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ABSTRACT

This study was conducted to test the effectiveness of proceduralized job guides in enabling placement of work experience students in allied health work stations requiring the performance of complex tasks. Phases of the study included: (1) establishment of work stations, which involved the identification of potential work station sponsors in San Joaquin County, the analysis of 960 job operations, and selection of participating sponsors, (2) development of proceduralized job guides, which required extensive analysis of specific job tasks required at each selected work station, and (3) experimentation, which involved a controlled experiment to compare job performance at selected work stations by an experimental group of 11 Grade 11 and 12 students who used proceduralized job guides and by a central group of 10 students who did not use proceduralized job guides. Findings of the study supported three conclusions that the use of a proceduralized job guide approach would: (1) increase the number and type of challenging job positions available to relatively unskilled students, (2) enable a broader spectrum of relatively unskilled students to participate in work experience programs, and (3) modify the employer's perception that relatively unskilled students cannot meet the requirements for selected job positions. Several recommendations are included. (SB)

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FINAL REPORT OF

AN EXPERIMENTAL RESEARCH PROJECT TO TEST A MORE EFFECTIVE MEANS TO ACHIEVE STATED WORK EXPERIENCE EDUCATION PROGRAM GOALS

1971 - 1972

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ABSTRACT

The present study reported here was designed to test the effectiveness of one approach to meeting the goals of Work Experience Education. That approach was the use of proceduralized job guides. The objectives of the present study were as follows:

- To determine the effectiveness of a selected approach, the use of proceduralized job guides, in fostering achievement of the stated goals of Work Experience Education
- To make possible the placement of secondary Work Experience Education program students into a wider variety of challenging job situations (including post-entry level) as part of the general and vocational phases of the program
- To enable a broader spectrum of students (specifically the disadvantaged and the handicapped) to participate in the achievement of the stated goals of Work Experience Education
- To increase the number and kinds of work stations which are available to implement the stated goals of Work Experience Education
- To gain fuller community and industry support for vocational education and to foster recognition that vocational education planners are spearheading the development of innovative programs which will effectively respond to critical and rapidly changing state and national requirements for a skilled work force.

The study was delimited to consideration of allied health occupations available within San Joaquin County, California.

Findings of the test supported four conclusions:

1. The use of a proceduralized job guide approach will increase the number and type of challenging job positions available to relatively unskilled students

2. The use of a proceduralized job guide approach will enable a broader spectrum of relatively unskilled students to participate in Work Experience Education programs

3. The use of a proceduralized job guide approach will modify the employer's perception that relatively unskilled students cannot meet the requirements for selected job positions

4. The proceduralized job guide approach is a particularly well suited means to improve the effectiveness of exploratory Work Experience Education programs.

ACKNOWLEDGEMENTS

This applied research study has been made possible as the result of the dedicated efforts of many people in the San Joaquin County Superintendent of Schools Office; the several secondary school districts within San Joaquin County; participating hospitals, dental offices, and other medical facilities within San Joaquin County; and the State of California Department of Education, Vocational Education Section.

Dr. Gaylord A. Nelson, San Joaquin County Superintendent, has actively encouraged and supported this program in all of its phases. Dr. John Bahnsen, Mr. William Todd, and Mr. Peter Ottesen, of the County Schools Office, have provided for effective program management, coordination, and publicity. Dr. James H. Crandall, California Research Coordinating Unit, played a key role in providing encouragement and direction during this project.

Special thanks are due to the five Work Experience Coordinators who gave freely of their time to actively coordinate and implement many project tasks. Without the able assistance of these Coordinators—Jim DeLoach, Masih Shafgat, John Torchia, Ed Vermeulen, and Frank Wulftange—the project could not have been completed.

Special acknowledgement is due also to the four hospitals and two dental clinics which sponsored the employment of students during this study and the twelve work supervisors who worked with and evaluated these students.

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

LIST OF TABLES

LIST OF TABLES
(Continued)

1.0 INTRODUCTION TO THE PROBLEM AREA

California's public vocational education programs are intended to make it possible for any young person to prepare for entry into the world of work. To make this entry successfully, a student must emerge from his education adequately trained in the skills of his chosen job. In addition, the student must be prepared to cope with the responsibilities of adult society.

To provide students with this comprehensive preparation, vocational educators use several approaches. One of the most promising and popular of these approaches is Work Experience Education, which combines a student's regular classroom and laboratory activities with actual on-the-job experience. A preliminary statement of Work Experience Education goals has been developed by the Special Committee on Work Experience Education. These goals state that:

> Students enrolled in Work Experience Education programs will:
>
> 1. Recognize that the process and content of the school's curriculum is relevant to career requirements and responsibilities (Relevancy)
> 2. Appreciate the importance of work to personal fulfillment and growing independence and maturity (Self-Development)
> 3. Analyze career opportunities and their requirements and compare these to personal potential and expectations (Self-Evaluation)
> 4. Identify with, and participate in, adult roles and responsibilities in the world of work (Acculturation)
> 5. Relate in a positive manner to Work Experience Education sponsors, employers and their employees, and the public served (Human Relations).[1]

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[1] California State Department of Education, Vocational Education Section, Goals, Program Objectives, Performance Objectives and Evaluation Criteria for Students Enrolled in California State Programs of Work Experience Education - A Preliminary Workbook (Sacramento: California State Department of Education, 1970).

Work Experience Education programs involve local hiring sources as well as the school. In these programs, local employers "sponsor" the use of their facilities to provide an opportunity for students to obtain work experience. In this sense, it can be said that to conduct a successful Work Experience Education program, it if first necessary to achieve a cooperative integration of the school and the employer components of the community.

However, there are forces at work which oppose this needed integration of the school and the employers of the community, potentially limiting the effectiveness of the Work Experience Education program approach which is dependent upon that integration for its success. These forces arise due to unique characteristics existing within each component, and they pose problems in the context of this required integration.

In tracing the background of these forces and the problems they cause, it must first be noted that, in order to achieve the objectives of a Work Experience Education program, it is necessary to expose students to meaningful, realistic job demands. Realistic job demands serve to engage the student in complex patterns of interaction with himself, the school, the employer, the public, and his peer group. This necessary exposure can be obtained in a work environment which has normal job demands which require a certain degree of skill proficiency. However, a hindering force, the student's lack of skill, often causes these normal job demands to be unavailable to the student. The Work Experience Education sponsor typically does not perceive that his organization's best interest is served by allocating job responsibilities requiring high skill levels to the student. The resolution most often adopted in this situation is to restructure the job activity to which the student is assigned, i. e. the work station, culling out demanding job tasks, often to the point of entirely eliminating the sought-for job realism.

The resulting "contrived" work stations actually give those students involved a distorted and disillusioning view of the world-of work, often rendering Work Experience Education programs counter-productive for these students. In addition to the above problem, the

traditional barriers which limit the regular employment opportunities of disadvantaged persons and of (to a lesser extent) handicapped persons also exist as hindering forces in Work Experience Education programs. Work Experience Education candidates are subject to "interview" and employer/personnel approval processes which involve traditional biases and constraints. These problems notwithstanding, the predominant constraint to achieving vocational education objectives through Work Experience Education programs is the admitted, though understandable and unavoidable, lack of experience on the part of students.

1.1 OBJECTIVES

The San Joaquin County Superintendent of Schools Office recently implemented a five-year county-wide plan for vocational education.[2] This plan was developed in accordance with instructions for preparing a district plan for vocational education, under guidelines issued by the State Department, in compliance with state planning mandates of the Vocational Education Act of 1968 (P.L. 90-576).

The study addressed in this report was commissioned as part of the County's five-year plan, and was designed to test the effectiveness of one approach to meeting the goals of Work Experience Education. That approach was the use of proceduralized job guides to foster achievement of the stated goals of Work Experience Education. The objectives of the present study were as follows:

- To determine the effectiveness of a selected approach, the use of proceduralized job guides, in fostering achievement of the stated goals of Work Experience Education
- To make possible the placement of secondary Work Experience Education program students into a wider variety of challenging job situations (including post-entry level) as part of the general and vocational phases of the program

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[2] San Joaquin County Schools Office, Vocational Education Through Planned Progress (Stockton, California: San Joaquin County Schools Office, 1970)

- To enable a broader spectrum of students (specifically the disadvantaged and the handicapped[3]) to participate in the achievement of the stated goals of Work Experience Education
- To increase the number and kinds of work stations which are available to implement the stated goals of Work Experience Education
- To gain fuller community and industry support for vocational education and to foster recognition that vocational education planners are spearheading the development of innovative programs which will effectively respond to critical and rapidly changing state and national requirements for a skilled work force.

1.2 HYPOTHESES

The present study was based on the reasoning that, with respect to selected occupations, "barriers" exist to providing a placement opportunity for students. The existence of these barriers traces to the fact that there are job performance requirements which cannot be met by an inexperienced student. The types of requirements most limiting in this regard concern need for the worker to accomplish tasks which require the mastery and retention of complex, sequential procedures. Since such skills are normally acquired through experience and since the Work Experience Education student is typically occupationally inexperienced, these job performance requirements pose entry level barriers with respect to that job. Approaches have been designed to circumvent these entry level barriers. Two basic approaches were considered: (1) restructuring jobs to eliminate the demanding tasks, or (2) circumventing the entry level barriers as they are encountered in selected tasks, by some means other than changing the character or nature of the jobs.

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[3] As defined by the Vocational Education Amendments of 1968. These definitions were presented in Appendix A.

The first approach was rejected as not responding to the need for providing realistic world-of-work experience (as discussed in Section 1.0). The second approach was accepted due to the extensive amount of technology which could be applied to reducing job requirements for complex procedure comprehension and retention. The use of proceduralized job guides has been among the most promising of these techniques.

Specifically, then, the study was designed to test the following hypotheses:

Hypothesis One: The use of proceduralized job guides will increase the number and type of challenging job positions available to relatively unskilled students.

Hypothesis Two: The use of proceduralized job guides will enable a broader spectrum of relatively unskilled students to participate in Work Experience Education programs.

Hypothesis Three: The use of proceduralized job guides will modify the employer's perception that relatively unskilled students cannot meet the requirements for selected job positions.

Hypothesis Four: The use of proceduralized job guides will enable relatively unskilled students to perform given operations in less time and with lower error rate than students not using proceduralized job guides.

Hypothesis Five: Relatively unskilled students using proceduralized job guides will require less training and supervision, for a given level of competency, than students not using proceduralized job guides.

1.3 DELIMITATIONS

The scope of the present study was delimited to a single geographic area, San Joaquin County, California.

