/dissatisfaction with vocational education taken,
   b. recommendations for improving the vocational education system,
   c. type of education the graduate would have taken in retrospect, and
   d. type of education former students are taking or would take (given the opportunity).

Floyd L. McKinney and Charles Oglesby (133) cited five groups of people who ought to be involved in conducting a follow-up study to insure maximum return of valid data. They are

1. counseling service,
2. teacher,
3. school administration,
4. student committee, and

5. Board of Education and Vocational Education Citizens' Advisory Committee.

There are three basic ways of conducting a follow-up study:

1. Mail questionnaire -- poor return and not representative of all former students, but the least expensive.
2. In-person interview -- costly and time consuming, but clarifying questions can be asked; and
3. Telephone interview -- less costly and time consuming than in-person interview, but limited in the amount of information that can be obtained.

When determining the procedure to follow, McKinney and Oglesby feel the following seven factors should be considered:

1. What kind of data are needed?
2. How much data are to be obtained?
3. What are the sources of data?
4. How much time is available?
5. What is the size of the group(s) to be studied?
6. How much money is available?
7. What is the availability and competency of the staff?

After the type of follow-up is determined, the students are selected. Some studies include just graduates while others also include dropouts. McKinney and Oglesby feel it is important to include the dropout and make him feel that he is a vital part of the follow-up population. They suggest the possibilities using a different approach for the dropout such as a different form of letter and questionnaire or even a different type of survey like an interview.

A few studies survey students within a few months after leaving the school and never again. Some studies conduct a follow-up shortly after graduation and again in about one year. The length of time elapsed after leaving the school and conduction of a follow-up tends to have an adverse effect on the rate of return. For example, the rate of return on a five-year follow-up will probably be lower than the rate of return for a one-year follow-up study. Therefore, the desired rate of return should be considered when deciding to conduct a one-, two-, or more year follow-up. McKinney and Oglesby (133) indicated that only students out of school for one year or more should be included. Students can be involved and alerted prior to graduation by having teachers discuss the importance of follow-up studies and by having the students supply basic information including the name and address of someone (such as a relative in the area) who would know where to reach them should they move.

A mail questionnaire is the most commonly used method. Various mailing procedures were used in an effort to obtain a good return. McKinney and Oglesby (133) suggested the following pattern:

1st mailing -- "alert" card
2nd mailing -- follow-up instrument, cover letter, and return envelope (stamped and addressed)
3rd mailing -- first thank you-reminder card
4th mailing -- second request follow-up instrument, second cover letter, and return envelope (stamped and addressed)
5th mailing -- second thank you-reminder card.

John A. Cox (52) utilized the following mailing pattern:

1st mailing -- questionnaire and pre-stamped, pre-addressed return envelope
2nd mailing (10 days later) -- reminder letter to non-respondents
3rd mailing (10 days later) -- questionnaire and envelope.

Donald V. Brown (30) listed the following techniques to produce a high return rate at the most economical cost:

1. involvement of present students to address envelopes, help locate students, and tally responses;
2. mailing a "get prepared" card;
3. a brief yet personal commitment cover letter;
4. a well-designed instrument that requires a minimum of time and effort to answer;
5. follow-up reminder card; and
6. finally send out another survey and a personal, typed letter to non-returns.

He also suggests that the card/and survey-cover letter be mailed out so as to be received about the same day of the week (i.e., Monday). Third and fourth mailings should be scheduled to arrive at a later day of the week (i.e., Friday) which compensates for the fact that some people are "early week" while others are "late week" respondents to mailings.

David J. Pucel (174) reported a research study finding on how to improve the returns on follow-ups. The study concluded that returns could be improved by approximately 20% if a pre-letter was used, the questionnaire was printed on green paper, and a novelty such as a packet of instant coffee was included with the materials. In addition, materials in the packet should be personalized by having addresses on the envelope and letter typed and the letter hand-signed.

McKinney and Oglesby (133) feel a cover letter should be used and should be brief. Five items should be included:

1. purpose of study,
2. uses to be made of the findings,
3. importance of hearing from everyone in the class,
4. a suggested date by which the form should be returned, and
5. assurance of the confidentiality of the information to be provided.

