

THE ADAPTATION OF PERT FOR COORDINATING
INTERDISCIPLINARY MANPOWER RESEARCH
IN A UNIVERSITY SETTING--A
DESCRIPTIVE STUDY

By

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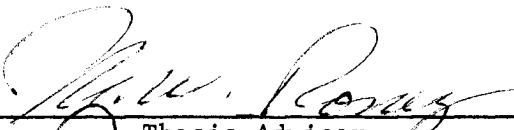
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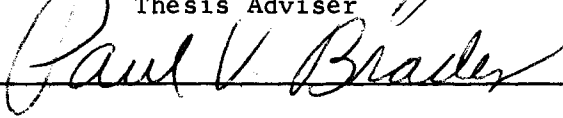
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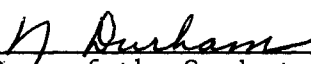
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CHAPTER I

THE PROBLEM

Traditionally, research problems within the manpower field have been attacked by researchers from single disciplines. Many pertinent factors and conditions typically tend to be neglected in analyses relating to manpower and manpower development when their analyses are restricted to particular disciplines since none of the separate disciplines can provide comprehensive explanations of the phenomena it chooses to study.

Problems in the manpower field appear to be getting more complex and more serious. Studies that are more comprehensive and interdisciplinary are needed to give better understanding in this broad and complex field. More systematic management of research projects is needed for the expanding efforts in the manpower field including those in the area of occupational education.

Increasingly there is a need for accurate data for planning different aspects of occupational education. Surveys and research projects are primarily conducted to gain information for making better decisions. In order for the study results to be of maximum use, the study must pertain to current and relevant topics, must make use of as much available information relating to the topic as possible including information from outside the particular discipline involved, and the results must be processed into meaningful form as quickly as possible.

Sources of primary data are flooded with questionnaires sent out independently by many different agencies; these data gathering instruments overlap, employ different terminologies and categorization, and in general, fit no pattern which may guide the people in positions of leadership and policy planning to make more comprehensive decisions. The new pressures, opportunities, and obligations in the manpower field highlight both the need and the difficulty of making intelligent decisions. These decisions must be made by competent people on the basis of the best available information.

Efficient management in organizing and conducting research can help to minimize time, effort, and money, and maximize value, reliability, and applicability of the results. In order to manage a study efficiently, particularly an interdisciplinary study, many phases of the study must be carefully coordinated. Data gathering instruments should be constructed and used in such a way that results will be reliable and lend themselves to ease of processing either by hand or by computer, and also to avoid duplication, errors, and irrelevant data gathering. To prevent research arrears each segment of work must be initiated early enough that it will not cause delay to the overall schedule of events.

Many of the individual research projects in different disciplines as well as within disciplines are overlapping and sometimes nearly duplicating. Many independent projects are not finding their way into the overall picture where they could add significantly to the growing body of knowledge. This study is concerned with the need for and viability of a particular research management technique, PERT, for

Developing an effective research management technique, PERT, for

conducting interdisciplinary manpower research in the area of occupational education.

Purpose of the Study

The purpose of this study is to describe the use of Program Evaluation and Review Technique (hereafter referred to as PERT) as a technique in managing interdisciplinary manpower research in a university setting.

This study should help answer the following questions:

1. How will the PERT scheduling of the Statewide Study affect the researchers?
 - (a) Will it give individual studies more significance?
 - (b) Will the individual researchers gain a feeling of belonging to a bigger project?
 - (c) Will the PERT scheduling encourage contacts between or among researchers?
2. Have researchers previously used the PERT technique in research?
3. How familiar are researchers with PERT?
4. Are researchers in favor of interdisciplinary research?
5. How will researchers react to the PERT scheduling of the Statewide Study?
 - (a) Will researchers react favorably to their involvement in the PERT scheduling of the Statewide Study?
 - (b) Will researchers recommend PERT scheduling for similar studies?

Limitations of the Study

In order to be as realistic as possible in this study, a current Statewide Study of Occupational Education Beyond the High School in Oklahoma was used as a vehicle for demonstrating PERT management. The application of the PERT technique was limited to activities and functions relating directly to this current statewide occupational education study from the time the study began until the background information publication Occupational Education Beyond the High School in Oklahoma was completed (1).

Definitions of Terms

PERT refers to Program Evaluation and Review Technique. It is a technique used by management to assist in making managerial decisions and coordinating complex projects.

Technician refers to "a worker on a level between the skilled tradesman and the professional scientist or engineer. His technical knowledge permits him to assume some duties formerly assigned to the graduate engineer or scientist. For example, technicians may design a mechanism, compute the costs, write the specifications, organize the production, and test the finished product...." (2).

On the basis of function and skill level, the U. S. Department of Health, Education and Welfare, Office of Education, defines the word technician as "a general term applied to an individual who assists with technical details in a trade or profession; uses tools, instruments, and/or special devices to design, illustrate, fabricate, maintain, operate and test objects, materials or equipment; performs mathematical and scientific operations, reporting and/or carrying out a prescribed

action in relation to them; examines and evaluates plans, designs, and data; determines action to be taken on the basis of analysis; assists in determining or interpreting work procedures and maintaining harmonious relations among groups of workers" (3).

Vocational and Technical Education refers to "training intended to prepare the student to earn a living in an occupation in which success is dependent largely upon technical information and an understanding of the laws of science and technology as applied to modern design, production, distribution, and service" (2, p. 22).

When reference is made to technical-vocational education in this study, the term is intended to relate to "education offered at the post-high school, non-baccalaureate level aimed at preparation for employment. This covers semi-professional, technical, and skilled level curricula for all fields (e. g., agriculture, business, industry, health, home economics, public service). Jobs filled by persons trained in such programs are in what is referred to as the 'middle-manpower' spectrum" (4).

Occupational Education is a broad term, but in this study it means the same as vocational and technical education beyond the high school.

CHAPTER II

REVIEW OF THE LITERATURE

A review of the studies pertaining to statewide technical-vocational education reveals a dearth of literature on methodology. No studies were found pertaining specifically to the application of PERT on statewide studies of technical-vocational education.

The following review of the literature pertinent to the background of this study is divided into four parts: (1) statewide studies of technical-vocational education, (2) Program Evaluation and Review Technique, (3) interdisciplinary manpower research, and (4) technical-vocational education.

Statewide Studies of Technical-Vocational Education

Many of the recent reports of surveys from different states have made very little if any reference to the actual methodologies of the reports. Usually, if methodology was mentioned, it was in such a general manner that little valuable information was gained. The four studies listed are examples of studies that were reviewed: (1) a report by Arthur D. Little, Inc., (5) entitled "A Policy Plan for Community College Education in the State of Washington" included use of regression equations and listed some of the sources of the statistical data. (2) Ankeney (6), in his report entitled "Institutional

Self-Study Report 1964-1965," included several of the forms used but no details of methodology. (3) The New York Department of Labor in "Technical Manpower in New York State, Volume I" outlined the sampling procedure used in the survey (7). (4) The North Carolina Employment Security Commission included a brief "Survey Methodology and Scope" and a copy of the forms used (8).

From these and other studies reviewed, there was virtually no indication of interdisciplinary effort to make the study more comprehensive or of any management technique such as PERT.

Program Evaluation and Review Technique

PERT stands for program evaluation and review technique. PERT is a technique used for keeping track of details of complex projects. This technique can be programmed on a computer for frequent reviewing and updating when it would be impractical because of time and effort to do it by hand. The critical path method of management is one aspect of the PERT technique.

The application of PERT to a project is a valuable aid in planning work packages in a logical sequence. It provides for constant progress checks to be made and it graphically demonstrates bottlenecks or time lags in the schedule of events. Cook (9) gives the following explanation of the PERT technique:

The PERT technique was somewhat revolutionary in the sense that it did away with the traditional bar charts for showing schedules and substituted instead a network showing graphically the inter-relationship between specific accomplishments and the work that needed to be done to achieve each accomplishment. The basic concepts involved are statistical probability and linear programming. The technique requires probability estimates of time needed to complete each activity. A careful study of the time

estimates in the program reveals a single path representing the longest time needed to complete the project and is known as the Critical Path. While CPM and PERT have differences between them, PERT is usually used to include any technique making use of the network concept based upon the two concepts previously noted.

PERT is basically a management tool. This technique gives managers a "look ahead" in project management. The PERT approach to management deals with work packages and their interrelationship to the overall project. Since it deals with work packages, it is frequently associated with construction work where a certain phase of work must be completed before another crew can start the next part. The PERT concept is also used by the National Aeronautics and Space Administration (10). PERT appears to be as adaptable as those who are using it. Desmond L. Cook (9, p. 3) deals with the application of PERT in education in his work entitled PERT Applications in Education. Another example of PERT application is the report documenting the establishment of Northern Virginia Technical College from point of conception to the first day of class instruction in 100 days (11). They adapted PERT to their unique situation. A "Master Chart of College" showed the overall project and sub-charts were used for "Furniture and Equipment", "Personnel", "Curriculum and Catalog", "Library", and "Food Service and Janitorial Service."

According to a recent publication by Federal Electric Corporation (12):

PERT is causing a stir in management quite unlike any other concept introduced in the past. Some look to PERT as the cure for all management planning and decision-making ills, while others are not quite so sure. But PERT is here, panacea or not, and it behooves managers to understand its principles, to know how to apply the technique, and to be able to use its information in making decisions.

Interdisciplinary Manpower Research

The "middle-manpower" spectrum has previously been defined as the portion of the labor force that was or could have been trained in technical-vocational education. This begins to indicate that a thorough and comprehensive statewide study of technical-vocational education is very much a part of "middle-manpower" which is a part of an operational manpower policy. Striner says (13):

Unfortunately, manpower problems do not fit into unique disciplines, especially the ones that happen to be represented by interested professionals. An adult who is functionally illiterate is not simply a candidate for help by an expert in remedial reading education. Experience discloses a role for psychological counseling, too, if this adult is to be readied for further skill training to facilitate his adjustment in a complex urban society.

Technical-vocational education has become more than just another type of education, but an interdisciplinary effort toward training and retraining a large segment of the work force. In order to conduct a thorough study of technical-vocational education, the study must be interdisciplinary, that is, have inputs from several disciplines. Striner (13,p. 235) in writing about Research Strategy for Manpower Policy, says:

In research on employment, training, and manpower mobility, the limited involvement of social psychologists, sociologists, demographers, geographers, and political scientists is noticeable and regrettable. Psychiatric counselors and cultural anthropologists should be encouraged to broaden their horizons to become better equipped to understand and deal effectively with the manpower and training problems of minority groups. The economist who plans large-scale educational and training programs to raise the economic status of residents in Negro, Puerto Rican, or Mexican ghettos should know about subculture mores and about the techniques of community organization. The social worker or sociologist who knows little about the local labor market and projected job opportunities

is hardly equipped to help plan for employment security in a community's trades and skills.

