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ABSTRACT

This study focused on the identification and description of environmental characteristics and their relationship to basic skills exposure. The objectives of the study were to identify the major factors that characterize environments in which learning is intended to occur, and to delineate patterns of co-exposure to basic skills and environmental factors in secondary classrooms and work-site settings. Four programs were studied, including two different models of experience-based career education, one of cooperative distributive education, and a traditional academic program that included part-time work. All programs had a work site as well as a classroom component. Observations were recorded live in the form of comprehensive field notes; overall, 193 observations of 45 students were obtained. Six basic skills were identified: psychomotor, reading, computing, speaking, reasoning, and writing, while 12 environmental factors were defined, including simultaneous tasks, self-initiation, working cooperatively and other work site features. The findings of the study included the following: (1) the programs and settings exhibited different patterns of environmental factors; (2) the relationship between exposure to basic skills and programs and settings was not the same for all programs and setting i.e., classrooms were significantly higher on exposure to reading and writing skills, while psychomotor and reasoning skills were more frequently used in the work site; (3) the environmental factors, when combined into the six factors of importance, support, control, complexity, feedback, and relational, affected the use of different basic skills. The study concluded that career and vocational education programs can provide students with as much exposure to basic skills as they would have in a traditional classroom. Further research is needed to clarify these issues and to establish causal relationships. (KC)

ALTERNATIVE ENVIRONMENTS FOR BASIC SKILLS DEVELOPMENT

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FOREWORD

Past research has shown that on-the-job experiences may improve basic skills attainment. Prior to this study, relatively little was known about the variables characterizing these experiences and how they are related to basic skills development. The results of this study, Salient Variables in Alternative Learning Environments that Influence Vocational Students' Basic Skills Acquisition and Retention are intended to fill this void by (1) identifying program and setting factors that may influence basic skills performance and (2) describing patterns of co-exposure to basic skills and different environmental factors.

Evaluators, researchers, and curriculum designers comprise the target audience of this report. The purpose of the document is to present a picture, both graphically and verbally, of environmental factors in classroom and work sites that may contribute to basic skills development. Data were collected during 193 observations in three cities. The programs included two experience-based career education (EBCE) models, a cooperative distributive education program (DE), and an academic/college preparatory program. Twelve observers were trained to collect the data. Observation periods lasted on the average nearly an hour. A naturalistic observation technique to collect data and a heuristic framework to describe observations were employed. The researchers used the method of log-linear models for multiway frequency tables to analyze data.

Many people have spent considerable time and energy on this study. While the students, teachers, school administrators, employers, and cities that participated in this study must remain anonymous, we sincerely thank them for allowing the observers the freedom to collect the data as was necessary. Special appreciation is extended to Harry F. Silberman, Professor of Education, University of California at Los Angeles, for his thoughtful review of this report. Technical papers used in the design of the study were prepared by Henry C. Ellis, Professor of Psychology at the University of New Mexico, and by David Thornton Moore, Director of Cooperative Education at the Gallaton Division of New York University. Robert MacCallum, Associate Professor of Psychology at The Ohio State University, provided technical assistance during the data analysis stage of the project.

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Robert E. Taylor
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EXECUTIVE SUMMARY

Functional illiteracy among seventeen year olds in the United States may run as high as 13 percent. A major concern of employers, educators, and the federal government is that schools are not providing youths with sufficient exposure to basic skills to enable them to enter the labor market successfully. A related concern is that skills learned in the classroom are not the same as the skills needed in a work environment. Achievement of basic skills, as tested by measures reflecting how these skills are taught in school, does not predict effective work performance. Relatively little is known, however, about the characteristics of school and work environments that might be causing these differences, and what type of environment best facilitates basic skill development.

This study focused on the identification and description of environmental characteristics and their relationship to basic skills exposure.

The objectives of this study were as follows:

- To identify the major factors that characterize environments in which learning is intended to occur
- To delineate patterns of co-exposure to basic skills and environmental factors in classroom and work site settings

The intended audience for this technical research report is educational researchers, vocational planners, curriculum designers, and evaluators who are interested in secondary education.

The intended use is to assist program developers in designing learning experiences incorporating the environmental factors that increase students' acquisition of basic skills and to contribute to evaluation methodology for assessing program effectiveness.

Four programs were selected for participation that emphasized different arrangements for learning. The first two programs were different models of experience-based career education (EBCE), the third was a cooperative distributive education (DE) program, and the fourth was a traditional academic program that included part-time work. All programs had a work site as well as a classroom component.

Observations were recorded live in the form of comprehensive field notes. Observers were trained over a period of twenty hours using videotapes and note-taking sessions in the field until they were able to achieve a high degree of accuracy. Overall, 193 observations of forty-five students were obtained.

The unit of analysis for the observations was the task episode. A task episode is a period of time in which the individual's focus of attention is constant. It refers to a segment of activity aimed at the completion of some identifiable goal. Therefore, it is event dependent, rather than defined by an arbitrary unit of time. The use of task episodes enabled the observers to identify instances of basic skill use, as well as capturing the characteristics of the environments. Six basic skills were identified for observation: psychomotor, reading, computing, speaking, reasoning, and writing. Twelve environmental factors were defined. They are simultaneous tasks,

split tasks, feedback, centrality, articulation, self-initiation, negotiation, supervisor present, co-worker present, and relational behaviors of taking direction, working cooperatively and giving directions. Past research has indicated that factors comparable to these were important determinants of environments.

Since the data were categorical in nature and collected in the form of frequencies, they were analyzed using the log-linear model for multiway frequency tables. This technique provided statistical tests of whether the dependent variable is a function of the level of the independent variable. Results are presented as chi-squared tests of significance.

The findings of the study indicated the following:

- The programs and settings exhibited different patterns of environmental factors. Nine of the twelve factors showed significant differences among the four programs; eight of the twelve factors discriminated between classroom and work settings.
- The relationship between exposure to basic skills and programs and settings was not the same for all programs and settings. Some of the basic skills occurred significantly more frequently in one of the programs than the other three. Classrooms were significantly higher on exposure to reading and writing skills, while psychomotor and reasoning skills were more frequently used in the work site. The use of computing and speaking skills was not different in the two settings.

- When the co-exposure of basic skills and environmental factors was examined, few statistically significant results were obtained; those that were found did not lend themselves to any meaningful interpretation.
- To provide a more powerful framework, the environmental factors were combined into six factors: importance, support, control, complexity, feedback, and relational.
  --The factor importance refers to whether the task is central to the mission of the organization, and whether other workers must rely on the student's work to complete their own tasks. Importance had a significant effect on psychomotor, reading, writing, and reasoning skills exposure. A moderate level of importance was associated with the use of all four of these skills.
  --Support refers to the presence of other people, either co-workers or supervisors. The level of support impacted significantly on psychomotor, reading, speaking, and writing skills exposure. For this factor, a high level of support led to more frequent use of basic skills.
  --Control is the amount of autonomy a student has in carrying out required work activities. The control factor impacted significantly on reading, computing, and reasoning skills, but in different ways. Reading and reasoning were associated with a moderate level of control while computing was related to a low level of control.

--The complexity of a task is a function of whether the student is performing either one task at a time or two or more tasks simultaneously; also, whether the task either can be completed without interruptions or must be stopped and then resumed at another time. Psychomotor, reading, and writing had significant results from task complexity. Tasks that were low in complexity were associated with the presence of basic skills.

--Feedback is receiving information on how well a task was carried out. Feedback was not significantly related to use of any of the basic skills.

--Relational refers to whether a student was taking directions, working cooperatively with others, or giving directions. The only significant relationship with basic skills exposure was for speaking. A moderate level of relating (i.e., working cooperatively with others) was associated most strongly with speaking.

Concern over high illiteracy rates has led many individuals to advocate a return to the concept of traditional, academically oriented classrooms. It is felt that this type of learning environment is the one that will provide students adequate opportunities to learn and practice basic skills.

Results of this study indicated that career and vocational education programs can provide students with as much exposure to basic skills as they would have in a traditional classroom. Contrast tests of the two EBCE programs and the DE model with the

academic classroom and part-time work combination showed that in 89 percent of the cases, vocational and career education students used basic skills as often or more frequently than their academic counterparts. A related issue is what environmental factors appear to enhance basic skills exposure. Of the six factors identified, importance and support were most frequently associated with exposure to basic skills.

These findings are, of course, tentative. More research will be needed to clarify these issues.

Since personal characteristics of students and achievement scores were not obtained for this study, a logical next step would be to obtain these measures within the context of an experimental research design. Using the methodology developed this year would permit the framework to be broadened and some causal relationships established. Another recommendation is that the observational methodology be further refined, so as to portray the existing environments more accurately.

CHAPTER 1

INTRODUCTION

Basic skills are essential to successful participation in American society. Whether in school, at home, in the community, or on the job, basic skills are a must for functioning effectively and for attaining upward mobility. Of these life arenas, school and employment settings are perhaps the most critical since they are typically viewed as the primary sites for learning and applying basic skills. Without doubt, such skills are crucial to demonstrating employability and occupational competence.

Federal Attention to Basic Skills

The development of basic skills that will allow for successful participation in American society has become a priority issue of the federal government. Recent federal legislation, such as the Job Training Partnership Act (U.S. Congress 1982) (P.L. 97-300), Title II, Part A--Adult and Youth Programs, refers to basic skills training and literacy training as important program activities for youth and adults. Section 204, Part A of the act states that

> services which may be made available to youth and adults with funds provided under this title may include, but need not be limited to . . . remedial education and basic skills training. . . . (p. 42)

Federal initiatives for improving basic skills achievement levels are usually tied to functional literacy levels reported for U.S. population segments. For example, the recently released report A Nation at Risk: The Imperative for Educational Reform (National Commission on Excellence in Education 1983) states the

following: "About 13 percent of all 17 year olds in the United States can be considered functionally illiterate. Functional illiteracy among minority youth may run as high as 40 percent" (p. 8). The U.S. adult population shares a similar burden in that some 23 million American adults are considered to be functionally illiterate "by the simplest tests of everyday reading, writing, and comprehension" (p. 8). Recommendations by the National Commission on Excellence in Education include strengthening the high school curriculum requirements for the five new basic skills, including English and mathematics.

The key role of basic skills in adult education is readily apparent in provisions of the Adult Education Act (P.L. 95-561). Section 302 of this act states that

> it is the purpose of this title to expand educational opportunities for adults and to encourage the establishment of programs of adult education that will (1) enable all adults to acquire basic skills necessary to function in society. . . . (p. 656)

These examples of federal reports and legislation are evidence of the importance attached by the federal government to basic skills achievement and application.

Basic Skills and the Work World

Why has the concern over basic skills heightened? Not only the government is concerned. "Employers seem to expect schools and training programs to deliver the basics, if nothing else" (Datta 1982, p. 140). Most contemporary occupations, including those considered to be entry level, have become more sophisticated and require basic skills that were not considered essential a few years ago. The lack of these skills (i.e., communication,

comprehension, and computation) has been recognized to be "the most serious barrier" keeping low-income and minority youth from "successful entry into the labor market" (Corman 1980, p. 1).

Many training programs provided by employers in business and industry attempt to include some basic skills instruction so that workers can function productively and safely on the job. It would appear that these programs and other corrective actions by employers (particularly those offering entry level-jobs) point to the failure of secondary public education to teach basic skills. But recent research suggests otherwise. Perhaps the most critical recent finding, in terms of its impact on education and employment, is that basic skills attainment in school settings and work settings may be quite different from each other. Datta (1982) reports that the "achievement of basic skills, as tested by measures reflecting how these skills are taught in school, seems to predict [so] poorly to work performance" (p. 151). Datta later concludes that "literacy needed for employability is different (at least for work not presently requiring a college degree or advanced professional training) from the literacy needed for further schooling, a finding which, if verified, would indicate that some restructuring of literacy-related curricula may be urgently needed" (p. 151). These findings suggest that a critical issue in basic skills development may not be whether or not schools are teaching basic skills. Rather, the point may be that settings outside the classroom require basic skills applications with which students are unprepared to cope.

Some interesting questions emerge from this change of focus from basic skills within classrooms to how they are used in employment settings. For example:

- Who learns which basic skills, where, best?
- What types of basic skills are demanded in various educational and employment settings to which secondary students are exposed?
- What set of factors describes or characterizes these settings, and how are these factors related to basic skills exposure?
- Are there secondary programs whose basic skills exposure differs according to the program setting? For example, do distributive education students gain more exposure to computation at the work site or in the classroom?

Research on School Instruction of Basic Skills

Typically, programs designed to prepare people to enter or reenter the labor market (e.g., secondary and postsecondary vocational education, CETA, military training, and employer-sponsored training programs) include components that focus upon providing those who are being trained or retrained with concrete, on-the-job work experiences. Past research has shown that such experiences may influence the basic skills attainment of those affected (Crowe and Harvey 1980; Scribner and Cole 1978). Other related research (Huff et al. 1977; Kirsch and Guthrie 1977-78; Larson 1979; Northcott 1975; and Sticht et al. 1972) clarifies this influence. These findings suggest that, when instructional

efforts to improve basic skills are tied directly to an area of application via such "functional" experiences, substantially improved, job-related basic skills and higher overall training payoffs can be expected. Relatively little, however, is known about the variables characterizing these experiences and how they are related to the demand for basic skills usage. The question remains, for example, as to which conditions of supervision relate to basic skills performance in positive or negative ways.

It is generally recognized that learned behavior is a combined function of the characteristics of the individual and of the situation or environment in which that behavior is both acquired and demonstrated. A growing body of research emphasizes the applicability of a paradigm that includes both individual differences and environmental effects in a joint capacity as determinants of behavior (e.g., Cronbach 1969; Hunt 1975; Cronbach and Snow 1977; Goldstein and Blackman 1977; and Karlins et al. 1967). A particular learning environment may or may not be appropriate, depending on the individual. A number of these researchers maintain that the "traditional" classroom environment is not optimal for all students.

This line of research has focused mainly upon the psychological assessment of individual learners. It has not dealt as much with the identification and measurement of variables that characterize the environments within which learning occurs. Nevertheless, a somewhat limited number of studies have been conducted that have advanced the development of environmental assessment techniques (e.g., Stern 1970; Craik 1971; Moos 1975).

What remains is to integrate such environmental assessments with data regarding individual differences. Only then will we be able to venture predictions about the behavior of learners in alternative learning environments (e.g., work "stations" that involve concrete, on-the-job work experiences) as well as in "traditional" classroom situations. The relationship among these variables may be expressed symbolically by the equation I x E = B where I = individual differences, E = environmental characteristics, and B = learned behavior.

Scope of This Study

This study focuses on the identification and description of environmental characteristics ("E") and their relationship to basic skills exposure. The "I" and "B" components of the equation, as well as the "E" component, will be addressed in future work.

During this initial research effort, specific steps were taken toward realization of the long-range research goals. These steps are reflected in the following objectives:

- To identify the major factors that characterize alternative programs and settings in which learning is intended to occur and that may have potential for affecting learner's basic skills performance
- To delineate patterns of co-exposure to basic skills and environmental factors in classroom and work site settings
- To conduct a feasibility analysis in order to prepare a Federal Education Data Acquisition Committee submission

regarding a longitudinal assessment of students' basic skills development

This study conformed to the contractual restriction that data collection activities during this contract period were not to be a burden to students. This included the stipulation that students were not to be interviewed or tested by the researchers. To meet these contractual conditions, the selection of programs capitalized on the availability of an ongoing National Center project--Youth-at-Risk: Employability Factors study. This project had established research relationships with LEA administrators and seven different vocational, career, and CETA program coordinators and was in the process of developing a longitudinal database on student, teacher, and employer perceptions of employability development.

The study involved four secondary public school programs located in three cities. Each program provided students alternative ways to acquire basic skills. Observations were collected at selected classrooms and work sites within two experience-based career education (EBCE) programs, one cooperative distributive education (DE) program, and one traditional academic classroom. For the classroom settings, 71 observations were obtained, which represents 37 percent of the total number of observations. For the work site settings, 122 observations--or 63 percent of the total observations--were secured.

The intended audience for this technical research report is educational researchers, vocational planners, and evaluators who are interested in secondary education. The intended use is to

assist program developers in designing learning experiences incorporating the environmental factors that increase students' acquisition of basic skills. Another intended use is to contribute to evaluation methodology for assessing program effectiveness.

The descriptive framework undergirding the design of the study is discussed in the next chapter. Methodological and analysis considerations are presented in chapter 3. The last two chapters deal with findings of the study, their implications for basic skills applications in school and work environments, and recommendations for future research.

CHAPTER 2

DEVELOPMENT OF A FRAMEWORK

The intent of this study is to examine basic skills development within the contexts of four classroom and work site program settings:

- Experience-based career education (EBCE) model$_1$
- Experience-based career education (EBCE) model$_2$
- Cooperative distributive education
- Academic/college preparatory program

This examination required a departure from methodology frequently cited in the literature. The focus of much of this research has been on student achievement of basic skills as related to student age, sex, grade level, and other background characteristics. Other studies dealing with the differential effects of various teaching methods and curriculum approaches on basic skills achievement have also been cited. These studies commonly employed experimental treatment and control designs in controlled laboratory environments to assess basic skills achievement.

Tracing Reasons for the Methodology Departure

The focus on environmental characteristics in the present study required that students be observed responding to the demands and limitations of environment in various real-life settings. To capture information from these settings, it became necessary to use a naturalistic observation technique to collect environmental information and to develop a heuristic framework for describing the phenomena observed.

The development of a framework for describing environments in which basic skills are learned and/or applied began with a review of the literature on human learning. Much of this literature is tied to classical learning theories. Such theories were developed and tested within laboratory settings and specific learning contexts. Acquisition and retention, for example, are cognitive processes involved in human learning. Their effects are usually described in terms of the experimental treatments and controls involved in their study.

To illustrate this point, a review of the literature on classical learning theory by Crowe and Harvey (1980) reveals that several variables having a potential effect on acquisition are task meaningfulness, task difficulty, stimulus-response similarity for tasks, and depth-of-processing procedures. Variables suggested as influencing the retention of learned behavior include spaced versus massed practice, two or three tasks learned simultaneously, the learning of interference tasks, length of retention interval, and reinforcement schedule. These variables were translated into experimental designs that employed artificial tasks and were studied under controlled conditions in a laboratory (or other artificial environmental) setting.

The current study, by contrast, focuses on naturalistic settings, using naturalistic observation techniques that do not allow control or manipulation of the components of those settings. Further, cognitive processes such as acquisition and retention have few, if any, observational correlates. For these reasons, the application of studies on classical learning to the current study is limited.

One can, however, measure the outcomes of cognitive processes. That is, one can measure what has been learned and what has been retained. To study such outcomes and the variables that affect them requires that one look at the unique composition of each learning environment. That is, the context-specific variables that affect cognitive processes such as acquisition and retention in one environment may not operate or may operate differently in another environment. Gagne (1977) has commented that

> it has not been possible to "reduce" one variety of learning to another, although many attempts have been made. In addition, there are many instances of learning that these prototypes (of learning) apparently do not represent. There seems, in fact, to be varieties of learning that are not considered by these standard examples; their representativeness of actual learning phenomena is not at all comprehensive. (p. 18)

Since, as mentioned earlier, naturalistic observation often does not permit easy identification of variables affecting cognitive processes such as acquisition and retention, the observer can only infer what those variables are and when they are operating. Extensive interviewing of subjects after observation periods might help to clarify the events observed. Cognitive processes, however, such as acquisition and retention, are complex phenomena; and the testimony of the participants observed often does not provide the information needed to define the presence of these processes and the important contextual variables that influence their operation. Moore (1981), quoting from Cole, Hood, and McDermott, writes that

> propositions about thought and learning observed from laboratory studies cannot be generalized to naturally occurring settings, suggesting that social scientists

> interested in how people think and learn outside of experimental contexts must find ways to describe natural environments. . . . Each setting and the activities in it must be analyzed for motives that organize it, the (possible multiple) goals that are being sought, and features of the environment relevant to each possible task/goal (i.e., stimula) in order to discover the structure of the activity that is thinking. (p. 228)

For these reasons, the current study has not sought to describe the relationships between basic skills performance and environmental characteristics in terms of classical learning theories that employ variables such as acquisition and retention. Rather, a modified version of Moore's task analysis framework is used to describe classroom and work site environments and their demand for basic skills applications.

Task Analysis Framework

Moore and his colleagues generated an empirical base on which to build a coherent theory of the social structuring of pedagogy and curriculum in nonclassroom environments. They focused on the process by which participants in a social setting organize their interactions in such a way as to make learning possible.

Focus on Task Episodes

Moore's work was the most influential in the present study since his methodology focuses on the process by which students encounter and accomplish tasks, the general features of the environment, and their impact on learning. Moore identified, for example, the task episode as the unit of analysis. The task episode consists of a process by which a student encounters a

problem, works on it, and receives information about the quality of performance. The task episode is event dependent, rather than time dependent. That is, a task episode is defined as that segment of time in which the individual's focus or foci of attention is/are constant. The length of the task episode is a function of the type of activity being performed; it is not, therefore, dependent on any arbitrary unit of time.

According to Moore, task episodes consist of two dimensions: logical-technical features and pragmatic features. Logical-technical features include the skills, information, operations, and resources one would need to perform the task adequately. For example, what physical or psychomotor skills are needed? How complex is the task--that is, how many components, operations, logical relations, and modalities does it involve? How much space and time are required to do the task? What relational or affective skills are necessary? The pragmatic features are the relationship between the tasks themselves and their specific social situations. For example, how central and essential is the task to the effective operation of the organization? What social prestige or status is attached to the performance of the task? Does this task qualify a person technically or pragmatically for other higher, more complex work?

Moore also identified three stages in the task episode:

1. The establishing stage involves the subject's initial encounter with a problem. It includes the process by which the subject gets information from the environment about what the task is, what it takes to do it,

and criteria by which performance will be judged. Important questions at this stage include the following: Who initiates the task as something the subject will do? In what form or channel is information provided about the tasks? To what extent can and does the subject negotiate the terms of the task? How much discretion does the subject have to choose the means of doing the task?

2. The accomplishing stage involves the process by which the subject uses information, materials, and other people to get the job done. Important questions at this stage are as follows: To what extent does the subject follow mandated procedures or, conversely, create new solutions? How many and which other persons are available for support, assistance, or guidance? How many and what kinds of resources and information are made available?

3. The processing stage involves the activities that provide information to the subjects through which they may first judge the quality of their performance and rethink their performance. There are four important questions at this stage: Who provides the processing? What form does the processing take? Judging from the performance according to explicit or implicit criteria, to what extent is the processing evaluative? To what extent does the processing occur simultaneously with the accomplishing phase, and to what extent are they separate in time and place?

Dependent and Independent Variables

Using Moore's framework as a starting point, project staff developed a framework for identifying and describing the acquisition of basic skills in four environments. Moore's logical-technical dimension was represented in the current study by the presence or absence of six basic skills. The six basic skills are defined on page 59 and are as follows: psychomotor, reading, computing, speaking, reasoning, and writing. For purposes of analysis, the six basic skills were considered to be dependent variables in the study. Independent variables, defined on page 60 and corresponding to other aspects of Moore's framework, consisted of six environmental attributes. The first attribute, importance (Moore's pragmatic dimension), is a composite of two factors: centrality and articulation. The second attribute, control (Moore's establishing phase), is a composite of initiation and negotiation factors. The presence or absence of feedback (Moore's processing phase) is the third attribute. Support (Moore's accomplishing phase), is the fourth attribute and refers to whether a supervisor or co-workers are present or absent. Complexity (not used as represented in Moore's framework) is the fifth environmental attribute and has split task and simultaneous composite factors. The final attribute, relational behavior, refers to the role that the student plays during the exchange of information.