To those graduates who did not respond to the second mailing of the Follow-Up of 1965 Graduates of Wisconsin Schools of Vocational, Technical, and Adult Education, Kenneth J. Little and Richard W. Whinfield (123) sent out two additional mailings of a shorter form requesting only basic data. This procedure increased the total return by approximately 35%.

Results of follow-up studies are used in a variety of ways such as:

1. To determine job placement relatedness,
2. To assess cost/effectiveness or cost/benefit,
3. To provide program improvement suggestions, and
4. To prepare State reports.

2. Employer-based Evaluation

Donald V. Brown (30) stated, "The primary function of vocational-technical education is to provide quality employees to business and industry. In business and industry, the process quality is largely a responsibility of the personnel employed (the product of vocational-technical education). It is generally recognized that in business, manufacturing or services the product relates closely to the quality of the process. Upon this idea the Local Evaluation Project attempts to relate the process of education to quality of its product (the student)." One of the methods used by the Tennessee Local Evaluation Project is an employer-based evaluation.

An employer evaluation is usually based on either a mail questionnaire, an interview, or a combination of the two. A typical evaluation utilizing a questionnaire was carried out in New Mexico (131). A covering letter from the Governor was sent along with the questionnaire. In an effort to achieve a quick return, a deadline was established and included in the letter: "Questionnaires returned after the 16th of December may be too late to be used." The employer rated five statements as true, false, or no effect concerning program graduates. The statements examined were:

1. Those who have had this type of training generally need less on-the-job training because of job knowledge and skills they already possess when hired.
2. Those who have had this type of training generally can be trained faster or more easily when required to take the same instruction as others.
3. Those who have had this type of training are potentially more productive and/or promotable.
4. Those who have had this type of training are more likely to possess specific critical job knowledge and skills that you find difficult to obtain or costly to develop in your employees.
5. Those who have had this type of training generally can be counted upon to have better work habits, attitudes and motivation.

Each of these statements was answered for five types of programs: high school, post-high school, adult education, Federal programs for those with special needs, and military. Employer opinions were also sought concerning program/availability in three respects:

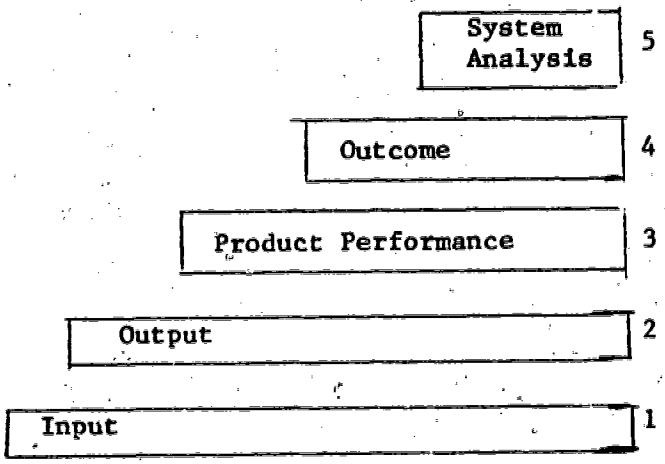
1. Is there an oversupply of applicants?
2. Is there a need for more applicants?
3. Do you prefer to start fresh and train on-the-job?

Lynn H. Willett and William E. Piland (243) used both a questionnaire and an interview for employer input. The same questionnaire was used for all program areas because the staff of Moraine Valley Community College felt that a given type of work or work situation involves generally the same "job requirements" regardless of the activity or situation. The staff from each of the college's program areas assisted in developing the questionnaire items and open-ended questions which were relevant to their area of concern. An interview schedule was developed to enrich data analysis and to gather data specific to individual programs not covered in the questionnaire.

A major problem when carrying out an employer-based evaluation appears to be getting an adequate response and useful information from the employers. If a questionnaire is sent to a large company, someone in personnel might easily fill it out without knowing the student or how the student is actually doing. The supervisor's time is limited, and he might not be able to be interviewed. In order to conduct an effective employer-based evaluation, excellent school-business-industry rapport should already exist if a maximum of success is to be expected.