The present study was further delimited to one occupational area, the allied health occupations. In recent years, increased demands for services and technological advances created a large number of career opportunities and increased the demand for trained manpower in allied health services. On the other hand, within the region studied,

there was a shortage of trained personnel to fill job vacancies in these occupations. In spite of this situation, the Work Experience Education programs of San Joaquin County Schools had not succeeded in establishing Work Experience Education programs in the allied health occupations. Because of minimal student placement in this field and because this field offered a wide range of job types, the allied health occupations were identified as the target job area for this study.

The delimitation to the allied health field was also useful in that these occupations involved a variety of skill requirements for which preparation was offered in many vocational education programs, such as food service, clerical, automotive, and technical health-related programs. In addition, the skills and capabilities required for these occupations were not untypical, in terms of complexity, of those required in a great many career areas. Therefore, the study results could be generalized to apply to Work Experience Education programs outside the allied health field.

In summary, the study was designed to test the effectiveness of one technique, the use of proceduralized job guides, to enable placement of Work Experience Education students into work stations requiring the performance of complex tasks. The study was limited to a consideration of the allied health occupations field in the County of San Joaquin, California.

1.4 ASSUMPTIONS

The following assumptions served to impact the procedures which were adopted in implementing the field test:

- That periodic on-site observations would yield the full body of data required for the study
- That work supervisors and Work Experience Coordinators could serve as data collectors
- That standardized tests used in selecting student subjects were valid
- That no radical changes in technology would occur, during the life of the test, for operations which were selected for proceduralization.

- That supervisory policies and practices would remain standard during the life of the test
- That no job selected for the test would be phased out during the test period

These assumptions remained valid throughout the life of this study.

1.5 SCOPE OF THE STUDY

The study's implementation included three phases:

Phase One: Establishment of Work Stations - This phase included the identification of potential work station sponsors in San Joaquin County, the analysis of 960 job operations, and the selection of participating sponsors.

Phase Two: Development of Proceduralized Job Guides - This phase involved producing proceduralized job guides to be used in the study. These proceduralized job guides were designed to enable the unskilled students to perform complex job operations. The development of these proceduralized job guides required extensive analysis of the specific job tasks required at each selected work station. This phase also included the validation of the proceduralized job guides by persons experienced in the current job procedures.

Phase Three: Experiment - The third phase of the study measured the effect of the use of proceduralized job guides by Work Experience Education students on the job. This phase involved a controlled experiment to compare job performance at selected work stations by an experimental group of students who used proceduralized job guides, and by a control group of students who did not use proceduralized job guides.

1.6 DEFINITIONS

Terms common to the project and to this report are defined below.

1. Department - A major division in the hospital
   Example: Radiology, Physical Therapy, Central Supply
2. Entry level barrier - A factor restricting or inhibiting the hiring of someone into a job which is typically the starting point for workers in an occupation

Example: Laboratory Technician is the entry level job for some laboratory occupations; the requirement of certification may constitute an entry level barrier for one who is not certified.

3. Instrument - A measuring device for determining the present value of a quantity under investigation

Example: A questionnaire is an instrument used for determining opinions under investigation.

4. Job - A specific duty, role or function; a regular remunerative position

Example: Darkroom Aide

5. Operation - A primary function of the job. A duty. A broad activity which includes many simpler activities (tasks)

Example: Process undeveloped x-ray film.

6. Proceduralized - Organized to contain a series of steps followed in a regular definite order

Example: A recipe; directions for assembling a child's bicycle

7. Subject - An individual whose reactions or responses are studied

Example: Experimental student

8. Task - A simple activity which, when accomplished in sequence with other related simple activities, completes an identifiable unit of work (operation)

Example: Unload cassettes.

9. Task Analysis - A method of "decomposing" or "tearing down" a complex activity (a job or one of its operations) to permit close examination of many parts

Example: Job Operation - Prepare bacteriological media

Task 1 - Pull appropriate media from storage.

Task 2 - Remove cover from Mettler Balance. Turn switch to ON.

Task 3 - Place paper (plastic cup) on Balance.

Task 4 - Rotate adjustment knob until arrow over the scale aligns with "0" on the scale.

10. Work Station - A term used in Work Experience Education to designate the work situation where a student receives his work experience; may also designate the job, or portion of the job, which the student performs while at work

Example: Darkroom Aide

1.7 ORGANIZATION OF THE REPORT

This report was divided into two major parts: the Body and the Appendices. The Body was prepared in four sections The first section was written to introduce the background and the purpose of the study. The second section was written to describe the methodology used in the investigation. The third section was prepared to disseminate the findings of the study, and the fourth to summarize the study, to draw conclusions, and to make recommendations for further study. The Appendices were included as supplementary information to provide clarification and increased detail for the reader who wished to have a degree of technical understanding that the Body of the report did not provide.

2.0 METHODOLOGY

In order to enable the placement of Work Experience Education program students into more challenging work situations, to enable a broader spectrum of students to participate in Work Experience Education, and to enlist the support of the community and its industry for Work Experience Education, the present study investigated the impact of the use of proceduralized job guides in a Work Experience Education program.

To complete the investigation, the following data were required:

1. Documentation of the impact of the use of a proceduralized job guide approach on establishing work stations in allied health occupations
2. Results of extensive analysis of selected job operations from a variety of allied health occupations
3. Results of a controlled experiment comparing the work performance of an experimental group of subjects using proceduralized job guides and a control group of subjects not using proceduralized job guides.

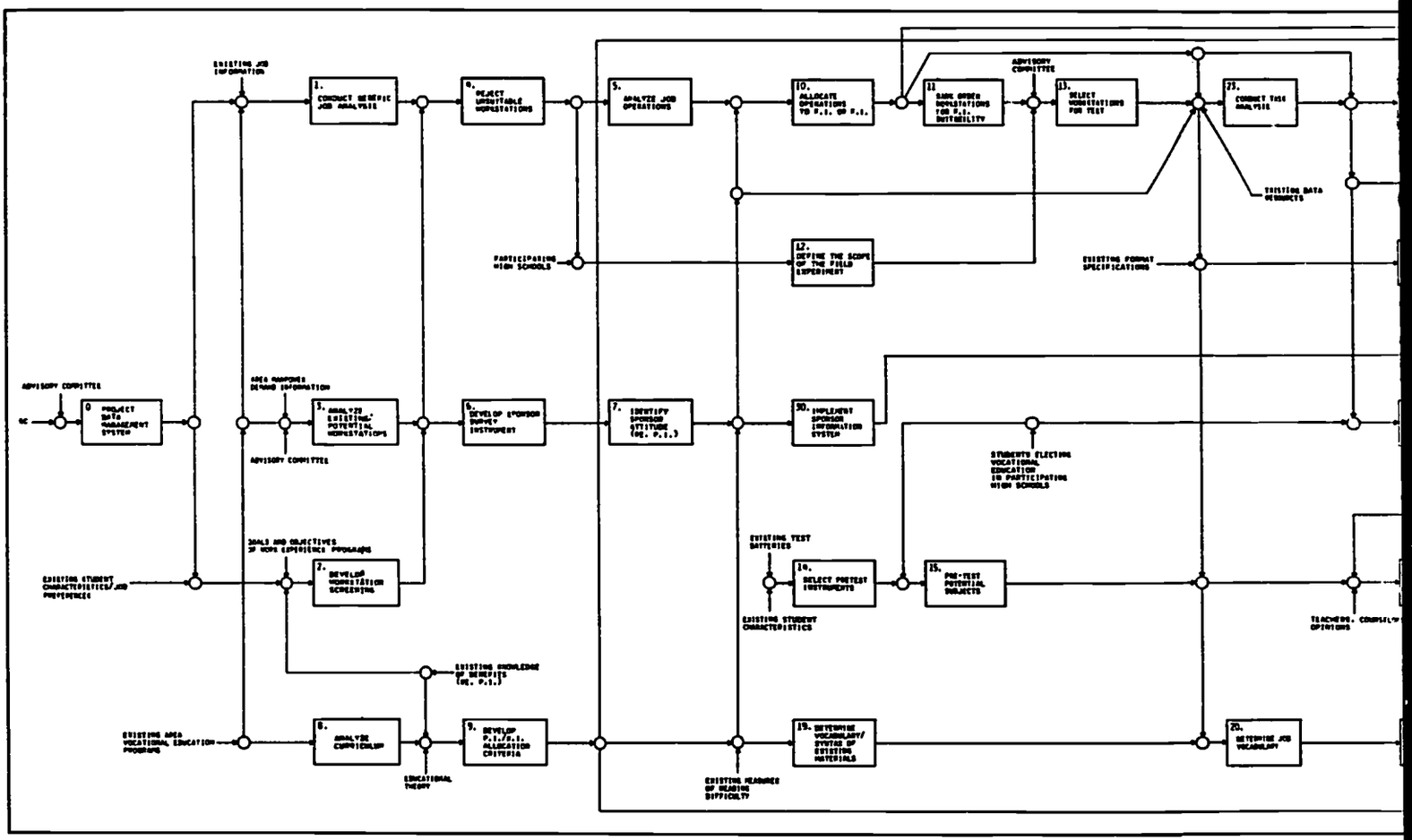
The procedures designed to meet these data requirements were extensive. A Function Flow Logic Diagram, presenting these procedures in graphic form, was included on the following page. The diagram format was selected to give visibility to the sequential nature of the specific procedures and to evidence their interdependence.