Nowhere in the manpower field, perhaps, is there greater need for multi-disciplinary research than in the area described as "structural" unemployment. Roughly, the so-called structural factors are (1) technological, (2) demographic, and (3) cultural. Brief comments on these factors show why a many-sided competence, in an individual researcher or a team, is desirable or even essential.

The solutions to unemployment require that more attention be turned to preparing the potential labor force for seeking employment. In its simplest form, the problem is training available manpower for vacant jobs.

According to Mangum very little is really known about the relative effectiveness of alternative ways of preparing people for employment. Because of the concentration of unemployment among the uneducated, there have been demands for more specific occupational preparation within the schools. There is appearing now a drawing back from occupational education as the answer. Education as a major answer to unemployment can guarantee only a better-educated unemployed. Mangum (14), in writing about the development of manpower policy, 1961-65, says:

As manpower policy continues to traverse uncharted seas, the research and experimentation capability of MDTA Title I and the allocation of 10 percent of Vocational Education Act funds to research could and should become important contributions to success.

As manpower research does become more interdisciplinary there will be the increasing problem of communication, storage of information and dissemination of information among the various disciplines. Although it is beyond the scope of this study, a similar problem within

and among colleges and universities is described in a recent publication by the National Science Foundation (15).

Technical and Vocational Education

The term "technical" as it relates to skills, training, and jobs or occupations is not usually very specific in the meaning it conveys. Sometimes a task or job is thought of as being technical when it becomes complex and involves scientific principles. At other times, the term "technical" is used because of the considerable amount of training that is required before a skill is achieved. Still another reason for the use of the term is because it is less costly to an employer than a pay raise would be.

A technical occupation or worker is very difficult to identify because of the very wide variety of demands within a "job cluster." Repeated observation would be necessary over a considerable period of time and by an observer very familiar with the field.

A U. S. Department of Health, Education and Welfare publication makes this statement concerning technical education (16).

The central concern of technical education is with a body of knowledge rather than with specific jobs. In the interest of clarity, the term 'technician' in this document refers to scope of training and work capability, rather than to employment classification as such, and to job requirements calling for broad technical competence based on proficiency in the application of mathematics and physical science principles and extensive knowledge in technology.

Technicians, the product of technical education, need more than just hardware skills. The technician may have responsibilities as group leaders and intergroup relationships. This aspect of a technician's work is emphasized by Henninger (17) in this statement:

In many instances, the technician may serve as a liaison between the engineer or scientist, on the one hand, and the skilled craftsman on the other hand. In carrying out these various activities, he may have group leadership responsibilities. Therefore, the technician must be able to communicate mathematically, scientifically, and linguistically.

Another approach to a definition or explanation of vocational and technical education is to go to some of the legislation that is very influential in that type of training. Public Law 88-210 gives this explanation (18):

...vocational or technical training or retraining which is given in schools or classes (including field or laboratory work incidental thereto) under public supervision and control or under contract with a state board or local educational agency, and is conducted as part of a program designed to fit individuals for gainful employment as semi-skilled or skilled workers or technicians in recognized occupation (including any program designed to fit individuals for gainful employment in business and office occupations and any program designed to fit individuals for gainful employment which may be assisted by federal funds under the Vocational Education Act of 1946 and supplementary vocational education acts, but excluding any program to fit individuals for employment in occupations which the Commissioner determines, and specified in regulations, to be generally considered professional or as requiring a baccalaureate or higher degree). Such terms includes vocational guidance and counseling in connection with such training, instruction related to the occupation for which the student is being trained or necessary for him to benefit from such training, the training of persons engaged as, or preparing to become, vocational education teachers, teacher-trainers, supervisors, and directors for such training, travel of students and vocational education personnel, and the acquisition and maintenance and repair of instructional supplies, teaching aids and equipment, but does not include the construction or initial equipment of buildings or the acquisition or rental of land.

Research is needed for the expanding efforts in manpower training in the vocational-technical area. Increasingly, there is a need for

accurate up-to-date data for planning different aspects of technical-vocational education. Levitan (19) states that:

...Changing occupational needs require flexibility on the part of the instructional staff. Once a teacher acquires tenure, he is hired for life, but the subject matter that he teaches may become obsolete. Schools must plan not only to teach their students, but also to equip the instructors to change their curricula and even their discipline to keep pace with the changing demands for skills. Moreover, even the most precise occupational data will prove of little value unless teachers, counselors, and school administrators keep abreast of changes in the job market and relate these changes in a meaningful way to needed adjustments in curricula and in guiding students in career planning.

CHAPTER III

BACKGROUND INFORMATION AND METHODOLOGY

This chapter deals with the background information and the methodology of the study. The early stages of planning for the comprehensive study Occupational Education Beyond the High School in Oklahoma conducted at the Oklahoma State University by the School of Industrial Education (now known as the School of Occupational and Adult Education) indicated a need for an efficient research management technique. Many seemingly unrelated activities that were thought to be valuable sources of information and data for the study along with activities pertaining directly to the study needed to be systematically listed and their progress monitored. It was decided that this comprehensive study would be an excellent research project to use as a vehicle for a descriptive study of the use of PERT as a management technique in conducting interdisciplinary research.

Institutional Setting

Oklahoma State University

Oklahoma State University was founded in 1890 as Oklahoma Agricultural and Mechanical College by an Act of the first territorial legislature in order to comply with the Morrill Act of 1862. The name of the college was changed to Oklahoma State University of Agriculture and Applied Science in 1957 (20). At this time the University was

organized into colleges and divisions as follows:

- The Division of Agriculture
- The college of Arts and Sciences
- The College of Business
- The College of Education
- The Division of Home Economics
- The College of Veterinary Medicine
- The Graduate College
- The Division of Engineering

The Oklahoma State Regents for Higher Education have the responsibility of coordinating all institutions of higher learning supported by state appropriations, and the Board of Regents for the Oklahoma Agricultural and Mechanical Colleges is the governing board of Oklahoma State University and seven other Oklahoma colleges (21).

Research Foundation

Organization and Purpose

The Research Foundation is an integral part of Oklahoma State University. Nearly all of its research projects are carried out in the departments of the Colleges of Arts and Sciences, Business, Education, and Home Economics, under the leadership of full time staff members of the departments.

The Research Foundation was established in 1944 to cooperate with other agencies of the University in the building and support of a sound program of basic research. The aim of the Foundation is to have all of its activities contribute to and be compatible with the undergraduate and graduate training programs in all parts of the University.

Applied research also is supported when it is of special interest to staff members and/or when the University is uniquely qualified to conduct the research as a service to private enterprise or to local, state, or federal governmental agencies.

Activities

Every effort is made by the Foundation to:

- (1) Encourage qualified staff members to engage in some research activity,
- (2) secure support for projects which are of interest to staff members, and
- (3) relieve staff members of administrative details in order that they can concentrate on the research.

There is a total of 442 research personnel, consisting of 161 professional staff members, 154 graduate assistants, 83 fellows and trainees, and 44 undergraduates. There are 177 research projects with 65 supported by the Research Foundation and 112 supported by outside agencies(22).

Manpower Research and Training Center

The Manpower Research and Training Center was established under a grant from the Manpower Administration, U. S. Department of Labor to train manpower specialists in a two-year interdisciplinary program culminating in a Master of Science Degree and to promote further manpower research throughout the university. The center is one of seven in the United States. Manpower fellows represent four disciplines: Economics, Sociology, Psychology, and Industrial Education.

School of Occupational and Adult Education

The School of Occupational and Adult Education (formerly the School of Industrial Education) is a part of the College of Education. The following schools and departments are administratively within the College of Education (21, p. 100):

Department of Aviation and Flight Training

Department of Education

School of Occupational and Adult Education

Industrial Arts Education

Technical Education

Trade and Industrial Education

Department of Library Science

Department of Philosophy

Department of Religious Education

The school of Occupational and Adult Education offers majors in Technical Education, Trade and Industrial Education, and Industrial Arts Education. These majors have distinct and separated functions in preparing teachers for service in educational fields (21, p. 104).

The Manpower Research and Training Center and the Research Foundation were awarded the research project entitled "A Study--of Technical-Vocational Education Beyond the High School in Oklahoma" (later entitled "Occupational Education Beyond the High School in Oklahoma") with the School of Occupational and Adult Education and the Technical Education Department as principal investigators.

This project was funded by the Oklahoma Economic Development Foundation, Incorporated, through the Research Foundation of Oklahoma State University.

Methodology

By way of review, this project deals with the application of the PERT technique to the study Occupational Education Beyond the High School in Oklahoma.

Review of Research Questions

The following research questions were used to guide this research project:

1. How will the PERT scheduling of the Statewide Study affect the researchers?
 - (a) Will it give individual studies more significance?
 - (b) Will the individual researchers gain a feeling of belonging to a bigger project?
 - (c) Will the PERT scheduling cause contacts between or among the researchers?
2. Have researchers used the PERT technique in research?
3. How familiar are researchers with PERT?
4. Are researchers in favor of interdisciplinary research?
5. How will researchers react to the PERT scheduling of the Statewide Study?
 - (a) Will researchers react favorable to their involvement in the PERT scheduling of the Statewide Study?
 - (b) Will researchers recommend PERT scheduling for similar studies?

Overall Procedure

This study used the current Statewide Study Occupational Education Beyond the High School in Oklahoma as a vehicle to demonstrate the PERT management technique. The procedure for using PERT on this study was broken down into the following steps:

1. The objectives of the current study were carefully reviewed.
2. The potential data sources which consisted of individual research projects were systematically listed.
3. These individual projects were listed in an outline form for the first of three monthly reports.
4. The individual projects were reviewed with the researchers involved and a brief PERT chart constructed of each project.
5. A PERT chart of the Statewide Study showing how the individual projects would contribute was constructed.
6. The individual projects, in outline form and with PERT charts, along with the Statewide Study PERT charts were distributed as the second monthly report.
7. The individual PERT charts were brought-up-to-date and reviewed with the individual researchers for the third monthly report.
8. A wall-size PERT chart of the Statewide Study was constructed for office use.
9. A questionnaire to get the reactions of individuals involved with the Statewide Study with respect to the effectiveness of PERT as a comprehensive management tool for this study was constructed.

10. The questionnaire was administered.
11. The results were studied and tabulated.
12. The study findings were written and the study concluded.

Data Analysis

The descriptive research method was used in this study. In order to evaluate the effectiveness of PERT as a management tool to coordinate an interdisciplinary manpower research project in a university setting, a questionnaire was developed (see Appendix B) and administered to most of the people closely involved with the Statewide Study. The purpose of this questionnaire was to measure the reactions of these people as to the effectiveness of PERT as a management tool and in enhancing interdisciplinary cooperation with respect to their own study and the Statewide Study in general.