3. Behavioral Objectives

Robert T. Williams (244) indicated that evaluation was the comparison between the processes, outputs, and outcomes which are desired and the processes, outputs, and outcomes which are actually observed. In this case, output refers to what the system pro duced, and outcome takes into consideration how this product was absorbed into the environment. He said there are five levels of evaluation of instructional programs in occupational education.



The third level, product performance, can be measured with the help of behavioral objectives. Mr. Williams feels this challenges educators to move away from the traditional practice of holding time constant and allowing achievement to vary to holding achievement constant while allowing time to vary thus providing for individual differences. This concept of allowing time instead of achievement to change is fairly new, and little has been written on the subject.

Behavioral objectives examine student and/or program outcomes with two measures: quantity and quality. The number achieving specific objectives as well as the quality of the performance are used for this type of evaluation.

The Massachusetts Information Feedback System (111) utilizes behavioral objectives which have three basic components:

1. Tell what it is that one will have to do when he is evaluated,
2. The conditions under which he will have to perform, and
3. The level or quality of performance expected.

In order to determine the number of students completing each objective, a pre-test/post-test format is used. Criterion testing is done prior to the beginning of instruction in a curriculum unit, and post-testing is administered after the unit has been presented. An analysis and reporting of the test results is then provided.

In the Evaluation Service Center for Occupational Education. Final Report (69), it was stated that the performance test used to measure the objectives can be conceived of as a criterion-referenced test for three reasons:

1. It is objective or criterion-centered,
2. It seeks to ascertain a subject's possession of a specific competency rather than to complete a comparison of the subject's competency level to a previously measured norm group, and
3. It usually requires a dichotomous decision as to whether the competency has been demonstrated.

The report also cited three reasons why performance testing is especially appropriate for evaluating vocational-technical education:

1. Performance tests can be hypothesized to produce more relevant and valid data concerning the instructional program output,
2. They produce product records which can be studied by teachers to diagnose where a weakness may have occurred, and
3. It contains the flexibility demanded by the information needs of an evaluation system.

The Fresno County Department of Education, Fresno, California, has an automated system, PEAPOL (Program Evaluation at the Performance Objective Level) (161). The system generates a series of reports designed to allow vocational teachers and district administrators to closely monitor the progress being made and expenses being incurred in individual classrooms. Its approach to the use of behavioral objectives is dissimilar to the method described above for Massachusetts. For each course, a set of measurable behavioral objectives (not to exceed 75 objectives) which completely describe course content must be developed for the PEAPOL system. A time clock is installed in each classroom and students are provided time cards for recording the amount of time they spend on each objective to the nearest hundreth of an hour. Another form used to supply necessary data is the class event input forms. The system generates four weekly reports:

1. The student summary report shows how much time each student has spent on each objective, which objectives he has completed, and how his present rate or progress compares to that of previous weeks.
2. The classroom summary report produces grouped data which shows the total amount of time all of the students in a class have spent working on each objective and how the class's present rate of progress compares to that of previous weeks.
3. The dollar summary report displays overall class budget, dollars expended to date, prorated cost for each objective, and prorated cost per student for each objective.
4. The special student report groups students by sex, ethnic group, age, reading or math scores, and produces performance data for each group.

The success or failure of these two approaches using behavioral objectives is not given in the reports reviewed. No information was supplied as to whether these systems are currently being used in any schools or states or if they are still in the developmental stages.

4. Nonbehavioral Objectives

While behavioral objectives look at both quantity and quality, nonbehavioral objectives examine only the quantity or number achieving an objective. For example, "15 out of 20 students completed the small engine repair program," refers to a nonbehavioral objective because no mention is made of the quality of the program output (what do each of the 15 students know?).

An approach to the use of nonbehavioral objectives for evaluating vocational-technical education was developed at The Center for Vocational and Technical Education, The Ohio State University, entitled, A System for Statewide Evaluation of Vocational Education (207-210). This system is designed to be compatible with a management-by-objectives approach to program planning by vocational education agencies. It is also constructed to serve as a monitoring mechanism for providing information about the extent to which the vocational agency is achieving its objectives. The authors of the system feel the main point in the evaluation-program planning cycle is the systematic manner in which the vocational agency proceeds.