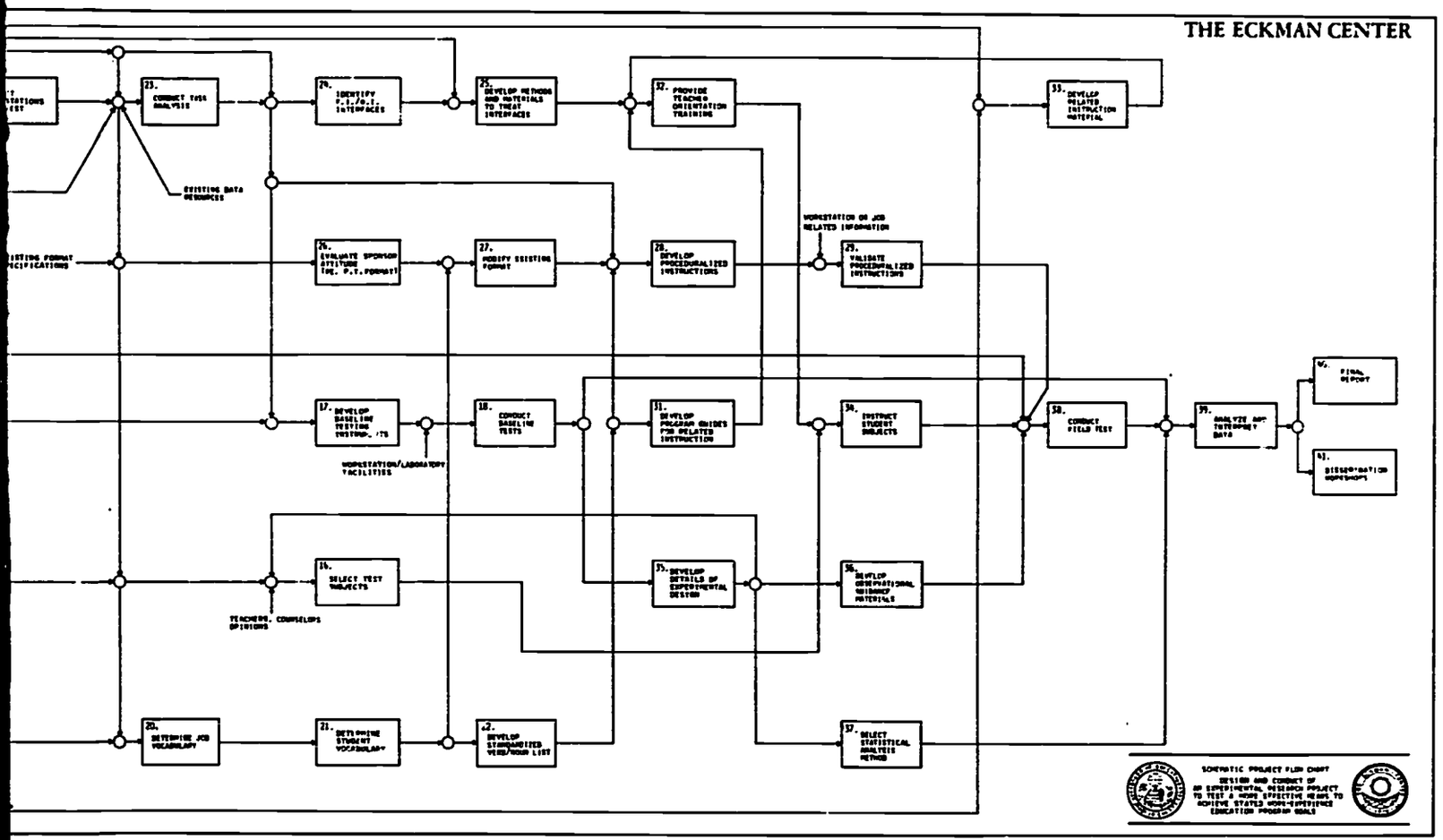
The procedures for implementing each of three study phases differed, and for ease of reporting, the phases have been reported separately in the following sections.

2.1 PROCEDURES, PHASE ONE: ESTABLISHMENT OF WORK STATIONS

The following activities were undertaken in Phase I of the study:

1. Establish Advisory Committee
2. Determine attitudes of potential sponsors of work stations


EXISTING JOB INFORMATION
1. CONDUCT GENERIC JOB ANALYSIS
6. REJECT UNSUITABLE WORKSTATIONS
5. ANALYZE JOB OPERATIONS
10. ALLOCATE OPERATIONS TO P.E. OR P.E.
11 RANK ORDER MANIPULATIONS FOR P.E. DIFFICULTY
ADVISORY COMMITTEE
13. SELECT WORKSTATIONS FOR TEST
23. CONDUCT TIME ANALYSIS
TESTING DATA REQUESTS
PARTICIPATING HIGH SCHOOLS
12. DEFINE THE SCOPE OF THE FIELD EXPERIMENT
EXISTING FORMAT SPECIFICATIONS
ADVISORY COMMITTEE
QC
0 PROJECT DATA MANAGEMENT SYSTEM
AREA MANPOWER DEMAND INFORMATION
3. ANALYZE EXISTING POTENTIAL WORKSTATIONS
ADVISORY COMMITTEE
4. DEVELOP SPONSOR SURVEY INSTRUMENT
7. IDENTIFY SPONSOR ATTITUDE (EG. P.E.)
30. IMPLEMENT SPONSOR INFORMATION SYSTEM
STUDENTS ELECTING VOCATIONAL EDUCATION IN PARTICIPATING HIGH SCHOOLS
GOALS AND OBJECTIVES OF WORK EXPERIENCE PROGRAMS
EXISTING STUDENT CHARACTERISTICS/JOB PREFERENCES
2. DEVELOP ORIENTATION SCREENING
EXISTING TEST BATTERIES
16. SELECT PRETEST INSTRUMENTS
15. PRE-TEST POTENTIAL SUBJECTS
EXISTING STUDENT CHARACTERISTICS
TEACHERS, COUNSELORS OPINIONS
EXISTING KNOWLEDGE OF BENEFITS (EG. P.E.)
EXISTING AREA VOCATIONAL EDUCATION PROGRAMS
8. ANALYZE CURRICULUM
9. DEVELOP P.E./P.E. ALLOCATION CRITERIA
EDUCATIONAL THEORY
EXISTING MEASURES OF READING DIFFICULTY
19. DETERMINE VOCABULARY/SYNTAX OF EXISTING MATERIALS
20. DETERMINE JOB VOCABULARY


THE ECKMAN CENTER
23. CONDUCT TASK ANALYSIS
24. IDENTIFY V.I./O.I. INTERFACES
25. DEVELOP METHODS AND MATERIALS TO TREAT INTERFACES
32. PROVIDE TEACHER ORIENTATION TRAINING
33. DEVELOP RELATED INSTRUCTION MATERIAL
EXISTING DATA RESOURCES
26. EVALUATE SPONSOR ATTITUDE (RE: P.T. FORMAT)
27. MODIFY EXISTING FORMAT
28. DEVELOP PROCEDURALIZED INSTRUCTIONS
WORKSTATION OR JOB RELATED INFORMATION
29. VALIDATE PROCEDURALIZED INSTRUCTIONS
17. DEVELOP BASELINE TESTING INSTRUM. /TS
18. CONDUCT BASELINE TESTS
31. DEVELOP PROGRAM GUIDES FOR RELATED INSTRUCTION
34. INSTRUCT STUDENT SUBJECTS
58. CONDUCT FIELD TEST
59. ANALYZE POST TREATMENT DATA
60. FINAL REPORT
61. DISSEMINATION WORKSHOPS
WORKSTATION/LABORATORY FACILITIES
16. SELECT TEST SUBJECTS
35. DEVELOP DETAILS OF EXPERIMENTAL DESIGN
36. DEVELOP OBSERVATIONAL INSTRUMENT MATERIALS
TEACHERS, COMPANIONS OPINIONS
20. DETERMINE JOB VOCABULARY
21. DETERMINE STUDENT VOCABULARY
42. DEVELOP STANDARDIZED WORD/PHRASE LIST
37. SELECT STATISTICAL ANALYSIS METHOD
SCHEMATIC PROJECT FLOW CHART
DESIGN AND CONDUCT OF AN EXPERIMENTAL RESEARCH PROJECT TO TEST A MORE EFFECTIVE MEANS TO ACHIEVE STATED WORK-COMPETENCE EDUCATION PROGRAM GOALS

3. Conduct analysis to determine suitability of job operations for proceduralized job guides

4. Conduct preliminary selection of sponsors of work stations.

These procedures corresponded or were related to Functions 3, 7 and 13 on the Function Flow Logic Diagram.

2.1.1 ESTABLISH ADVISORY COMMITTEE

An Advisory Committee was established to assist in the planning, development and conduct of the study. The purpose of the Advisory Committee was also to review the progress of the study and to provide guidance regarding technical considerations and project activity coordination. Members of this committee included personnel from the Office of the Superintendent of San Joaquin County Schools, local district Work Experience Coordinators, of the San Joaquin County Schools, The California State Department of Education, and The Eckman Center, the firm retained to conduct this study. A roster of the members of the Advisory Committee was included in Appendix B.

2.1.2 DETERMINE ATTITUDES OF POTENTIAL SPONSORS OF WORK STATIONS

Announcements of the study were mailed to public and private organizations who employed persons in the allied health occupations, to solicit their interest in sponsoring work stations for the study. A copy of the announcement was included in Appendix C. Employers were invited by the County Superintendent to attend orientation meetings, at which time the objectives of the study were presented, as well as the benefits the study results could provide. These meetings were held between July 13 and 15, 1971.

The employers who attended these orientation meetings had been previously identified as potential sponsors of work stations. The potential sponsors who attended the meetings were screened on the basis of the following criteria:

- Attitude toward Work Experience Education
  Attitude toward the conduct of research
- Attitude toward the use of modified approaches at the work station site

- Understanding of the need for sponsor cooperation in conducting research
- Understanding of benefits which could be derived from the study.

A copy of the instrument used in this screening was included in Appendix D.

The application of the above mentioned criteria provided the following assurances with respect to the group of work station sponsors subsequently (Section 2.1.4) selected as part of the study:

- Sponsors were thoroughly cognizant and supportive of the objectives of Work Experience Education programs
- Sponsors were willing to consider the use of modified approaches in the on-going work situation
- Sponsors were willing to consider introduction of inexperienced Work Experience Education students into the regular work force.
- Sponsors were willing to encourage middle management and first-line management to support the conduct of the study, thereby assisting successful implementation of the study at the work site.

2.1.3 CONDUCT ANALYSIS TO DETERMINE SUITABILITY OF JOB OPERATIONS FOR PROCEDURALIZED JOB GUIDES

Work stations in allied health occupations were analyzed to identify the specific operations performed there. This activity included the conduct of on-site observations of approximately 95 functional departments and 960 job operations at local employer sites, including hospitals and dental service sites. Each work station job operation was subjected to analysis to determine, on a preliminary basis, the extent to which it was suited to the use of proceduralized job guides. Suitability was assessed by means of on-site observations of work performance and interviews with employers, employees, and work supervisors. The following factors were weighted in ranking the suitability of job operations to proceduralization:

- Frequency with which the operation occurred at the work station

- Dependency of co-worker coordination on job performance success
- Extent to which task sequence required memorization for successful performance
- Extent to which job completion was independent of time constraints
- Extent to which operation was free of requirements for exceptional manual dexterity or motor skill for successful completion
- Extent to which successful task completion required work station mobility
- Extent to which task performance accuracy and reliability was more critical than quantity of output
- Extent to which job environment posed a constraint on the use of a proceduralized job guide.