Selection of Population

A population of 29 people who were associated with the study was selected. Of the 29 people in the population, 21 responded to the questionnaire. The respondents were asked, "How are you associated with the Statewide Study mentioned above?" The responses were as follows: Two "staff researchers on Statewide Study", five "researchers or administrators of research agencies", three "writing doctoral dissertation", eight "writing master's thesis", and three answered "other" because their project did not fit the above categories. The non-responses were not considered to have been sufficiently involved with the Statewide Study to affect the results. These studies were near completion and did not prove to be valuable inputs to the study.

CHAPTER IV

DESCRIPTION AND ANALYSIS

This chapter deals with the process of adapting PERT as a management tool to coordinate a statewide study as it progressed from the beginning of study activities through the publication of the preliminary report, Occupational Education Beyond the High School in Oklahoma, on September 7, 1967.

The early stage of this study was devoted to the identification of the principal researchers and other potential research contributors to the Statewide Study. Most of the potential contributors consisted of individuals conducting master's and doctoral research. Some of these researchers were to write rough drafts of sections of the Statewide Study and others were to make available the findings of their independent related studies. Also, the Research Coordinating Unit of Oklahoma State University was a potential contributor to the study.

First Analysis of Research Inputs

To begin organizing information sources for the Statewide Study, each individual researcher or research group known to be a potential contributor to the Statewide Study was listed with project title, procedures and work packages; work packages refer to independent tasks or jobs, or independent groups of tasks or jobs. Their topics were listed in four levels. Level 0 which is common to all potential

contributors is the abstract page of the proposal for the Statewide Study (see Table I). Level 1 is "Title and Objectives of Substudies." (Table II is a one page example of the report.) Under "Title and Objectives of Substudies" was listed each of the individual researchers and the title of his study. Under Level 2, "Methodology", was listed the major methodology headings for each study opposite the researcher's name and project title (see Table II). Level 3, "Work Packages" listed major research tasks or groups of tasks for each of the major methodology headings (see Table II).

This list of research projects and outlines of activities made it possible to determine what types of research data and information would be available to the principal researchers conducting the Statewide Study. From this information the principal researchers could plan the additional research activities to complete the Statewide Study. Also this list, along with the abstract page of the Statewide Study research proposal, was mimeographed and distributed to people actively concerned with the project. This was the first draft progress report entitled "Objectives and Work Packages for a Study of Technical-Vocational Education Beyond the High School in Oklahoma."

Summary of "First Draft" Report

The first monthly progress report contained basic information about 13 different possible data inputs for the Statewide Study. They were as follows: Five Doctoral dissertations, three Masters theses, and five projects of researchers and research organizations. There was a wide variety of general topics, with respect to occupational education, being investigated in these different studies as can be noted

TABLE I

LEVEL O (MAJOR STUDY)
ABSTRACT

- (A) Submitted By: Marvin T. Edmison, Ph.D., Director
Research Foundation, Oklahoma State University
- (B) Principal Investigator: Maurice W. Roney, Ed.D., Director and
Professor, School of Industrial Education
Oklahoma State University
- Coordinator: Paul V. Braden, Ph.D., Associate Professor
School of Industrial Education and Occupational
Analysis Specialist
Manpower Research and Training Center
Oklahoma State University
- (C) Title: A Study of Technical-Vocational Education Beyond the
High School in Oklahoma
- (D) Objectives: This study has four major objectives:
1. To determine the availability of post-high school technical-vocational education and the supply of middle-manpower generated from these training sources.
 2. To determine the present and projected demand for post-high school technically and vocationally trained manpower in industry, business, military, and other government agencies.
 3. To determine actual and potential enrollment for post-high school technical-vocational education.
 4. To make recommendations for middle-manpower supply and demand policy decisions to responsible state agencies.
- (E) Procedure:
- The study will be undertaken in three phases. Phase I will be devoted primarily to planning the procedures for compiling demographic data, labor market information, middle-manpower mobility data, present and potential training program enrollment and other pertinent data in preparation for Phase II to be launched in June 1967. Phase II will concentrate on contacting existing middle-manpower personnel and employers through the use of questionnaires and in some cases directed interviews. Phase II will terminate August 31, 1967. Phase III will be devoted to interpretation of results which will culminate in recommendations for policy decisions to responsible state agencies.
- (F) Time Schedule: February 14, 1967 to January 15, 1968.

TABLE II
 SAMPLE OF LEVEL BREAKDOWNS

LEVEL 1 Title & Objectives of Substudies	LEVEL 2 Methodology	LEVEL 3 Work Packages
<u>D. S. Phillips:</u> An Investigation of scholastic aptitude, social class background, and vocational interests of post-high school technician education students.	Review of Literature.	Review of Literature.
	Standardized tests.	Test selection.
		Administer tests.
		Analysis and findings.
	Personnel data sheet.	Construction of personnel data sheet.
		Administer.
Analysis and find- ings.		
<u>John Noyes:</u> Geographic regions served by post-high school technical- vocational institu- tions in Oklahoma.	Review of Literature.	Review of Literature
	Personal interview schedule.	Construction of in- terview schedule.
		Field interviewing.
		Analysis and find- ings.

in the following list:

- Scholastic aptitude
- Geographic regions served
- Enrollments
- Graduate follow-up
- Vocational plans of high school seniors
- Industrial survey instrument
- Success predictors
- Historical development
- Student behavioral changes
- Cost analysis
- Teachers role perceptions
- Educational unit organization

Second Analysis of Research Inputs

The first draft progress report was used to construct brief PERT charts for each of the individual research projects. These PERT charts were reviewed with many of the individual researchers to be sure that their projects were correctly represented. Changes had to be made because of changes in research objectives and estimated completion times. An overall PERT chart for the Statewide Study was constructed including the individual PERT charts showing when the various inputs would be available and where they would feed into the Statewide Study.

The second monthly report consisted of the same topic and activity breakdown for each individual project, updated and with the addition of the PERT charts for the individual projects and for the Statewide Study. This second report, entitled "Second Draft-PERT

Scheduling of Objectives and Work Packages for a Study of Technical-Vocational Education Beyond the High School in Oklahoma" was duplicated by mimeograph and distributed to the researchers and other interested personnel.

Summary of "Second Draft" Report

The second report was about the same as the first, but included new inputs and the PERT charts. The overall PERT chart of the State-wide Study made it easy for the principal researchers to see what research material would be available, when it would be available, what additional studies must be conducted, and the time allotted for each portion of the project. This PERT chart was not of value in meeting a deadline in the usual sense because the principal researchers had no control over the various individual projects, but it did make it possible to keep track of the progress of these sources of information and material and plan accordingly.

Several copies were sent to the Funding Agency in Oklahoma City, the Oklahoma Economic Development Foundation, Incorporated. They put this second part on multilith masters, duplicated, bound, and distributed about 25 more copies.

Third Analysis of Research Inputs

The second monthly report was reviewed with the individual researchers, corrections made, new projects added, new Statewide Study PERT charts were made and put on multilith masters for the third monthly report. (See Appendix A.) This report shows 19 different individual projects and their relation to the Statewide Study.

PERT Chart for Office Use

A large PERT chart, approximately three feet by four feet, was constructed for office use. The individual PERT charts with investigator and title, from the third monthly report, were posted on the wall chart. Then the Statewide Study PERT chart was drawn in showing the various phases of the major study and how the individual studies related to the Statewide Study. This chart was large enough to make progress notations for quick and easy reference.

Analysis of Questionnaire Data

The questionnaire (see Appendix B) developed to evaluate this project was designed to sample reactions of the respondents with respect to the following general areas:

1. Overall PERT scheduling of the Statewide Study.
2. Some specific aspects of the PERT scheduling of the Statewide Study.
3. Affect on the individual projects.
4. Assistance to the individual projects.
5. Individual knowledge and use of PERT.
6. Interdisciplinary manpower research.

The reactions of various researchers involved with the Statewide Study with respect to the use of PERT in conducting the Statewide Study was in general very favorable. The respondents were given an opportunity to make comments on the questionnaire if they so desired. The fact that several people did so, added to the writer's understanding

and evaluation of the project. In general, these comments were explanations for the answers given and will not be included in this study.

Question number one asked "How are you associated with the 'Statewide Study' mentioned above" (the "mentioned above" refers to the introductory paragraph on the questionnaire). The responses to this question were the criteria for categorizing the respondents. The results of this question were: (a) eight "writing master's thesis", (b) three "writing Doctoral dissertation", (c) two "staff researchers", on "Statewide Study", (d) five "researchers or administrators of research agency", (e) three "other". The three respondents that marked "other" were working on projects that did not fit any of the other categories.

The responses to the remainder of the questions were put into chart form according to the criteria of question one. A "No Response" column was added to the chart because nearly all of the responses had some blanks. The main reason for the questionnaire not being complete was because many of the questions do not apply to the entire population equally.

The questionnaire does not measure the respondents involvement in the Statewide Study but it is the writer's judgment based on observation and comments on the questionnaires that many of the "neutral" answers were because of relatively less involvement of these particular researchers in the Statewide Study. This lack of involvement may have been due to individual projects nearing completion before the Statewide Study began; individual projects not very relevant to the Statewide Study; and physical separation from major activities of it.

What was the general or overall reaction of the respondents to the PERT scheduling of the Statewide Study? The respondents were asked "If your study was listed in report 1, 2, or 3, what was your first reaction to this listing?" Table III shows that of the 21 respondents, 14 indicated "favorable", two "neutral", zero "unfavorable" and five did not respond.

TABLE III
REACTIONS TO PERT SCHEDULING OF STATEWIDE STUDY

Respondents	Responses			
	Favorable	Neutral	Unfavorable	No Response
Writing Master's Thesis	6	2	0	0
Writing Doctoral Dissertation	2	0	0	1
Staff Researchers on Statewide Study	2	0	0	0
Researchers or Administrators of Research Agency	2	0	0	3
Other	<u>2</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	14	2	0	5

A brief PERT schedule was made of the individual projects listed in the second and third monthly progress reports. The respondents were asked "How did the PERT scheduling of your research affect your project in overall terms?" Table IV shows that of the 21 respondents, nine indicated "favorable", eight "neutral", zero "unfavorable", and four

did not respond. The main reason given for indicating "neutral" was because the individual project was nearing completion at the time the PERT scheduling was done. Again this question did not apply to some of the respondents.

TABLE IV
AFFECT OF PERT SCHEDULING ON INDIVIDUAL PROJECTS

Respondents	Responses			
	Favorable	Neutral	Unfavorable	No Response
Writing Master's Thesis	3	4	0	1
Writing Doctoral Dissertation	1	2	0	0
Staff Researchers on Statewide Study	2	0	0	0
Researchers or Administrators of Research Agency	1	0	0	4
Other	<u>2</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total	9	7	0	5

It was expected that the PERT scheduling of the Statewide Study would not only be of assistance to accomplishing the Statewide Study but also be of assistance to many of the individual researchers. Reports one, two, and three listed the various research projects that were thought to be possible contributors to the Statewide Study. One reason for distributing these reports was to let the various researchers know what others were doing in hope that more inter-research communication would be established. The respondents were asked "Did

you contact any other researchers concerning your research project based on information you obtained in monthly reports 1, 2, or 3?" Table V shows that eight answered "yes", ten "no", and three did not respond. Although a little less than one-half of the respondents indicated that they contacted another researcher, if they had contacted the ones that answered "no" there would have been interchange among most of the subjects in the population.