Environmental Factors

The environmental factors (e.g., centrality, articulation), as well as the list of basic skills and their interrelationships,

were derived from Moore's framework. Selected questions he posed to identify the major components of his framework have been translated into operational concepts. For example, to identify logical-technical features of his framework, one of the questions Moore posed was, "How complex is the task?" Similarly, to identify pragmatic features, he asked, "How central and essential is the task to the effective operation of the organization?" These questions were translated into the concepts of complexity and centrality for the present study.

It was necessary to redefine some of these concepts using terms that facilitated their observation in classrooms and work sites. For example, complexity was redefined as consisting of split tasks--those task episodes that are started, interrupted, and resumed--and simultaneous tasks, two or more task episodes occurring at the same time. In this fashion the following ten environmental factors were adopted for study:

1. Centrality - Tasks that constitute the goals/mission of an organization.
2. Articulation - Relationship of the task episode to other tasks in the observational setting. That is, someone depends on the completion of the task as part of their job.
3. Initiation - A response to motivation within the student--either self-induced or induced by others--that results in beginning a task.
4. Negotiation - The student's modifying the terms of the task episode through a process of reaching mutual agreement with the supervisor/teacher.
5. Supervisor presence - The presence of a supervisor during the task episode.

6. Co-worker presence - The presence of a co-worker during the task episode.

7. Feedback - Information provided by a supervisor/co-worker about performance.

8. Split tasks - Those task episodes that are started, interrupted, and resumed.

9. Simultaneity - Two or more task episodes occurring at the same time.

10. Relational behavior - Student skills such as giving directions, working cooperatively, or taking direction.

These variables, derived from Moore's framework, are anticipated to occur in various combinations or patterns that can be used to describe or compare environments. Thus, school programs such as EBCE, traditional academic, or cooperative vocational education may be viewed as reflecting various combinations of the ten environmental factors. These combinations allow comparison and contrasts to be made on a common conceptual basis.

Summary

It should be apparent from this discussion that Moore's task analysis framework was not applied in toto to the present study. It was not intended that there should be a one-to-one correspondence. This study was not undertaken to test his "nascent theory of situations" that addresses potential learning situations in nonclassroom environments. His framework does provide, however, a useful way of analyzing environments. It also poses a series of important questions that one might ask to identify important structural features of environments. Additionally, his focus on

task episodes provides the advantage of keying in on observable phenomena--a critical design consideration in the present study.

As the conceptual development of the framework proceeded, a review of other bodies of literature was carried out to determine whether any of the ten variables or correlates of them had been studied within the context of other conceptual schemes. This inclusion would reinforce their significance as environmental descriptors. One such body of research that reflected these relationships was that of task design. The following section discusses the job characteristics model within task design theory and points out some similarities between the task design model's components and the ten factors derived from Moore's framework.

Task Design

The most widely cited theory of task design today is the Job Characteristics Model (Hackman and Oldham 1976 and 1980). This model focuses on the conditions necessary for an individual to become internally motivated to perform effectively on the job (see figure 1). Hackman and Oldman described five characteristics, called job dimensions, that they hypothesized were present in every job in varying amounts. These five characteristics are (1) skill variety, (2) task identity, (3) task significance, (4) autonomy, and (5) feedback. Their definitions follow:

Skill variety - The degree to which a job requires a variety of different activities in carrying out the work, involving the use of a number of different skills and talents of a person

Task identity - The degree to which a job requires completion of a "whole" and identifiable piece of work--that is, doing a

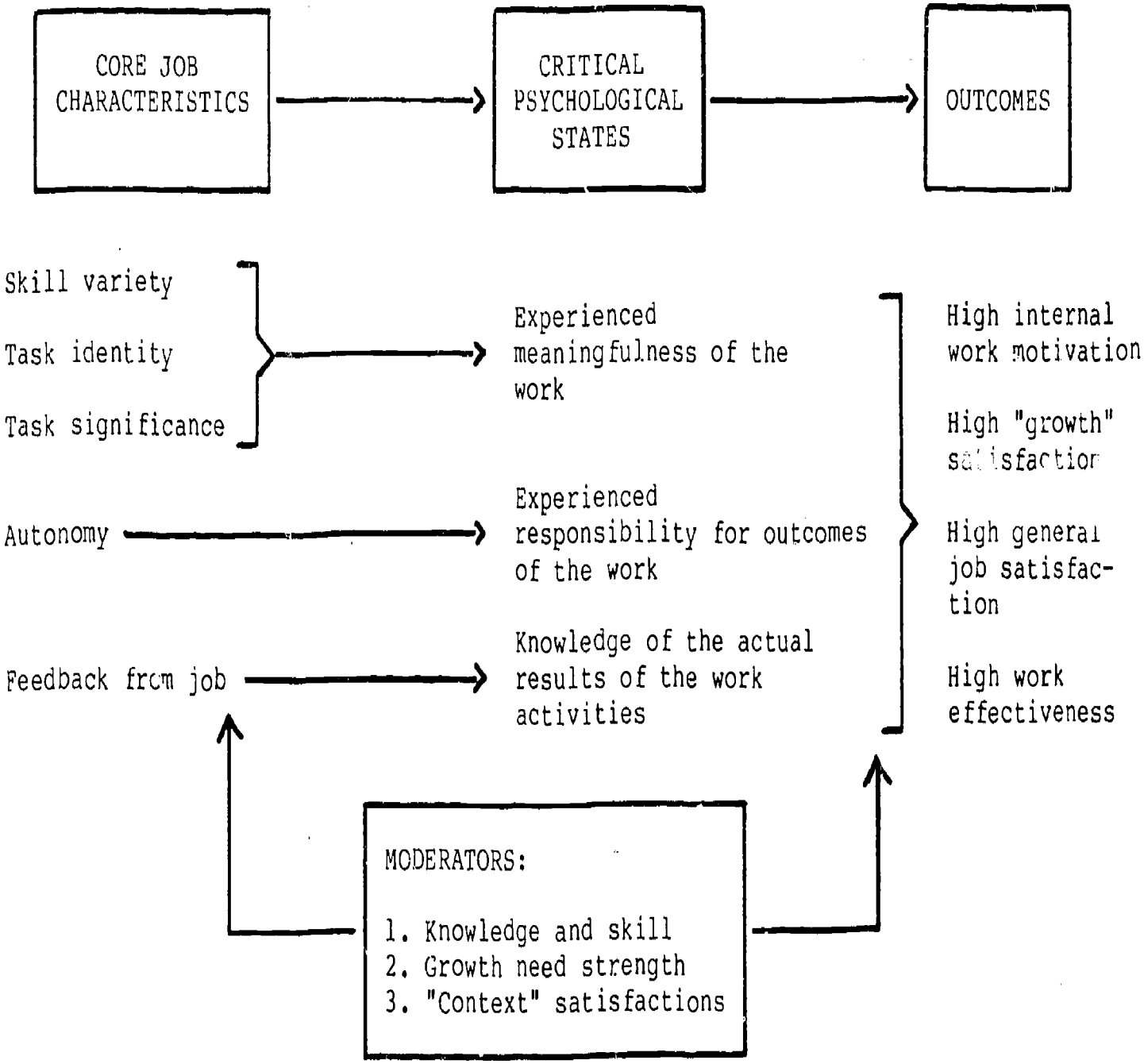

Figure 1. The job characteristics model

SOURCE: Hackman and Oldham 1980, p. 90.

job from beginning to end with a visible outcome

Task significance - The degree to which the job has a substantial impact on the lives of other people, whether those people are in the immediate organization or in the world at large

Autonomy - The degree to which the job provides substantial freedom, independence, and discretion to the individual in scheduling the work and in determining the procedures to be used in carrying it out

Feedback - The degree to which carrying out the work activities required by the job provides individuals with direct and clear information about the effectiveness of their performance

Critical Psychological States

These five job dimensions impact on three critical psychological states: experienced meaningfulness of the work, experienced responsibility for outcomes of the work, and knowledge of the actual results of the work activities. The authors of the task design theory hypothesize that (1) skill variety, task identity, and task significance will impact on experienced meaningfulness; (2) experienced responsibility will result from autonomy; and (3) feedback will lead to knowledge of results.

The psychological states lead to several personal and work outcomes--high internal work motivation, high "growth" satisfaction, high general job satisfaction, and high work effectiveness (quality and quantity of work). All of these outcomes are expected to be more prevalent in jobs with high motivating potential than in jobs with low motivating potential (Hackman and Oldham 1980).

There are three individual variables that can moderate the relationship between either the core job characteristics and the critical psychological states, or the psychological states and desired outcomes--they are knowledge and skill, growth need strength, and satisfaction with the work context. If workers lack enough knowledge and skill to perform the required activities, have low needs for accomplishment and growth, or are dissatisfied with aspects of the work such as pay or supervision, then they may not respond positively to jobs high in motivating potential.

Environmental Factors and Job Dimensions

Hackman and Oldham tested their job characteristics model on sixty-two different jobs involving 658 employees. The results generally verified their model's predictive validity. The specific findings from that study will not be discussed since its importance to the current study resides in the significance of the relationships between the model's job dimensions and the ten environmental factors postulated in the current study. These relationships are depicted in the following diagram.

Environmental Factors	Job Dimensions
Simultaneity Split task	Skill variety
Centrality Articulation	Task significance
Relational behavior Initiation Negotiation	Autonomy
Feedback Supervisor presence Co-worker presence	Feedback

A discussion of the relationships follows.

Simultaneity and split tasks--skill variety. Tasks that must be performed simultaneously, as well as those that are interrupted by other tasks before completion, require that the worker use a broader range of skills in carrying out the work (i.e., task variety). Completion of simultaneous tasks and split tasks will also require a greater cognitive effort or allocation of capacity than completion of single, uninterrupted tasks. Ellis (1983) discusses cognitive effort as one of the basic processes that are fundamental to learning and memory. Thus, simultaneous task and split task attributes have research correlates in classical learning theory as well as task design theory.

Centrality and articulation--task significance. Tasks that are central to the organization and impact on workers have greater significance for them. Also, if tasks performed by some workers are dependent on the performance of tasks by other workers (i.e., articulation), a higher level of task significance is perceived. Thus, articulation and task significance can also be viewed as related concepts.

Initiation and negotiation--autonomy. Being able to initiate tasks and to negotiate the conditions (e.g., time, place, procedures) for completing the tasks gives a greater feeling of independence to the worker. This sense of independence is an important concept represented in the job dimension of autonomy.

Feedback, supervisor and co-worker presence--feedback. Several of the environmental factors are related to the job

dimension of feedback. One factor, feedback, is identical to its job dimension counterpart. Co-worker and supervisor presence also relate to feedback in that their presence provides opportunity for feedback. On the other hand, absence of a supervisor suggests the influence of the autonomy dimension in that the worker may have more independence to control work schedules and procedures.

The presence of others in work site settings has implications for learning that Coleman (1976) has noted. Addressing the effects of other persons on learning in experiential situations, he states that

> the importance of the other persons in the action setting provides an additional affect or emotional involvement that arises in an interpersonal setting. This both increases the motivation and provides an associative structure of events in memory that helps insure that whatever has been learned is not lost. (p. 60)

Later he comments that

> this intrinsic reward of accomplishment is stronger if the successful actions are in the context of other persons: either actions toward the other persons or in some other direct relation to them, in a realistic setting. (Ibid.)

Summary

This discussion is intended to illustrate the importance of the ten environmental factors or their correlates to research being conducted in other fields. The descriptive framework comprised of ten factors represents an eclectic approach. Its theoretical roots are diverse and include microethnography, sociology, anthropology, and psychology--disciplines that Moore lists as background for his approach toward analyzing social

situations. It is apparent that task design theory also has relevant contributions.

The intent throughout the development of this study's approach was that it be based on observable phenomena in realistic settings and that such phenomena be manipulated to produce desired outcomes. These requirements must be met if the results of this research are to benefit basic skills performance in school and job settings.

CHAPTER 3

RESEARCH METHODOLOGY AND DESIGN

The intent of this study, which was to examine environmental factors that are related to basic skills development in natural settings, required that naturalistic observation techniques be used to collect data. The naturalistic approach was viewed as involving five components:

1. Program environments and participants to observe
2. A strategy for conducting observations
3. A system for classifying and recording observations
4. Materials for training observers
5. A training program for preparing observers to collect, record, and classify observational data

Each of these components and its development are described in detail in the following sections of this chapter.

Selection and Description of Programs and Participants

To obtain observations of classroom and work site environments, four programs were selected that emphasize different arrangements for learning. Each program is characterized by a different combination of activities and of time students spend in the classroom and in the work site settings and represents an alternative pathway in which learning may occur. The key program features are illustrated in table 1. The first two programs are different models of experience-based career education (EBCE) programs; the third program is a cooperative distributive education (DE) program; the final program is a traditional academic or college preparatory program.

TABLE 1

PROGRAM COMPARISON OF KEY FEATURES

KEY FEATURES	PROGRAMS			
	Experience-based Career Education (EBCE) Model$_1$	Experience-based Career Education (EBCE) Model$_2$	Cooperative Distributive Education	Academic/College Preparatory
Type	Resource for Better Schools Model	Appalachian Education Laboratory's Model	Cooperative Education	Traditional College Preparation
Location	Northeast, urban center, alternative high school program within a comprehensive high school	Eastern central states, urban center, public high schools	Midwest, urban center, public high school	Northeast, urban center, comprehensive high school
Description	"Experience-based" learning allows for exposure to as many as 15 work sites. Provides students with realistic settings in which they learn about people and tasks associated with each particular work environment.	Permits students to earn academic credit through the practical application of academic principles in the work world.	Enables students to receive on-the-job training and some classroom education in fields related to marketing and management.	Prepares students for college-level study of the arts and sciences through the use of a structured academic program.
Purpose	To aid students in the development of realistic career and life goals, and to help them gain a broad understanding of the world of work and the various components within it.	To aid students in the development of realistic career and life goals, and to help them gain a broad understanding of the world of work and the various components within it.	To prepare youth for full-time employment in the distributive occupations--i.e., those concerned with the flow of goods and merchandise from the producer to the consumer.	To provide students with the requisite skills and knowledge necessary for success in the college-level academic environment.
Percentage of time for -Classroom setting -Workplace setting	Classroom: 83% Workplace: 17%	Classroom: 62% Workplace: 38%	Classroom: 22% Workplace: 78%	Classroom: 100% Workplace: 0

TABLE 1--Continued

KEY FEATURES	PROGRAMS			
	Experience-based Career Education (EBCE) Model$_1$	Experience-based Career Education (EBCE) Model$_2$	Cooperative Distributive Education	Academic/College Preparatory
Payment	None	None	Minimum or near minimum wage	
Length of program	Up to one year	Up to one year	One year	Three to four years
Type of work placement	Exploration and specialization one day a week in the community with the aid of community sponsors (Different positions)	Carefully planned work positions; community members essential partners in this type of learning (One position)	On-the-job training (Specific position)	None
Total credits required for graduation	12	18	17	12
Total credits given for program participation	1	12	3.5	one credit per year per academic subject
Type of credits given for program participation	Academic, elective	Academic, career, elective	Academic, vocational, or elective	Academic
Advisory committee	Yes	No	Yes	No

EBCE-Model$_1$ Program

The first program (EBCE-model$_1$) emphasizes experience-based learning in the form of exposure to many different work sites. In order to help students develop realistic career and life goals, this program sends students to actual work settings where they learn about both people and tasks associated with each occupation. Approximately 80 percent of the time that students invest in the program is spent in the EBCE classroom or in the traditional academic classroom. The remainder of the time is spent sampling occupations such as nursing aide, secretary, and computer technician. Students earn academic and elective credit by spending one day a week exploring the various vocational opportunities. Enrollment in the program for the full year allows students to rotate among as many as fifteen sites, enabling them to learn a great deal about many different career possibilities.

EBCE-Model$_2$ Program

The second experience-based career education program (EBCE-model$_2$) shares the same goal as the first model, that of helping students develop realistic career and life goals through an understanding of the world of work and the people associated with it. The EBCE-model$_2$ program is different from the EBCE-model$_1$ program in many ways, however. In the EBCE-model$_2$ program, emphasis is on earning academic credit through the application of academic principles in the work world. Approximately 60 percent of the time that students invest in the program

is spent in the classroom, while the remaining 40 percent is spent in the work setting. Students earn academic, career, or elective credits through the practical application of academic skills. In this yearlong program, students are placed in carefully planned work positions. Community members are an integral part of the program and are essential partners in this type of learning. For example, students interested in a career in journalism may be placed at a local newspaper. These students complete an activity sheet that delineates work site activities associated with concepts or principles of English. By completing the activities listed on the activity sheet, these students can earn English credits and gain experience in journalism at the same time.

DE-Co-op Program

The third program is a one-year cooperative distributive education (DE-Co-op) program. Students are prepared for full-time employment in the distributive occupations (those concerned with the flow of goods and merchandise from the producer to the consumer) through a combination of actual on-the-job training and classroom education in fields related to marketing and management. Students can earn academic, vocational, or elective credit in the program, and receive minimum or near minimum wage while in training. Approximately 80 percent of the time is spent in the workplace, while the remaining 20 percent is spent in the classroom. After graduation, DE-co-op students have the option of seeking full-time employment in the distributive occupations or

continuing their education in a technical or college-level program. An important part of this program is the Distributive Education Clubs of America (DECA), a local, state, and national organization for distributive education students. DECA is an activity designed to develop leadership skills, professional activities, and overall social growth of each individual.

Traditional Academic/College Preparatory Program

The fourth program studied was a traditional academic/college preparatory program. Typical of most comprehensive high schools, this program prepares students for college-level study in the arts and sciences through the use of a structured academic system. All of the students' time is spent in the classroom in an effort to provide them with the requisite skills and knowledge necessary for success in a collegiate academic setting. Students earn academic credits toward graduation in this three- to four-year program. Students who held down after-school, part-time jobs that they had found on their own also participated.

Selection of Participants

To achieve a typical sample of work assignments for each program, the researchers selected students based on their current workplace assignments. The observers and program coordinators then contacted students to explain objectives of the study. The students had the choice of participating or not participating in the study. Table 2 displays the job title and type of work organization for the students in each program who volunteered to participate. Overall, the students' jobs in this sample are

TABLE 2

LISTING OF STUDENTS' JOB TITLES AND WORK ORGANIZATIONS

Job Titles	Type of Organization
EBCE-Model$_1$	
Technician	Hospital (public)
Clerical worker	City government
Assistant aide	School for handicapped children
Clerical worker	City government
Records clerk	City government
Hospital volunteer	Hospital (private)
Animal caretaker	Animal hospital
EBCE-Model$_2$	
Communications technician's assistant	Fire department
Interior decorator's assistant	Small retail store
Fashion designer's assistant	Small retail store
Retail sales worker	Small women's clothing store
Technician's assistant	Cable TV company
Clerical worker	Health care center
Technician-clerical worker	Hospital (pharmacy)
Clerical worker	Small travel agency
Clerical dental assistant	Periodontist's office
Teacher's aide	Public high school
Equine assistant	Large museum and park
Clerical worker	Public gas company
Teacher's aide	Elementary school
DE-Co-op	
Mechanic's assistant	Medium-size garage
Courtesy clerk	Large retail grocery
Courtesy clerk	Large retail grocery
Cashier	Large retail grocery
Clerk-office worker	Large retail grocery
Sales clerk	Small retail drug store
Sales clerk	Large department store
Sales clerk	Large department store
Assistant manager	Local fast food store
Fast-food worker/cashier	National fast food store
Fast-food worker	National fast food store
Part-time Jobs	
Cashier	Small pharmacy drugstore
Food service worker	Small restaurant
Clerk	Small retail store
Cashier/clerk	Small retail shop
Clerical assistant	Small law firm

typical of the workplace assignments for students in each of the four programs. Table 3 displays the characteristics of the students who were observed. The distribution of the students' sex, race, and grade level in this sample is representative of the same characteristics of students in each program. For the forty-five students in this data set, approximately 40 percent are male and 60 percent are female; 60 percent are white, 30 percent are black and 10 percent are hispanic; and 10 percent are freshmen and sophomores, 40 percent are juniors, while the remaining 50 percent are seniors.

Development of an Observational Strategy

Recommendations and guidelines on observational methodology written by Patton (1980) were used to shape the strategy pursued in the current study. Patton writes thus in chapter 6, "Evaluation through Observation":

> The purpose of observational data is to describe the setting that was observed; the activities that took place in that setting; the people who participated in those activities; and the meanings of the setting, the activities, and their participation to those people. . . . The basic criterion to apply to a recorded observation is the extent to which that observation permits the reader to enter the situation. (p. 124)

Nine Observation Areas

Patton later provides procedures for taking field notes and offers guidelines for identifying some areas within which observations can be focused. These areas, termed sensitizing concepts by Patton, represented the first look at potentially observable phenomena that project staff anticipated in classroom

TABLE 3

CHARACTERISTICS OF STUDENTS IN THE SAMPLE

PROGRAMS	N	STUDENT CHARACTERISTICS								
		Sex (N)		Race (N)			Grade Level (N)			
		Male	Female	White	Black	Hispanic	9th	10th	11th	12th
EBCE Model$_1$	12	5	7	1	7	4	1	3	5	3
EBCE Model$_2$	13	3	10	11	2	0	0	0	5	8
DE-Co-op	11	5	6	9	2	0	0	0	0	11
Academic/College Preparatory	4	2	2	2	2	0	0	0	3	1
Part-time work	5	2	3	5	0	0	0	0	4	1
Total number of students	45	17	28	28	13	4	1	3	17	24
Percentage of total		38%	62%	62%	29%	9%	2%	7%	38%	53%

and work site settings. Nine sensitizing concepts were used to develop the observational framework:

1. Program setting
2. Human, social environment
3. Program activities and participant behaviors
4. Informal interaction and unplanned activities
5. The native language of program participants
6. Nonverbal communication
7. Unobtrusive measures
8. Programs documents and records
9. Observing what does not happen

These nine concepts were also used to screen the utility of the descriptive framework discussed in chapter 2 of this report. They provided project staff with insights concerning the feasibility of obtaining observational data for putting into operation the framework's major components, that is, the six basic skills and ten environmental attributes.

Instruments and Procedures

As the observational methodology was being formulated, much thought was given to the development of instruments and procedures for recording and classifying observational data. Rosenblum (1978) suggests that one begin this developmental process in an unstructured fashion:

> It is best to begin in the most unstructured fashion possible. There is great advantage to beginning such observations with only a pencil and blank pad for recording, putting aside . . . rigidifying constraints that must be imposed in separating wheat from chaff later on in the development of the research programs; it is vital to begin by using the incredible synthesizing and integrative functions of the human mind. (p. 16)

Following this advice, project staff began by observing a variety of people at work sites in the Columbus area. Detailed notes were taken regarding all events at the observation sites.

Details were added subsequent to each practice observation period, and all notes were then reviewed and thoroughly discussed. Discussions used guidelines from the observational framework to focus on what events were possible to observe and what events were desirable to observe to satisfy the theoretical or descriptive framework described in chapter 2. Hawkins (1982) states that

> the most important determinant of the choice of events to record is often a conceptual or theoretical issue. The research may be testing some major theory, evaluating a hypothesis regarding the probable effect of a given intervention or simply describing the frequency and the relationships in which certain events occur. (p. 23)

A System for Recording and Classifying Observations

Project staff conferred with David T. Moore in their efforts to relate their theoretical framework to an observational system including classification and recording procedures. In his review of the project work to date, Moore viewed videotapes made of several work sites that were representative of those scheduled for observation.