Based upon these criteria, job operations which typically had the following characteristics in common were selected as appropriate to the use of proceduralized instruction:

- Offered a complex interaction (challenge) between worker and work situation
- Did not require employee to move significantly often from the work station to accomplish the job
- Did not require work completion on a time-constrained basis (relative to interfacing tasks on work stations)
- Job operation was performed frequently
- Successful job performance was not highly dependent upon co-worker collaboration
- Job tasks required a high level of procedural skill retention
- Job tasks did not require abnormal motor skill proficiency for successful completion
- Successful job completion was not gauged solely in terms of piece rate
- Job environment did not impose a limitation on the means by which job procedure information was disseminated.

2.1.4 CONDUCT PRELIMINARY SELECTION OF SPONSORS OF WORK STATIONS

As a result of procedures reported above, eleven work station sponsors for the study were preliminarily identified. Potential sponsor affiliations included six hospitals, one dental laboratory, and four private orthodontia offices.

The preliminary selection of sponsors was performed on a basis which assured that a sufficiently high number of work stations would be available from which to select test sites in compliance with the requirements arising from consideration of the experimental design.

2.2 PROCEDURES, PHASE TWO: DEVELOPMENT OF PROCEDURALIZED JOB GUIDES

Six activities were undertaken to develop proceduralized job guides for use by Work Experience Education students in the study. They were:

1. Enumerate job operations similar or common to various work stations
2. Allocate job operations for proceduralization and select work stations for actual study
3. Conduct task analysis
4. Develop standardized vocabulary for each type of work station
5. Draft proceduralized instructions for job operations selected for proceduralization
6. Validate and revise proceduralized job guides with work supervisors, and produce final version.

These procedures corresponded or were related to Functions 5, 9, 11, 20-23 and 26-31 on the Function Flow Logic Diagram.

2.2.1 ENUMERATE JOB OPERATIONS COMMON TO VARIOUS WORK STATIONS

Analyses were conducted to determine those job operations common to various types of work stations. As a result of these analyses, a "set" of work stations, having a total of 230 operations in common, was identified. Analyses results were verified as to completeness by several means, including comparison with task descriptions in

Task Inventories[4] and in Allied Health Professions Project[5]. The comparison also showed that the operations were not uniquely common to the nine sponsor organizations, but were common to all hospitals and dental service units in general.

2.2.2 ALLOCATE JOB OPERATIONS FOR PROCEDURALIZATION AND SELECT WORK STATIONS FOR ACTUAL STUDY

As previously discussed in Section 1.2, it was desired to investigate the use of proceduralized job guides to circumvent job entry barriers which currently limited the placement potential of inexperienced Work Experience Education program students. These entry barriers were traced to certain aspects of job performance which required a high level of complex procedure comprehension and retention for successful accomplishment. For this reason, analysis was used to determine those operations at each candidate work station which gave rise to such barriers and which, therefore, were of priority concern as candidates for proceduralization at the job station in question.

The analysis of job operations in this activity differed from that described in Section 2.1.3, in that it gave recognition to the nature, interdependence, and distribution of frequency across the set of operations associated with each work station.

Final selection from among the 230 candidate operations was made in the context of the work station setting, and was based on the following requirements:

- Operation was performed frequently relative to other operations at that work station
- First correct performance of operation did not ensure correct performance thereafter
- Operation was performed in environment which permitted use of proceduralized job guides

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4 (University of California at Los Angeles)

5 (Los Angeles, January, 1971)

- Permissible job completion times did not span normal work shift periods
- Job performance accurance and reliability was more critical than piece rate
- Availability of supportative items required for performance remained constant
- Operation required substantial special skills training
- Job performance requirements did not exceed student's ability
- Job operation requirements remained constant during duration of test.

As a result of the application of these requirements, thirteen operations performed at twenty-one work stations were selected for proceduralization. The work stations selected for the test were described in Table One.

2.2.3 CONDUCT TASK ANALYSIS

Task analyses were conducted for the thirteen operations selected for proceduralization. During on-site observations, data were collected on the following concerns and validated by work supervisors:

- Sequence of tasks
- Number of operators involved (multi-man task)
- Time required for each task
- Time required for entire operation
- Location of each operator for each task (multi-man task)
- Cooperation required between operators for each task (multi-man task)
- Work items associated with each task
- Safety considerations (including warnings) associated with each task
- Supplies or preparation required for each task
- Tools or special equipment required for each task

A copy of the instrument used to conduct the task analysis was included in Appendix E.

TABLE 1

Description of Work Stations

Title and Location	Number of Work Stations	Number of Operations at Work Station	Operations Allocated to Proceduralized Instructions
Central Supply Aide, Manteca Hospital	1	9	Cleaning instruments Sterilizing instruments
Central Supply Aide, Lodi Memorial Hospital	2	9	Cleaning instruments Sterilizing instruments
Medical Records Clerk, San Joaquin County General Hospital	2	6	Pulling files
Medical Records Clerk, St. Joseph's Hospital	2	6	Pulling files
Medical Records Clerk, Lodi Memorial Hospital	2	6	Pulling files
Darkroom Technician, St. Joseph's Hospital	2	10	Process standard x-ray film Process rapid process x-ray film Process x-ray mamograms
Darkroom Technician, San Joaquin County General Hospital	2	10	Process standard x-ray film Process rapid process x-ray film Process dental x-ray film
Laboratory, San Joaquin County General Hospital	2	6	Preparing bacteriological media (8 types of media)
Dental Aide, Office of Dr. Bruce Benninger	1	7	Preparing dental models (2 types of models)
Dental Aide, Office of Dr. Wong	1	7	Preparing dental models (2 types of models)
Physical Therapy Aide, San Joaquin County General Hospital	2	6	Cleaning Hydrowhirlpools Preparing Hydrowhirlpools Preparing hydrocollator packs
Physical Therapy Aide, St. Joseph's Hospital	2	6	Cleaning Hydrowhirlpools Preparing Hydrowhirlpools Preparing hydrocollator packs

2.2.4 DEVELOP STANDARDIZED VOCABULARY FOR EACH TYPE OF WORK STATION

Analysts observed and documented the vocabulary actually used by work station employees in their work environment. Specifically, unusual names of any tools or work items, or verbs which were used in an uncommon or particular way, were identified. Special verb and noun lists were compiled for each type of work station. Where a number of words appeared for the same action, tool, or work item, one word was selected. An example of the standardized vocabulary was included in Appendix F.

2.2.5 DRAFT PROCEDURALIZED INSTRUCTIONS FOR JOB OPERATIONS SELECTED FOR PROCEDURALIZATION

Drafts of job guides were prepared which contained all information required to prepare for and execute the job operations. Each job guide draft contained the following information:

- Job operation title, specifying the type of operation to be performed

  Example: Prepare curved neck pak.

- Specification of special tools, equipment, and supplies required for performing the operation, and not normally contained at the work station

  Example: This operation requires a roll of cloth electrician's tape.

- Specification of condition—the state or configuration—of equipment necessary before an operation could begin

  Example: All lights in darkroom, except safety lights, must be OFF.

- Warnings and cautions - information necessary to the safe completion of the operation. "Warning" implied that severe consequences might ensue if the information was ignored; "Caution" indicated that care had to be taken not to damage equipment

  Examples: ***WARNING***

  Steam packs are extremely hot. Care must be taken not to burn hands or fingers when handling packs.

CAUTION

Be sure that drain pump does not operate unless water is in tank.

- Location and access information

Example: All plates and test tubes are located on shelf above work table.

- Task activities - step-by-step instructions for completion of the operation, including resultant changes in equipment state or configuration, and necessary tolerances and permissible limits

Example: Place one pan in right-hand sink. Measure and pour one-fourth cup of Yale cleaner into pan. Fill pan one-third full of hot distilled water.

The draft copies of the job guides, as well as the final copies, utilized a specialized presentation format. Equipment to be used in performing the task activities was illustrated on each right-hand page; task activities and special instructions were listed on each left-hand page. It was intended that the user refer to both of the facing pages for instruction, since illustrations often conveyed information not indicated in the written text (location of handles, guages, doors, shelves, faucets).

2.2.6 VALIDATE AND REVISE PROCEDURALIZED JOB GUIDES WITH WORK SUPERVISORS, AND PRODUCE FINAL VERSION

Drafts of proceduralized job guides were submitted for validation to the work supervisors and their employees, to guard against any errors in content information or operational procedures.

Job guides went through several revisions as a result of this intensive validation process. Final validation of the job guides included a close observation of an employee performing the operation.

A complete set of the final job guides prepared for this study has been retained at the San Joaquin County Schools Office.

An example of a page from a final version of a job guide was included in Appendix G.

2.3 PROCEDURES, PHASE THREE: EXPERIMENT

The controlled experiment was designed to determine whether

or not the use of proceduralized job guides would affect students' performance in selected job operations. Quantifiable measures included error rate and time required to complete operations. The experiment followed a parallel group, random-assignment design. Experimental and control subjects were matched on the basis of chronological age, grade level, sex, grade point average, and general learning ability as measured by a standardized test battery. The parallel group, random-assignment design was employed in order to control for history, maturation and other internal characteristics of subjects. Subjects were matched and then determination was made randomly as to which member of the matched pair would be assigned to the experimental or to the control group. This procedure was selected for the present study since the number of subjects in the parallel groups was so small that simple random assignment to groups presented too great a probability that random individual differences would heavily impact results of the experiment.

Each matched pair of subjects was placed on the same work station doing the same operations, for different hours of the day, and under the supervision of the same work supervisor. There were only two exceptions to this procedure. The first was in the case of the dental aides, where two matched subjects were placed on work stations in two different dental service offices. These subjects, therefore, were supervised by different work supervisors. The second exception was in the case of two matched subjects working at one of the hospitals in the medical records department. Because of class scheduling conflicts, both worked in the department during the same hours; their work supervisor was instructed not to have the subjects work together or assist each other. In neither of these cases were the exceptions judged to have impact on study results.

The experimental design provided for the collection of the following data during conduct of the experiment:

- Time required by subjects to complete an operation
- Frequency and type of errors made by subjects in completing an operation

- Evaluation of student job performance by work supervisors
- Evaluation of student job performance by Work Experience Coordinators
- Experimental and control group subject interviews
- Attitude (of sponsoring employers) toward issues raised by the study.

Activities conducted in support of the experiment were as follows:

1. Screen and select student subjects
2. Instruct experimental subjects, work supervisors and Work Experience Coordinators in use of job guides
3. Collect weekly reports evaluating job performance from work supervisors and Work Experience Coordinators
4. Conduct on-site evaluative observations of subjects
5. Interview subjects, sponsors, work supervisors and Work Experience Coordinators

These procedures corresponded or were related to Functions 14-18 and 34-38 on the Function Flow Logic Diagram.