The system has five system elements which provide the data required for evaluative decisions about programmatic outcomes:

1. A set of program objectives and goal statements. There are four broad objectives and 47 goal statements. Each goal statement is designed to have a number supplied by the vocational agency in order to quantify the goal.
2. A data set. This was designed to produce a core of evaluative information useful to most states and is organized to provide:
   a. student in-school data,
   b. vocational program data,
   c. school data and
   d. follow-up information about former vocational students.
3. A set of six instruments used to collect evaluative information.
4. Information flow procedures. Evaluation personnel plan for distributing, collecting, processing, and reporting evaluation data; for receiving feedback required to improve the system; and for revising the system in preparation for system recycling.
5. Data processing routines and computer programs to produce data in a variety of formats useful to system users.

Alaska (125) examines how well program objectives were met. The objectives for each vocational program are to have four characteristics:

1. Relate to the accomplishment of priorities,
2. Contain a time frame,
3. Be measurable, and
4. Indicate degree or time of achievement.

The results of the various programs are determined by means of a follow-up questionnaire.

5. Cost/Effectiveness, Cost/Benefit, and Cost/Efficiency

While there is a good deal written on the subject, most of it is extremely complex. Although many formulas cited in the studies are very lengthy and appear to be complex, the real complexity lies in determining what numbers to "plug" into the formula. The terms cost/effectiveness, cost/benefit, and cost/efficiency are often used interchangably. William W. Stevenson and William Gary Ward (213) indicate there are no concrete definitions to those three terms, but they deal somewhat with the following:

1. Cost/effectiveness -- ratio of products to total cost of program.
2. Cost/benefit -- payback to society for its investment in education.
3. Cost/efficiency -- ratio of resources to training activities.

In this report, the terms will be used interchangably.

Jacob J. Kaufman (114) stated six misconceptions of cost/benefit analysis. They are

1. It is merely a subterfuge for seeking to conduct education on a "least-cost" basis.
2. A benefit is measured only in dollar terms.
3. There are some things that are not quantifiable.
4. Not fully developed.

5. The cost/benefit analyst substitutes his judgment for that of the decision-maker.
6. Tends to ignore political considerations.

Mr. Kaufman stated that one aspect of cost/benefit analysis which should be stressed is that it is basically a "way of thinking." He indicated it tends first to force an administrator to think through his objectives, to concentrate on costs as well as objectives, and to think in terms of alternative ways of achieving the same objective. Charles O. Hopkins (101) remarked, "There is a certain quality of product produced by vocational education that business, industry, and government services wish to acquire. It costs a specific amount to produce the product to the specifications required. A cost can be associated with the accomplishments of a vocational training program. If the objectives of the schools warrant change, the administration should evaluate the total vocational program by looking at the achievements and costs of each individual program."

Teh-Wei-Hu (102) cited three basic steps in determining the cost/benefit analysis of a program:

1. Identification of costs and benefits of a given program.
2. Lists of benefits and costs, both private and social, are expressed as monetary values in order to arrive at an estimate of current net benefits.
3. Comparison must be made of the stream of annual net benefits and the cost stream of the program.

A variety of factors must be taken into account in order to analyze vocational-technical education as an investment in the human agent. The relationship between costs and benefits should be determined only when factors such as time, depreciation, risk, and uncertainty are taken into account. Below is a description of the social and private costs and benefits as presented by Richard H. P. Kraft (120).

Social	Private
Costs Def.: costs incurred either directly or indirectly by society at large for operation of formal vocational-technical training.	Costs Def.: costs incurred either directly or indirectly by students for formal vocational-technical training.
Elements 1. Total dollar amounts actually expended for providing educational programs.	Elements 1. Foregone earnings or operational costs of students due to attending training programs.
Elements 2. Operational costs of not leasing or renting facilities.	Elements 2. Total direct costs to students for registration, books, supplies, etc.
Benefits Def.: economic welfare gained by society at large as a result of formal training.	Benefits Def.: economic welfare gained by individual as a result of formal training.
Elements Local, State, and Federal marginal taxes attributable to formal training.	Elements Student's marginal earnings attributable to formal training.