Student Behaviors

An important outcome of the consultation between Moore and project staff was a list of the student behaviors (i.e., events) to be observed and preliminary definitions of these behaviors. The definitions were based on work conducted by Moore (1981, 1983) Grannis (1978), and the U.S. Department of Labor (1972).

Comprehensive Field Notes

Another outcome of the meeting with Moore was the decision to record the observations in the form of comprehensi

field notes. This strategy would ease the observer's burden of having to record and classify events simultaneously. Instead, they would be able to concentrate on recording the events at hand and later add details to their field notes to complete an accurate portrayal of the events observed. At this point, or as soon as possible thereafter, the field notes were to be divided into task episodes (see chapter 2, "Development of a Framework"). Behaviors and activities within each task episode were then to be coded using the definitions that were being formulated and a coding strategy modeled after that devised by Halasz and Behm (1983). The format of their coding form was modified to incorporate both the ideas of task episodes as well as the specific behaviors related to environments and basic skills performance.

These developmental activities were fi[illegible]-tested in the Columbus area with subsequent reviews and refinements of procedures and instruments by project staff. After several field test review-revision iterations, the data collection process emerged as a manageable effort and reflected levels of reliability (see page 45) judged acceptable by project staff.

Criteria Applied to Methodology

Throughout the developmental process, project staff also searched for criteria that could be used to judge the acceptability of the methodology by professional standards reflected in the literature. Journal articles, texts, and other published sources--particularly those in qualitative evaluation methods and behavioral research--were reviewed for such information. A

discussion of the characteristics of observations with recommendations for achieving effective outcomes is presented by Kerlinger (1967) in Foundations of Behavioral Research. His discussion and recommendations (pp. 507-514) addressing six considerations for developing observation systems further shaped the project's direction. These considerations and their application to the current observation methodology are presented below.

1. Operational definition--Provide precise and unambiguous operational definitions of variables being observed.

Observers for the current study were provided extensive training by means of videotape and group instruction on procedures for recording and classifying the events in an observation period. Observers' responsibilities were first to record student behaviors and later to classify them into defined categories. After each observation period, which lasted fifty to seventy minutes, observers reviewed field notes of their observations and classified them into the variables defined for the study. For some variables (e.g., presence or absence of supervisor or co-worker), classification presented no uncertainties. For other variables (e.g., initiation and negotiation), classification of field notes required precise instruction during training on the observable features of the variable.

2. Categories--Provide well-defined categories for assigning variables based on the universe of behaviors to be observed.

In the current study, interest focused on the occurrence of six basic skills and relational skills and the attributes of environments in which they were observed. Each of these

observational variables was recorded as present or absent. In addition, for any of the basic skills observed to be present, a further breakdown of low level or medium level was recorded. Definitions of low and medium levels were provided to observers as part of their training activities.

3. Units of behavior--Select units to use in measuring human behavior that reflect acceptable levels of reliability and validity.

A molecular approach to recording observations was taken in the present study. Observers were trained by means of videotape to record all of the activities and conversation that involved the student subject during an observation period (e.g., "took box off shelf," "said hello to supervisor," "walked to window and observed outside scene"). Observers were cautioned not to be selective in recording behaviors. After each observation period was completed, recorded behaviors were then classified into task episodes, and within each task episode, into the categories of variables described earlier. Thus, initial recordings were molecular and then classified into molar behavior categories and concepts.

4. Degree of observer inference--Consider the amount of interpretation required to classify observations into behavioral categories.

Initial observations in the present study were molecular and required little, if any, inference on the part of the observers. Later reclassification of observations into molar categories was to be accomplished, which was aided by the extensive training

received by observers prior to data collection. The observers and trainers were prepared for the data collection through the use of videotape exercises, which increased the effectiveness of the training provided.

5. Generality or applicability--Consider the degree of generality to research situations other than those for which they were originally designed.

The observation system was considered to be in its developmental phase, with further refinement planned in future research applications. Since the focus of this system was an analysis of environments and their demand for basic skills performance, the potential for application spans a broad range of educational and work environments.

6. Sampling of behavior--Consider the method of obtaining observations.

According to Kerlinger (1967), event sampling has distinct advantages over time sampling:

- The event sampling unit has "inherent validity" because of its focus on "natural life like situations." (p. 512)
- An event sampling focuses on the complete behavioral event and thus "possesses a continuity of behavior that the more piecemeal behavioral acts of time samples do not possess." (p. 512)
- Event sampling is especially effective for rare events that can easily be missed by time sampling. That is, the event of interest is well defined, but occurs infrequently, event sampling is much more likely than time sampling to include that event during an observation. (p. 513)

The sampling unit employed in the current study was the task episode, an event sampling unit. This sampling unit was most appropriate since some of the variables of interest occurred

infrequently and might otherwise have been missed with time sampling techniques.

In addition to analyzing the observational system--using Kerlinger's characteristics of observations--staff applied a list of criteria for observation instruments developed by Herbert and Attridge (1975) to determine the strengths and weaknesses of the system. Table 4 contains an adapted list of their criteria and the degree of compliance that the task episode approach has with them.

After repeated field-testing and refinement of the observation methodology had been completed, the development of a training program was undertaken to prepare observers for the collection of data in work sites and classrooms. The next section describes procedures and details for developing various components of the training program, including materials development and the selection and training of observers.

Development of the Training Materials

To achieve the objectives of the data collection procedures, each observation required the completion of the following:

- Background Information Form--observation times and places, student and supervisor characteristics, environment characteristics, and interpretive comments
- Field notes--written descriptions of students' task behaviors
- Task Episode Coding Form--conversions of the written field notes to variables with specific values related to basic skills usage and environmental factors.

TABLE 4

APPLICATION OF CRITERIA TO OBSERVATION PROCEDURES AND FORMS

Criteria	Observation Procedures and Forms
1. Identifying Criteria	
1.1 Representative title	+
1.2 Statement of purpose	+
1.3 Underlying rational or theoretical support	+
1.4 Clearly specify the behaviors, Ss, and substantive content on which the instrument focused	+
1.5 Applications of instrument	?
1.6 Situations in which instrument should not be used	?
2. Validity Criteria	
2.1 Item characteristics	+
2.2 Inference	-*
2.3 Context	+
2.4 Observer effect	+
2.5 Reliability	+
2.6 Validity procedures	+
3. Criteria for Practicality	
3.1 Instrument items	+**
3.2 Observers	+
3.3 Collection and recording data	+

SOURCE: Categories and criterion (without subdivisions) are from Herbert and Attridge, (1975, pp. 4-18).

NOTE: A plus sign (+) indicates that a given criterion is addressed; a minus sign (-) indicates a possible weakness; a question mark (?) indicates a possible concern.

*Contact restrictions did not permit the observers to talk with the students.

**Since observers first recorded and later classified their observations, it was not necessary that observers memorize the codes or categories. Thus, the requirement that codes and categories be easily learned does not strictly apply.

With these requirements in mind, the purpose of the training materials was to ensure that observers could do the following: (1) accurately complete the background information forms, (2) consistently record the student's task behaviors and prepare field notes, (3) reliably identify task episodes from the written task behaviors, and (4) reliably code the task episodes using standardized procedures and definitions.

Use of Videotapes

To achieve these training goals, project staff used videotapes of workers in four different occupations and work settings--clerk-typist in a hospital setting, mechanic in a small garage, sales clerk in a small retail store, and a food preparer in a delicatessen. For training purposes these videotapes were divided into nine ten-minute segments. After two project staff observed each videotape segment, they prepared the background information form and field notes, and, using the written definitions of the variables, completed the task episode coding form. The coding forms were compared and when differences occurred, staff examined the differences and reached a consensus on the variable's value. This process, which led to revising or clarifying the definitions of the variables, provided more detailed and precise descriptions of the variables. The above process, repeated for all nine training tapes, resulted in a complete set of observation materials--a background information form, field notes, and task episode coding forms--for each training tape.

Completion of Training Materials

In addition to preparing the training tapes, staff assembled information on conducting systematic observations and procedures for contacting workplace supervisors to set up the observations. The training materials were pilot-tested with staff in the National Center's Development Division and the training plan revised based on the results of the pilot test. Appendix A contains the training plan, the definition of terms for coding the task episodes, the completed Background Information Form, field notes, and Task Episode Coding Form for training tape number 1. The reader may want to refer to these items as the training process is described in the next section.

Training of Observers

Two project staff trained four observers in each of the three cities. All the observers except one were female, and all possessed at least a master's degree in education. The following steps were carried out for each training session, which lasted approximately twenty hours. Each session began with a description of the project and a definition of terms and concepts. The following aspects of observer behavior when on-site were discussed: introductions, finding a place from which to observe that did not interfere with the worker and yet provided good visibility of the worker's behavior, and conversation with the workers or supervisors. Systematic observation methods, based on Patton's (1980) description of the purpose of observational research and what to look for were discussed.

Hands-on Training Activities

The trainees were then exposed to an entire unit of training materials, including videotape segment 1 (ten minutes of a clerk working in a hospital), field notes, a coding sheet, and the definitions of behaviors. Time was spent to ensure that the trainees understood the concept of task episode and the definitions (supplemental information was given to trainees on both of these topics). The trainees were then given an opportunity to take field notes on videotape segments 2, 3, and 4. The researchers and trainees compared the trainees' notes with the exemplary notes. Differences were discussed in an attempt to foster a shared definition of "good" field notes. Using the exemplary notes, the trainees were asked to divide them into task episodes. This activity was then reviewed to be sure a shared definition of task episode was being used. Using the exemplary task episodes, trainees then coded the notes using the definitions of behaviors. These were reviewed to determine areas of disagreement, which were discussed and resolved. The trainees then practiced field note taking, division into task episode, and coding as a unit of activity with the remaining videotapes.

The final activity of the training session was meeting with the school personnel to set up schedules for observations. At each site, the program coordinator made the initial contacts with the students and work site supervisors. Each observer then followed up on the initial contact to make final arrangements,

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Training of Observers

Two project staff trained four observers in each of the three cities. All the observers except one were female, and all possessed at least a master's degree in education. The following steps were carried out for each training session, which lasted approximately twenty hours. Each session began with a description of the project and a definition of terms and concepts. The following aspects of observer behavior when on-site were discussed: introductions, finding a place from which to observe that did not interfere with the worker and yet provided good visibility of the worker's behavior, and conversation with the workers or supervisors. Systematic observation methods, based on Patton's (1980) description of the purpose of observational research and what to look for were discussed.

Hands-on Training Activities

The trainees were then exposed to an entire unit of training materials, including videotape segment 1 (ten minutes of a clerk working in a hospital), field notes, a coding sheet, and the definitions of behaviors. Time was spent to ensure that the trainees understood the concept of task episode and the definitions (supplemental information was given to trainees on both of these topics). The trainees were then given an opportunity to take field notes on videotape segments 2, 3, and 4. The researchers and trainees compared the trainees' notes with the exemplary notes. Differences were discussed in an attempt to foster a shared definition of "good" field notes. Using the exemplary notes, the trainees were asked to divide them into task episodes. This activity was then reviewed to be sure a shared definition of task episode was being used. Using the exemplary task episodes, trainees then coded the notes using the definitions of behaviors. These were reviewed to determine areas of disagreement, which were discussed and resolved. The trainees then practiced field note taking, division into task episode, and coding as a unit of activity with the remaining videotapes.

The final activity of the training session was meeting with the school personnel to set up schedules for observations. At each site, the program coordinator made the initial contacts with the students and work site supervisors. Each observer then followed up on the initial contact to make final arrangements,

conducted the observations, and completed the observation forms. All coding forms were checked for accuracy and completeness by the coordinator of observers in each city and by one person from the project staff.

Reliability

In the present study, reliability was addressed in two ways. First, during observer training, the trainees took field notes and coded them according to a criterion, that is, so that their coding forms matched those that were based on the videotape segments. Second, during the observation period, one of the researchers in the study went out with each observer to take notes and code them side by side. The criterion used for reliability between raters was a 95 percent match between coding values on the coding form. This criterion was achieved in all cases.

Collection of Data

Observations were obtained for four programs--EBCE-Model$_1$, EBCE-Model$_2$, DE-Co-op, and Academic/College Preparatory--and two settings--classrooms and work sites. Overall, 193 observations were secured for the environments. Table 5 displays the number and percentage of observations obtained for each program and setting. Approximately 20 percent of the observations were obtained for both the EBCE-Model$_1$ and the academic programs and roughly 30 percent of the observations were secured for both the EBCE-model$_2$ and the DE-Co-op programs. For the classroom settings, seventy-one observations were obtained, which represents 37 percent of the total number of observations. Of these

TABLE 5

NUMBER AND PERCENTAGE OF OBSERVATIONS BY PROGRAM AND BY SETTING

	PROGRAMS								TOTAL	
	EBCE-Model$_1$ (City 1)		EBCE-Model$_2$ (City 2)		DE-Co-op (City 3)		Academic/College Prep (City 1 & 3)			
	Number of Observations	% of Total Observations	Number of Observations	% of Total Observations	Number of Observations	% of Total Observations	Number of Observations	% of Total Observations	Number of Observations	% of Total Observations
s-s	24	12	15	8	21	11	11	6	71	37
							Part-time Work			
s	18	9	50	26	33	17	21	11	122	63
ls	42	21%	65	34%	54	28%	32	.7%	193	100%

classroom observations, 21 percent were secured in math classes including EBCE math and academic math; 16 percent were secured in English classes including both EBCE and academic classes; 30 percent were secured in social studies classes, which included career education classes, and 33 percent were secured in principles of marketing (DE) and business classes. For the work site settings, 122 observations--63 percent of the total observations--were secured.

Scheduling Observations

To obtain a representative description of environments, observers purposefully conducted observations on different days of the week. Although the observers attempted to secure the observations on different days of the week and at different times of the day, the scheduling of observations was dependent on both the observers' schedules and the students' assignments at the organization. The distribution of the secured observations by the day of the week and by the program and settings is displayed in table 6. Generally, the percentage of observations secured on Monday through Thursday was similar for the four days. The lower number of observations secured for Friday resulted primarily from students' end-of-school activities that preempted the regularly scheduled daily routines.

Observation Summary

The average length of time for the observations was fifty-three minutes with a standard deviation of six minutes. The observations were secured during May and the first week of June

TABLE 6

PERCENTAGE OF OBSERVATIONS BY DAY OF THE WEEK AND BY PROGRAM/SETTING

PROGRAM SETTING	NUMBER OF OBSERVATIONS	PERCENT OF OBSERVATIONS BY DAY OF WEEK							PERCENT OF TOTAL OBSERVATION
		Monday %	Tuesday %	Wednesday %	Thursday %	Friday %	Saturday %	Sunday %	
EBCE-Model 1									
Classroom	24	16	42		42				12%
Work site	18	11		89					9%
EBCE-Model 2									
Classroom	15	26	40	8	13	13			8%
Work site	50	20	20	30	24	6			26%
DE-Co-op									
Classroom	21	4	43	48	4				11%
Work site	33	3	27	13	36	9	9	3	17%
Academic/College Preparatory									
Classroom	11	64			36				6%
Part-time Work									
Work site	21	10		20	48	14	4	4	11%
Percentage of total observations for each day	193	16	23	26	26	6	2	1	100%

1983. Since observations secured at the end of the school year are not necessarily representative of the entire school year, technically the findings are not generalizable to the first eight months of school and are constrained by the end-of-the-year activities, such as senior picnics and proms.

Analytic Strategy

In considering how to analyze the data so as to best answer the research questions, it is important to recognize first that the variables of interest are categorical in nature. That is, the task episodes were each "measured" in terms of several categorical attributes. For instance, task episodes were recorded in terms of whether they took place in the classroom or the workplace, which program was being observed, and whether each given basic skill or other factor was present or absent. In other words, the basic data took the form of frequency counts; for example, the number of task episodes in a given setting and program that involved the presence of a particular basic skill. Given this type of data, the researchers needed to employ a statistical procedure that was capable of providing information about relationships among categorical variables. The technique of this type that was chosen for the project is the method of log-linear models for multiway frequency tables. Discussions of this approach can be found in Everitt (1977) and Fienberg (1977).

Log-linear Analysis

In general, this technique provides statistical tests of whether the pattern of frequencies for one categorical variable,

which is defined as the dependent variable, depends on the levels of other categorical variables, which are defined as independent variables. For instance, it was desired to determine whether the pattern of frequencies for each basic skill (i.e., absent vs. present) was a function of the setting and the program in which the task episodes were observed. A log-linear analysis could be carried out to determine this issue in which a given basic skill represented the dependent variable, and setting and program represented independent variables. In addition, the interaction of the independent variables could be incorporated into the analysis. Results would consist of three statistical tests (chi-squares, in this procedure). There would be one test for the effect of setting. If this test were significant, it would indicate that the pattern of frequencies for this basic skill was dependent on the setting.

To interpret the nature of this dependency, one could examine the actual patterns of frequencies. For instance, it might be the case that the basic skill was used much more often, relatively, in the workplace than in the classroom. There would be a similar test for the effect of program. Finally, there would be a test of the interaction of setting and program. A significant result here would indicate that the effect of programs on the basic skill depended on the setting. Again, one could examine the actual patterns of frequencies to attempt to determine the nature of such an effect. Such results can be presented and interpreted graphically, as will be seen later.

It should be pointed out that it is also possible to obtain some specific statistical information to aid in the interpretation of significant effects obtained in these analyses. When a significant effect is obtained, it is possible to examine tests of specific aspects of that effect. These tests are called contrasts. For example, if it were found that a program had a significant effect on a given basic skill, it would be possible to employ contrast to test which programs were significantly different from each other. Contrasts can also be employed to assist in interpreting interactions.

This general strategy of log-linear analysis of frequency tables was employed in this study to analyze the effect of types of dependencies of categorical variables on other categorical variables. Analyses were accomplished via a computer software program called FUNCAT, which is available in the SAS package of statistical programs (SAS Institute 1982).

Two Analysis Concerns

As in virtually all statistical analyses, the data being analyzed in the present study do not strictly satisfy the assumptions underlying the technique being employed. In particular, it is of some concern that there is a much larger number of observations (task episodes) obtained in the workplace than in the classroom. Though this imbalance will not necessarily cause artifactual significant results, its effect is not really understood by statisticians. A second concern involves the fact that the observations (task episodes were not

episodes) were not really independent observations. Indeed, they

t be so in the present c text, since a number of task episodes were observed for each person under observation. As a result of these two issues, it was decided that it would be best to be rather conservative ($P \leq .001$) in interpretation of results; this strategy can be accomplished by paying attention to only those effects that are strongly significant and ignoring those effects that are only marginally significant. The use of this type of analysis within this strategy is considered to be quite appropriate for the present data and objectives, and should provide clear indications of important relationships for further study.

CHAPTER 4

FINDINGS

Overview

The long-range goal of this research is to address the question of which vocational education student learns which basic skill best in what environment or setting. This year's study was directed at describing environments within which students acquire basic skills. The goal was to develop an observational methodology that describes exposure to basic skills and environmental factors (related to basic skills performance or achievement) within different settings. That is, do settings differentially emphasize exposure to basic skills and exhibit different patterns of environmental factors that ultimately affect student's basic skills development?

The methodology was used to observe four different programs within which students spent time in classroom and work site settings. This chapter presents the findings resulting from the observations. The chapter begins with a discussion of task episodes and then is organized around three topics that address the major research questions for the project. These three topics are--

- relationships between exposure to basic skills and programs and settings,
- relationships between environmental factors and programs and settings,
- relationships between exposure to basic skills and environmental factors.

Description of Task Episodes

An understanding of the task episode is crucial when interpreting the study's findings. The task episode is not dependent upon an arbitrary unit of time but instead involves the notion of "focus of attention" and depends on the meanings that participants attribute to segments of activity. A task episode can be considered a psychological time unit in which the individual's focus of attention is constant. Focus of attention does not refer to highly specific things such as a single word or the turn of a screw. Rather it refers to a segment of activity aimed at the completion of some identifiable goal, for example, assembling a drawer (in a cabinetmaker's shop), changing the oil (in an auto shop), or ringing up a sale (in a supermarket).

Boundaries of a Task Episode

In practical terms, a task episode can be determined by asking the participant, "What are you working on now?" The car mechanic might answer, "I'm changing the oil"; the apprentice cabinetmaker might say, "I'm assembling this drawer." These descriptions would provide an insider's definition of segments of work, or what we call task episodes. However, given the fact that the observers could not talk to the participants (per contract restrictions), locating the boundaries of a task episode required a fairly high level of inference on the part of the observers. Three decision rules were used to determine the boundaries of a task episode. First, the stream of activities should not be divided into ridiculously small units. The observer should think about how the workers might describe

what they are doing if it were possible to ask them. Second, in repetitive tasks, cycles of activity that recur over time constitute a task episode. Third, if the goal is essentially the same for a series of apparently different actions (e.g., retrieving oil pan, placing pan, unscrewing stopcock, and waiting for oil to drain), then the actions collectively constitute a task episode (e.g., changing the oil).

Appendix B contains two examples of field notes that are displayed by task episodes. In addition to the division by task episodes, the field notes show the coding for the exposure to basic skills and to environmental factors. A review of this appendix should provide the reader with a good grasp of what the field notes looked like and how they were coded for analysis.

Distribution of the Task Episodes

In this data set, 3,156 task episodes were identified. Of this number, 24.6 percent were classified as nontask related (e.g., eating, socializing). The remaining 75.4 percent or 2,380 task episodes were classified as task episodes related to doing the job or doing activities that accomplish the mission or productive goals of the organization. It is these latter task episodes that are of interest for this report. Table 7 displays the distribution of task episodes for each program and setting. Of the 2,380 task episodes, 1,901 or 80 percent of the task episodes were identified in work site settings, and the remaining 20 percent of the task episodes were identified for classroom settings. This pattern is a function of the greater number of

TABLE 7

PERCENTAGE OF TASK EPISODES FOR PROGRAMS AND SETTINGS

SETTINGS	N	PROGRAMS				TOTAL
		EBCE-Model 1 P_1 %	EBCE-Model 2 P_2 %	DE-Co-Op P_3 %	Academic Part-time Work P_4 %	%
Classroom	479	38	19	31	12	100%
Work site	1901	19	29	33	19	100%
TOTAL	2380	23	27	33	17	100%

observations conducted in the work sites, and is not caused by any inherent difference in the nature of task episodes between classroom and work site settings. For example, the average number of task episodes per observation period was not statistically different for classroom or work site settings.

It should be noted that the exposure to basic skills was originally coded as low, medium, or high level. That is, what level of the basic skill was required to complete the task episode? Initial analysis of the data revealed that, as defined by our coding scheme, there were no high levels of basic skills identified. Eight percent of the task episodes required medium levels of basic skills, and the remaining 92 percent of task episodes required low levels of basic skills. Given this high preponderance of low-level basic skills, research staff decided to treat exposure to basic skills as present or absent in the task episode. In future work, staff will reexamine the definitions to decide if it is practical to differentiate levels of basic skills usage.