These activities were conducted with the assistance of the five Work Experience Coordinators who participated in the study. These Coordinators made weekly on-site visits to the work stations, collected weekly evaluation reports from supervisors, and submitted weekly reports to The Eckman Center. In addition, the Coordinators provided general assistance and guidance throughout the conduct of the study. Names and school district affiliations of the Work Experience Coordinators were included in Appendix H.

2.3.1 SCREEN AND SELECT STUDENT SUBJECTS

Five Work Experience Coordinators from five school districts screened potential subjects. The initial screening requirement was that students must have been 16 years old on February 1, 1972, and be enrolled in grade 10 or above. Students were further screened on the basis of their interest in working in allied health occupations and their expressed interest in participating in the Work Experience Education program. As a result of these screenings, seventy-eight students were

selected as potential subjects. These students were then administered the "Army General Classification Test - Civilian Edition" by the Work Experience Coordinators, to assist in identifying matched pairs of subjects for the two parallel groups.

Subjects were matched according to the following factors:

Chronological age
Sex
Grade level
Grade point average
General learning ability

The eleven pairs of subjects who were able to be most closely matched according to these factors were finally selected for participation in the study. A description of the matched pairs of subjects selected for the experiment was presented in Table Two.

Discrepancies occur between grade point averages of experimental and control group subjects in the cases of pairs A, E, and G. In the case of Pair A, the discrepancy is in favor of the experimental subject; in Pairs E and G the discrepancy favors the control subjects.

Two subjects, one in the experimental group and one in the control group, were classified by their school districts as "disadvantaged" as defined by the Vocational Education Amendments of 1968. None of the subjects were described as "handicapped." These definitions were presented in Appendix A.

One experimental subject (K1) lacks a matched subject in the control group. Shortly before the experimental period, one sponsor withdrew from participation in the study, leaving an uneven number of 21 subjects. It was decided to retain the extra experimental subject as part of the experimental group.

2.3.2 INSTRUCT EXPERIMENT SUBJECTS, WORK SUPERVISORS, AND WORK EXPERIENCE COORDINATORS IN USE OF JOB GUIDES

A training manual instructing students in the use of the job guides was developed by The Eckman Center. The manual, which used a programmed instruction format, was provided to each experimental student by his or her Work Experience Coordinator, as a self-instructional guide

TABLE 2

SELECTED CHARACTERISTICS OF MATCHED PAIRS OF STUDENT SUBJECTS

SUBJECTS 1 = Experimental Subject 2 = Control Subject	CHRONOLOGICAL AGE February 1, 1972	SEX	GRADE LEVEL	GRADE POINT AVERAGE	GENERAL LEARNING ABILITY - ARMY GENERAL CLASSIFICATION TEST
			All school semester subjects ending June, 1971		
A1	18	F	12	3.61	80%ile
A2	17	F	12	3.15	80%ile
B1	17	M	12	2.10	44%ile
B2	17	M	12	2.00	49%ile
C1	17	F	12	3.11	49%ile
C2	17	F	12	3.18	49%ile
D1	17	F	12	3.46	75%ile
D2	18	F	12	3.28	75%ile
E1	17	F	12	2.95	91%ile
E2	17	F	12	3.50	95%ile
F1	16	M	11	2.35	56%ile
F2	16	M	11	2.70	68%ile
G1	16	F	11	2.60	87%ile
G2	17	F	11	3.50	84%ile
H1	17	F	11	2.22	62%ile
H2	17	F	11	2.56	62%ile
I1	18	F	12	3.22	85%ile
I2	17	F	12	3.04	80%ile
J1	17	F	12	3.40	55%ile
J2	17	F	12	3.40	*
K1	18	F	12	3.14	89%ile
K2**	—	—	—	—	—

* Subject (J2) was hired by sponsor independently. This subject was matched with Subject (J1) on all characteristics except AGCT score which was not available.

** Subject (K2) was not included in the study because sponsor of this work station withdrew from participation in the study.

Subject (K1) was retained and was included in the experimental group.

on how to use proceduralized instructions. The information presented in the manual was then reinforced by the Coordinator in a tutorial situation. Coordinators had been trained in the use of the manual prior to these tutorial sessions. A copy of the manual was included in Appendix I.

The use of this self-instructional manual by students and their Coordinators provided a control on the manner in which experimental subjects were introduced to the job guides.

Prior to placing students on the job, work supervisors were briefed on the use of the job guide. Since the job guides were designed to supplement, not replace, supervisory personnel, it was intended to allow experimental students to see a demonstration of how each operation was performed before they began using their job guide. Work supervisors, therefore, were instructed to give experimental subjects a demonstration on the first day of work, to show them how to perform each operation in their job guide.

2.3.3 COLLECT WEEKLY REPORTS EVALUATING JOB PERFORMANCE FROM WORK SUPERVISORS AND WORK EXPERIENCE COORDINATORS

Work supervisors and Work Experience Coordinators submitted weekly reports evaluating the work performance of both experimental and control subjects. During the course of the study, both supervisors and Coordinators were instructed by Eckman Center staff in the use of the report instruments, and Eckman Center staff members made themselves available to Work Experience Coordinators for consultation whenever questions concerning the study arose. Questions of concern raised by work supervisors were usually dealt with through the appropriate Work Experience Coordinator.

Supervisors' weekly reports rated students' performance in the following areas:

- Quality of work
- Efficient use of materials and supplies
- Ability to follow directions
- Understanding of technical procedures
- Use of equipment

- Ability to work independently
- Willingness to ask for assistance when needed
- Quantity of work produced
- Speed of performance
- Necessity of repeating work
- Relationships with fellow employees
- Enthusiasm toward work

Coordinators made weekly visits to work stations to observe both experimental and control subject performance. Reports of these on-site visits evaluated subjects' performance in the following areas:

- Quality of work
- Quantity of work
- Extent of need for supervision
- Extent of need for on-the-job training
- General work attitude - relationship with others, conscientiousness, etc.

Sample copies of the instruments used for both these types of reports were included in Appendix J.

2.3.4 CONDUCT ON-SITE EVALUATIVE OBSERVATIONS OF SUBJECTS

Two on-site observations were conducted by The Eckman Center for the purpose of documenting the quality of work performance of every subject in both the experimental and control groups. The first observations were made in the first and second weeks of the subjects' employment, the second observations were made in the eighth and ninth weeks of the test period - corresponding to the eighth and ninth weeks of employment.

Subjects were observed while performing job operations for which proceduralized job guides had been developed. Observers recorded the time required by the subject to complete the job operation and the number and types of errors made by the subject in performing the operation.

The instrument used to record data during on-site observations was included in Appendix K.

2.3.5 INTERVIEW SUBJECTS, SPONSORS, WORK SUPERVISORS AND WORK EXPERIENCE COORDINATORS

Interviews were conducted to obtain qualifying information from participants in the study regarding their perceptions of the effectiveness of the job guides. Experimental students and their sponsors were interviewed after the test period was ended, work supervisors and Work Experience Coordinators were interviewed in the eighth week of the study. Samples of interview guides used to collect these data were included in Appendix L.

2.4 COMPILE AND ANALYZE DATA

Quantitative data from on-site observations were submitted to statistical treatment, specifically The Wilcoxon Matched-Pairs Signed-Ranks Test. Qualitative data were quantified where appropriate, but were not submitted to statistical analysis. The qualitative data were compiled to provide insight into, and interpretation of, the more subtle effects resulting from the use of proceduralized job guides. Of particular value were the qualitative data provided by interviewees in the following areas:

- Subject perceptions of usefulness of proceduralized job guides
- Sponsor perceptions of usefulness of proceduralized job guides
- Comparison by work supervisors of work performance of experimental and control subjects.

3.0 FINDINGS AND DISCUSSION

Findings were based upon data collected from on-site observations, weekly evaluations by work supervisors and Work Experience Coordinators and interviews with sponsors, subjects, Work Experience Coordinators and work supervisors. These findings were reported in relation to the five hypotheses of the study:

Hypothesis One: The use of proceduralized job guides will increase the number and type of challenging job positions available to relatively unskilled students.

Hypothesis Two: The use of proceduralized job guides will enable a broader spectrum of relatively unskilled students to participate in Work Experience Education programs.

Hypothesis Three: The use of proceduralized job guides will modify the employer's perception that relatively unskilled students cannot meet stated job requirements for selected positions.

Hypothesis Four: The use of proceduralized job guides will enable relatively unskilled students to perform given operations in less time and with a lower error rate than students not using proceduralized job guides.

Hypothesis Five: Relatively unskilled students using proceduralized job guides will require less training and supervision, for a given level of competency, than students not using proceduralized job guides.

3.1.1 HYPOTHESIS ONE: THE USE OF PROCEDURALIZED JOB GUIDES WILL INCREASE THE NUMBER AND TYPE OF CHALLENGING JOB POSITIONS AVAILABLE TO RELATIVELY UNSKILLED STUDENTS.

Data documenting the activities of Phase One of the study show that the type and number of challenging job positions available to Work Experience Education students were increased as a result of the introduction of proceduralized job guides.

Prior to the study, those more complex jobs in the allied health field had not been available to Work Experience Education students. A limited number of Work Experience Education students with clerical skills had been placed in clerical occupations in the allied health field,

but the more technical, health-related occupations had not been available to Work Experience Education students. However, when presented with the prospect of having proceduralized job guides, potential sponsors of work stations in allied health fields were found to be willing to make more challenging job positions available to the Work Experience Education students involved in this study. Potential sponsors were able to identify job positions not requiring special state-required training or licensing in nearly every occupational area for which relatively unskilled Work Experience Education students could be employed.

In summary, results of the study supported Hypothesis One.

3.1.2 HYPOTHESIS TWO: THE USE OF PROCEDURALIZED JOB GUIDES WILL ENABLE A BROADER SPECTRUM OF RELATIVELY UNSKILLED STUDENTS TO PARTICIPATE IN WORK EXPERIENCE EDUCATION PROGRAMS.

The ranges of grade point averages and general learning ability (reported in Table 2) show that students from a broad spectrum of abilities participated in the study. Two subjects, one in the experimental group and one in the control group, were classified by their school districts as disadvantaged. These subjects also had the lowest grade point averages and the lowest AGCT rankings of all subjects in their groups.