Charles O. Hopkins (101) cited an example of another means for determining the cost/benefit ratio of a program. A Carpentry program has 30 students enrolled. The program length is two years. 80% of the students completing the program had a marketable skill. The total annual costs of the program are $11,843.00 For 30 students, the cost is $394.77 per student annually. School information indicates that 15 students completed the program, and 25% of the graduates were employed in the area for which they were trained or in a related area (four students). The annual placement cost of these four students is then $2,960.75. A total of ten students are placed in related and nonrelated employment for an annual placement cost of $1,184.30 to the program.

Steven L. Barsby (22) presented "The Three Methods of Comparing Benefits and Costs." The type of comparison, method of calculation, and decision rule are presented in Table E.

TABLE E

"The Application of Cost-Benefit Analysis in Manpower Area." by Steven L. Barsby. Arizona Occupational Research Coordinating Unit, Phoenix.

The Three Methods of Comparing Benefits and Costs

Type of Comparison	Method of Calculation	Decision Rule
1. Percent Value of Net Benefits	$\sum_{t=0}^{n} \frac{B_t - C_t}{(1+i)^t}$	Select the project with the highest net benefits first, then pursue successive projects in descending order of net benefits.
2. Rate of Return	$\sum_{t=0}^{n} \frac{B_t - C_t}{(1+r)^t} = 0$	Select the project with the highest rate of return (r), then pursue successive projects in descending order of (r) until (r) equals some predetermined interest rate (i).
3. Benefit-Cost Ratio	$\frac{\sum_{t=0} \frac{B_t}{(1+i)t}}{\sum_{t=0}^{n} \frac{C_t}{(1+i)^t}}$	Select the project with the highest B/C, then pursue projects in descending order until B/C = 1 or budget exhausted.

B_t = benefits in year t

C_t = costs in year t

n = number of years spanned by the analysis

i = social discount rate

r = rate of return

Very little information was found dealing with job placement relatedness as it relates to the evaluation of vocational-technical programs. In some cases, this was tied in with a follow-up of program graduates, but methods for assessing the job relatedness were not provided.

David N. Wheeler (242) discussed three methods of measuring job relatedness. (1) Ask former student if his present job is related to his training. This obtains only a yes or no response, and the reliability of such responses is questionable. Relatedness may mean different things to different people. This could be minimized, however, if a description with examples is used to give the respondents a reference upon which to base their answers. (2) Individuals rate the relatedness of their training program to their jobs on several educationally-relevant variables. The difference between raters and that the relative emphasis of variables will shift between occupations are problems with this method. (3) An individual will supply his job title along with a brief description of his job. On the basis of this information and a knowledge of the occupational training program, the evaluator would make a judgment as to the relatedness of the occupation to training. A suitable decision model is needed. Mr. Wheeler's paper describes a complex decision model for this method.

David J. Pucel (174) discussed the design in Minnesota to provide information on job placement relatedness and program improvement. Mr. Pucel indicated that the overall effectiveness of programs should be judged on the extent to which the graduates of the program become employed and maintain employment in occupations in which they can utilize the skills developed in the program. Five classifications are used for a graduate's job one year after graduation:

1. Employed in exact occupation for which trained;
2. Employed in occupation related to but not exact occupation for which trained;
3. Employed in unrelated occupation;
4. Unemployed -- seeking work but cannot find work; and
5. Unavailable for employment -- further training, military service, illness, housewife, or pregnancy.

C. COMBINATION OF METHODS

In addition to each of the methods discussed above being used for evaluation, a variety of combinations of these methods was found among the literature. The most widely found combination is a self-study followed by a visiting team. Often the visiting team's evaluation is extensive, but sometimes it is mainly to verify reportings on the self-study. Follow-up of graduates and nongraduates frequently is also used with the self-study and visiting team approaches.

Another combination that is found is an employer-based evaluation and a follow-up of students. Both of these methods are also used for cost/benefit analysis and the behavioral and nonbehavioral objectives approaches.