Overall Perspective

Before considering the observed relationships, the reader might benefit from an overall perspective of the data set. Table 8 shows the distribution of task episodes for all programs and settings related to basic skills usage and the environmental factors. Tables 9 and 10 provide definitions of the basic skills and environmental factors. With regard to basic skills exposure, reasoning and psychomotor skills were most frequently present in the task episodes, and computing and writing skills were least

TABLE 8

PERCENTAGE OF TASK EPISODES (FOR ALL PROGRAMS AND SETTINGS) EXPOSING STUDENTS TO BASIC SKILLS AND ENVIRONMENTAL FACTORS

BASIC SKILLS	PERCENT OF TASK EPISODES*
Psychomotor	79
Reading	34
Computing	17
Speaking	50
Reasoning	87
Writing	16
ENVIRONMENTAL FACTORS	
Centrality	91
Articulation	27
Self-initiation	55
Negotiation	41
Supervisor presence	58
Co-worker presence	75
Feedback	4
Simultaneity	2
Split task	13
Relational--taking direction	12
Relational--working cooperatively	32
Relational--giving direction	4

*Total number of task episodes is 2,380.

TABLE 9

DEFINITIONS OF BASIC SKILLS

Basic Skills

Psychomotor skills	Performs manual or motor skills. Handle things, feed or tend things, file, start/stop/adjust uncomplicated machinery; manipulate several objects with coordination, and operate, control, or drive complicated things (e.g., operate a cash register, type); do precision work (e.g., use drafting tools, use jeweler's tools).
Reading skills	Read simple instructions; read product prices; read journals, manuals, dictionaries, safety rules, instructions in the use and maintenance of shop tools and equipment; read scientific and technical journals, financial reports, legal documents.
Computing skills	Add and subtract two digits; do simple multiplication; count; perform arithmetic operations involving American money; apply fractions, percentages, ratio, proportions, practical algebra; work with differential equations, advanced calculus, correlation techniques.
Reasoning skills	Apply commonsense understanding to carry out simple one- or two-step instructions. Deal with standardized, routine, repetitive, rule bound situations. Apply commonsense understanding to carry out a variety of instructions furnished in written, oral, or diagrammatic form. Solve practical problems and deal with a variety of variables. Apply principles of logical or scientific thinking to a wide range of intellectual and practical problems.
Writing skills	Print simple sentences containing subject, verb, and object, sines of numbers, names and addresses; copy information. Write reports and essays, prepare business letters. Write editorials, journal articles, speeches, manuals, critiques.
Speaking skills	Speak simple sentences using normal word order and present and past tense; speak before an audience, speak extemporaneously on a variety of subjects; demonstrate familiarity with the theory, principles, and methods of effective and persuasive speaking, voice and direction, phonetics, and discussion debate.

SOURCE: U.S. Department of Labor, Manpower Administration (1972).

TABLE 10

DEFINITIONS OF ENVIRONMENTAL FACTORS

Environmental Factors

Centrality	Central tasks constitute the core of the mission of the institution, i.e., those functions that the institution is "about."
Articulation	How a task episode relates to other tasks performed at the organization. If other workers rely on the student to complete a task before commencing their own, it is an articulated task. Articulation excludes the client.
Self-initiation	Subject decides upon a certain course of action and begins own task episode.
Negotiation	The ability of workers to negotiate the terms of what they are doing.
Supervisor presence	Supervisor observes, gives directions, is present and engaged in other types of activities. Supervisor is present and engaged in independent/parallel work.
Co-worker presence	Co-worker observes, gives assistance (peer tutor is present or gives help in accomplishing task); co-worker is present and engaged in independent/parallel work; co-worker is engaged in other types of action.
Feedback	Workers receive direct and clear information about the effectiveness of their performance on the job.
Simultaneity	Two or more tasks are being done at the same time.
Split task	The task episode is interrupted before it is completed, and the student returns to complete the task later.
Relational skills	Any exchange of information (printed instructions/dialogue) with any human being.
Low	Worker takes directions.
Medium	Worker works cooperatively with others.
High	Worker gives directions.

frequently present or required to complete a task episode. Exposure to using the basic skills of speaking and reading was present in about half and one-third of the task episodes respectively. With regard to the environmental factors, the factor of centrality--when task episode is related to the mission of the organization--was most frequently present in over 90 percent of the task episodes. As a group, the environmental factors of split task, simultaneity, feedback, and relational behavior--how the student relates to other persons in the environment--were present in fewer than one-third of the task episodes. Those environmental factors that were present in 25 to 75 percent of task episodes included co-worker presence, supervisor presence, self-initiation, negotiation, and articulation.

Relationships between Exposure to Basic Skills and Programs and Settings

Comparing Basic Skills Development Sites

The typical approach for students to acquire basic skills is through classroom participation. In classroom settings the content is organized by academic disciplines and is taught by teachers trained in the discipline who usually design and direct students' learning activities. Another alternative to acquire basic skills is student participation in work site settings.

From the perspective of an employer, the purpose of students' spending time in their organizations is to "do the work" required by the organizations. From the perspective of school coordinators and students, the purpose of students' work activities is to gain firsthand knowledge of careers, practice

skills learned in school, and acquire academic credit for work-place experiences. The specific nature of the interaction between the employer and student is determined by the goals of the school program; it is an underlying assumption that students will use or apply basic skills in performing their tasks in the work settings. Thus, the content or curriculum of the work site experience is the work performed by the student.

Comparing basic skills development in classroom and work site settings points out that teaching basic skills is the prime purpose of classroom settings, whereas basic skills are embedded in the job tasks at work settings. For this study, exposure to basic skills should be considered as an indicator of curriculum content requiring the use or application of basic skills encountered in classroom and work site settings. If the settings differentially require the use of basic skills, then ultimately one would expect different rates of growth for basic skills achievement. Thus, the intent of this area of inquiry is to examine the patterns of exposure to basic skills related to programs and settings. That is, do programs and settings differ with respect to exposure to basic skills?

Exposure and Participation Patterns

Tables 11 through 13 display the distribution of task episodes in which students were exposed to basic skills by participation in programs, settings, and programs and settings respectively. These tabular results are graphically displayed in figures 2 through 7. For each figure, the percentage of task

TABLE 11

PERCENTAGE OF TASK EPISODES (BY PROGRAMS)
EXPOSING STUDENTS TO BASIC SKILLS

PROGRAMS	BASIC SKILLS EXPOSURE					
	Psychomotor %	Reading %	Computing %	Speaking %	Reasoning %	Writing %
P_1 EBCE-1 N = 550	87	45	10	28	82	23
P_2 EBCE-2 N = 641	78	27	1.0	49	86	12
P_3 DE-Co-op N = 775	72	37	25	60	93	12
P_4 Academic and Part-time work N = 414	81	26	38	62	86	18

TABLE 12

PERCENTAGE OF TASK EPISODES (BY SETTINGS)
EXPOSING STUDENTS TO BASIC SKILLS

SETTINGS	BASIC SKILLS EXPOSURE					
	Psychomotor %	Reading %	Computing %	Speaking %	Reasoning %	Writing %
Classroom N = 479	56	42	12	52	66	33
Work site N = 1901	84	32	19	50	93	11

TABLE 13

PERCENTAGE OF TASK EPISODES (BY PROGRAM AND SETTING) EXPOSING STUDENTS TO BASIC SKILLS

PROGRAM/ SETTING	BASIC SKILLS EXPOSURE					
	Psychomotor %	Reading %	Computing %	Speaking %	Reasoning %	Writing %
P_1 EBCE-1/ Classroom N = 181	75	50	30	48	61	43
P_1 EBCE-1/ Work site N = 369	93	43	0	18	93	13
P_2 EBCE-2/ Classroom N = 92	60	29	1	52	87	24
P_2 EBCE-2/ Work site N = 549	80	26	1	49	86	10
P_3 DE-Co-op Classroom N = 148	33	38	1	67	80	26
P_3 DE-Co-op Work site N = 627	81	36	30	59	96	10
P_4 Academic Classroom N = 58	52	50	2	26	14	31
P_4 Part-time work N = 356	85	22	44	67	97	16

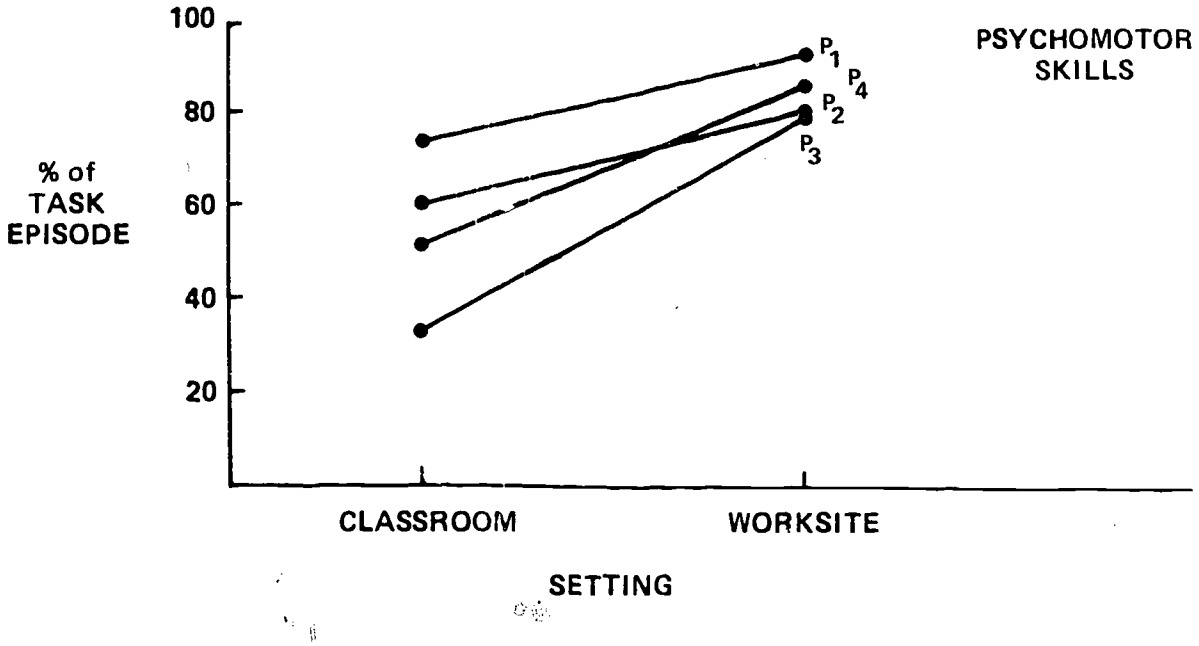


Figure 2. Percentage of task episodes (by setting) exposing students to psychomotor skills

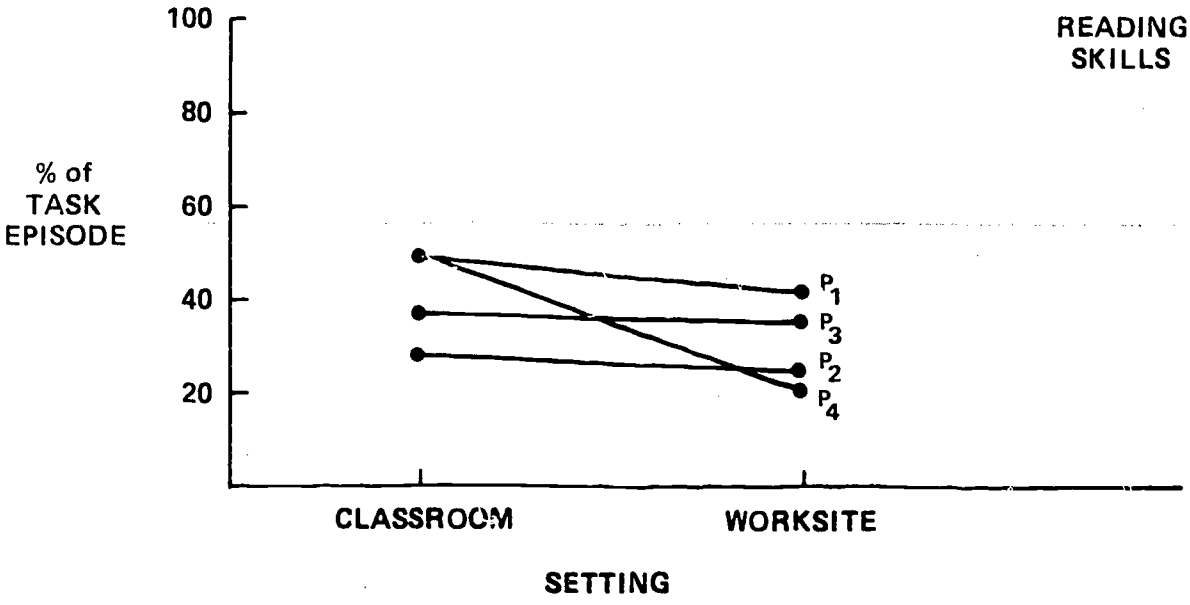


Figure 3. Percentage of task episodes (by setting) exposing students to reading skills

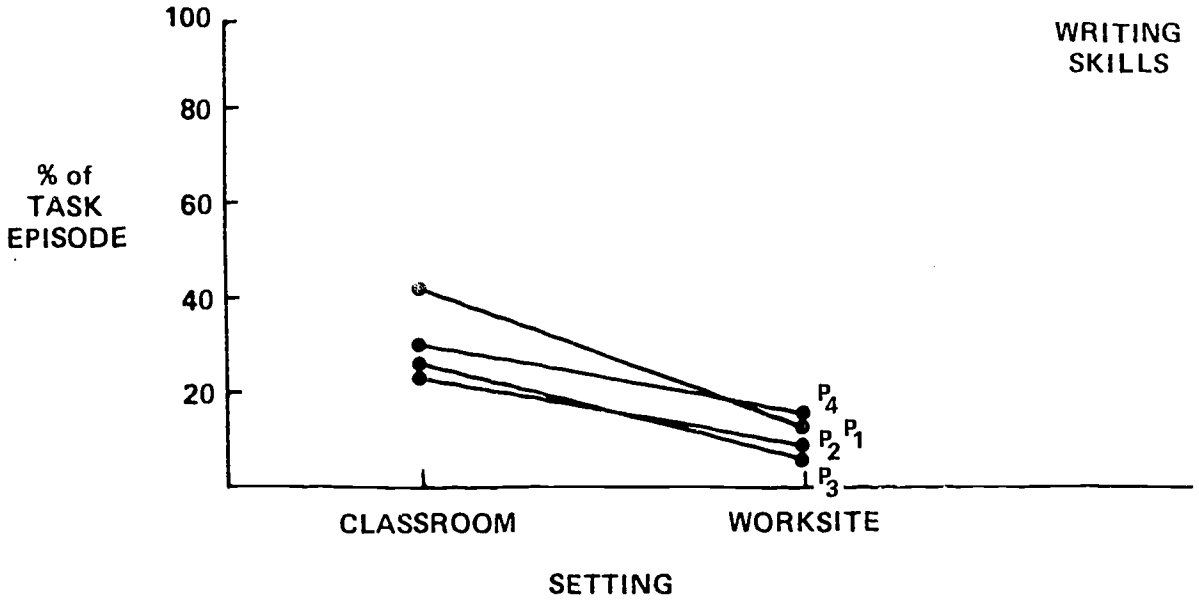


Figure 4. Percentage of task episodes (by setting) exposing students to writing skills

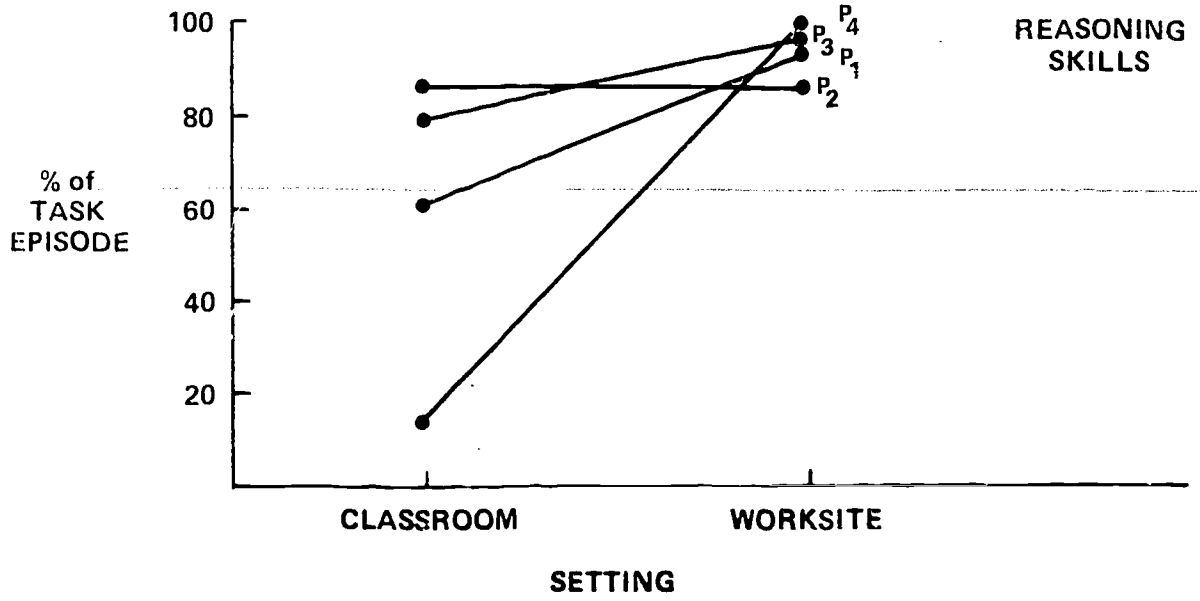


Figure 5. Percentage of task episodes (by setting) exposing students to reasoning skills

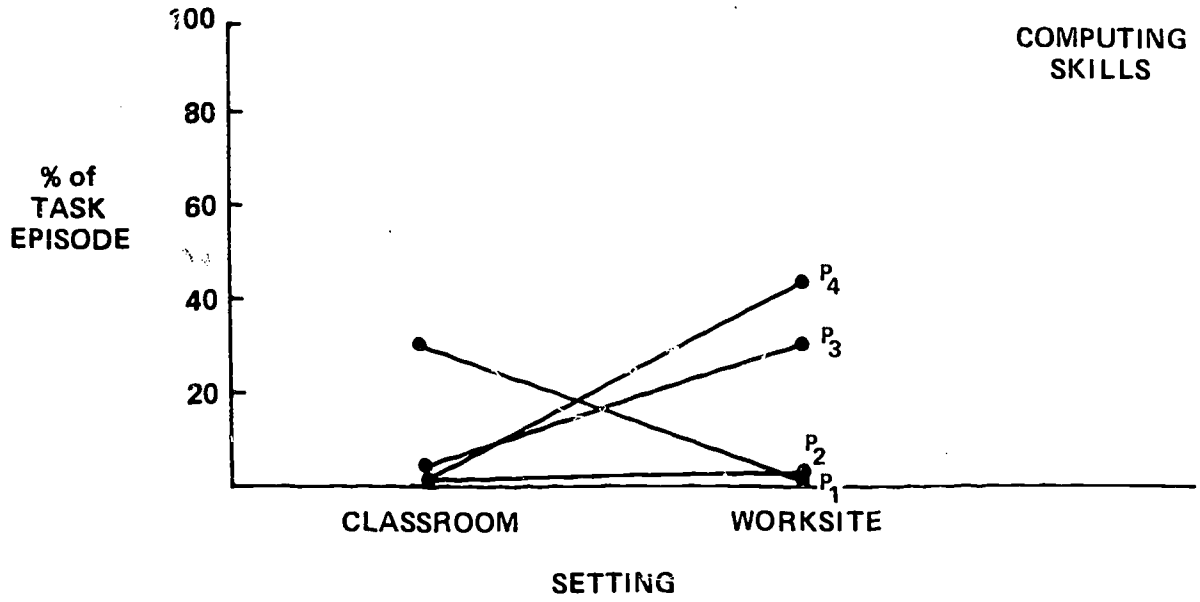


Figure 6. Percentage of task episodes (by setting) exposing students to computing skills

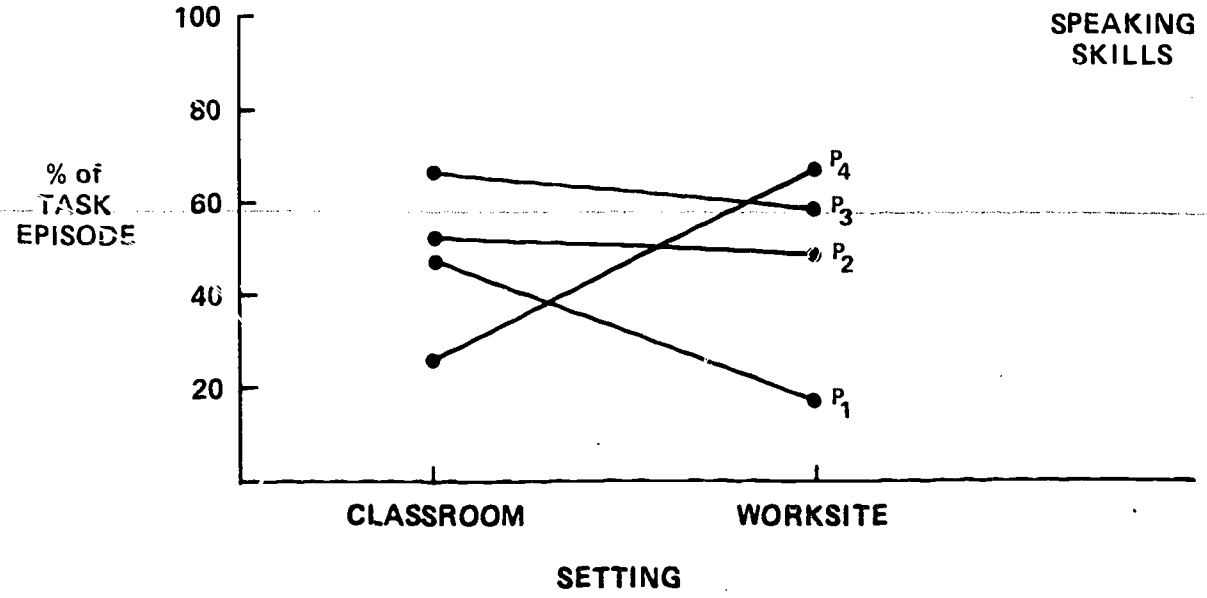


Figure 7. Percentage of task episodes (by setting) exposing students to speaking skills

episodes that required the use of the basic skill is shown on the vertical axis. The two points on the horizontal axis represent the classroom and work site settings. The four programs are represented by P_1 through P_4. P_1 represents the EBCE-model$_1$ program, P_2 represents the EBCE-model$_2$ program, P_3 represents the cooperative distributive education program, and P_4 represents the academic/college preparatory program for the classroom setting and part-time work for the work site setting.

As the figures illustrate there are different patterns of exposure to basic skills and participation in the program and setting. To determine if there were significant main effects for the programs or settings or significant program-by-setting interactions, a series of chi-squared tests were performed on the frequencies with basic skills being treated as the dependent variable. (Details of this statistical procedure are described in the analytic approach section.) The results of this analysis are presented in table 14, which shows the probabilities for the observed relationships between exposure to basic skills and programs, settings, and program by setting interactions. The probabilities are indicated by X_1 and X_2 where X_1 represents a probability of less than or equal to .001, and X_2 represents a probability of less than or equal to .0001. An examination of this table permits a statistical determination of whether the differences in the observed frequencies of task episodes for exposure to basic skills result from the program, setting, or an interaction of both. If there are statistically significant main

TABLE 14

EFFECTS OF PROGRAM AND SETTING ON EXPOSURE TO BASIC SKILLS

BASIC SKILLS	Program (P_1, P_2, P_3, P_4)	Setting (Class, Work)	Program x Setting		P_1 vs. P_4	CONTRASTS P_2 vs. P_4	CONTRASTS P_3 vs. P_4	Class vs. Work
Psychomotor	X_2	X_2			X_2		X_2	X_2
Reading	X_2	X_1			X_2	X_1		X_1
Computing			X_2					
Speaking	X_2		X_2			X_2		X_2
Reasoning	X_2	X_2	X_2				X_2	X_2
Writing	X_1	X_2			X_1			X_2

$X_1 \leq .001$
$X_2 \leq .0001$

effects or interactions, then examination of the contrasts can provide additional information on which program and setting are significantly different from each other.