It is appropriate here to compare the extent to which these two disadvantaged subjects had a successful work experience. Both subjects were placed on the same work station and, therefore, had the same work supervisor and Work Experience Coordinator. The disadvantaged subject in the experimental group did not perform well at the work station and was terminated by the sponsoring employer after eight weeks of employment. Reports by both the supervisor and the Work Experience Coordinator indicate that this subject was frequently late in reporting to work and that the quality of his work was very poor. Reports also indicate that he did not use his job guide while performing operations, usually leaving the guide at home or at school. The subject did not respond to counseling by the Work Experience Coordinator and he was described by both the Coordinator and the work supervisor as appearing to lose interest in the job. By contrast, this subject's counterpart in

the control group, also described as disadvantaged, received very high ratings throughout the test period from both the supervisor and the Coordinator. On-site observations also revealed that the control subject was superior to the experimental subject in both length of time required to complete operations and number of errors. The experimental subject was replaced at the work station by an alternate subject who matched the terminated subject on the basis of all matching criteria and who was also classified as disadvantaged. After four weeks, this alternate subject received high ratings from both supervisor and Coordinator, equal to those of his matched counterpart after four weeks of employment, and he completed his period of employment successfully.

Outcomes of the study, as reported above, support Hypothesis Two.

3.1.3 HYPOTHESIS THREE: THE USE OF PROCEDURALIZED JOB GUIDES WILL MODIFY THE EMPLOYER'S PERCEPTION THAT RELATIVELY UNSKILLED STUDENTS CANNOT MEET STATED JOB REQUIREMENTS FOR SELECTED POSITIONS.

While the majority of department heads and supervisors at sponsoring hospitals, as well as sponsors in private practice, were supportive of the objectives of the Work Experience Education program, a certain amount of prior skepticism was found to exist among some supervisors regarding the study. Supervisors most frequently proposed two reasons why the study would not be appropriate for their work situation:

- Job operations were too complex to be performed by untrained workers
- Job operations were too complex to be proceduralized.

In most cases, these objections were overcome as the preliminary steps in the development of proceduralized job guides began. Supervisors participated in the analysis of job operations and their tasks, and were kept informed of the results of analyses conducted to determine the suitability of job operations for proceduralization. In fact, supervisors who had raised these objections reported in interviews after the test period that more complex job operations should have been selected for proceduralization. In spite of the continuing program

to inform supervisors of the technical analyses, one department in a sponsoring hospital and one dental service office had to be eliminated from the study because of continuing reluctance. In both cases, work supervisors felt they required experienced and trained professional workers and that they could not justify introducing inexperienced Work Experience Education students into the work situation.

Task analysis and on-site observations of workers performing the operations selected for the study were conducted to determine the extent to which job entry level barriers relating to education, training, and experience requirements were valid. Work supervisors were also asked to identify the entry level education, training, and experience they felt were required for jobs included in the study.

Table Three presented a comparison of education, training, and experience requirements as revealed by task analysis and by supervisors' perceptions.

Table Three showed that supervisors perceived the entry level requirements to be higher than the requirements were seen in The Eckman Center analysis. All but one supervisor out of eleven perceived that at least a completed high school education was required for entry level. Seven supervisors out of eleven reported that some specific experience was a requirement. Actual analysis of all the operations on these jobs revealed that, in fact, someone with no prior experience or training could perform all these jobs, given a minimum of supervision.

The requirement of high school diploma was found not to be related to the actual job performance requirements for the jobs listed in Table Three. A specific level of reasoning ability was found to be required, such as that needed to apply common sense understanding to carry out detailed instructions. No more than simple arithmetic processes were found to be required for any of these jobs. Analysis further revealed that requirements for language development did not exceed the need for a worker to comprehend and express himself so that he could learn job duties from oral, written or demonstrated instructions and write identifying information.

TABLE 3

Comparison of Analysis by The Eckman Center and Supervisors' Perceptions of Education, Training and Experience Requirements

Job Title	Level of Education		Specific Training		Specific Experience	
	Analysis by* Eckman Center	Supervisors' perception	Analysis by* Eckman Center	Supervisors	Analysis by* Eckman Center	Employer
Physical Therapy Aide	less than high school	1high school 2high school	none	16 weeks ojt 2one month minimum	none	1some type of hospital exposure 2not essential but helpful: some hospital experience
Central Supply Aide	less than high school	1high school 2high school	none	13 weeks 21 month	none	1none special 2home economics, biology helpful
Laboratory Aide	less than high school	1high school 2high school	none	14-6 weeks 21 month	none	1science courses: bacteriology, chemistry 2chemistry, mathematics
Darkroom Technician	less than high school	1high school 2less than high school -10th grade	none	1less than one week 2one month	none	1none 2photography
Medical Records Clerk	less than high school	1high school 2high school 3high school	none	1typing, business, English 2training in filing helpful 3general clerical work:typing and office procedures	none	1none 2general clerical work 3office work experience
Dental Aide	high school	1high school 2high school	none	13-6 months 22 months	none	1dental experience 2clerical experience

*Included extensive analysis of tasks required to complete job operations, on-site observations of workers at the job site, and analysis of data contained in Dictionary of Occupational Titles.

As evidence of the fact that supervisors' perceptions of job entry requirements changed during the test, three supervisors reported in unsolicited comments made during the test period, that jobs performed by the students under their supervision had been too simple and that the students could have performed more complex jobs. Further evidence was gathered when supervisors participating in the study were interviewed in the eighth week. They were asked whether or not they would be willing to hire subjects as regular employees. Eleven of the twelve supervisors responded that they would be willing to hire subjects under their supervision.

Supervisors were also asked to compare the work performance of subjects to the work performance of regular new hires. Comparison data, summarized in Table Four, showed that supervisors found more than 80 percent of the subjects to perform as well as regular new hires, if not better. Supervisors were divided equally in their rating of experimental or control subjects as better than regular new hires.

Sponsors of work stations were also interviewed at the conclusion of the study. Of the six sponsors, five (83 percent) reported that they viewed proceduralized job guides as a useful method of training regular new hires on other job operations. The sixth sponsor reported that in a small hospital such as the one he represents, every worker must be able to perform many operations which are part of many jobs. Hence, proceduralized job guides were not, in his view, an advantage for his situation.

All but one sponsor identified a wide range of jobs for which they would consider hiring Work Experience Education students in the future. The exception was a dentist's office, where licensed personnel were required for jobs other than the job included in the study.

Sponsors unanimously reported willingness to participate in future Work Experience Education programs.

These results supported Hypothesis Three.

3.1.4 HYPOTHESIS FOUR: THE USE OF PROCEDURALIZED JOB GUIDES WILL ENABLE RELATIVELY UNSKILLED STUDENTS TO PERFORM GIVEN OPERATIONS IN LESS TIME AND WITH A LOWER ERROR RATE THAN STUDENTS NOT USING PROCEDURALIZED JOB GUIDES.

TABLE 4

Comparison by Work Supervisors of Experimental and Control Subjects with Regular New Hires

Performance compared with regular new hires	Number of subjects					
	experimental (N=11)		control (N=10)		Total (N=21)	
	number	percent	number	percent	number	percent
Subject rated better than regular new hires	3	27	3	30	6	29
Subject rated the same as regular new hires	6	55	5	50	11	52
Subject rated not as good as regular new hires	2	18	2	20	4	19

Data on length of performance time and frequency of error were collected during periods of on-site observation. Results were presented in Table Five.

Data obtained from these measures were submitted to statistical treatment using The Wilcoxon Matched-Pairs Signed-Ranks Test for significance. Results of these tests revealed no significant differences between the two groups. The data presented in Table Five showed that there was little difference, if any, between the groups in average performance time per observation at both times the measures were taken. The data did show, however, fewer errors per observation for the experimental group. This positive trend was noted at the time of both measures and was particularly evident in measures taken in the first/second weeks of employment.

Work supervisors' weekly evaluations of each subject's work performance were also used to compare the performance of experimental and control subjects. Supervisors were asked to use rating scales to evaluate subjects in twelve areas. In addition, supervisors were interviewed in the eighth week of the test period and were asked to compare experimental and control subjects under their supervision. Results of these comparisons were presented in Tables 6A through 6M. It should be noted that, for ease of comparison, results of supervisors' ratings for the third week and the tenth (or final) week of the test period were presented to illustrate changes in ratings over time. These evaluations were also compared with data collected during interviews with supervisors in the eighth week of the experiment.

The data presented in Table 6A showed that in the third week of the test (third week of employment for students) five work supervisors, 56 percent, found no difference in the *quality of work* of experimental and control subjects. Three supervisors, 33 percent, favored control subjects in the third week of the test, and one supervisor, 11 percent, favored an experimental subject. In contract, in the tenth week of the test (tenth week of employment) the number of

TABLE 5

Average Performance Time Per Observation and Average Numbers of Errors Per Observation, For Experimental and Control Groups. Measures Taken in First/Second Weeks and Eighth/Ninth Weeks of Employment.

Measures	Subjects	
	Experimental Group	Control Group
First/second weeks of employment		
Average performance time per observation (minutes)	12.77	12.77
Average number of errors per observation	1.67	3.17
Eighth/ninth weeks of employment		
Average performance time per observation (minutes)	4.31	4.83
Average number of errors per observation	1.92	2.42

TABLE 6A

Comparison of Supervisors' Ratings on Quality of Work. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
5	56	1	11	3	33	7	88	0	0	1	13	**					

* Three supervisors participating in the study had only one subject (S) under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

** These items not measured in interviews with supervisors.

TABLE 6B

Comparison of Supervisors' Ratings on Efficient Use of Materials and Supplies. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
6	67	1	11	2	22	7	88	0	0	1	13	6	67	2	22	1	11

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

TABLE 6C

Comparison of Supervisors' Ratings on Ability to Follow Directions. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
7	78	0	0	2	22	5	63	1	13	2	25	4	44	2	22	3	33

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

TABLE 6D

Comparison of Supervisors' Ratings on Understanding of Technical Procedure. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
7	78	1	11	1	11	6	75	1	13	1	13	6	67	1	11	2	22

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

TABLE 6E

Comparison of Supervisors' Ratings on Use of Equipment. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
6	67	2	22	1	11	6	75	0	0	2	25	6	67	2	22	1	11

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

TABLE 6F

Comparison of Supervisors' Ratings on Ability to Work Independently. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
5	56	1	11	3	33	5	63	1	13	2	25	4	44	1	11	4	44

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

TABLE 6G

Comparison of Supervisors' Ratings on Willingness to Ask for Assistance When Needed. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
5	56	2	22	2	22	6	75	0	0	2	25	5	56	1	11	3	33

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

TABLE 6H

Comparison of Supervisors' Ratings on Quantity of Work Produced. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
6	67	0	0	3	33	6	75	0	0	2	25	7	78	1	11	1	11

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

TABLE 6I

Comparison of Supervisors' Ratings on Speed of Performance. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
4	44	3	33	2	22	6	75	0	0	2	25	**					

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

** These items not measured in interviews with supervisors.

TABLE 6J

Comparison of Supervisors' Ratings on Necessity of Repeating Work. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
5	56	2	22	2	22	6	75	0	0	2	25	4	44	3	33	2	22

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

TABLE 6K

Comparison of Supervisors' Ratings on Relationships with Fellow Employees. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
4	44	3	33	2	22	7	88	0	0	1	13	**					

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

** These items not measured in interviews with supervisors.

TABLE 6L

Comparison of Supervisors' Ratings on Enthusiasm Toward Work. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
4	44	2	22	3	33	4	50	0	0	4	50	**					

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

** These items not measured in interviews with supervisors.

TABLE 6M

Comparison of Supervisors' Ratings on Total of Twelve Ratings. Measures Taken from Scaled Evaluations and Interviews, Three Time Periods

Frequency of Supervisors' Ratings (total may not equal 100 percent due to rounding)

Week #3 Scaled Evaluation (N = 9*)						Week #10 Scaled Evaluation (N = 8+)						Week #8 Interview (N = 9*)					
Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student		Found no Difference		Favored Experimental Student		Favored Control Student	
#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
64	59	18	17	26	24	71	74	3	3	22	23	42	58	13	18	17	24

* Three supervisors participating in the study had only one subject under their supervision. Hence they could not make comparisions between subjects.