TABLE V
CONTACTED OTHER RESEARCHERS

Respondents	Responses		
	Yes	No	No Response
Writing Master's Thesis	4	4	0
Writing Doctoral Dissertation	1	2	0
Staff Researchers on Statewide Study	2	0	0
Researchers or Administrators of Research Agency	0	3	2
Other	<u>1</u>	<u>1</u>	<u>1</u>
Total	8	10	3

In order to get more detailed information in this area, a four-part question was used. The first three parts asked for numbers of joint efforts and exchange of information among individual researchers and the fourth part was open-ended and did not prove to be very fruitful. The purpose of this question was to get some idea of how much the

Statewide Study, managed with the PERT technique and with the three monthly progress reports, influenced research cooperation and information exchange among individual projects. Also this question identifies activities between disciplines as well as within disciplines. Some of the results were not included because they did not reflect what the investigator wanted to know. The respondents were asked "As a result of your affiliation with the 'Statewide Study':"

"(a) How many researchers have you worked with in gathering data? From your academic field at Oklahoma State University, _____. From other academic fields at Oklahoma State University, ____ other _____."

There was a total of 29 contacts for the first part and 16 for the second part.

"(b) How many researchers have given you valuable data or information? From your academic field at Oklahoma State University _____. From other academic fields at Oklahoma State University ____ other _____."

There were 26 contacts indicated within the respondents discipline and 20 for other disciplines.

"(c) How many individual researchers have you given valuable information or data? From your academic field at Oklahoma State University _____. From other academic fields at Oklahoma State University _____. Other _____."

The response was 20 for the first part and 12 for the second part. The respondents were asked "Do you feel that the PERT report of the 'Statewide Study' gave your project any additional significance?" Table VI shows that twelve answered "yes", four "no", and five did not respond. Most of the "no" responses were due to the near completion of some of the projects before the PERT report was published.

TABLE VI
GAINED ADDITIONAL SIGNIFICANCE

Respondents	Responses		
	Yes	No	No Response
Writing Master's Thesis	4	3	1
Writing Doctoral Dissertation	2	1	0
Staff Researchers on Statewide Study	2	0	0
Researchers or Administrators of Research Agency	2	0	3
Other	<u>2</u>	<u>0</u>	<u>1</u>
Total	12	4	5

The respondents were asked "Did you gain a feeling of belonging to a bigger project by virtue of monthly reports 1, 2, or 3?" Table VII shows that ten said "yes", five "no", and six did not respond.

The respondents were asked to react to the PERT scheduling of the individual projects even though it may not have been of assistance to their project. The question asked, "What is your reaction to the PERT scheduling of individual research projects that accompany the overall charts found in monthly reports 2 and 3?" Table VIII shows that of the 21 respondents, 17 indicated "favorable", two "neutral", zero "unfavorable", and two did not respond.

TABLE VII
FEELING OF BELONGING TO BIGGER PROJECT

Respondents	Responses		
	Yes	No	No Response
Writing Master's Thesis	6	1	1
Writing Doctoral Dissertation	1	2	0
Staff Researchers on Statewide Study	2	0	0
Researchers or Administrators of Research Agency	0	1	4
Other	<u>1</u>	<u>1</u>	<u>1</u>
Total	10	5	6

TABLE VIII
REACTIONS TO PERT SCHEDULING OF INDIVIDUAL PROJECTS

Respondents	Responses			
	Favorable	Neutral	Unfavorable	No Response
Writing Master's Thesis	5	2	0	1
Writing Doctoral Dissertation	3	0	0	0
Staff Researchers on Statewide Study	2	0	0	0
Researchers or Administrators of Research Agency	5	0	0	0

TABLE VIII (Continued)

Respondents	Responses			
	Favorable	Neutral	Unfavorable	No Response
Other	<u>2</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	17	2	0	2

The next question is more specifically directed toward the reaction of the respondents with respect to the monthly reports in PERT form rather than the idea of the individual projects in PERT form. The question asked, "What is your overall reaction to the monthly reports in PERT form?" Table IX shows that nineteen responded "favorable", two "neutral", zero "unfavorable" and zero did not respond.

The respondents were asked, "Would you recommend that PERT scheduling listed in report form be used in similar studies?" The author felt that there might be a difference between the subject's reaction to the PERT scheduling and their recommendation to use it in similar studies. All of the 21 respondents said "yes."

Even though the period of time was rather short, a few months from the publication of the monthly reports until the questionnaire was administered, the investigator wanted to know how many of the subjects had used PERT since the monthly reports were published. This question failed to find out whether the use of PERT was due to the monthly reports but the following question gives some indication of this. The question asked, "Have you used the 'PERT concept' in any

other research work since monthly reports 1, 2, or 3 were published?" This question would probably not apply to subjects that were students since they would not likely be starting additional research. Only two subjects, one staff researcher of the Statewide Study and one from the category "Researchers or Administrators of Research Agency" indicated that they had used PERT since the monthly reports. The author should also have asked how much research had been initiated during this period of time.

TABLE IX
REACTIONS TO THE MONTHLY REPORTS

Respondents	Responses			
	Favorable	Neutral	Unfavorable	No Response
Writing Master's Thesis	7	1	0	0
Writing Doctoral Dissertation	3	0	0	0
Staff Researchers on Statewide Study	2	0	0	0
Researchers or Administrators of Research Agency	5	0	0	0
Other	<u>2</u>	<u>1</u>	<u>0</u>	<u>0</u>
Total	19	2	0	0

The respondents were asked, "Were you familiar with the 'PERT concept' before you became aware of its utilization in the 'Statewide Study'?" Table X shows that seven "Never heard of it", three "Heard about it", five "Familiar with it", and six "Used it."

TABLE X
FAMILIARITY WITH THE "PERT CONCEPT"

Respondents	Responses			
	Never Heard of It	Heard About It	Familiar With It	Used It Previously
Writing Master's Thesis	5	2	0	1
Writing Doctoral Dissertation	1	1	1	0
Staff Researchers on Statewide Study	1	0	1	0
Researchers or Administrators of Research Agency	0	0	2	3
Other	<u>0</u>	<u>0</u>	<u>1</u>	<u>2</u>
Total	7	3	5	6

The respondents were asked, "What is your reaction to inter-disciplinary manpower research?" and all of the respondents indicated "favorable."

The respondents were asked, "If you worked in any way with another researcher affiliated with the 'Statewide Study' was it a result of: (a) Monthly report number 1, 2, or 3, (b) Advice from major advisor, (c) Suggestion from Research Agency Administrator, (d) Other." Table XI shows the results of this question.

TABLE XI
CAUSES OF COOPERATIVE EFFORTS

Respondents	Monthly Report No. 1, 2, 3	Advice from Major Advisor	Suggestion	
			from re- search	Adm. Other
Writing Master's Thesis	2	5	1	1
Writing Doctoral Dissertation	0	0	0	1
Staff Researchers on Statewide Study	2	1	0	0
Researchers or Administrators of Research Agency	2	0	0	0
Other	<u>0</u>	<u>0</u>	<u>1</u>	<u>0</u>
Total	6	6	2	2

CHAPTER V

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to describe the use of PERT (Program Evaluation and Review Technique) as a technique in managing interdisciplinary manpower research in the university setting. The current on-going Statewide Study, Occupational Education Beyond the High School in Oklahoma was used as a vehicle to demonstrate the use of PERT in interdisciplinary manpower research. This study describes the use of PERT in the Statewide Study from the beginning of the study, February, 1967, until publication of the preliminary draft, September 7, 1967.

A questionnaire was developed and administered to 29 of the people connected with the Statewide Study to collect and summarize their reactions as to the effectiveness of PERT as a management technique.

Findings

The results of this study indicate generally very favorable reactions of the respondents toward the PERT management of the Statewide Study and of their involvement in the PERT scheduling.

Several of the questions gave the respondent a choice of "favorable", "neutral", or "unfavorable" as answers. There were no "unfavorable" responses from the population. The "neutral" answers and no responses were primarily due to the questions not applying to

all of the population equally or the individual projects being nearly completed at the time of this study. The findings are listed in percentages and these responses caused some of the percentages to be lower than they should be, but the author chose to base the percentages on all of the 21 respondents.

The findings of this study are listed below according to five major headings:

1. Affect of PERT scheduling of the Statewide Study on individual researchers.
 - a. Favorable reaction to individual's project being listed in the monthly reports was indicated by sixty-six percent of the respondents.
 - b. Fifty-seven percent of the respondents felt that their individual project gained additional significance.
 - c. A feeling of belonging to a larger project was indicated by forty-eight percent of the respondents.
 - d. Thirty-eight percent indicated that they contacted other researchers as a result of this study.
2. Familiarity of respondents with the PERT concept.
 - a. Thirty-three percent never heard of PERT.
 - b. Fourteen percent had heard about PERT.
 - c. Twenty-four percent was familiar with PERT.
 - d. Twenty-nine percent had used PERT previously.
3. Ten percent of the respondents have used PERT since this study began. (The author failed to find out how much research was initiated and if the use of PERT was a result of this study.)

4. Respondents are unanimously in favor of interdisciplinary manpower research.
5. Reactions of respondents to the PERT scheduling of the Statewide Study.
 - a. Eighty-one percent indicated favorable reaction to the PERT scheduling of individual projects that accompanied the overall PERT schedule of the Statewide Study.
 - b. Ninety-one percent indicated favorable reaction to monthly reports in PERT form.
 - c. The respondents unanimously recommended PERT for similar studies.

Conclusions

1. The data in the previous chapter indicate that PERT can be successfully adapted to the management of a comprehensive statewide study of occupational education. The data indicate that the PERT management of the "Statewide Study" not only was helpful to the principal researchers in executing the study, but also it was helpful to many of the individual research projects being conducted by individuals associated with the Statewide Study.

2. Individual research projects were favorably affected in several ways. The data indicate that exchange of information was encouraged among researchers, individual projects were given additional significance, and the individuals gained a feeling of belonging to a bigger project. Several of the individuals contacted with respect to correcting and updating the PERT chart of their individual projects

commented that the reviewing and estimating dates for their PERT chart forced them to do valuable and realistic planning for their research project.

3. The application of the PERT concept to the management of the early stages of the Statewide Study received favorable comment by a letter from the Oklahoma Economic Development Foundation, Incorporated, the Funding Agency.