Identification of Specific Skills

Psychomotor skills (figure 2) were identified when students coordinated or manipulated objects or tools in the environments. Examples of these activities include typing, filing, or operating a cash register. The percentage of task episodes requiring psychomotor skills ranged from a high of 87 for program 1 to a low of 72 for program 3. The percentage of task episodes requiring psychomotor skills was 84 for the work site and 56 for the classroom settings. There was no interaction of program and setting; however, there was a main effect of both programs and settings.

Reading skills (figure 3) were identified when students were required to read a book or manual in order to complete a task. The percentage of task episodes requiring reading ranged from a high of 45 for program 1 to a low of 26 for program 4. The percentage of task episodes requiring reading skills was 42 for classroom settings and 32 for work site settings. This range of percentages was enough to show significant main effects of both programs and settings. The interaction was not significant.

Writing skills (figure 4) were identified when students were required to write information to complete a task. This included completing forms, copying material, and composing reports or memos. The percentage of task episodes that required writing ranged from 23 for program 1 to 12 for programs 2 and 3. The

percentage of task episodes that required writing was 33 for the classroom and 11 for work site settings. There were significant main effects for both program and setting but no significant interaction.

Reasoning skills (figure 5) were identified when common-sense understanding was required to carry out instructions or deal with problems involving several concrete variables in a standardized situation. Generally, reasoning skills were identified when the researcher could observe that a pattern of behavior had been established to carry out the task. Examples included assisting a customer with a purchase, delivering messages, operating a machine, filing forms, or sterilizing equipment. The percentage of task episodes that required reasoning skills ranged from 93 for program 3 to 82 for program 1. The percentage of task episodes that required reasoning was 93 for work site settings and 66 for classroom settings. The significant interaction indicates that in this case the frequency of occurrence for reasoning task episodes is a function of both the program and the setting.

Computing skills (figure 6) were identified when students performed mathematical operations in order to complete tasks. The percentage of task episodes requiring computation ranged from 38 for program 4 to 1 for program 2. The percentage of task episodes requiring computing was 19 for the work settings and 12 for the classroom settings. The significant interaction for the computing task episodes indicates that the effect of the program on the exposure to computation depends on the setting. In this

case, programs 3 and 4 have the greater percentage of computing task episodes in the workplace and a lesser percentage in the classroom, whereas program 1 has the greater percentage in the classroom setting and the lesser percentage in the work site. Program 2 has few computing task episodes in either setting.

Speaking skills (figure 7) were identified when students asked or answered questions, or explained something to a supervisor/teacher, co-worker/student, or customer/client. The percentage of task episodes requiring speaking ranged from a high of 62 for program 4 to a low of 28 for program 1. The percentage of task episodes requiring speaking was 52 for classrooms and 50 for work site settings. The significant interaction indicates that the effect of programs on speaking task episodes depends on the setting. In this case, programs 1, 2, and 3 had a greater number of speaking task episodes in the classroom settings than in the work site settings, whereas the reverse was true for program 4.

Conclusions

Using this methodology we can conclude that definite patterns exist between exposure to basic skills and programs in which students participate in both classroom and work site settings. The significant patterns, when comparing the four programs, indicate that program 1 emphasizes task episodes high in psychomotor, reading, and writing skills; program 3 emphasizes task episodes high in reasoning skills; and program 4 emphasizes task episodes high in speaking skills. For classroom settings, the significant patterns emphasize task episodes high in exposure

to reading and writing skills. For work site settings, the significant patterns emphasize task episodes high in exposure to psychomotor and reasoning skills.

Relationships between Environmental Factors and Programs and Settings

When deciding whether participation in a hypothetical program affects group A's achievement of basic skills, the typical approach is to determine students' achievement before and after participation and then compare their performance to the performance of a comparison group B. If significant gains in scores are found, they are attributed to exposure or to non-exposure. Under this condition, the independent variable is treated as either participation in the program or non-participation, and the dependent variable is the achievement scores.

Focus on Environmental Factors

This part of the study focuses on the specification of the independent variables--programs and settings--as certain context variables. That is, context variables that affect cognitive processes and that may operate differentially in classroom and work site environment and, therefore, ultimately influence performance or achievement. Thus, the intent of this area of inquiry is to examine the patterns of environmental factors related to programs and settings. In other words, do the programs and settings exhibit different combinations of environmental factors?

Distribution of Task Episodes

Tables 15 through 17 display the distribution of task episodes in which students are exposed to the environmental factors by participation in programs, settings, and both programs and settings, respectively. These tabular results are graphically displayed in figures 8 through 19. Inspection of the figures reveals that the programs and settings exhibit different patterns of environmental factors. To determine if there were significant program-by-setting interactions, a series of chi-squared tests were performed on the frequencies with the environmental factors being treated as the dependent variable. The results of this analysis are presented in table 18, which shows the probabilities for the observed relationships between the environmental factors and program, setting, and program-by-setting interactions. Interpretation of this table is similar to that of table 14 described in the last section.

Of the environmental factors, seven had significant interactions. This indicates that the level of the factor for each program is dependent upon whether it has a classroom or work site setting. The following paragraphs describe the observed pattern for each environmental factor.

Observed Patterns for Each Environmental Factor

The environmental factor of centrality (figure 8) was identified when the task episode constituted the mission or core tasks of the organization. The percentage of task episodes in which centrality was present ranged from 91 for the work site to 89 for classroom settings. There was no interaction for program

TABLE 15

PERCENTAGE OF TASK EPISODES (BY PROGRAM) EXPOSING STUDENTS TO ENVIRONMENTAL FACTORS

PROGRAMS	ENVIRONMENTAL FACTORS											
	Centrality %	Articu-lation %	Self-Initia-tion %	Negoti-ation %	Supervisor Presence %	Co-Worker Presence %	Feedback %	Simul-taneity %	Split Task %	Rolation. Taking Direction %	Relation. Working Cooperat. %	Relation. Giving Direction %
P_1 EBCE-1 N = 550	95	47	76	58	50	52	2	0	11	17	10	2
P_2 EBCE-1 N = 641	84	30	62	50	46	75	2	0	12	14	40	2
P_3 DE-Co-op N = 775	93	25	46	21	69	85	2	1	11	7	42	5
P_4 Academic and Part-time Work N = 414	92	8	35	16	64	90	10	9	19	9	30	8

TABLE 16

PERCENTAGE OF TASK EPISODES (BY SETTING) EXPOSING STUDENTS TO ENVIRONMENTAL FACTORS

SETTING	ENVIRONMENTAL FACTORS											
	Centrality %	Articu-lation %	Self-Initia-tion %	Negoti-ation %	Supervisor Presence %	Co-Worker Presence %	Feedback %	Simul-taneity %	Split Task %	Relation. Taking Direction %	Relation. Working Cooperat. %	Relation. Giving Direction %
Class N = 479	89	18	52	47	92	92	8	0	14	22	25	2
Work Site N = 1901	91	30	56	35	49	71	2	2	12	9	34	4

TABLE 17

PERCENTAGE OF TASK EPISODES (BY PROGRAM AND SETTING) EXPOSING STUDENTS TO ENVIRONMENTAL FACTORS

PROGRAM/ SETTING	ENVIRONMENTAL FACTORS											
	Centrality %	Articu-lation %	Self-initia-tion %	Negoti-ation %	Supervisor Presence %	Co-Worker Presence %	Feedback %	Simul-tanelty %	Split Task %	Relation. Taking Direction %	Relation. Working Cooperat. %	Relation. Giving Direction %
P_1 EBCE-1 Classroom N = 181	88	29	62	59	98	98	4	0	12	33	15	1
P_1 EBCE-1 Work Site N = 369	98	63	82	57	26	29	1	0	11	10	7	2
P_2 EBCE-2 Classroom N = 92	85	10	57	67	61	63	7	0	18	12	42	3
P_2 EBCE-2 Work Site N = 549	84	34	62	45	44	77	2	0	11	14	39	2
P_3 DE-Co-op Classroom N = 148	91	8	45	27	99	99	7	0	14	14	33	4
P_3 DE-Co-op Work Site N = 627	93	29	46	0	62	81	1		11	5	44	5
P_4 Academic Classroom N = 58	90	22	29	22	100	100	22	0	16	22	3	0
P_4 Part-Time Work Site N = 356	93	5	36	12	58	89	8	10	19	6	34	9

TABLE 18

EFFECTS OF PROGRAM AND SETTING ON ENVIRONMENTAL FACTORS

ENVIRONMENTAL FACTORS	Program (P_1, P_2, P_3, P_4)	Setting	Program x Setting		CONTRASTS			
					P_1 vs. P_4	P_2 vs. P_4	P_3 vs. P_4	Class vs. Work
Centrality	X_2					X_2		
Articulation	X_2	X_2	X_2		X_2			X_2
Self-initiation	X_2	X_2	X_2		X_2		X_1	X_1
Negotiation	X_2	X_2	X_1		X_1			
Supervisor presence	X_2	X_2	X_2			X_2		X_2
Co-worker presence	X_2	X_2	X_2			X_2		X_2
Feedback	X_2	X_2						
Simultaneity	--	--	--		--	--	--	--
Split task	--	--	--		--	--	--	--
Relational:								
Taking direction	X_2	X_2	X_1		X_2	--	X_1	X_2
Working cooperatively	X_2	--	X_2		X_2	X_2	X_2	--
Giving direction	--	--	--		--	--	--	--

$X_1 \leq .001$
$X_2 \leq .0001$

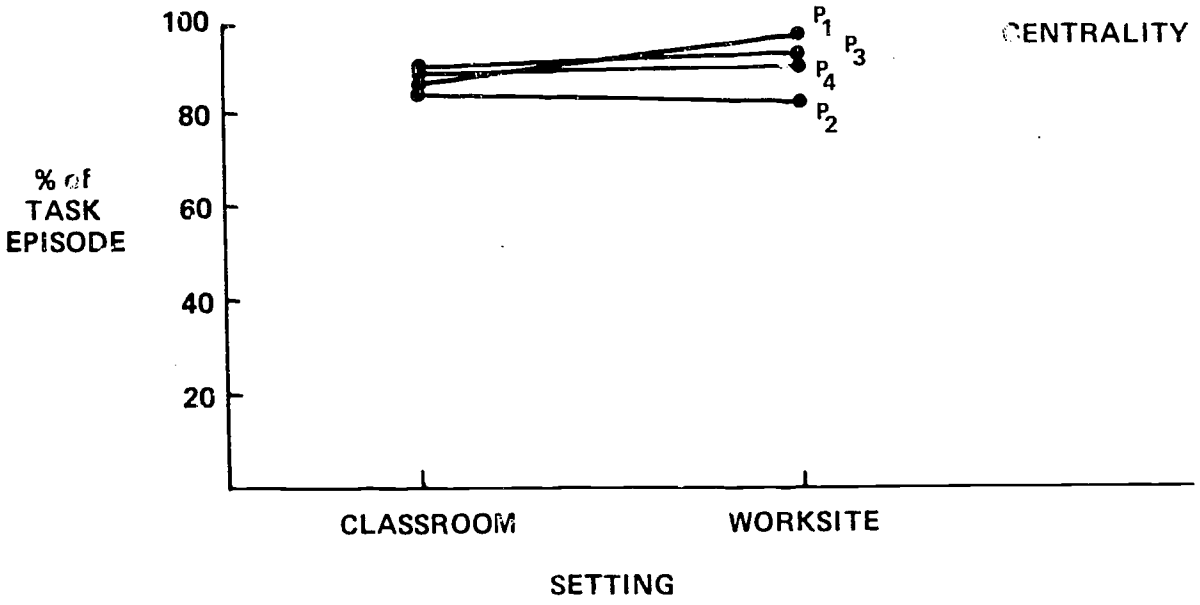


Figure 8. Percentage of task episodes (by setting) exposing students to the factor of centrality

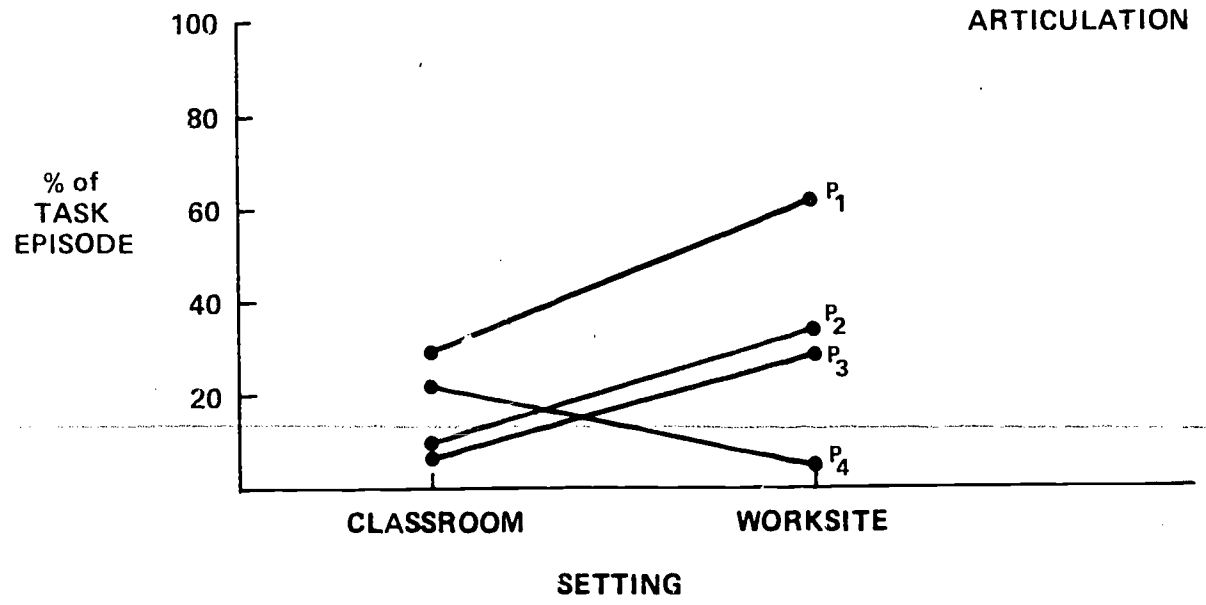


Figure 9. Percentage of task episodes (by setting) exposing students to the factor of articulation

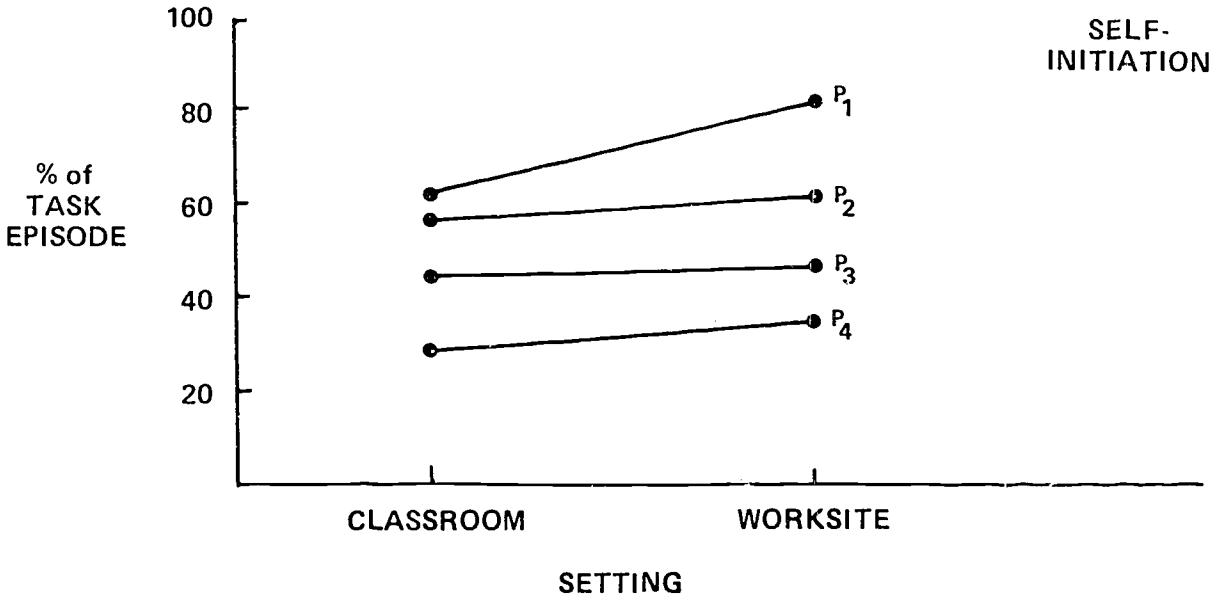


Figure 10: Percentage of task episodes (by setting) exposing students to the factor of self-initiation

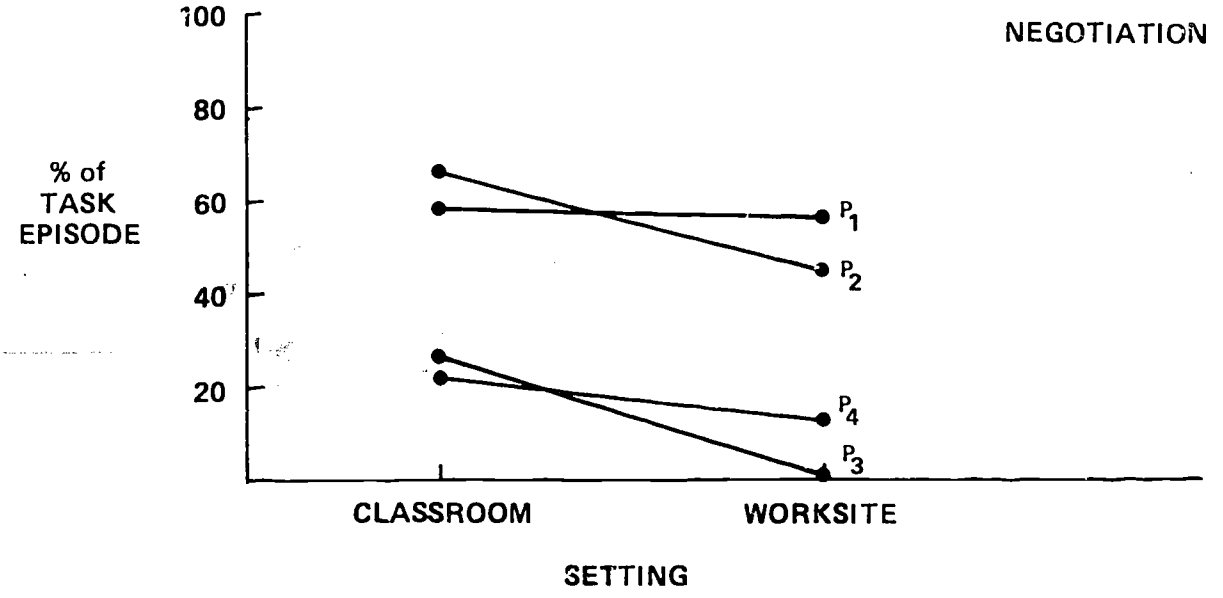


Figure 11: Percentage of task episodes (by setting) exposing students to the factor of negotiation

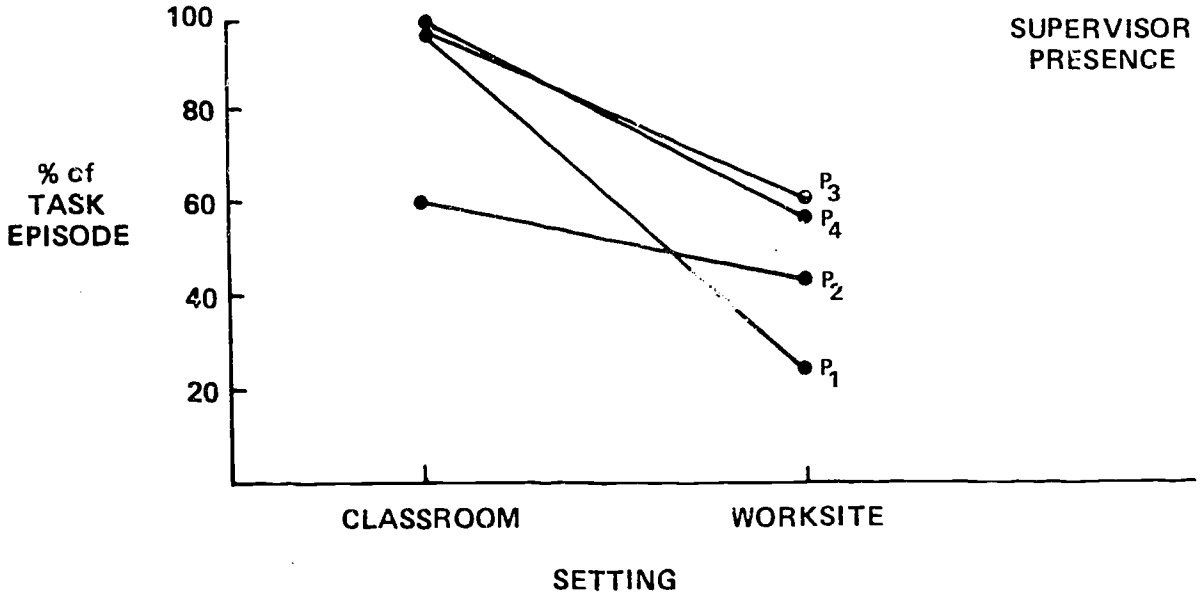


Figure 12: Percentage of task episodes (by setting) exposing students to the factor of supervisor presence

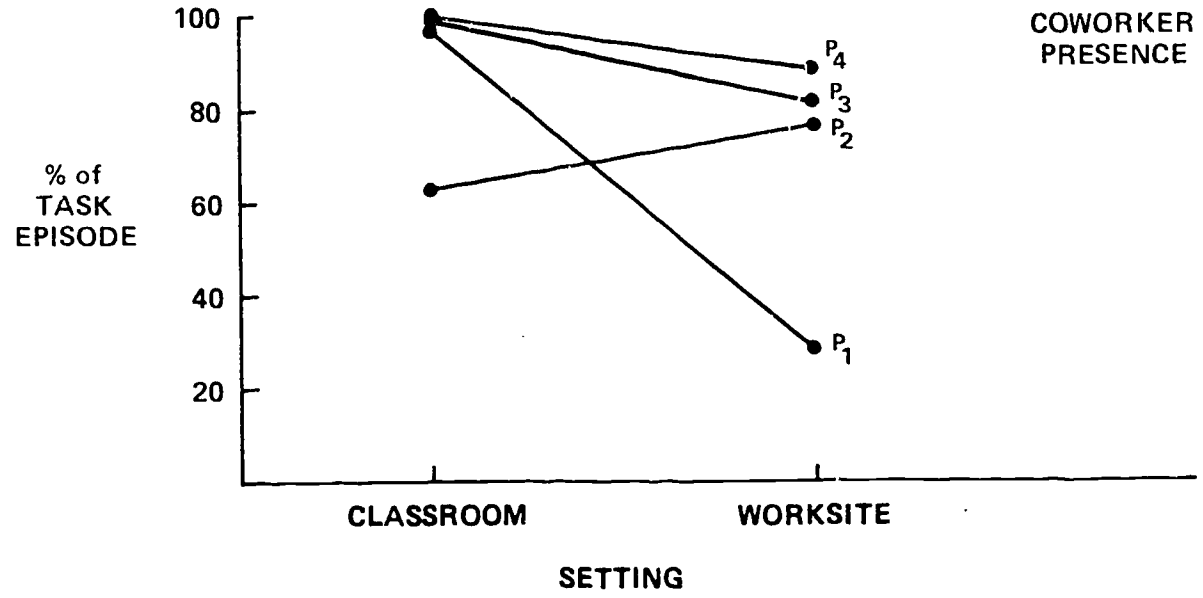


Figure 13: Percentage of task episodes (by setting) exposing students to the factor of coworker presence