+ One supervisor lost a subject under his supervision who was terminated by the sponsor.

supervisors finding no difference in the quality of work of experimental and control subjects had increased to seven, 88 percent. One supervisor, 13 percent, favored the control subject and no supervisors favored experimental subjects.

Table 6B showed that in the tenth week the number of supervisors who found no difference in the *efficient use of materials and supplies* between experimental and control subjects had increased over the number reporting no difference in the third week and in the eighth week. Six supervisors, 67 percent, found no difference in the third week, while seven supervisors, 88 percent, found no difference in the tenth week. The table also showed some fluctuations in the third week and in the eighth week among supervisors who favored one subject over another.

In rating subjects on *ability to follow directions*, supervisors increasingly found differences between experimental and control groups. Table 6C showed that supervisors tended to favor control subjects at all three time periods and that a greater proportion of supervisors found no difference in the third week than they had in the eighth or tenth weeks of the test.

Results of the comparison of supervisors' ratings on *understanding of technical procedure*, Table 6D, showed that the greatest proportion of supervisors found no difference between the two groups at all three time periods. One supervisor favored the experimental subject and one favored the control subject in both the third and the tenth week, while in the eighth week two supervisors favored the control subject and one favored the experimental subject.

Table 6E showed that in all time periods, the number of supervisors finding no difference in *use of equipment*, which was the majority, remained constant. Supervisors favoring one subject over another tended to favor the experimental subject, except in the tenth week, when two supervisors favored the control student and no supervisor favored the experimental student.

In rating subjects on their *ability to work independently*, reported in Table 6F, supervisors reported most frequently that they

found no difference between the two groups, except in the eighth week where as many supervisors favored the control subject as found no difference.

Data in Table 6G showed that the proportion of supervisors finding no difference between the two groups in *willingness to ask for assistance* had increased in the tenth week. Although in all the time periods the majority of supervisors had found no difference, a sizeable proportion of supervisors had favored one or the other group in the third and eighth weeks of the test.

Once again, as shown by Table 6H, in rating subjects on *quantity of work produced*, the majority of supervisors found no difference between the two groups at all three time periods. In the tenth week, two supervisors, 25 percent, favored control subjects, no supervisor favored experimental subjects, and six supervisors, 75 percent, found no difference.

Table 6I showed a noticeable change in ratings by supervisors between the third and the tenth week of subject *speed of performance*. In the third week, five supervisors, 55 percent, favored either experimental or control subjects, while four, 44 percent, found no difference. In the tenth week, the proportion of supervisors finding no difference had increased to 75 percent.

Table 6J showed a similar trend toward supervisors' finding no difference between the two groups in *necessity of repeating work* from the third to the tenth weeks of the test.

In the third week, the majority of supervisors favored one subject over another in *relationships with fellow employees*. In the tenth week, however, as Table 6K showed, all but one supervisor found no difference between the two groups.

Table 6L showed that in rating subjects on *enthusiasm toward work*, supervisors tended to favor one group over another in the third week. In the tenth week, however, supervisors were equally divided between finding no difference and favoring control subjects.

Table 6M presented the *total of all ratings* by supervisors. The data showed that the majority of supervisors found no difference

between the two groups. The proportion of supervisors favoring control subjects was only slightly larger than the proportion favoring experimental subjects in the third and eighth weeks. However, in the tenth week, the proportion of supervisors favoring control subjects remained constant while the proportion of supervisors favoring experimental subjects declined. The data showed that a greater proportion of supervisors found no difference in the tenth week of the test.

The outcomes of the study related to Hypothesis Four were equivocal. Results of on-site observations showed that experimental subjects did perform given job operations with fewer errors than control subjects. Differences between the two groups of subjects were found not to be statistically significant. Findings revealed no differences in time required to perform given job operations, after the first two weeks of employment. A difference in favor of the experimental group was found in performance time recorded after eight weeks of employment. Again, this difference was not statistically significant.

Supervisors' evaluations of subjects' work performance showed that in general, a majority found no difference in performance of experimental and control subjects.

3.1.5 HYPOTHESIS FIVE: RELATIVELY UNSKILLED STUDENTS USING PROCEDURALIZED JOB GUIDES WILL REQUIRE LESS TRAINING AND SUPERVISION, FOR A GIVEN LEVEL OF COMPETENCY, THEN STUDENTS NOT USING PROCEDURALIZED JOB GUIDES.

In interviews during the eighth week of the test period, supervisors were asked to evaluate the effectiveness of job guides. While the majority of supervisors reported that the job guide neither saved supervisory time nor made a difference in the job performance of subjects, the majority also reported that they would recommend use of the job guide with unskilled adults in other hospitals. These data were summarized in Table Seven. In the interviews, supervisors responded with additional comments summarizing their perceptions of the effectiveness of the job guides. These comments were not solicited, but were recorded and categorized for presentation as additional qualifying data regarding supervisors' evaluations.

TABLE 7

Frequency of Response to Selected Interview Items Evaluating the Effectiveness of the Job Guides by Work Supervisors Employing Matched Pairs of Students

(N = 9)

(+) = positive response
(-) = negative response

	Frequency of Response			
	Yes		No	
	No.	Percent	No.	Percent
1. Has the job guide saved you supervisory time?	3 (+)	33	6 (-)	67
2. Has the job guide interfered with your role as supervisor or with the ongoing work situation?	2 (-)	22	7 (+)	78
3. Do you think the job guide made a difference in (subject's) performance of this job?	3 (+)	33	6 (-)	67
4. Would you recommend its (job guide's) use with unskilled adults in (name of operation) to another hospital?	6 (+)	67	3 (-)	33

Positive Comments (in descending order of frequency)

- Job guide useful as a supplemental guide.
- Written instructions more efficient than verbal instructions.
- Job guide stimulated employee at first.
- Job guide useful for new employees.
- Job guide encourages standardization of procedures.
- Job guide enables employee to become proficient sooner - especially in vocabulary development.

Negative Comments (in descending order of frequency)

- Verbal instructions preferred by supervisor to written instructions.
- Use of job guide required additional supervisory time.
- Trying to follow a book is a disadvantage for employee.

Experimental subjects were also interviewed following the test period. Results of these interviews showed that the majority of these subjects favored the use of job guides as an effective means for improving job performance.

Subjects were asked how frequently they consulted job guides in selected circumstances, as opposed to consulting the supervisor or other workers. Table Eight summarized responses to these items.

It was of special interest that, despite the fact that they consulted supervisors and other workers to help correct mistakes and to save time, 67 percent of the experimental subjects reported that at first they learned mostly by consulting the job guide.

In reference to other interview items not included in Table Eight, ten subjects (83 percent) reported that the job guide was most useful in the first week of employment, one subject reported it was most useful in the first ten days of employment, and one subject reported that the job guide was not useful at all.

When asked if they would recommend the use of job guides to other Work Experience Education students, ten subjects (83 percent) said they would. Reasons given for positive responses were as follows (in descending order of frequency):

TABLE 8

Frequency of Responses by Experimental Subjects to Interview Items Comparing Use of Job Guide with Use of Other Means of Improving Job Performance

(N = 12)*

QUESTION ITEM	Frequency of Response**							
	The Job Guide		The Supervisor		Another Worker		Other	
	#	%	#	%	#	%	#	%
If you wanted to know how to use equipment, did you consult.	7	58	3	25	2	17	0	0
If you wanted to know how to correct mistakes, did you consult.	4	33	3	25	5	42	0	0
If you wanted to save time learning how to do something, did you consult. . .	2	17	4	33	5	42	1	8
At first did you learn mostly by consulting	8	67	2	17	2	17	0	9

* One experimental subject was terminated by sponsor, but he was replaced by another alternate experimental subject, bringing the number of subjects to 12.

** Totals may not equal 100 percent due to rounding.

- Job guides avoid having to ask questions of the supervisor
- Job guides save time
- Job guides are easy to read, self-explanatory
- Job guides give new worker confidence

Two subjects said they would not recommend use of the job guides because they felt the supervisor could explain more fully than the job guide could.

Results of the study did not support Hypothesis Five. Although the majority of experimental students reported that they consulted the job guide more frequently than they consulted the supervisor during the first weeks of employment, the majority of supervisors reported that the use of proceduralized job guides did not save supervisory time. On the other hand, supervisors reported the job guides to be a useful supplemental training aid for the student.

4.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This section summarized the outcomes of the present study and presented conclusions based on these outcomes. Recommendations for applying the information obtained from the study were also presented.

4.1 SUMMARY

The present study was designed to test the effectiveness of one approach to meeting the goals of Work Experience Education. That approach was the use of proceduralized job guides. The objectives of the present study were as follows:

- To determine the effectiveness of a selected approach, the use of proceduralized job guides, in fostering achievement of the stated goals of Work Experience Education
- To make possible the placement of secondary Work Experience Education program students into a wider variety of challenging job situations (including post-entry level) as part of the general and vocational phases of the program
- To enable a broader spectrum of students (specifically the disadvantaged and the handicapped) to participate in the achievement of the stated goals of Work Experience Education
- To increase the number and kinds of work stations which are available to implement the stated goals of Work Experience Education
- To gain fuller community and industry support for vocational education and to foster recognition that vocational education planners are spearheading the development of innovative programs which will effectively respond to critical and rapidly changing state and national requirements for a skilled work force.

The study was delimited to consideration of allied health occupations available within San Joaquin County, California. The following five hypotheses were tested to meet the objectives of the study:

Hypothesis One: The use of proceduralized job guides will increase the number and type of challenging job positions available to relatively unskilled students.