4. The data indicate that PERT scheduling encourages interdisciplinary association and cooperation.

Recommendations for Further Study

1. Further study should be initiated concerning a central research information center within each discipline listing on-going and recently completed research.

2. Further study should be initiated concerning a central research information center for the university listing all on-going and recently completed research.

Further study should be initiated concerning guidelines for exploring broad areas in conducting interdisciplinary manpower research in the university setting.

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APPENDIX A

THIRD DRAFT

PERT SCHEDULING
of
OBJECTIVES AND WORK PACKAGES
for
A STUDY OF TECHNICAL-VOCATIONAL EDUCATION
BEYOND THE HIGH SCHOOL IN OKLAHOMA

Distributed to
Personnel Affiliated with the Study
May 20, 1967

INTRODUCTION

This report contains PERT scheduling (Program Evaluation Review Technique) of studies related to a statewide study of technical-vocational education beyond the high school in Oklahoma. The majority of the studies are masters' and doctors' theses relative to the project. In addition, several studies related to the statewide study of technical-vocational education in Oklahoma will be completed by the Oklahoma Employment Security Commission and the principal investigators listed in the original proposal. For example, the research economists related to this study will investigate the changing employment mix, historical trends in middle-level manpower, and identification of Oklahoma's employer population.

The study is divided into three phases (see abstract on next page) and only phase one has thus far been approved. However, the overall PERT scheduling includes phases two and three, thereby anticipating the approval of the later two phases.

The overall study seems to be progressing on schedule. A half-time secretary was employed on March 20 as per budget for phase one, and this has helped in processing research proposals and in general setting the stage for phases two and three. It is anticipated that a monthly report of this nature will be submitted to principal parties, including both sponsors and researchers.

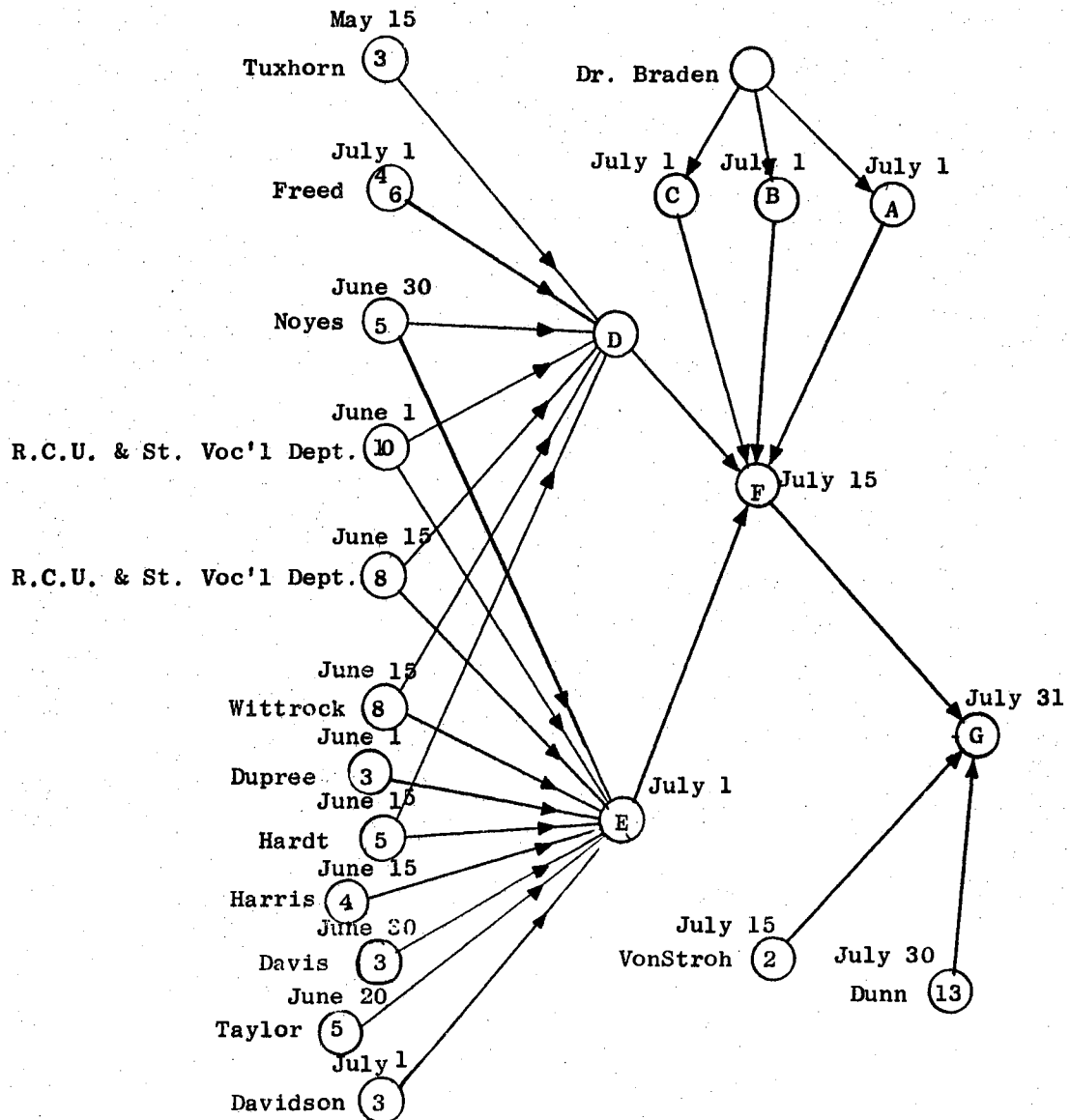
Report number 2 dated May 20, 1967 serves as the basic structure for report number three. However, two theses have been completed and six new studies incorporated into the total research effort. Dr. Scott Tuxhorn completed The Educational Unit for Administration, Organization, and Supervision of Area Vocational-Technical Schools in Oklahoma, and Mr. David Lonobardi completed Historical Development of the Electronics Technology Curriculum at Oklahoma State University's Technical Institute. Studies added to the total research effort are: Follow-up Study of The Graduates of Fire Protection Technology at Oklahoma State University Technical Institute by Tom Davidson, Expenditures for Secondary and Post-High School Technical-Vocational Education in Oklahoma from 1930-66 in Relation to Demographic and Occupational Shifts by Sammy C. Davis, Study of Commuting Patterns as Oklahoma City Air Material Command by Ray Grimes, A Follow-up Study of High School Technical Programs in Oklahoma City by James Harris, A Survey of Industrial Arts Programs in Oklahoma Junior Colleges during 1966-67 by Thomas Taylor, An Economic Study of Vocational-Technical Education by Gordon VonStroh.

LEVEL 0 (MAJOR STUDY)

ABSTRACT

- (A) Submitted By: Marvin T. Edmison, Ph.D., Director
Research Foundation, Oklahoma State University
- (B) Principal Investigator: Maurice W. Roney, Ed. D., Director and Professor
School of Industrial Education
Oklahoma State University
- Coordinator: Paul V. Braden, Ph. D., Associate Professor
School of Industrial Education and
Occupational Analysis Specialist
Manpower Research and Training Center
Oklahoma State University
- (C) Title: A Study of Technical-Vocational Education Beyond the High School
in Oklahoma
- (D) Objectives: This study has four major objectives:
1. To determine the availability of post-high school technical-vocational education and the supply of middle-manpower generated from these training sources.
 2. To determine the present and projected demand for post-high school technically and vocationally trained manpower in industry, business, military, and other government agencies.
 3. To determine actual and potential enrollment for post-high school technical-vocational education.
 4. To make recommendations for middle-manpower supply and demand policy decisions to responsible state agencies.
- (E) Procedure:
- The study will be undertaken in three phases. Phase I will be devoted primarily to planning the procedures for compiling demographic data, labor market information, middle-manpower mobility data, present and potential training program enrollment and other pertinent data in preparation for Phase II to be launched in June 1967. Phase II will concentrate on contacting existing middle-manpower personnel and employers through the use of questionnaires and in some cases directed interviews. Phase II will terminate August 31, 1967. Phase III will be devoted to interpretation of results which will culminate in recommendations for policy decisions to responsible state agencies.
- (F) Time Schedule: February 14, 1967 to January 15, 1968.

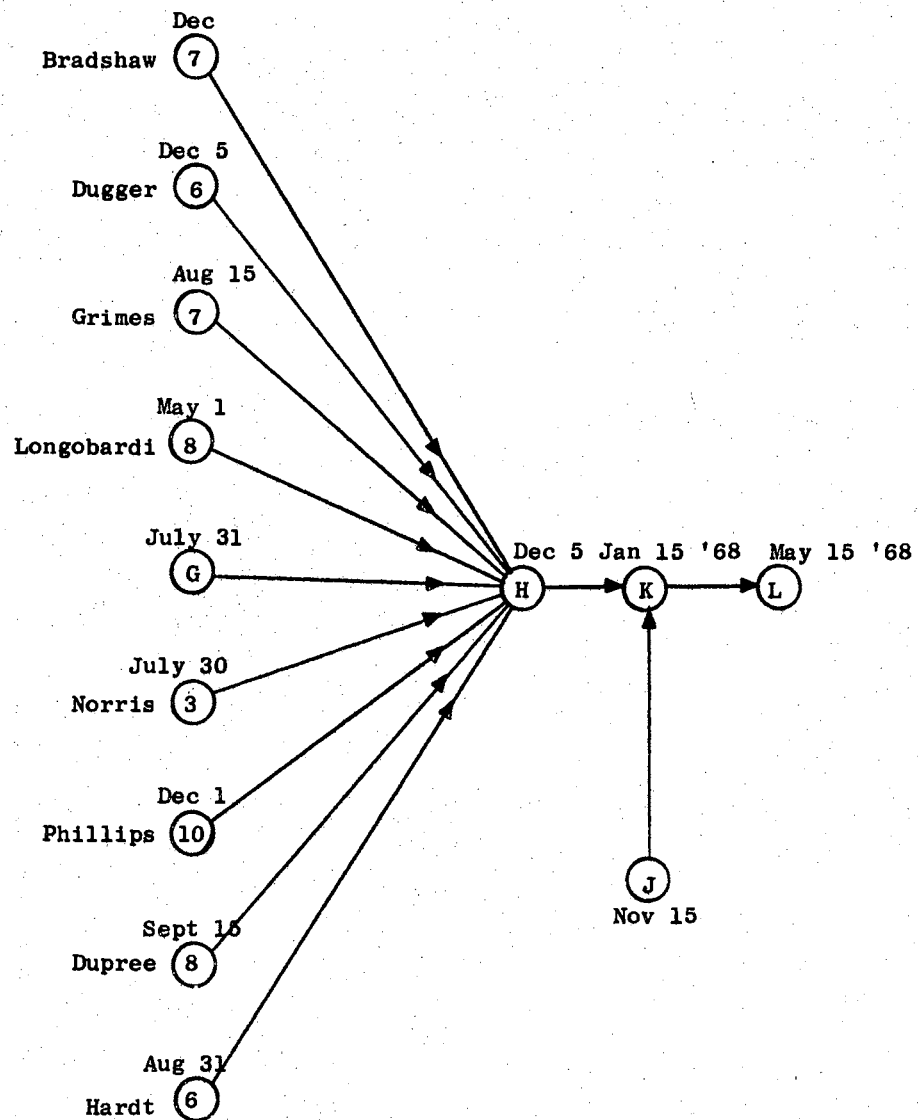
**PERT Chart Depicting Data Inputs for Post-High School Technical-Vocational
Education in Oklahoma--Background Information--
Publication Date, July 31, 1967**



NOTE: For meaning of numbers refer to individual's PERT Chart.