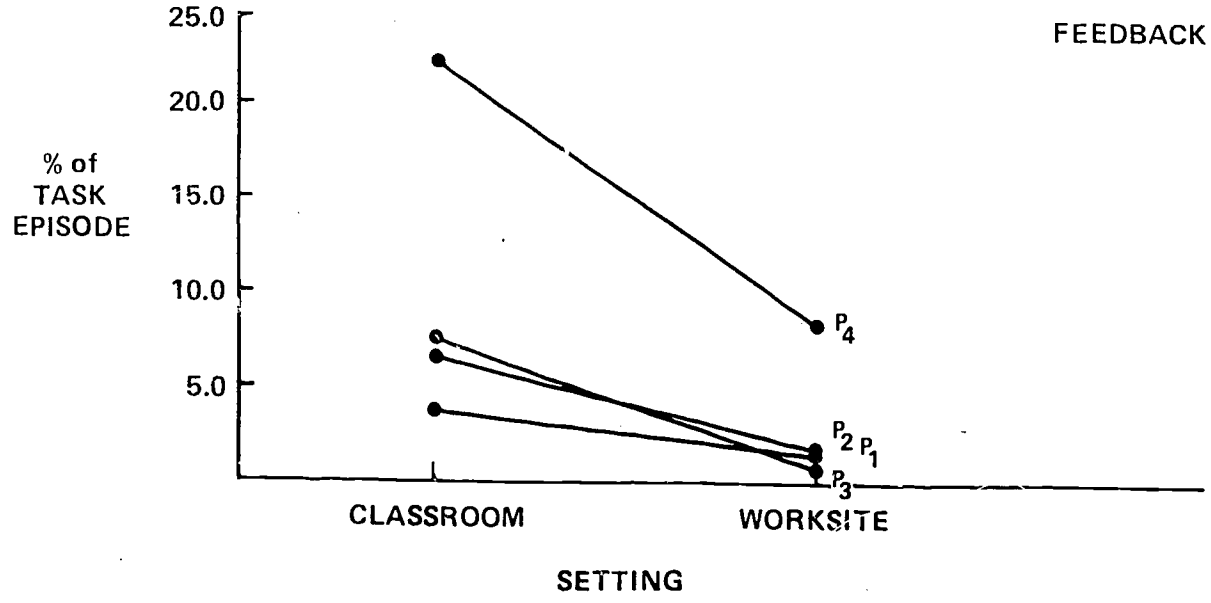


Figure 14. Percentage of task episodes (by setting) exposing students to the factor of feedback

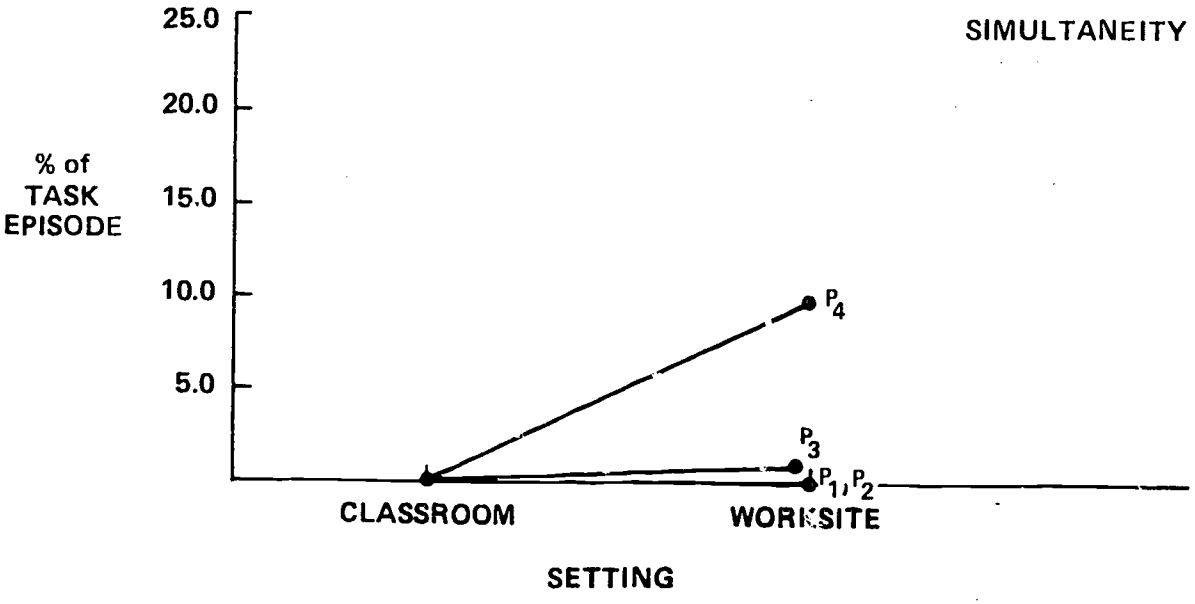


Figure 15: Percentage of task episodes (by setting) exposing students to the factor of simultaneity

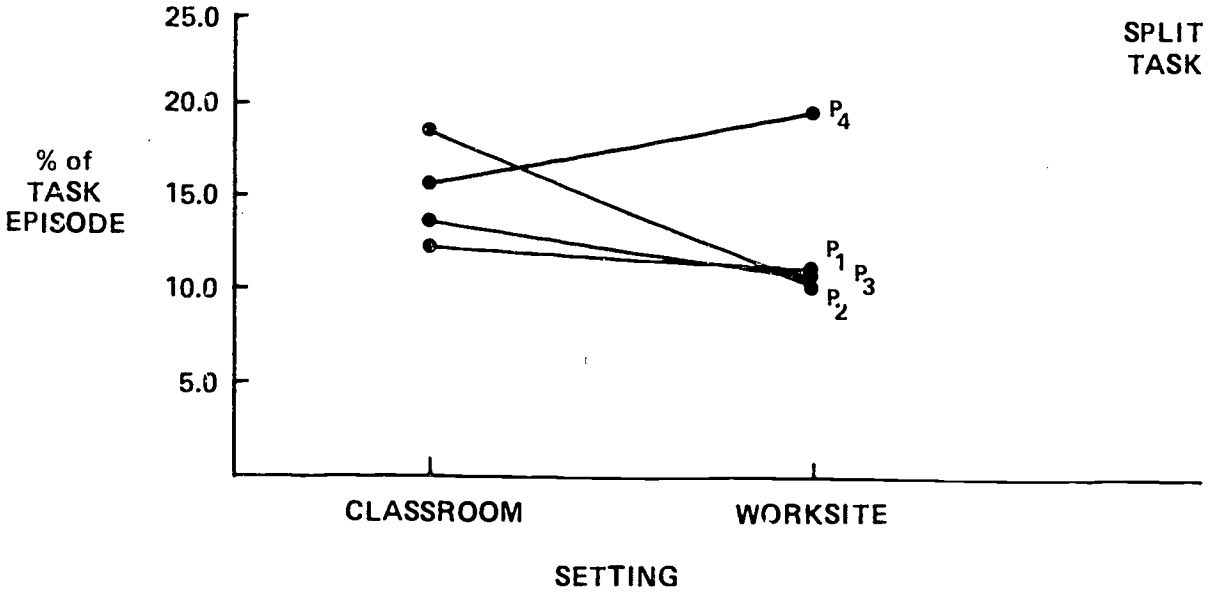


Figure 16. Percentage of task episodes (by setting) exposing students to a split task

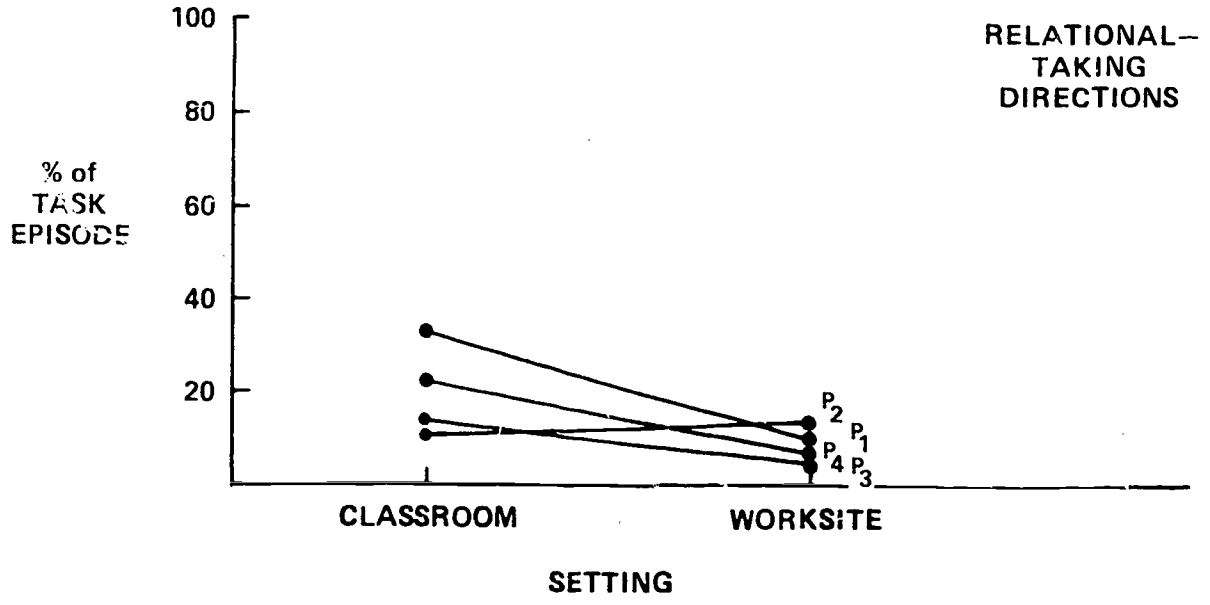


Figure 17. Percentage of task episodes (by setting) exposing students to the relational factor of taking directions.

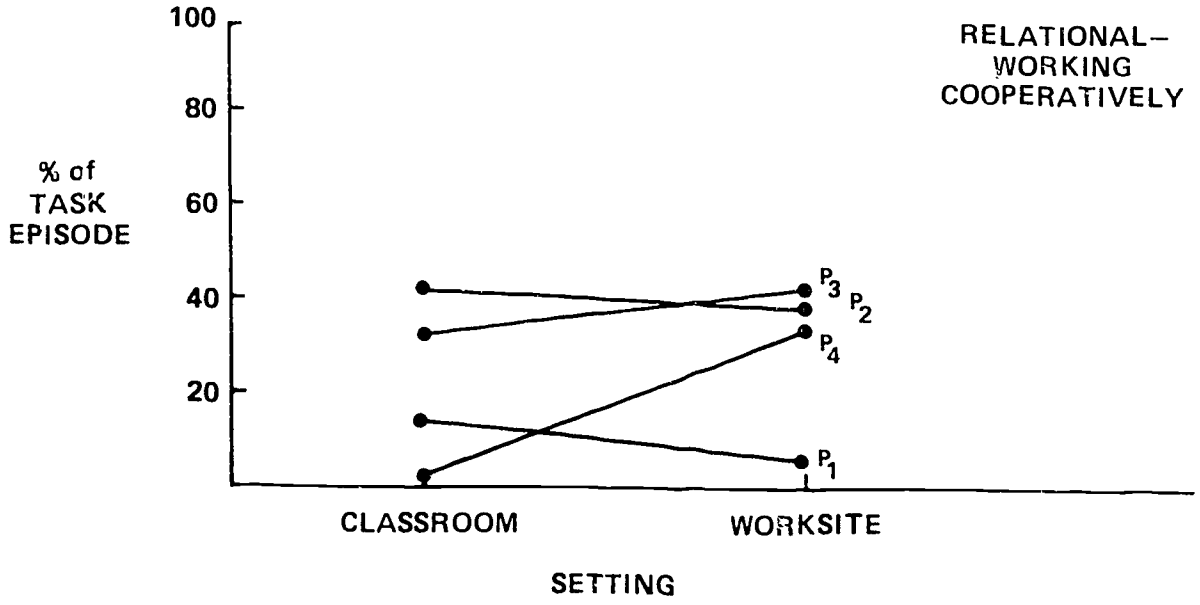


Figure 18. Percentage of task episodes (by setting) exposing students to the relational factor of working cooperatively.

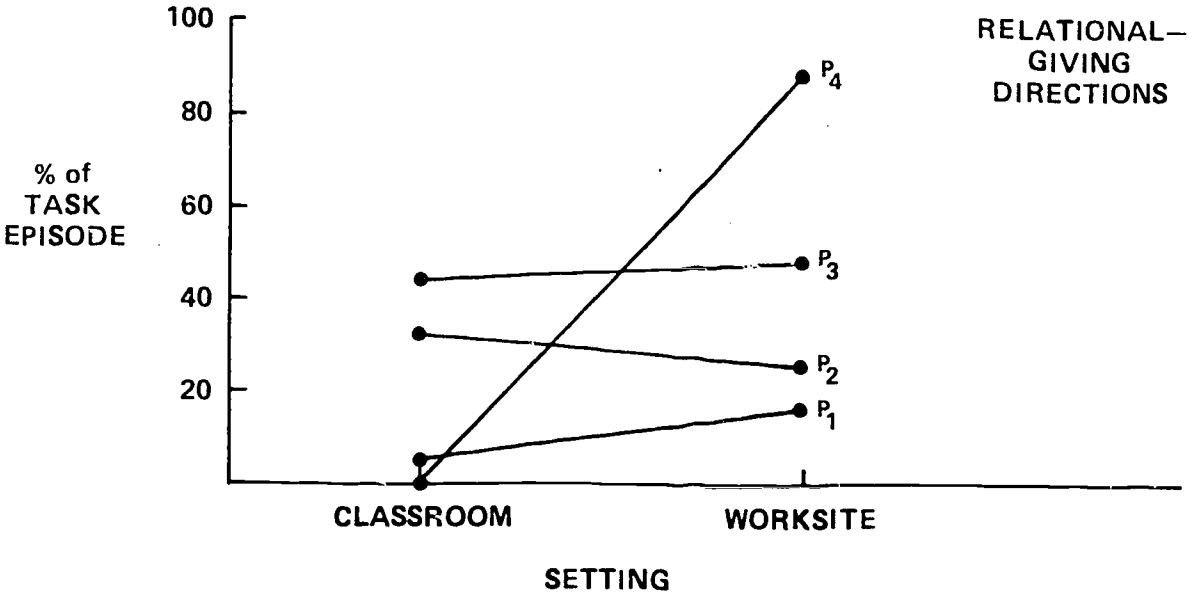


Figure 19. Percentage of task episodes (by setting) exposing students to the relational factor of giving directions.

and setting, nor was there a main effect for setting; however, there was a main effect for program.

The articulation factor (figure 9) required that the student's task be related to the tasks of other workers or students. A task episode was considered articulated if, for example, the pharmacist could not fill a prescription until the student brought him the medical card from the central files. The percentage of task episodes in which articulation was present ranged from 47 for program 1 to 8 for program 4. The percentage of articulated task episodes was 30 for the workplace and 18 for classroom settings. The significant interaction indicates that the effect of programs on articulated task episodes depends on the setting. In this case, programs 1, 2, and 3 had a greater number of articulated task episodes in the work site settings than in the classroom settings. The reverse pattern was observed for program 4.

The factor of self-initiation (figure 10) was identified when the student decided on or initiated a course of action without being told what to do. The percentage of self-initiated task episodes ranged from 76 for program 1 to 35 for program 4. The percentage of self-initiated task episodes was 56 for the work site and 52 for classroom settings. The significant interaction indicates that in this case the frequency of occurrence for self-initiated task episodes is a function of both the program and the setting. Program 1 had the greatest number of self-initiated task episodes in both the classroom and work site settings. Program 4 ranked lowest for both settings.

The environmental factor of negotiation (figure 11) was identified when students discussed with their supervisor/teacher an alternative way to do a task or assignment. The percentage of task episodes in which negotiation was present ranged from 58 for program 1 to 16 for program 4. The percentage of negotiated task episodes was 47 for the classroom and 35 for work site settings. The significant interaction indicates that the effect of programs on negotiated task episodes depends on the setting. Program 1 exhibited the greatest number of negotiated task episodes in the work site. Program 2 exhibited the greatest number in the classroom setting. Although program 3 ranked third in negotiated task episodes for the classroom setting, it dropped to zero in the work site settings.

The factor of supervisor presence (figure 12) was identified when the supervisor or teacher was present and observing, giving directions, or doing parallel work. The percentage of task episodes in which the supervisor was present ranged from 69 for program 3 to 46 for program 2. The percentage of supervisor present task episodes was 92 for classroom and 49 for work site settings. The significant interaction indicates that the effect of programs on this factor depends on the setting. Programs 1, 3, and 4 have percentages of classroom task episodes for the factor at or near 100. Program 2 ranked fourth at 61 percent. Compared to the classroom settings, all four programs--with program 1 ranking fourth--have fewer incidents of the factor present for the work site task episodes.

The environmental factor of co-worker presence (figure 13) was identified when the co-workers or other students were present and observing, giving directions, or doing parallel work. The percentage of task episodes in which co-workers were present ranged from a high of 90 for program 4 to a low of 52 for program 1. For this factor, the percentage of classroom task episodes was 92; the percentage of work site task episodes was 71. The significant interaction indicates that in this case the frequency of occurrence for the task episodes of co-worker presence is a function of both the program and the setting. Programs 1, 3, and 4 have percentages of near 100 for classroom task episodes for the factor, while program 2 ranks fourth at 63. Compared to the classroom settings, programs 1, 3, and 4 have fewer incidents of the factor present in the work site task episodes, while program 2 increased in work site task episodes to 77 percent.

The environmental factor of feedback (figure 14) was identified when the students were given information to improve their performance relative to a stated criteria. The percentage of feedback task episodes ranged from 10 for program 4 to 2 for programs 1, 2, and 3. The percentage of task episodes for the factor was 8 for the classroom and 2 for the work settings. This range of percentages was enough to show significant main effects of both programs and settings. The interaction was not significant.

The environmental factor of simultaneity (figure 15) was identified when students were doing two or more tasks at the same

time, for example, talking on the phone while filling out an order form. The percentage of simultaneous task episodes ranged from 9 for program 4 to zero for programs 1 and 2. The percentage of task episodes for this factor was 2 for the work site and zero for the classroom settings. There were no significant effects for this factor. Thus, the percentages of task episodes were approximately equal for the different programs and settings.

The environmental factor of split tasks (figure 16) was identified when students began a task episode, stopped it to work on another task episode, and then resumed the original task. The percentage of split task episodes ranged from 19 for program 4 to 11 for programs 1 and 3. The percentage of task episodes for this factor was 14 for the classroom and 12 for the work site settings. There were no significant program, setting, or interaction effects for this factor.

The relational factor of taking directions (figure 17) was identified when students were told what to do. The percentage of task episodes for this factor ranged from 17 for program 1 to 7 for program 3. The percentage of task episodes for this factor was 22 for the classroom and 9 for the work site settings. The significant interaction indicates that the effect of programs on this factor depends on the setting. Program 1 exhibited the greatest percentage of task episodes for the classroom setting. Program 2 ranked lowest for the factor in the classroom task episodes and has the top ranking in the work site task episodes.

The relational factor of working cooperatively (figure 18) was identified when students cooperated with co-workers or other students to complete a task. The percentage of task episodes for this factor ranged from 42 for program 3 to 10 for program 1. The percentage of task episodes for the factor was 34 in work site settings and 25 for classroom settings. The significant interaction indicates that in this case the frequency of occurrence for these relational task episodes is a function of both the program and the setting. For this relational factor, program 1 ranked fourth in work site task episodes and third in classroom task episodes. Program 3 ranked highest for the factor in the work site task episodes and second in classroom task episodes.

The relational factor of giving directions (figure 19) was identified when students told co-workers or other students what to do. The percentage of task episodes for this factor ranged from 8 for program 4 to 2 for programs 1 and 2. The percentage of task episodes for the factor was 4 for the work site and 2 for the classroom settings. There were no significant program, setting, or interaction effects for this factor.

Significant Patterns

Using this methodology, we can conclude that the programs and settings do exhibit different patterns of the environmental factors. When one compares the four programs, the significant patterns for the environmental factors are as follows:

- Program 1 exhibits the presence of the environmental factors of centrality, articulation, self-initiation,

negotiation, and the relational behavior of taking direction. The program does not emphasize the factors of feedback, co-worker presence, and the relational behavior of working cooperatively.

- Program 2 has no prominent environmental factors and is low in occurrences for the factors of feedback, centrality, and supervisor presence.

- Program 3 exhibits high occurrences for the factors of supervisor presence and the relational behavior of working cooperatively. The program does not emphasize the factors of feedback and the relational behavior of taking direction.

- Program 4 exhibits the presence of the environmental factors of feedback and co-worker presence. It is low in occurrences for the environmental factors of articulation, self-initiation, and negotiation.

When one compares the classroom and work site settings, the significant patterns for the environmental factors are as follows:

- The classroom settings exhibit high occurrences for the factors of feedback, negotiation, supervisor/teacher presence, co-worker/student presence, and the relational behavior of taking directions.

- The classroom settings exhibit low occurrences for the factors of articulation and self-initiation.

- The work site settings exhibit high occurrences for the factors of articulation and self-initiation.

- Work site settings do not emphasize the factors of feedback, negotiation, supervisor presence, co-worker presence, and the relational behavior of taking directions.

Relationships between Exposure to Basic Skills and Environmental Factors

It is reasonable to assume that characteristics of the environment can influence the acquisition of skills. For example, exposure to basic skills is a necessary prerequisite to

the achievement of basic skills. In addition, other environmental factors affect cognitive processes that may, in turn, impact on achievement. However, the focus of the current study was to identify relationships between exposure to basic skills and environmental factors. Therefore, a necessary next step in the analytic process was to examine the co-exposure to basic skills and environmental factors.

A frequency distribution for the use of each basic skill and the presence or absence of each environmental factor is shown in table 19. These distributions are independent of the program and setting in which they occurred. The accompanying tests of statistical significance are presented in table 20.

As can be seen in table 20, the only factors that showed significant differences were simultaneity and the three types of relational factors. However, the majority of task episodes showed an absence of these factors. Although the differences in percentages are statistically significant, they do not lend themselves to any meaningful interpretations.

The other eight environmental factors did not show any significant results. Apparently, these factors are not powerful enough in and of themselves to show differential effects in the presence of basic skills. What is needed, then, is a new set of factors that allow for these discriminations.