Hypothesis Two: The use of proceduralized job guides will enable a broader spectrum of relatively unskilled students to participate in Work Experience Education programs.

Hypothesis Three: The use of proceduralized job guides will modify the employer's perception that relatively unskilled students cannot meet the requirements for selected job positions.

Hypothesis Four: The use of proceduralized job guides will enable relatively unskilled students to perform given operations in less time and with lower error rate than students not using proceduralized job guides.

Hypothesis Five: Relatively unskilled students using proceduralized job guides will require less training and supervision, for a given level of competency, than students not using proceduralized job guides.

Findings supported Hypotheses One, Two and Three. The test did not provide findings which supported, or which failed to support, Hypotheses Four and Five.

4.2 CONCLUSIONS

It was possible to draw three conclusions based upon the findings presented in previous sections of this report. These conclusions, followed by interpretive comments, were as follows:

1. The use of a proceduralized job guide approach will increase the number and type of challenging job positions available to relatively unskilled students.

COMMENT: This conclusion was reached from considerations of the program made prior to the initiation of field testing of the proceduralized job guides. It was based on the observation that the job guide approach applied in this project yielded new, previously untapped work stations to relatively unskilled students. Employers did not require the restructuring of job descriptions prior to assigning students. Typically, this had not been the case. Employers usually seek to restructure job positions in such a way that the difficult, challenging, and hence most instructional aspects of the job, are removed. This defeats a basic intent of Work Experience Education, as it precludes

the development of necessary skills in the Work Experience student. In the present research, the sponsors retained the job performance requirements actually necessary for satisfactory job performance and were amenable to dropping those requirements which the use of proceduralized instructions rendered unnecessary.

The relative strength of Conclusion One was further demonstrated by employer willingness to permit relatively unskilled students to participate in unrestructured work station assignments—without the use of proceduralized job guides as required in the matched pair's experimental design. These students were placed by use of a proceduralized job guide approach, but one which did not actually involve their use of job guides. Factors influencing the decision by sponsors to not restructure the jobs are in part applicable to the explanation of this phenomenon as well. While student subjects not using the job guide might be expected to not have the benefits of proceduralization of the job tasks and hence not benefit from the attendant benefits expected to accrue, it is likely that a substantial degree of the job performance requirements and job complexity mystique was removed from the sponsors attitude toward use of relatively unskilled students in relatively complex jobs.

2. *The use of the proceduralized job guide approach will enable a broader spectrum of relatively unskilled students to participate in Work Experience Education programs.*

COMMENT: The proceduralized job guides served to reduce the level of skill proficiency required by sponsors at the entry level. This in turn made it possible for students having less developed levels of skill proficiency than normal new hires to experience the work station demands of relatively complex job positions. To the extent that such proceduralization of job stations is carried out, the number and type of job stations available to relatively unskilled students is likely to increase, permitting greater numbers of Work Experience Education students the opportunity to meet real and hence challenging work conditions. The breaking down of existing entry level employment barriers to the placement of Work Experience Education students and resultant increases in the numbers of students able to take advantage of Work

Experience Education programs will be essential, as the demand for Work Experience Education increases, as entry level jobs become increasingly complex, and as the related instruction becomes more appropriate.

3. The use of a proceduralized job guide approach will modify the employer's perception that relatively unskilled students cannot meet the requirements for selected job positions.

COMMENT: Experimental evidence has shown that employers as a group tend to overrate the level of entering skill required to adequately perform on the unrestructured job. A rather dramatic shift in this belief was noted as a result of applying the proceduralized job guide approach in developing work stations for student assignment. In fact, employers subsequently tended to view the particular jobs to which students were assigned as relatively simple and not meritorious of excessive job development activity. This conclusion was particularly significant in light of the fact that this characteristic of employers is perhaps the most difficult one for Work Experience Coordinators to overcome in the context of work station development. The proceduralized job guide approach itself would seem to constitute a rather effective program of training, largely impacting the employer and his staff with regard to their perception of the nature and extent of job performance requirements. Such demonstration to the employer has an impact on changing the attitudes which result in limiting Work Experience Education opportunities.

4.3 RECOMMENDATIONS

It was possible to formulate the following recommendations for further consideration, based on the activities and outcomes of the present study:

1. It is recommended that a demonstration project be initiated to determine the maximum extent to which a proceduralized job guide approach can extend an opportunity for students of low achievement (for whatever reason) to take an active part in Work Experience Education programs.

COMMENT: The particular experimental design selected for use in this study did not allow testing of the extent to which under-achieving students could be successfully placed at challenging station assignments. This recommendation draws particular attention to segments of the student population having low motivation and/or physical capability, and students exhibiting various forms of educational handicap, such as EMR and TMR. There is strong evidence to suggest that use of a proceduralized job guide approach can put the benefits of a Work Experience Education program within easy reach of great numbers of these students. It would be expected that the impact of the proceduralized job guide approach would be different for various classifications of students. The extent to which a proceduralized job guide can sufficiently reduce the entering level skill proficiency requirements, that is, compensate for limited ability to achieve skills, is not known at this time. One of the purposes of such a demonstration project would be to determine for which classifications of low-achieving students the proceduralized job guide approach would be most useful in accomplishing a successful Work Experience Education achievement.

2. *It is recommended that a demonstration project be initiated which requires the student, the Work Experience Coordinator, and the employer to collaborate in the process of developing proceduralized job guides for work stations assignable to the student.*

COMMENT: To a large extent, the benefits to the Work Experience Education program of using a proceduralized job guide approach accrue prior to the actual placement of a student at the work station. It is strongly believed that the student himself can, with training, play a major role in the necessary job analysis and job development activities preceeding the "construction" of a proceduralized job guide. It is further believed that the actual construction and utilization of the proceduralized job guide is in a sense "anticlimatic" with respect to providing inexperienced students with challenging work experience opportunity. This is particularly true in light of the rapid on-the-job learning effect observed in connection with the use of such job guides.

It would appear that this process of work station/job development, including the task analysis, job proceduralization and employer validation, represents an extremely powerful level of dialogue between the student, the Work Experience Coordinator, and the employer, in connection with job development. In addition, this process also optimizes the benefits of Work Experience Education through permitting the student an intimate understanding of job tasks and their interrelationships. Such experience permits the students to gain invaluable understanding of jobs in general and the sequencing of work activity.

3. *It is recommended that the use of the proceduralized job guide approach be tested to determine the degree to which it can reduce the undesirable impact of personnel change or turnover at the work station site.*

COMMENT: During the present study it was found that the proceduralized job guide approach served both to eliminate part of the initial requirement for on-the-job training, and to reduce error rates typically observed of new hires. Thus the undesirable impacts of personnel change typically experienced at the tested workstations were believed to have been reduced. It is noted that the nature of Work Experience Education, and particularly exploratory Work Experience Education, is such that there is relatively frequent and dramatic impact felt by the employer in cases when that employer places Work Experience Education students at demanding, unrestructured work stations. This recommendation asserts that the use of a proceduralized job guide approach can serve to reduce this undesirable impact by a quantifiable amount.

4. *It is recommended that careful consideration be given to providing Work Experience Education opportunity to students on a "no-pay basis" at the general and vocational levels.*

COMMENT: Several work station sponsors, while sympathetic to and supportive of the goals of Work Experience Education programs in general, withdrew from the present study owing to the requirement that students be paid minimum wages. There are several heavily populated Work Experience Education types of programs in California which operate

outside the minimum pay requirement limitations imposed on these programs. It is highly likely that additional expansion of program and work station opportunities would be afforded by utilizing this approach.

5. It is recommended that a pilot program be initiated to compare various Work Experience Education approaches as to how effective, in terms of meeting the goals of Work Experience Education, they are in raising the level of work station challenge.

COMMENT: Current Work Experience Education programs often succeed in gaining student "placement" by conventionally restructuring job assignments at selected work stations so that relatively unskilled students may participate in Work Experience Education programs. A significant amount of standard job challenge is thereby reduced. It is generally believed that the higher the job challenge relative to individual student capability, the more effective the program becomes. This would suggest that Work Experience Education programs operating in this "restructuring" manner could be counterproductive in terms of providing students with valid experiences from the world of work. On the other hand, it is not clear what the impact of various Work Experience Education approaches are with respect to raising the level of work station challenge. Specifically, it would be of interest to determine the relative costs and benefits of various Work Experience Education approaches in creating increased job station challenge.

6. It is recommended that a longitudinal study having provision for extensive student/employer follow-up be initiated so as to assess the extent to which the Work Experience Education approach (as opposed to alternative program means) is effective in achieving goals and objectives of vocational education.

COMMENT: The objectives of the present study were developed to test specific means for maximizing benefits of vocational education delivery through Work Experience Education. This study did not test, but rather asserted as an assumption, that Work Experience Education is effective in achieving goals and objectives of vocational education. While that assumption has high fact validity, a longitudinal study is suggested

to assess the degree and types of effectiveness provided by the Work Experience Education approach.

7. It is recommended that the use of a proceduralized job guide approach be tested to determine its applicability to further the stated goals of Work Experience Education in occupations other than allied health.

COMMENT: The allied health occupations were selected for this pilot research study since they encompassed a wide spectrum of job performance requirements. Since the use of a proceduralized job guide approach was found to have increased the number and type of challenging job positions available in allied health occupations, it is reasonable to assert that a proceduralized job guide approach, when used in other occupations, would also be beneficial. This recommendation suggests that this assertion be tested to determine its validity.

8. It is recommended that a demonstration project be initiated to seek effective means of impacting related instruction processes with respect to individual student work experiences in Work Experience Education.

COMMENT: During the present study there was behavior observed which tended to support the belief that, while the work experiences of individual students are valuable and the related instruction experiences of these same students are also valuable, the full derivable impact of work experiences on related instruction is not being obtained. In searching for more effective means of fostering this desirable impact, the position that a proceduralized job guide approach provides a detail of analysis capable of simplifying and facilitating the interface between work experiences and related instruction, should be tested.

9. It is recommended that the State Department of Education work closely with professional groups, unions, certification authorities, and others, to gain maximum support for the assignment of Work Experience Education students in a broad spectrum of work stations.

COMMENT: Skilled workers and their representative organizations

are able to cite several concerns related to the placement of Work Experience Education students. Such concerns relate to the existence of unemployed skilled workers, the desire to conserve traditional job entry requirements not typically met by students, and the general concern for the security and welfare of trained, skilled workers. These concerns can constitute peer group-based barriers to the successful employment, and thus successful placement, of Work Experience Education students. If implemented, this recommendation would serve to reduce these kinds of entry level barriers.