- A. Introduction, Ch 1
- B. State and National Manpower Projections, Ch 2
- C. Recommendations for further studies, Ch 5
- D. Historical Development, Ch 3
- E. Descriptive Research, Ch 4
- F. Rough Draft of Background Information Report
- G. Background Information Publication

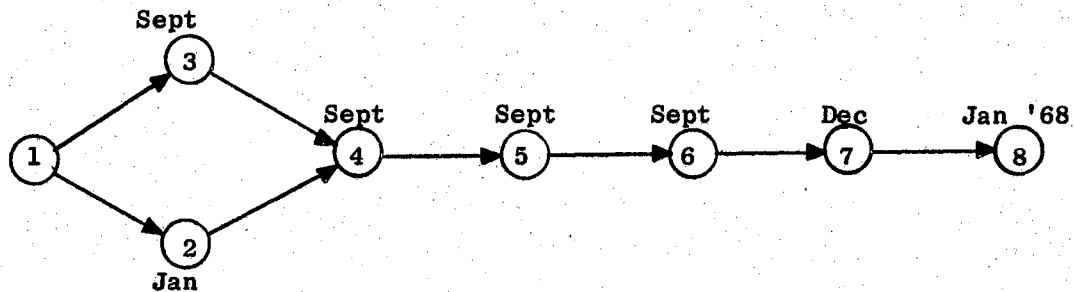
**PERT Chart Depicting Data Inputs For Policy Recommendations for Post-High
School Technical-Vocational Training in Oklahoma--
Publication Date, January 15, 1968**



NOTE: For meaning of numbers refer to individual's PERT Chart.

- G. Background Information Publication
- H. Rough Draft of Final Report
- J. Employment Security Commission report of Present and Projected Manpower Needs
- K. Final Report (Technical-Vocational Education Beyond High School in Oklahoma)
- L. Employment Security Commission Final Report

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<u>O. Leon Bradshaw:</u> Development of a battery of tests to predict success in college level engineering technician programs. Characteristics of success in Comparison with drop-outs.	Review of Literature	Review of Literature
	Test instruments	Develop tests
		Pre-test tests
		Administer tests
		Analysis & findings
		Final report



1. Begin project
2. Review of literature completed
3. Tests developed
4. Pre-test and revisions completed
5. Population defined
6. Test administered
7. Analysis and findings
8. Final report

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<u>Tom Davidson:</u> (2-3 credit 540 problem) 1. Follow-up study of the graduates of fire protection technology at Oklahoma State University Technical Institute	Questionnaire to National Fire Protec- tion Association	<u>Construct Questionnaire</u> <u>Analysis</u>
	Questionnaire to Oklahoma State Uni- versity Student Records Office	<u>Construct Questionnaire</u> <u>Analysis & findings</u> <u>Final report</u>



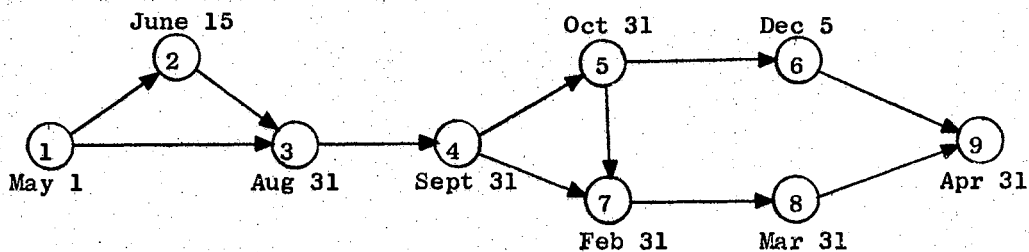
1. Previous work
2. Data collected
3. Analysis and findings
4. Final report

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<u>Sammy C. Davis:</u> Expenditures for Secondary and Post-High School Technical- Vocational Education in Oklahoma from 1930-66 in Relation to Demo- graphic and Occupational Shifts	Review of Literature	Review of Literature
	Collection of cost data	Collection of published data on expenditures for Technical-Vocational Programs
		Analysis and findings
		Final report



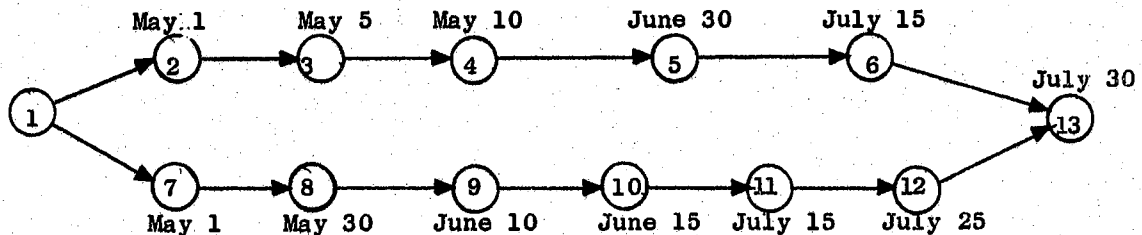
1. Project started
2. Review of literature
3. Collection of published data on expenditures for Technical-Vocational Programs
4. Analysis and findings
5. Final report

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<p><u>Cecil W. Dugger:</u></p> <p>Cost analysis of select two-year post-high school technician education programs in Oklahoma and the United States</p> <p>1. Develop system to determine technician education program costs</p> <p>2. Determine technician education program costs per student, per credit hour, etc.</p>	Review of Literature	Review of Literature
	Interview schedule	Develop proposal
		Interview business managers
		Develop first draft of interview schedule
		Pre-test first draft and modify
		Collect program cost data in Oklahoma
		Tabulate and analyze Oklahoma program cost data
		Collect program cost data in the United States
		Tabulate and analyze United States program cost data
		Final report



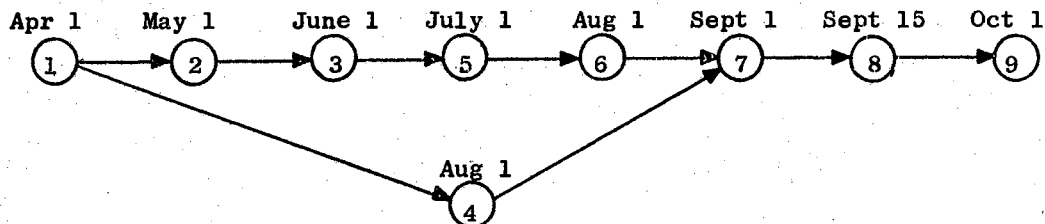
1. Start (begin review of literature, interview business managers)
2. Proposal developed
3. First draft of interview-schedule developed
4. First draft of interview-schedule pre-tested and modified
5. Program cost data collected in Oklahoma
6. Oklahoma program cost data tabulated and analyzed
7. Program cost data collected in United States
8. United States program cost data tabulated and analyzed
9. Final report

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
Bill Dunn: Rough draft of employer survey instruments (2 credit course)	Personal Interview schedule for employers 1. Role perceptions held by industrialists concerning post-high school technical education	Construct personal interview schedule for employers
		Pre-test
		Identify Population
		Interviews
		Analysis and recommendations
		Construct mail questionnaire to employees
	Mail questionnaire to employees 1. Last job information 2. Job-training information 3. Job satisfaction	Pre-test
		Send out mail questionnaire
		Follow-up letters
		Analysis and recommendations



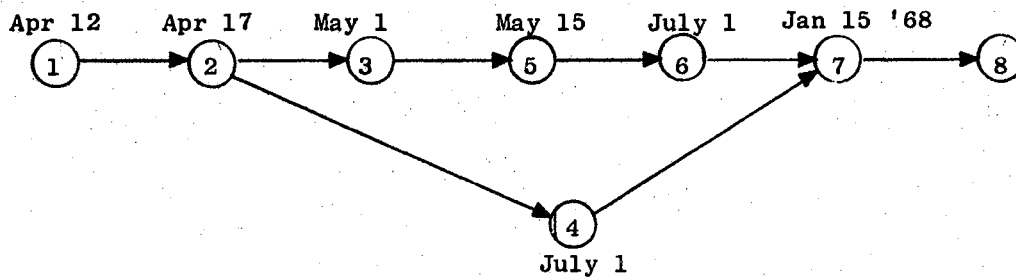
1. Begin construction of employee and employer instruments
2. Employer instrument constructed and population defined
3. Pre-test completed
4. Revisions completed
5. Interviews completed
6. Analysis
7. Employee instrument constructed and population defined
8. Pre-test completed
9. Revisions completed
10. Instrument mailed
11. Follow-up letters mailed
12. Analysis
13. July 30 publication

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<u>Robert Lee Dupree:</u> A cost-benefit study of post-high school technical education in Oklahoma 1. To determine student and institutional costs relevant to technical education 2. To estimate benefits obtained as a result of technical education	Review of Literature	Review of Literature
	Student cost Questionnaire	Develop Questionnaire
		Administer Questionnaire
	Follow-up Question- naire of student benefit	Obtain forwarding addresses for follow-up
		Develop Questionnaire
		Administer Questionnaire
	Analysis, findings, and recommendations	
	Final report	



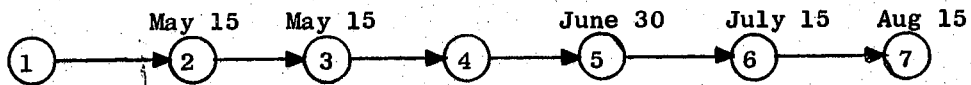
1. Begin (Review of Literature, construction of student cost instrument)
2. Student cost instrument completed
3. Data gathered with student cost instrument
4. Review of Literature and published data compiled
5. Benefit analysis instrument constructed
6. Benefit analysis instrument administered
7. First draft of report completed
8. Analysis and findings completed
9. Final report

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<u>Robert V. Freed:</u> Historical develop- ment of Oklahoma's post- high School occupational education programs 1. When schools developed 2. Boards of control 3. Legislation 4. Development of occupational programs	Review of Literature	Review of Literature
	Published data	Construct personal interview schedule
		Conduct personal inter- views
		Analysis and findings
	Schedule personal interviews	Final report
	Collect published data	



1. Project started
2. Proposal submitted
3. Interview schedule constructed
4. Published data collected
5. Pilot study completed and changes made
6. Field interviewing completed
7. Analysis completed
8. Final report