Revision of Environmental Factors

At this stage in the analysis, some of the environmental attributes were combined, resulting in a new set of six factors. These new factors provide a more parsimonious and powerful

TABLE 19

PERCENTAGE OF TASK EPISODES EXPOSING STUDENTS
TO BASIC SKILLS AND ENVIRONMENTAL FACTORS

ENVIRONMENTAL FACTORS	BASIC SKILL EXPOSURE					
	Psychomotor %	Reading %	Computing %	Speaking %	Writing %	Reasoning %
Centrality						
Present	93	96	96	89	95	92
Absent	7	4	4	11	5	8
Articulation						
Present	31	35	24	28	31	28
Absent	69	65	176	72	69	72
Self-initiation						
Present	57	54	22	34	51	55
Absent	43	46	78	66	49	45
Negotiation						
Present	43	26	25	38	35	38
Absent	57	74	75	62	65	62
Supervisor						
Present	52	60	73	68	74	54
Absent	48	40	27	32	26	46
Co-worker						
Present	73	76	96	86	78	74
Absent	27	24	42	14	22	26
Feedback						
Present	3	6	8	7	8	3
Absent	97	94	92	93	92	97
Simultaneity						
Present	2	4	9	3	9	2
Absent	98	96	91	97	91	98
Split Task						
Present	15	24	20	13	34	13
Absent	85	76	80	87	66	87
Relational: Taking direction						
Present	9	11	8	17	12	10
Absent	91	89	92	83	88	90
Relational: Working cooperatively						
Present	30	24	44	55	19	34
Absent	70	76	56	45	81	66
Relational: Giving direction						
Present	3	4	8	8	10	4
Absent	97	96	92	92	90	96

TABLE 20

EFFECTS OF ENVIRONMENTAL FACTORS ON THE PRESENCE OF BASIC SKILLS

ENVIRONMENTAL FACTORS	BASIC SKILLS					
	Psychomotor	Reading	Computing	Speaking	Writing	Reasoning
Centrality	--	--	--	--	--	--
Articulation	--	--	--	--	--	--
Self-initiation	--	--	--	--	--	--
Negotiation	--	--	--	--	--	--
Supervisor presence	--	--	--	--	--	--
Co-worker presence	--	--	--	--	--	--
Feedback	--	--	--	--	--	--
Simultaneity	--	X_2	X_2	X_1	X_2	--
Split task	--	--	--	--	--	--
Relational:						
Taking direction	X_2	--	--	X_2	--	X_2
Working cooperatively	X_2	X_2	X_2	X_2	X_2	X_2
Giving direction	X_2	--	X_2	X_2	X_2	--

$X_1 \leq .001$
$X_2 \leq .0001$

framework within which to analyze the data. They also closely parallel the variables identified in past research. These new factors are (1) importance, (2) support, (3) control, (4) complexity, (5) feedback, and (6) relational.

Since the goal of this study is to describe environments that expose students to basic skills, the new set of factors was analyzed in combination with the six basic skills. A frequency distribution of the six combined factors and exposure to the six basic skills is presented in table 21. This table shows the percentage of task episodes in which the skills were in use under each environmental condition.

Table 22 shows the results of a chi-squared procedure on these data. The table identifies significant differences in task episodes for the presence of basic skills exposure and for the levels of the different factors.

Definitions and Effects of New Environmental Factors

The factor importance is a combination of centrality and articulation. If individuals' work impacts on the work of others, and if their work is central to the goals of the organization, then the individuals will be more likely to view their work as important and meaningful. Importance had a significant effect on psychomotor, reading, writing, and reasoning skills exposure. A moderate level of importance was associated with the use of all four of these skills.

Support refers to the presence of other people, which increases the opportunities for feedback, assistance, or instruction. Both co-worker presence and supervisor presence are

TABLE 21

PERCENTAGE OF TASK EPISODES COMPARING EXPOSURE TO BASIC SKILLS AND ENVIRONMENTAL FACTORS

ENVIRONMENTAL FACTORS	BASIC SKILL EXPOSURE					
	Psychomotor %	Reading %	Computing %	Speaking %	Writing %	Reasoning %
Importance						
Low	13	15	15	16	17	13
Medium	63	60	64	60	59	65
High	24	25	21	24	24	22
Support						
Low	21	19	4	8	16	20
Medium	35	26	27	35	18	35
High	44	55	69	57	66	45
Complexity						
Low	85	76	80	87	66	86
Medium	13	19	11	10	23	12
High	2	5	9	3	11	2
Control						
Low	42	45	77	64	47	43
Medium	55	54	21	32	49	54
High	3	1	2	4	4	3
Feedback						
Absent	97	94	92	93	92	97
Present	3	6	8	7	8	3
Relational						
Absent	58	60	41	20	60	52
Low	9	11	7	17	12	10
Medium	30	24	44	55	19	34
High	3	4	8	8	10	4

TABLE 22

EFFECTS OF ENVIRONMENTAL FACTORS ON EXPOSURE TO BASIC SKILLS

ENVIRONMENTAL FACTORS	BASIC SKILLS EXPOSURE					
	Psychomotor	Reasoning	Reading	Computing	Speaking	Writing
Importance	X_2	X_2	X_2	--	--	X_1
Support	X_2	--	X_2	--	X_2	X_2
Control	--	X_2	X_2	X_2	--	--
Complexity	X_1	--	X_2	--	--	
Feedback	--	--	--	--	--	--
Relational	--	--	--	--	X_2	--

$X_1 \leq .001$
$X_2 \leq .0001$

the factors that increase support opportunities. The level of support impacted significantly on psychomotor, reading, speaking, and writing skills exposure. For this factor, a high level of support led to more frequent use of basic skills.

Control is the amount of autonomy a student has in carrying out required work activities. Being able to initiate tasks and negotiate the conditions for completion of the tasks will lead to increased feelings of control. The control factor impacted significantly on reading, computing, and reasoning skills, but in different ways. Reading and reasoning were associated with a moderate level of control while computing was related to a low level of control.

The complexity of a task is a function of whether the student is performing either one task at a time or two or more tasks simultaneously; also, whether the task can be completed without interruptions or must be stopped and then resumed at another time. Psychomotor, reading, and writing skills showed significant results from task complexity. Tasks that were low in complexity were associated with the presence of basic skills.

The factor feedback was left intact. This factor was distinct enough that it was felt feedback should remain in the framework as originally defined. Feedback was not significantly related to use of any of the basic skills. However, it should also be noted that 96 percent of the task episodes showed no feedback occurring. Because this situation left only a small number of task episodes in which feedback was present, statistical significance was more difficult to achieve than with the other factors.

The three types of relational factors were also combined to form a single relational factor. Taking directions is the lowest level of relational behavior, since it requires only passive listening on the part of the recipient. Working with others requires some interaction; therefore, it is a moderate relational behavior. Giving directions is the highest level of relational behavior since it requires an individual to take control of a situation, as well as to interact with others. The only significant relationship with basic skills exposure was for speaking. A moderate level of relating (i.e., working cooperatively with others) was associated most strongly with speaking.

Conclusions

As can be seen from the above analysis, the relationship between these six environmental attributes and opportunities to use basic skills is a complex one. Not all environmental factors impact on the frequency of basic skills use. None of the factors were associated with all six basic skills. The factors of importance, support, control, and complexity affected use of three or four of the basic skills, while relational affected use of only one skill. The remaining factor, feedback, did not appear to be related to any of the skills; however, as was noted, this factor is more difficult to analyze than the others. Use of all of the basic skills can be affected by environmental factors; of the six, reading showed significant results the most often.

The level of any factor that is associated with the presence of a skill's use is also not constant. For the factor support, a high level was needed. For importance and relational, however, a moderate level was desirable; and for the complexity factor, a low level. The desired level is not constant across all skills' use, either. For control, two of the skills were associated with a moderate amount of control, while a third skill was related to a low level of the factor.

CHAPTER 5

SUMMARY, IMPLICATIONS, RECOMMENDATIONS

Summary

Introduction

The development of basic skills that will enable youths to enter the labor market successfully has become a major concern of employers, educators, and the federal government. Yet, there is evidence that basic skills attainment in school and work settings may be quite different. Relatively little is known, however, about characteristics of school and work environments that might be causing these differences. The focus of the current study was on the identification and description of environmental characteristics and their relationship to basic skills exposure.

Development of a Framework

It was necessary to use a naturalistic observation technique to collect environmental information. Moore's (1981) task analysis framework was used to develop this technique--in particular, his concept of a task episode as the unit of analysis. The task episode is event dependent, rather than time dependent. Six basic skills were identified: psychomotor, reading, computing, speaking, reasoning, and writing. Twelve environmental factors were also defined. These twelve factors were related not only to Moore's framework, but also to task design theory.

Research Methodology

To obtain observations, four programs were selected that emphasized different arrangements for learning. The first two programs were different models of experience-based career education (EBCE), the third was a cooperative distributive education (DE) program, and the fourth was a traditional academic program. The programs differ in their overall goals, whether the student is paid or not, and the amount of time spent in the classroom and work site.

Observations were recorded live in the form of comprehensive field notes. A coding form was developed that incorporated both the ideas of task episodes as well as specific behaviors related to environments and basic skills performance. The methodology was extensively field-tested and refined before training of observers was begun.

Observers were trained over a period of twenty hours by means of videotapes, practice note-taking sessions from the videotapes and in the field, and discussion with the trainers.

Data were collected during May and the first week of June 1983. Overall, 193 observations were secured on forty-five students. In developing an analytical strategy, it is important to recognize that the data were categorical in nature and had been collected in the form of frequency of occurrences, rather than cause and effect. A technique that was appropriate for this type of data was the log-linear models for multiway frequency tables. This technique provides statistical tests as to whether the

dependent variable is a function of the level of the independent variable. Results are presented as chi-squared tests of significance.

Findings

The first research question to be addressed in the analysis was the relationship between exposure to basic skills and programs and settings. The purpose of this analysis was to determine whether there were statistically significant differences in patterns between exposure to basic skills and participation in the four programs and the two settings. Definite patterns of high and low percentages of basic skills being used were obtained for the different programs and settings.

The second question was whether the programs and settings exhibited different combinations of environmental factors. Again, significant patterns were found. The classroom percentages were higher on some factors, while work site percentages were higher on others. For two of the factors, the percentages were not significantly different from each other.

A summary of the results of the analysis of exposure to basic skills, environmental factors, and the programs and settings is presented in table 23. This table indicates which programs and settings were highest and lowest when the differences in percentages were statistically significant.

The data were further analyzed to assess the relationship between the twelve environmental factors and the basic skills. A preliminary analysis showed few statistically significant results; those that were significant did not lend themselves to

TABLE 23

SIGNIFICANT PATTERNS OF EXPOSURE (BY PROGRAM AND SETTINGS) TO BASIC SKILLS AND ENVIRONMENTAL FACTORS

Programs				Observation Variables	Settings	
P_1	P_2	P_3	P_4		Classroom	Work Site
				Exposure to Basic Skills		
+[a]		-[b]		Psychomotor	-	+
+			-	Reading	+	-
				Computing		
-			+	Speaking		
+	-	-		Writing	+	-
-		+		Reasoning	-	+
				Environmental Factors		
				Simultaneous tasks		
				Split tasks		
-	-	-	+	Feedback	+	-
+	-			Centrality		
+			-	Articulation	-	+
+			-	Self-initiation	-	+
+			-	Negotiation	+	-
	-	+		Supervisor present	+	-
-			+	Co-worker present	+	-
+		-		Relational--takes direction	+	-
-		+		Relational--works cooperatively		
				Relational--gives direction		

[a]High occurrences of task episodes = +
[b]Low occurrences of task episodes = -

any meaningful interpretations. Therefore, to increase the opportunities for detection of statistically significant and meaningful results, some of the environmental factors were combined, forming a new set of factors. These new factors were labeled as follows: importance, support, control, complexity, feedback, and relational. Importance and support were associated with four of the basic skills; control was related to three skills; complexity, to two; and relational, to one skill. Feedback was not significantly related to any of the six skills. The level of the factor--low, medium, or high--associated with the presence of the skill was not constant.

Overall, these findings appear to indicate that there is a complex relationship between opportunities to use basic skills and characteristics of the environments in which these opportunities occur. This study represents an initial attempt to describe environments using observational techniques. Further research will be needed to develop a list of environmental attributes that provide a parsimonious yet powerful framework for defining environments associated with exposure to basic skills.

Implications

As was mentioned in chapter 1, the illiteracy rate among seventeen-year-olds in the United States is about 13 percent. Concern over these high illiteracy rates has led many individuals to advocate a return to the concept of traditional, academically oriented classrooms. It is felt that this type of classroom will require students to become proficient in the basic skills necessary for effective functioning in modern society.

Other, more innovative types of classrooms may provide career exploration or practical work experience but do not give students enough opportunities to learn and practice basic skills such as reading, writing, and mathematics.

But is this paradigm necessarily true? Is there a trade-off between career experience and acquisition of basic skills? Do school programs that emphasize on-the-job training and/or job-oriented skills neglect the basic skills? It could also be argued that exposure to basic skills occurs at work sites as well as in classrooms, and that vocational education students receive as much exposure to basic skills as academic students, albeit in a less traditional manner.

This concern over whether vocational education programs provide students with enough practice in basic skills can be partially addressed with the data obtained from the current study. A contrast test was done on the first three programs (i.e., the two EBCE models and the DE model) and the traditional academic program with respect to exposure to basic skills. The contrasts were tested for statistical significance. The results were presented in chapter 4.

For the psychomotor skill, program 1 had a significantly higher frequency of exposure to the skill than program 4 (the academic program), while program 3 was significantly lower than program 4. For reading, both programs 1 and 2 were significantly higher than program 4. With respect to speaking, program 2 was significantly lower than the academic program; for reasoning, program 3 was significantly higher; and for writing, program 1 was highest.

Even though this study was not designed to compare and contrast vocational education and traditional academic programs, these results do present some interesting findings. In 61 percent of the cases, vocational education experiences--both in the classroom and work site--yielded as much exposure to basic skills as academic classrooms and part-time work. And in 28 percent of the cases, the vocational education programs had a significantly higher frequency of basic skills being used.

This comparison of various programs was not definitive. Issues of achievement, retention, and level of skill were not addressed. These data do suggest, however, that concerned parents, academicians, and educators should be cautious in their condemnation of alternative school experiences as not providing practice in the type of skills that schools have been traditionally expected to provide. Learning of basic skills may occur in a different setting or a different format, but it may still be just as likely to occur.

Given this study's emphasis on the environment and how, if at all, it relates to exposure of basic skills, one final question emerges. If one wants a student to be exposed to basic skills, what environmental characteristics should be present? This question has obvious practical implications since a teacher/supervisor desiring to give a student practice in basic skills may be able to manipulate the environment to facilitate basic skills exposure. However, it is recognized that this activity is undoubtedly easier said than done. The relationships between environmental factors and exposure to basic skills are at best

tenuous, and in no case can a causal relationship be assumed. Yet the wealth of the data collected in this study may yield some interesting preliminary findings that advance ideas about desirable characteristics of classroom and work site environments for providing students with useful educational experiences.

Two factors that appeared to be frequently associated with exposure to basic skills were those designated as importance and support. A moderate level of importance was most strongly associated with the skills. A possible interpretation is that tasks low in importance will also be low in number of skills being used, while jobs high in importance may require mostly interpersonal or social skills. Therefore, a moderate degree of importance leads to basic skills use. Regarding support, a high level was associated with basic skills use. This finding suggests that the presence of others may cause the student to work more rapidly and more knowledgeably, thereby facilitating basic skills use.

The findings for control also show a moderate level occurring most frequently with reading and reasoning. Instances of high control, however, were very infrequent. Therefore, it may be the case that higher control leads to greater use of certain skills.

Other statistically significant results were obtained for the six environmental factors and their association with the presence of the six basic skills. It is unclear whether these findings are the result of statistical error or whether they are,

in fact, meaningful findings. Further research on this topic will either reiterate or disconfirm these findings.

All of these interpretations are, of course, tentative. Relationships of this type are undoubtedly complex and may be dependent on interactions of environmental attributes as well as their main effects. As stated earlier, these interpretations are intended only to spark ideas as to the possible importance of the environment in facilitating use of basic skills.

Recommendations for Further Research

This study was designed as an exploratory effort to develop an observational methodology describing environmental factors that differentially operate in classroom and work site settings and that ultimately may influence basic skills achievement. This effort is the first step in a long-range effort to address the question of which vocational education student learns which basic skill best in what setting. Since personal characteristics of students and achievement scores were not obtained for this study, a logical next step is to secure these measures within the context of an experimental research design. Using the methodology developed this year would permit an investigation of the effects of the interaction between the individual's characteristics and the environmental factors on the outcome of basic skills achievement.

Two recommendations are offered to revise the observational methodology. First, the current observations of the exposure to basic skills in classroom and work site settings revealed

predominantly heavy distributions of task episodes for the low levels of the skills. The existing field notes need to be reviewed and, if possible, the basic skills levels, redefined so as to show an improved distribution of observations for skill levels. Secondly, several environmental factors need to be redefined or dropped from the observations. These include split tasks and simultaneous tasks. Their inclusion as environmental factors does not appear to contribute to the overall patterns.

APPENDIX A

TRAINING MATERIALS

TRAINING PLAN FOR OBSERVERS FOR THE SALIENT VARIABLES PROJECT

Objectives	Activities
1. Explain background information on the purpose of the study.	1. See Project Profile. Discuss and answer any questions.
2. Define terms.	2. See "Steps in the Salient Variables Study."
3. Discuss what to do before entering the site.	3. See item 4 on "Steps in the Salient Variables Study."
4. Discuss what to do when on-site.	4. Introduce self to person on-site. Give a brief explanation as to the purpose of the study. Find a place from which to observe that does not interfere with the workers, yet provides good visibility of the worker's behavior. Take notes. Be polite, but do not engage in conversation during the observation period.
5. Discuss/review systematic observation methods.	5. Review techniques of systematic observation methods. (See handout.)
6. See an example of an entire package of observation materials.	6. View training tape number 1. See exemplary field notes and background information and coding sheet. Review each component, including the definitions used for coding.
7. Practice observation.	7. View training tape number 2. Take notes. Review notes and compare with exemplary notes. Repeat with training tape numbers 3, 4, and 5.
8. Practice with coding sheet.	8. Using a transcript from training tape 2, code it. See a coding sheet that coded that transcript correctly. Compare with own. Repeat this step until coding is acceptable.
9. Practice observing and coding.	9. Observe, take notes, and code for training tapes 7, 8, and 9.

OVERVIEW OF THE STEPS IN THE SALIENT VARIABLES STUDY

1. The Boundaries

(The limits, type of program, type of person, type of outcomes, geographic area)

Location	EBCE	Classroom	Jobs	DE	Total Students/Observations
City #1	13	2	3		18/90
City #2	13		3		16/80
City #3		2	3	13	18/90

NOTE: Each student will be observed five times for approximately 60 minutes.

a. City #1: For EBCE, three of these observations will be at the work site and two will be in the classroom.

b. City #2: For EBCE, four of these observations will be at the work site and one will be at the resource center while the student is interacting with the supervisor or teacher.

c. Classroom: These should be in classes such as math, science, or English; observe 5 times in classroom.

d. Jobs: Students in part-time non-school jobs; observe 5 times at work site.

2. Determine Unit of Analysis

Unit of analysis is the "thing" being studied--in this case, the setting.

3. Select a Site (sample selection)

Sampling strategy: purposive to obtain representation of the types of settings young people experience in EBCE.

4. Establish Initial Contacts: Follow Protocol (See worksheet for planning observations)

a. National Center staff and coordinators will meet with school representatives.

b. Observer will contact the school.

4. Establish Initial Contacts - (continued)

- Set up appointment to observe in the school.

c. Observer will contact the employer to set up observation time.

- Identify and set the observation schedule before entering the site.

d. Observer will schedule the necessary amount of time for each observation.

5. Develop Data Collection Procedures

a. Study and design a coding scheme that identifies these variables.

- Site.

- Observer.

- Type of person being observed.

- Each observation must be assigned a number from a master list.

6. Staff Training

7. Logistics of Field Work and Collection of Data

a. Complete background information. Sketch location.

b. Takes notes in field. Try to observe at least once at the beginning of the work period and once at the end.

c. Write up notes daily.

d. Code notes daily.

8. Coordination of Data: Return and Clean Up of Data

9. Analyze Data

10. Report Findings

11. Utilize Findings

COORDINATOR'S DUTIES

1. Send forms in every week
2. For each observation, a complete set of materials is returned
    a. Background
    b. Field notes
    c. Coding sheet(s)
3 Check materials for completeness
4. Assign subjects and corresponding code numbers
5. Act as a liaison between observers and National Center staff
6. Act as a liaison with local school personnel

OBSERVER'S DUTIES

1. Set up observation appointments
2. Complete background information
3. Take notes
4. Code notes: Code background data, number lines in field notes, divide into task episodes, code each task episode
5. Return to coordinator
6. Make any needed revisions

DEFINITION OF TERMS FOR THE OBSERVATION OF SALIENT VARIABLES CODING SHEET

Column

1 Observer # - Each observer will be assigned a number during the training session.

City #1	City #2	City #3
1 _____	1 _____	1 _____
2 _____	2 _____	2 _____
3 _____	3 _____	3 _____
4 _____	4 _____	4 _____
5 _____	5 _____	5 _____

2 City

1 -

2 -

3 -

3-4 Subject - Each subject will be assigned a number by the coordinator in the city. This number will refer to all five observations of that same student. (See Tally Sheet for Coordinator).

5 Observation # (for each subject)

1 - First observation
2 - Second observation
3 - Third observation
4 - Fourth observation
5 - Fifth observation

6-9 Date of Observation - Enter:

Month	Day
04 - April	01 to 31
05 - May	
06 - June	

NOTE: Any category that is not applicable, leave it blank.

Column

10 Day of Observation

1 - Monday
2 - Tuesday
3 - Wednesday
4 - Thursday
5 - Friday
6 - Saturday
7 - Sunday

11-14 Start Time - Use military time. Enter hour and minutes of the start of the observation.

1:30 p.m. would be 1330; 8:45 a m. would be 0845

15-18 Finish Time - Enter hour and minute of the end of the observation.

19-20 Total Time (in minutes)

21 School Program

1 - EBCE
2 - DE
3 - Regular math class
4 - Regular English class
5 - Regular classroom, subject other than math or English
6 - Not part of school program (after school part-time job)
7 - Other

22 Location of Observation

1 - Traditional classroom
2 - EBCE or DE special classroom
3 - Work site
4 - Other

23 Student Sex

1 - Female
2 - Male

NOTE: Any category that is not applicable, leave it blank.

Column

24 Student Race

1 - Caucasian
2 - Black
3 - Hispanic
4 - Oriental
5 - Other

25-26 Grade Level

10 - 10th
11 - 11th
12 - 12th
13 - Other

27-28 Number of weeks at that specific placement or in that specific class.

98 - if unknown

99 - if equal to or greater than 99 weeks

29 Supervisor's (Teacher's) Sex

1 - Female
2 - Male

30 Supervisor's (Teacher's) Race

1 - Caucasian
2 - Black
3 - Hispanic
4 - Oriental
5 - Other

31-33 Task Episode # - Number the task episodes sequentially for each observation session. A task episode is a segment of time in which the individual's focus of attention is constant and the activity is aimed at the completion of some "identifiable" goal (see green attachment for further clarification).

34-37 Line # - Number the lines of the field notes. Enter the number of the first line in the field notes for each task epi ode.

38-39 Task Behaviors - Count the number of behaviors that make up the task episode. These usually appear as action verbs referring to the subject.

99 - if equal or greater than 99 task behaviors

Column

40 Simultaneity

1 - if more than one task is being done at once (e g., knitting and listening)

41-42 Split - Code this if the task episode is interrupted before it is completed, and the subject returns to complete the task later.

1 - Identify parts of the first task episode that is split by putting a 1 in column 42 for all parts of that episode.

2 - Identify parts of the second task episode that is split by putting a 2 in column 42 for all parts of that episode.