IV. CONCLUSION

While there is a great amount of literature on vocational-technical education evaluation, each approach has several advantages and disadvantages. There is no foolproof method of evaluation that would work for every vocational-technical program which would always provide the most useful information. When developing

an evaluation system, several factors should be considered:

1. Is the evaluation for the entire institution or just certain areas?
2. Do you want to evaluate vocational-technical programs or courses?
3. What is the purpose of the evaluation?
4. How much time do you have to conduct an evaluation?
5. How much money is available?
6. Are there any state or federal requirements that must be fulfilled?
7. What is the target for the evaluation (i.e., students, facilities, staff)?
8. Do you want to evaluate the processes, the products, or both?
9. How much cooperation can be anticipated from the school staff, Advisory Committees, and the community?
10. Are resource people available to assist when needed?
11. Should special groups receive additional attention (i.e., disadvantaged, handicapped, etc.)?

No matter what design is used for evaluating a particular program or school, the most important criteria to keep in mind are that the system must meet the needs of the school or program, and a desire and cooperation to implement the results to improve the programs should be evident on the part of all concerned audiences.

Page 24 was retyped at The Center for Vocational Education.

APPENDIXES

NEW EDUCATIONAL DIRECTIONS

Bowker Gannon and Associates Education Projects

BOX 307 CRAWFORDSVILLE, INDIANA 47933 (317) 362-8877

November 1, 1973

New Educational Directions (NED) is interested in learning of the efforts being carried out in the various states concerning state-wide evaluations of vocational-technical programs at both the secondary and post-secondary levels.

Is your state currently involved in or has itcompleted a comprehensive state-wide evaluation of vocational-technical programs in the state? If no, is such an evaluation being considered for implementation in the foreseeable future? If yes, will you share with NED descriptive information, interim or final reports, as well as data-gathering techniques and instruments for such a comprehensive study?

I look forward to hearing from you soon. NED will report to you a summary of the responses we receive from this letter of inquiry. I thank you in advance for your cooperation.

Sincerely yours,

Judith M. Thompson
Director of Administration

JMT:cs

NEW EDUCATIONAL DIRECTIONS

Bowker Gannon and Associates Education Projects

BOX 307 CRAWFORDSVILLE, INDIANA 47933 (317) 362-8877

October 10, 1974

New Educational Directions is currently working with the Indiana State Board of Vocational and Technical Education. Our present task is to review literature concerned with evaluation of vocational-technical education for grades K-12 (including exemplary career education projects at the elementary level). Ultimately the state will be developing a comprehensive evaluation system. We are writing to the various states requesting information they might have available.

We are just beginning so any information or materials you are able to supply will be deeply appreciated. At this stage, we would like to know about the system(s) you have developed (if you have one), information concerning how you went about developing it, how the system works, time schedules, sources utilized, and cost estimates for developing and applying the system.

Thank you in advance for your assistance and I look forward to hearing from you soon.

Sincerely,

Sandra K. Roth
Administrative Associate

SKR:aa

NEW EDUCATIONAL DIRECTIONS

Bowker Gannon and Associates Education Projects

BOX 307 CRAWFORDSVILLE, INDIANA 47933 (317) 362-8877

December 6, 1974

New Educational Directions has written to the various states concerning an evaluation system for vocational-technical education. Mr. Phil Mann, Coordinator of Evaluation, Indiana Department of Public Instruction, has suggested that we write to you directly about the enclosed "request for information" as we have not yet received a response from

Thank you in advance for your assistance, and I look forward to hearing from you soon.

Sincerely,

Sandra K. Roth
Administrative Associate

SKR:aa
Enclosure

REQUEST FOR ASSISTANCE

New Educational Directions is currently working with the Indiana State Board of Vocational and Technical Education. Our present task is to review literature concerned with evaluation of vocational-technical education for grades K-12 (including exemplary career education projects at the elementary level). Ultimately the state will be developing a comprehensive evaluation system. We are writing to the various states requesting information they might have available.

We are just beginning so any information or materials you are able to supply will be deeply appreciated. At this stage, we would like to know about the systems you have developed. If one is available, information concerning how you went about developing it, how the system works, time schedules, sources utilized, and cost estimates for developing and applying the system will be most helpful to us.

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