LEVEL 1	LEVEL 2	LEVEL 3
Title & Objectives of Sub-Studies	Methodology and Instrumentation	Work Packages
<u>Ray Grimes:</u> Study of commuting patterns at Oklahoma City Air Material Command	Questionnaire	Construction of Questionnaire



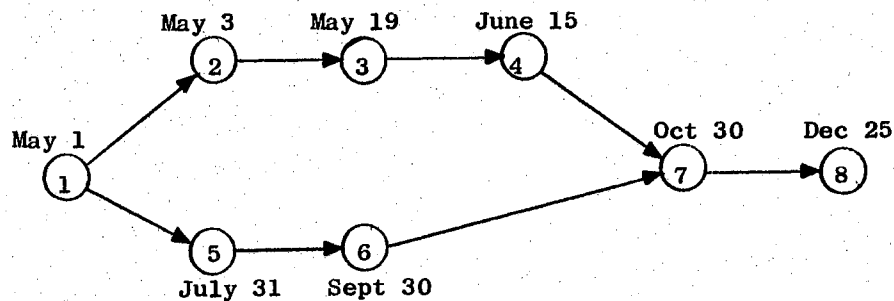
1. Project started
2. Review of literature completed
3. Questionnaire constructed
4. Questionnaire administered
5. Data collected
6. Analysis and findings
7. Final report

LEVEL 1	LEVEL 2	LEVEL 3
Title & Objectives of Sub-Studies	Methodology and Instrumentation	Work Packages
<u>Howard P. Hardt:</u> Enrollments in post-high school programs in Oklahoma 1. Enumerate graduates from engineering technology since 1960 2. Collect mailing lists for these graduates to implement further study 3. Identify the principle employers of these graduates	Review of Literature (pre-interview information)	Review of Literature (includes college catalogs)
		Enrollment data (1960-present)
	Personal interview schedule and observations (pre-test)	Range or programs
		Level of Federal support
		Number of graduates (1966-present)
		Analysis and findings
		Final report



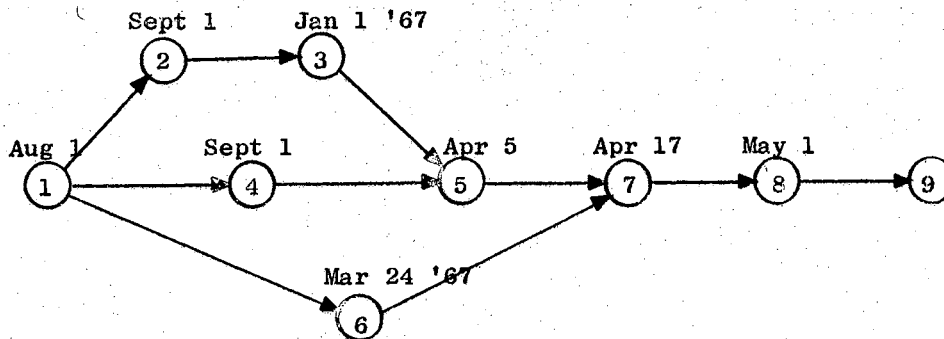
1. Project started
2. Literature Reviewed
3. Interview schedule constructed
4. Pilot study completed and changes made
5. Field interviewing completed
6. Analysis and findings completed
7. Final report

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<p><u>James Harris:</u></p> <p>A follow-up study of high school technical programs in Oklahoma City.</p> <p>1. To determine what students actually continue in post-high school technical-vocational programs.</p> <p>2. What rationale do pre-tech students who do not continue technical training give for their participation in pre-technical programs.</p>	Review of Literature	Review of Literature
	Background information questionnaire	Construct questionnaire
	Follow-up questionnaire	Analysis
		Construct questionnaire
		Analysis and findings
Final report		



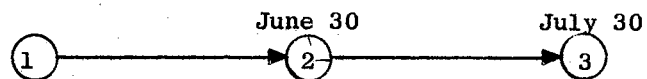
1. Review of literature
2. Construct background instrument
3. Administer background instrument
4. Compilation of background data
5. Construct follow-up questionnaire
6. Administer follow-up questionnaire
7. Analysis and findings
8. Final report

LEVEL 1	LEVEL 2	LEVEL 3
Title & Objectives of Sub-Studies	Methodology and Instrumentation	Work Packages
<u>David Longobardi:</u> Historical development of the electronic technology curriculum at the Technical Institute, O.S.U. 1. When it developed 2. Methods used 3. Problems Encountered 4. Evaluation of program 5. Findings and recommendations	Review of Literature	Review of Literature
	Questionnaire(s)	Develop questionnaire
		Pre-test
		Administer questionnaire
		Analysis and recommendations
	Final report	



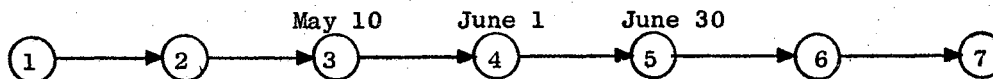
1. Project started. Began review of literature
2. Interview schedule constructed
3. Pilot study completed and corrections made
4. Define population
5. Interviews completed
6. Ch I & II rough draft completed
7. Rough draft completed
8. Final report
9. Study now available

LEVEL 1	LEVEL 2	LEVEL 3
Title & Objectives of Sub-Studies	Methodology and Instrumentation	Work Packages
<u>Marsena M. Norris:</u> Selected behavioral changes of students attending the Southern Oklahoma area vocational- technical center during 1966-67	Questionnaire	Analysis and findings Final report



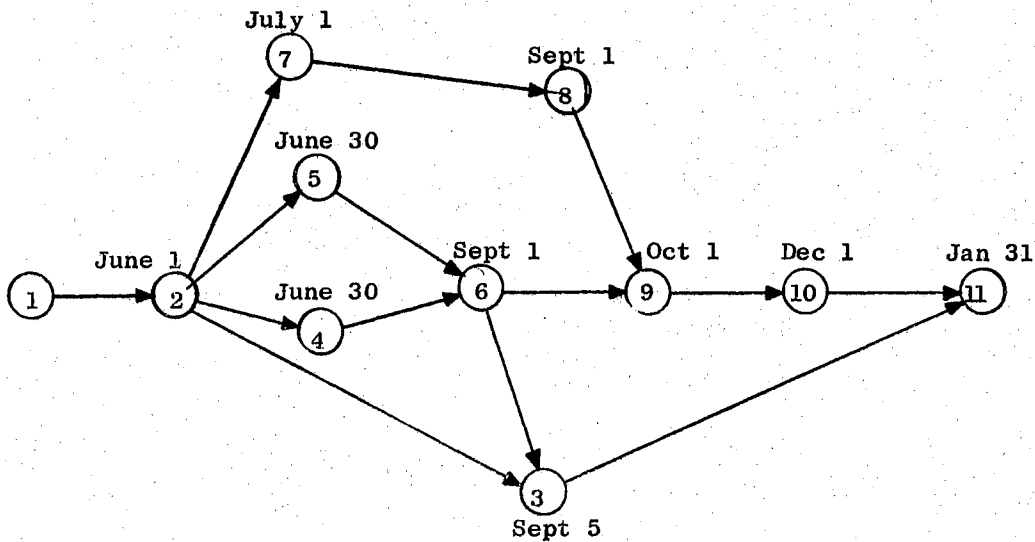
1. Previous doctoral work
2. Analysis and findings completed
3. Final report

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<u>John Noyes:</u> Geographic regions served by post-high school technical-vocational institutions in Oklahoma 1. To determine areas served by present institutions 2. To determine student mobility patterns.	Review of Literature	Review of Literature
	Personal interview schedule	Construction of interview schedule
		Field interviewing
		Analysis and findings
		Final report



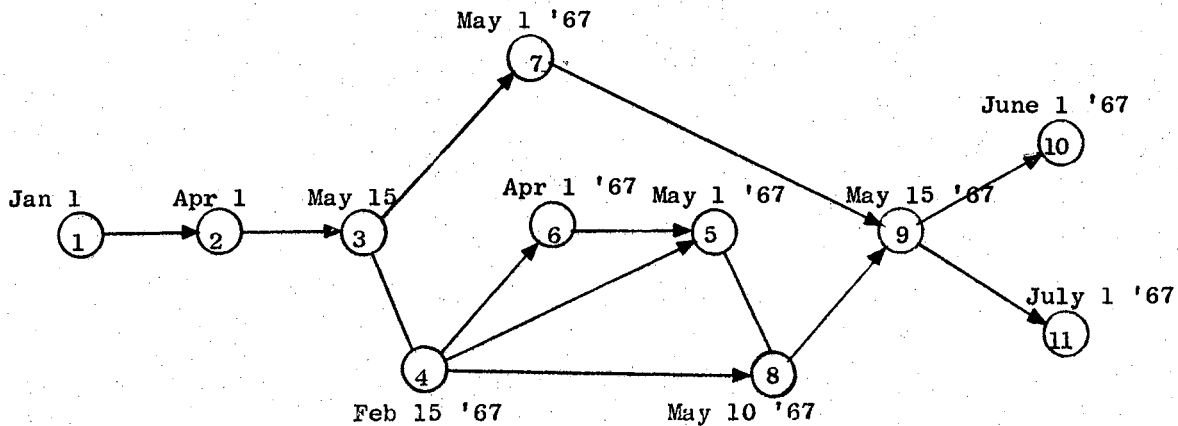
1. Project started
2. Literature reviewed
3. Interview schedule constructed
4. Pilot study completed and changes made
5. Field interviewing completed
6. Analysis completed and findings completed
7. Final report

LEVEL 1	LEVEL 2	LEVEL 3
Title & Objectives of Sub-Studies	Methodology and Instrumentation	Work Packages
<u>D. S. Phillips:</u> An investigation of scholastic aptitude, social class background, and vocational interests of post-high school technician education students	Review of Literature	Review of Literature
	Standardized tests	Test selection
		Administer tests
		Analysis and findings
		Final report



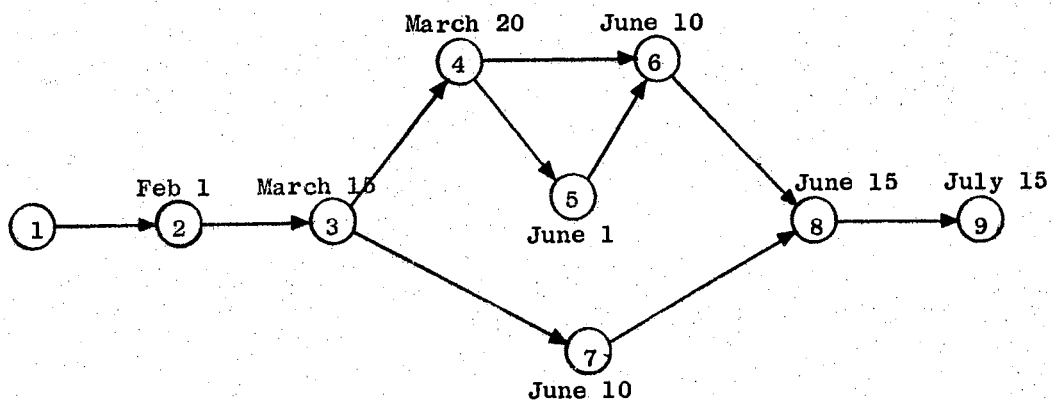
1. Previous research
2. Begin (Review of Lit, Test Selection, Determining Procedure, and Ch I and Ch II)
3. Ch I and II completed
4. Procedure determined
5. Test selected
6. Population defined
7. Personal data sheet constructed
8. Pilot study complete and corrections made
9. Instruments administered
10. Analysis and findings completed
11. Final report

LEVEL 1	LEVEL 2	LEVEL 3
Title & Objectives of Sub-Studies	Methodology and Instrumentation	Work packages
Research Coordinating Unit and State Vocational Dept:		
Vocational plans of Oklahoma high school graduates	Mail questionnaire (To all 1966-67 seniors in Oklahoma high schools)	Follow-up letters
		Writing computer program
		Computer analysis and findings



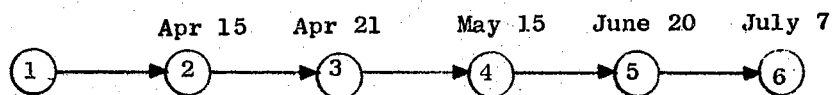
1. Began questionnaire
2. Questionnaire developed
3. Answer sheet constructed
4. Administered
5. Questionnaire returned
6. Follow-up letters sent out
7. Computer program written
8. Cards punched
9. Computer analysis
10. Preliminary report
11. Detailed analysis and report

LEVEL 1	LEVEL 2	LEVEL 3
Title & Objectives of Sub-Studies	Methodology and Instrumentation	Work packages
Research Coordinating Unit and State Vocational Dept: A follow-up of federally supported vocational-technical graduates and drop-outs in Oklahoma	Mail questionnaire (To instructors with vocational enrollees since 1963-present)	Follow-up letters Location of students Computer analysis and findings Final report



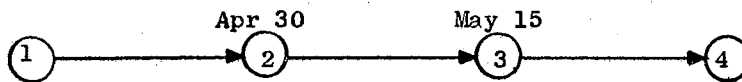
1. Start project
2. Questionnaire developed
3. Answer sheet developed
4. To the teachers
5. Returned
6. Card punching completed
7. Computer program written
8. Computer analysis
9. Final report

LEVEL 1	LEVEL 2	LEVEL 3
Title & Objectives of Sub-Studies	Methodology and Instrumentation	Work Packages
<u>Thomas Alan Taylor:</u> A survey of Industrial Arts Programs in Oklahoma Junior Colleges during 1966-67	Review of Literature	Review of Literature
	Mail questionnaire	Construct questionnaire
		Analysis and findings
		Final report



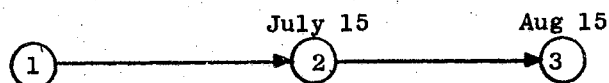
1. Project started
2. Review of literature
3. Construct mail questionnaire and administer
4. Follow-up letter
5. Analysis and findings
6. Final report written

LEVEL 1	LEVEL 2	LEVEL 3
Title & Objectives of Sub-Studies	Methodology and Instrumentation	Work Packages
<u>S. E. Tuxhorn:</u> The educational unit for organization, administration and supervision of area vocational-technical schools in Oklahoma	Mail Questionnaire	Analysis and recommendations
		Final report



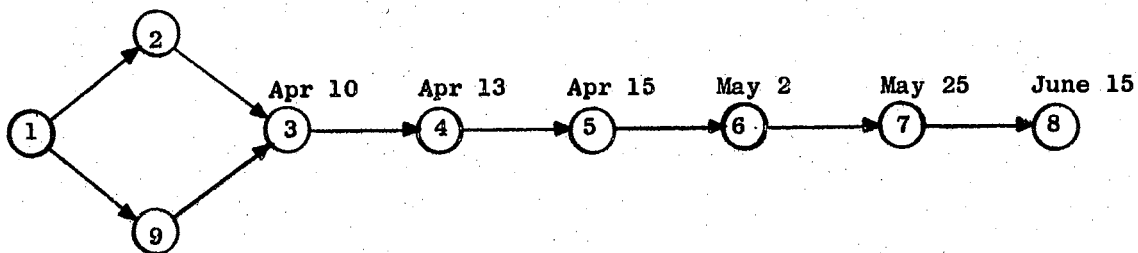
1. Previous doctoral work
2. Analysis and recommendations completed
3. Final report
4. Study now available

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<p><u>Gordon E. VonStroh:</u> (Econ Doctoral candidate at OU)</p> <p>An economic study of vocational-technical education</p> <p>1. Economic analysis of Oklahoma State Tech at Okmulgee</p> <p>2. Analysis of personal social, and economic characterics of the August 12, 1966 graduates at Okmulgee</p> <p>3. Analysis of selected characteristics of third semester 1966 dropouts at Okmulgee</p>	Questionnaire (before graduation)	<p><u>Questionnaire completed</u></p> <p><u>Analysis of questionnaire</u></p>
	Questionnaire (six months after graduation)	<p><u>Questionnaire completed</u></p> <p><u>Analysis and findings</u></p> <p>Final report</p>



1. Previous work
2. Analysis and findings
3. Final report

LEVEL 1 Title & Objectives of Sub-Studies	LEVEL 2 Methodology and Instrumentation	LEVEL 3 Work Packages
<u>Marvin A. Whittrock:</u> The role perceptions of technical teachers toward technical teacher certification in Oklahoma 1. To derive criteria for certification 2. Determine number of technical teachers 3. Determine present certification criteria	Review of Literature	Review of Literature
		Construct questionnaire
		Pre-test questionnaire
		Define population
		Send out questionnaire
		Analysis and recommendations
		Final report



1. Begin (review Lit, Questionnaire construction, define population)
2. Population defined
3. Questionnaire constructed
4. Pilot study and revisions complete
5. Questionnaire sent out
6. Follow-up letters
7. Data in
8. Summary, analysis, and final report
9. Proposal completed

APPENDIX B

Questionnaire Administered to Personnel
Associated with the Statewide Study

Industrial Education
&
Manpower Research Center
Oklahoma State University
July 14, 1967

A study of post-high school vocational-technical education in Oklahoma was initiated by the Research Foundation and the Manpower Research and Training Center in early March, 1967, referred to hereafter as the "Statewide Study." The primary objective of the "Statewide Study" is to evaluate post-high school vocational-technical education in Oklahoma. Since your activities (research, administration, etc.) were related to this study, mention of these activities may have been included in one or more of three monthly reports which were sent to interested parties during March, April, and May, 1967. Would you please react to the following questions which are applicable to you:

Name _____

Title _____

Position _____

Address _____

- (1) How are you associated with the "Statewide Study" mentioned above?

(Check all that apply.) (a) _____ Writing Master's Thesis; (b) _____ Writing
Doctoral Dissertation; (c) _____ Staff Researcher on "Statewide Study";
(d) _____ Researcher or Administrator of Research Agency; (e) _____ Other

Describe _____

- (2) If your study was listed in Report 1, 2, or 3, what was your first
reaction to this listing? _____ Favorable _____ Neutral _____ Unfavorable

Explain _____

- (3) How did the PERT Scheduling of your research affect your project in over-
all terms? _____ Favorable _____ Neutral _____ Unfavorable

Explain _____

- (4) Did you contact any other researchers concerning your research project based on information you obtained in monthly reports 1, 2, or 3?
 Yes No Explain _____

- (5) Do you feel that the PERT Report of the "Statewide Study" gave your project any additional significance? Yes No Explain _____

- (6) Did you gain a feeling of belonging to a bigger project by virtue of monthly reports 1, 2, or 3? Yes No Explain _____

- (7) What is your reaction to the PERT Scheduling of individual research projects that accompany the overall charts found in monthly reports 2 and 3? Favorable Neutral Unfavorable Explain _____

- (8) What is your overall reaction to the monthly reports in PERT form?
 Favorable Neutral Unfavorable Explain _____

- (9) Would you recommend that PERT Scheduling listed in report form be used in similar studies? Yes No Explain _____

- (10) Have you used the "PERT Concept" in any other research work since monthly reports 1, 2, or 3 were published? Yes No Explain _____

- (11) Were you familiar with the "PERT Concept" before you became aware of its utilization in the "Statewide Study"? Never heard of it
 Heard about Familiar with it Used it

(12) What is your reaction to interdisciplinary manpower research?

_____ Favorable _____ Neutral _____ Unfavorable Explain _____

(13) As a result of your affiliation with the "Statewide Study":

(a) How many individual researchers have you worked with in gathering data? From your academic field at OSU _____ From other academic field at OSU _____ Other _____
(Number) (Number)

(b) How many individual researchers have given you valuable data or information? From your academic field at OSU _____ From other academic fields at OSU _____ Other _____
(Number) (Number)

(c) How many individual researchers have you given valuable information or data? From your academic field at OSU _____ From other academic fields at OSU _____ Other _____
(Number) (Number)

(d) In what other ways have studies affiliated with the "Statewide Study" been of assistance to you? Explain _____

(14) If you worked in any way with another researcher affiliated with the "Statewide Study" was it a result of:

(a) Monthly Report No. 1, 2, 3 _____

(b) Advice from Major Adviser _____

(c) Suggestion from Research Agency Administrator _____ Please specify _____

(d) Other _____ Please specify _____

VITA

David Allen Anderson

Candidate for the Degree of

Master of Science

Thesis: THE ADAPTATION OF PERT FOR COORDINATING INTERDISCIPLINARY
MANPOWER RESEARCH IN A UNIVERSITY SETTING--A DESCRIPTIVE
STUDY

Major Field: Technical Education

Biographical:

Personal Data: Born at Perkins, Oklahoma, June 23, 1933, the son
of Keith A. and Opel I. Anderson.

Education: Graduated from Waynoka High School in 1951; received
Associate degree in Electronics Technology from Oklahoma
State University in 1953; attended North Carolina State
College Extension, 1962-64; attended University of Houston,
summer 1964; attended University of Illinois, summer 1965;
received the Bachelor of Science degree from Oklahoma State
University with a major in Technical Education in May, 1967.

Professional experience: Electronic Systems Tester, Western
Electric Company, Burlington, N. C., 1953-55; Electronics
Instructor, United States Air Force, Denver, Colorado, 1955-
59; Electronic Systems Tester, Western Electric Company,
Burlington, N. C., 1959-61; Electronics Instructor, Technical
Institute of Alamance, Burlington, N. C., 1961-65.