Continue to increment for each additional split task.

43 Task/Nontask - This category should be used to distinguish between task and nontask episodes. This distinction involves a judgment about the kinds of actions that accomplish some segment of the "mission" or productive goals of the organization, and the kinds that do not. Nontask behavior includes off-task activities such as socializing, idle chatter, or going away from the work area for a cigarette break or whatever.

1 - if it is a task episode

2 - if it is a nontask episode

NOTE: Any category that is not applicable, leave it blank.

Column

44 Psychomotor - Psychomotor refers to manual or motor skills. Use the following scale to rate the level of psychomotor skills observed:

1 - Low, i.e., handling things, feeding or tending things, starting, stopping, or adjusting uncomplicated machinery

2 - Medium, i.e., manipulation that involves the coordination of several objects, and operating, controlling, or driving/controlling complicated things; typing

3 - High, i.e., precision working; using drafting tools; using jeweler's tools

45 Learning/Applying

1 - if the student is learning a psychomotor skill

2 - if the student is applying a psychomotor skill

46 Reading - Use the following scale to rate the level of reading skills observed:

1 - Low, i.e., reads simple instructions; reads product prices

2 - Medium, i.e., reads journals, manuals, dictionaries, safety rules, instructions in the use and maintenance of shop tools and equipment

3 - High, i.e., reads scientific and technical journals, financial reports, legal documents

47 Learning/Applying

1 - if the student is learning a reading skill

2 - if the student is applying a reading skill

NOTE: Any category that is not applicable, leave it blank.

Column

48 Computing - Use the following scale to rate the level of computing skills observed:

1 - Low, i.e., add and subtract two digits; simple multiplication; perform arithmetic operations involving American money

2 - Medium, i.e., application of fractions, percentages, ratio, proportion, practical algebra

3 - High, i.e., work with differential equations, advanced calculus, correlation techniques

49 Learning/Applying

1 - if the student is learning a computing skill

2 - if the student is applying a computing skill

50 Speaking - Use the following scale to rate the level of speaking skills observed:

1 - Low, i.e., speak simple sentences, using normal word order, and present and past tense

2 - Medium, i.e., speak before an audience with poise, speak extemporaneously on a variety of subjects

3 - High, i.e., conversant in the theory, principles, and methods of effective and persuasive speaking, voice and diction, phonetics, and discussion/debate

51 Learning/Applying

1 - if the student is learning a speaking skill

2 - if the student is applying a speaking skill

NOTE: Any category that is not applicable, leave it blank.

Column

52 Reasoning Skills - Use the following scale to rate the level of reasoning skills observed:

1 - Low, i.e., apply commonsense understanding to carry out simple one- or two-step instructions. Deal with standardized situations.

2 - Medium, i.e., apply commonsense understanding to carry out a variety of instructions furnished in written, oral, or diagrammatic form. Solve practical problems and deal with a variety of variables.

3 - High, i.e., apply principles of logical or scientific thinking to a wide range of intellectual and practical problems.

53 Learning/Applying

1 - if the student is learning a reasoning skill

2 - if the student is applying a reasoning skill

54 Writing Skills - Use the following scale to rate the level of writing skills observed:

1 - Low, i.e., print simple sentences containing subject, verb, and object, and series of numbers, names and addresses

2 - Medium, i.e., write reports and essays, prepare business letters

3 - High, i.e., write editorials, journal articles, speeches, manuals, critiques

NOTE: Any category that is not applicable, leave it blank.

Column

55 Learning/Applying

1 - if the student is learning a writing skill

2 - if the student is applying a writing skill

56 Relational Skills - Refers to interaction with others. Use the following scale to rate the level of relational skills:

1 - Low, i.e., worker takes directions

2 - Medium, i.e., worker works cooperatively with others

3 - High, i.e., worker gives directions

57 Learning/Applying

1 - if the student is learning a relational skill

2 - if the student is applying a relational skill

58 Centrality - Central tasks constitute the core of the mission of the institution, i.e., those functions that the institution is "about."

1 - if the task episode is a central or crucial part of the organization

2 - if the task episode is not central to the organization

3 - if the task episode is not central and was added on to give the student something to do

4 - if no judgment can be made

59 Articulation - Articulation refers to how this task episode relates to other tasks performed at the organization. During the observation period, if other workers rely on the student to complete this task before commencing their own, it is an articulated task.

1 - if it is an articulated task

2 - if it is not an articulated task

3 - if no judgment can be made

Column

60 Initiator - Who initiates the task episode (did you see anyone tell the student what to do?)

1 - self-decision (nonrepetitive)

2 - self-decision (routine or repetitive)

3 - supervisor

4 - peer

5 - customer/client

6 - other

61 Negotiations - Refers to ability of workers to negotiate the terms of what they are doing.

1 - the subject can negotiate the terms of the task

2 - student can not negotiate; is told exactly what to do

3 - no judgment can be made

62 Solo/Group

1 - Solo, i.e., subject works alone

2 - Group, i.e., subject works with other workers

3 - Group, i.e., subject works with clients/customers

4 - Group, i.e., subject works with both other workers and clients/customers

5 - Subject talks on the telephone to unknown party

63 Supervisor Present

1 - Supervisor absent

2 - Supervisor observing

3 - Supervisor giving direction

4 - Supervisor present and engaged in other types of action

NOTE: Any category that is not applicable, leave it blank.

Column

64 Co-worker Present/Absent

1 - Co-worker absent

2 - Co-worker present and engaged in independent work

3 - Co-worker observing

4 - Co-worker giving assistance

5 - Co-worker engaged in other types of action

65 Type of Feedback on Performance - Formative feedback serves an instructional function; it is meant to help the student improve performance relative to certain criteria. Summative feedback stands more as a judgment, a comment on the ability, personality, and/or performance of the student--a summary assessment.

1 - Formative, i.e., feedback presented in such a way that student can alter performance (monitoring)

2 - Summative, i.e., feedback presented at the end of task

66 Valence - Of what quality was the feedback?

1 - Positive

2 - Negative

3 - Mixed (both positive and negative)

67 Timing of Feedback (When was the feedback given?)

1 - Given for correct performance

2 - Given for incorrect performance

3 - Given for both correct and incorrect performance

68 Nontask Activity

1 - Socialize 2 - Nothing 3 - Other

NOTE: Any category that is not applicable, leave it blank.

ADDENDUM - April 25, 1983

DEFINITION OF TERMS FOR THE OBSERVATION OF SALIENT VARIABLES CODING SHEET

Column

43 Line 5 of definition delete first "such" so this line becomes "behavior includes off-task activities such as socializing, idle"

44 Line 7 delete "controlling"

48 For low-level computing, add counting as an example

52 For low-level reasoning, change second sentence to:
Deal with standardized, routine, repetitive, rule-bound situations.

54 1 - Low, i.e., print simple sentences containing subject, verb, and object; series of numbers; names and addresses; and copying.

56 Relational Skills - Change opening sentence to: Refers to any exchange of information (printed instructions/dialogue) with any human being. Use the . . .

59 Articulation - Add to end of definition: Articulation excludes the client.

61 Add to end of definition within the parentheses, (Is there any dialogue?)

62 Solo/Group

2 - Group, i.e., subject works with other workers or supervisors

3 - Group, i.e., subject works with clients/customers/human beings other than peers or supervisor

63 Supervisor Present

Correct 4

4 - Supervisor present and engaged in other types of activities

Add category 5

5 - Supervisor present and engaged in independent/parallel work

64 Co-worker Present/Absent

2 - Co-worker present and engaged in independent/parallel work

4 - Co-worker giving assistance (peer tutor or help in accomplishing a task)

TRAINING TAPE # 1

BACKGROUND INFORMATION FOR EACH OBSERVATION

BASIC SKILLS ACQUISITION AND RETENTION IN ALTERNATIVE LEARNING ENVIRONMENTS

City: 1.____ 2.____ 3. ✓

School Program: 1. ___ EBCE 2. ___ DE 3. ___ Regular Math Class

4. ___ Regular English Class

5. ___ Regular classroom, subject other than Math or English

6. ___ Not Part of School Program (after school part-time job)

7. ✓ Other: Full Time Employment

Date of Observation: 3/24/83 Day of Week: THUR Time Start: 1:10 am

Time Finish: 1:20 am

Total Time (min.): 10

Supervisor's (Teacher's) Name: KEN SMITH

Supervisor's (Teacher's) Title: FLOOR SUPERVISOR

Business Address: UNIVERSITY HOSPITAL
1920 Long DRIVE

Telephone Number 422 - 6189

Type of Business: HEALTH CARE - HOSPITAL

Estimated Number of Employees: 2000

Student's Name (for observation purposes): CAROL JONES

Job Title of Student Worker: CLERK SPECIALIST

Does worker (student) receive pay for work? ✓ Yes ___ No

Location of Observation: 1. ___ Traditional Classroom

2. ___ EBCE or DE Special Classroom

3. ✓ Worksite

4. ___ Other (specify) _____

Observation number 1 of 5 observations

Observer's Name: MIKE Crowe

CHARACTERISTICS OF WORKER AND SUPERVISOR

1. Student Worker

Sex: 1. ✓ Female 2. ____ Male

Race: 1. ✓ White 2. ____ Black 3. ____ Hispanic 4. ____ Oriental

5. ____ Other: _____

Grade Level: ____ 10th ____ 11th ____ 12th ✓ Other: H.S. GRAD

Length of time at worksite: 50 weeks

2. Supervisor

Sex: 1. ____ Female 2. ✓ Male

Race: 1. ✓ White 2. ____ Black 3. ____ Hispanic 4. ____ Oriental

5. ____ Other: _____

Symbols for Recording Behavior

W_1 = Worker (Student) Being Observed

W_2-W_n = Other Workers (Students)

S_1 = Immediate Supervisor of Worker

S_2-S_n = Other Supervisors

C_1-C_n = Customers/Clients

T = Teacher

R = Resource Person (EBCE)

Summary Notes: Interpretive Comments:

During this work period, the worker appeared to work very intensely. She worked alone. She did not talk to anyone. She repeated the same task.

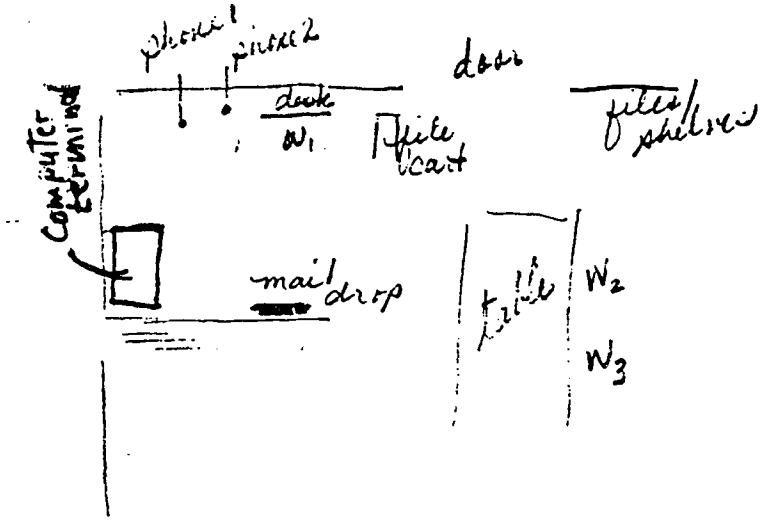
The worker needed to be thoroughly meticulous in that she was copying detailed information. She had to make sure that she got it on the right page and the right place. All of the work seemed to be related to updating the patient record books. Evidently the doctors and nurses had recorded information on the stack of pages that appeared on her left and it was her job to record them in the notebook for each patient--perhaps for a permanent file for the patient.

(Please specify any problems encountered in coding)

CHARACTERISTICS OF WORKER'S (LEARNER'S) ENVIRONMENT

1. Sketch the Primary Work Area

   - approximate size
   - arrangement of furniture
   - location of key co-workers



2. Materials/Tools Available in Primary Work Area

1 ✓ desk	2 ___ manuals	3 ___ dictionary
4 ✓ telephone	5 ___ telephone book	6 ___ typewriter
7 ✓ computer-keyboard	8 ___ hand held calculator	9 ___ mechanical adding machine
10 ___ cash register	11 ✓ files	
12 ___ word processor	13 ___ textbooks	
14 ✓ other: 2 pencils Taped together	15 ___ other: _____	16 ___ Special Tools

3. Materials/Tools Used During Observeration Period (Use 1 through 16 above)

   1, 4, 7, 11, 14

4. Terminology related to the job. List of words or phrases specific to the job task.

Overall, for the 60 minute observation:

1. Estimate the amount of attention this worker gives to the job.

   ✓ 76% - 100%
   ____ 51% - 75%
   ____ 26% - 50%
   ____ 0% - 25%

2. Estimate how much attention the job demands.

   ✓ 76% - 100%
   ____ 51% - 75%
   ____ 26% - 50%
   ____ 0% - 25%

3. What is the level of cognitive effort required to do the job? (e.g., What kind of problems were solved, if any?)

   ____ high ____ medium ✓ low

4. Are the tasks varied or repetitious?

   ____ varied ✓ repetitious ____ mixed

5. Does the job require a rearrangement or breaking up of information in order to complete the activities?

   ____ Yes ✓ No ____ Not applicable

6. Is recall facilitated by imagery? (i.e., Are there image producing or concrete events rather than abstract events?)

   ____ Yes ____ No ✓ Not applicable

7. Are there opportunities for discovery learning? (Such as, solving a problem, generating an answer, etc.)

   ____ Yes ✓ No

8. What is the prevailing mood state of the environment?

   STERILE

9. What is the prevailing mood state of the worker?

   TASK ORIENTED, SERIOUS

10. Is there interference that affects the transfer of learning from the classroom to the worksite? If yes, please give specific examples.

    ____ Yes ____ No ✓ Not applicable

TRAINING TAPE NUMBER 1

SETTING

Observing one female clerical worker in the hospital; the worker is sitting at a desk facing a wall; on her left is a pile of papers. The papers contain information about patients. On her right is a cart that contains notebooks--one notebook for each patient.

TASK BEHAVIORS

1	Wl takes notebook out of cart	(It appears Wl is transcribing numerical data)
2	Flips through pages	
3 4	Takes a sheet of paper from stack on the left	
1 5	Wl records information into the notebook	
6	Wl puts the sheet in the notebook	(Wl is using two pencils taped together)
7	Takes sheet out	
8	Closes notebook	
9	Puts it back into the cart	
10	Pulls another notebook from the cart	
11	Refers to the information on the left	
#2 12	Wl begins recording information	
13 14	Wl turns paper over and records more information into the notebook	
15	Places the paper to the right of herself	
16	Flips through the notebook	
17	Closes it and places it back into the cart	
18	Wl reaches for paper on the right	
19	Looks at the cart	
#3 20 21	Records information on this new stack of paper	
22	Wl looks at sheet of paper	

23 Looks at cart

24 Looks back at paper

25 Puts paper into file on the left.

26 Wl stacks paper

27 Places on the left

---

28 Takes a notebook out of the cart

29 Flips through the pages

#4 30 Picks up paper from the left and
31 begins recording into the notebook

32 Wl closes notebook

33 Places in cart

---

34 Pulls out another notebook

35 Begins to record information from
36 paper on the left

#5

37 Wl turns page over

38 Records information on the top portion
39 of the notebook

---

40 Telephone rings

#6 41 Wl answers it, "May I help you."
42 Listens for a minute, but

43 Keeps recording, says "Thank you, goodbye."

#5 44 Closes notebook

45 Places into cart

---

46 Pulls out another notebook

47 Reaches for paper on the left

#7 48 Begins to transfer the information
49 into the notebook

50 Closes notebook

51 Places in cart

52 Puts a sheet of paper on the right

---

53 Draws out another notebook

54 Takes paper from left

B 55 Begins recording information into the
56 notebook

57 Turns paper over and continues recording

58 Closes notebook

59 Places paper on right

---

60 Reaches for another page on the left

9 61 Pulls a notebook

---

62 Gets out of seat

63 Goes over to the wall

64 Pulls a tube out of the wall

65 Pulls information from the tube

66 Places tube back into device

10 67 Presses button

68 Tube disappears

69 Goes over to a terminal

70 Presses some buttons

71 Then takes the information that came
72 from the tube

73 Walks across the room and gives it to
74 another W2

75 W1 returns to her seat

---

76 Stacks papers on the right

11 77 Starts recording information in a notebook

(Soft music is constantly playing in the background)

78 W1 turns page over

79 Continues recording information
80 in the notebook

81 Places page on the right

82 Closes notebook

83 Places in cart

TASK EPISODE CODING FORM

TRAINING TAPE # 1

Complete this information for ALL coding sheets

1.	Observer Number	[1] (1)
2.	City	[3] (2)
3.	Subject I.D. Number	[0] (3) [1] (4)
4.	Observation Number	[1] (5)

Complete this information only for FIRST coding sheet of an observation. (for each set of fiel

5.	Date of observation	[0] (6)	[3] (7)	[2] (8)	[4] (9)
6.	Day of observation				[4] (10)
7.	Time start	[0] (11)	[1] (12)	[1] (13)	[0] (14)
8.	Time finish	[0] (15)	[1] (16)	[2] (17)	[0] (18)
9.	Total time (minutes)			[1] (19)	[0] (20)
10.	School program				[7] (21)
11.	Location of observation				[3] (22)
12.	Student sex				[1] (23)
13.	Student race				[1] (24)
14.	Grade level			[1] (25)	[3] (26)
15.	Number of weeks at work/school			[5] (27)	[0] (28)
16.	Supervisor sex				[2] (29)
17.	Supervisor race				[1] (30)

Quality Control Checks

Site Coordinator _____ (Date) _____ (Initials)

Project Staff _____ (Date) _____ (Initials)

TASK EPISODE CODING FORM

Task Episode Number	Line Number	Number of Task Behaviors	Simultaneity	Split Task	Task/Nontask	Psychomotor Skill	Learning /Applying	Reading Skill	Learning/Applying	Computing Skill	Learning/Applying	Speaking Skill	Learning/Applying	Reasoning Skill	Learning/Applying	Writing Skill	Learning/Applying	Relational Skill	Learning/Applying	Centrality	Articulation	Initiator	Negotiation	Solo/Group	Supervisor Present/Absent	Coworker Present/Absent	Type of Feedback	Valence	Timing of Feedback	Nontask Activity
31 32	33 34 35 36 37	38 39	40	41 42	43	44	45	46	47	48	49	50 51		52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69 70 71 72 73 74 75 76 77 78 79 80
	10001	8			1	1	2	1	2					1	2	1	2			1	3	2	3	1	1	1					
	20010	9			1	1	2	1	2					1	2	1	2			1	3	2	3	1	1	1					
	30018	9			1	1	2	1	2					1	2	1	2			1	3	2	3	1	1	1					
	40029	6			1	1	2	1	2					1	2	1	2			1	3	2	3	1	1	1					
	50034	4	1		1	1	2	1	2					1	2	1	2			1	3	2	3	1	1	1					
	60040	3	1		1	1	2					1	2							4	3	6		5	1	1					
	50043	3	1		1	1	2	1	2					1	2	1	2			1	3	2	3	1	1	1					
	70046	6			1	1	2	1	2					1	2	1	2			1	3	2	3	1	1	1					
	80053	6			1	1	2	1	2					1	2	1	2			1	3	2	3	1	1	1					
	90060	2		1	1	1	2	1	2											1	3	2	3	1	1	1					
	100062	1			1	2	2	1	2					1	2					1	3	6	3	2	1	2					
	110076	7		1	1	1	2	1	2					1	2	1	2			1	3	2	3	1	1	1					

APPENDIX B
FIELD NOTES DISPLAYED BY TASK EPISODES, BASIC SKILLS, AND ENVIRONMENTAL FACTORS

The following observation took place in a small retail drugstore in an urban area. The subject of the observation was a white, twelfth grade female participating in a distributive education program offered through her high school. Her direct supervisor (also the pharmacist) was a white male. The drug-store proper was approximately fifty feet long and twenty-five feet wide. The pharmacist on duty sat behind a high counter located in the rear of the store. Directly in front of the counter was a small table upon which several files were located. Employees were usally engaged either in filing work or running the cash register at the front of the store. Observation of the subject lasted approximately fifty-three minutes in this case.

On the following pages, the actual field notes and corresponding coding for each task episode are displayed. Field notes are presented in the left column of each page, while the coding for these notes is represented in the right column. The notes are formatted by task episode. The reader will note that a data table listing various basic skills and environmental factors is presented for each different task episode. The presence or absence of these basic skills and environmental factors in each task episode is indicated through the use of a numerical coding system. A key to the coding system follows.

(1) 0 = Absent/No; 1 = Present/Yes
Number and letter represent a split task episode, e.g., 1A, 1 B, 1C, etc. represents a task episode that was split by another task episode
(2) 0 = Absent/No; 1 = Present/Yes, low level; 2 = Present/Yes, medium level
(3) 0 = Absent/No judgment made; 1 = Takes direction; 2 = Works cooperatively; 3 = Gives direction
(4) 0 = Absent/No; 1 = Present/Yes; Blank = No judgment made
(5) 1 = Self initiation; 2 = Other initiated
(6) 1 = Solo; 2 = Group

Customer 1 asks Worker 4 for prescription
Worker 1 gets up and gets it
Worker 1 tells Customer 1 price, gets money, counts change
Customer 1 corrects price, Worker agrees, gives extra 25 cents
Worker 1 rings up 25 cents, gets co-worker to verify

Task Episode (TE) Number(1): 1 | Split TE: 0 | Simultaneous: 0 | Task: 1 | Non-Task: 0

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	1	Articulation	1
Computing	1	Initiation(5)	1
Speaking	1	Negotiation	0
Reasoning	1	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational(3)	2	Solo/Group(6)	2
		Feedback	0

Worker returns to table, find Customer card from file, records prescription data, files card

Task Episode (TE) Number(1): 2 | Split TE: 0 | Simultaneous: 0 | Task: 1 | Non-Task: 0

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	2	Supervisor Present	1
Writing	1	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	2
		Feedback	0

Carries on conversation with co-worker

Task Episode (TE) Number(1): 2 | Split TE: 0 | Simultaneous: 1 | Task: 0 | Non-Task: 1

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	2
		Feedback	0

Worker 1, Worker 2, Worker 3 sit around table discussing a return to the store

Task Episode (TE) Number(1): 3 | Split TE: 0 | Simultaneous: 0 | Task: 0 | Non-Task: 1

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	2
		Feedback	0

... to counter, gets sack, returns to table, puts medicine on table in it, staples order onto sack
Worker 2 takes sack to pharmacy area
Worker 1 returns stapler to front counter
Stands behind counter, talks to Worker 4

Task Episode (TE) Number(1) 4	0 Split TE	1 Task
	0 Simultaneous	0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	0
Writing	0	Co-Worker Present	0
Relational(3)	0	Solo/Group(6)	0
		Feedback	0

Carries on conversation with Worker 2, Worker 3

Task Episode (TE) Number(1) 4	0 Split TE	0 Task
	1 Simultaneous	1 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	2
		Feedback	0

Worker 1 returns to table, carries on conversation with Worker 3

Task Episode (TE) Number(1) 5	0 Split TE	0 Task
	0 Simultaneous	1 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation(5)	2
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	2
		Feedback	0

"Get ____'s card" pharmacist calls out
Worker 1 gets card, takes to pharmacist behind wall

Task Episode (TE) Number(1) 6	0 Split TE	1 Task
	0 Simultaneous	0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	1	Articulation	1
Computing	0	Initiation(5)	2
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational(3)	1	Solo/Group(6)	2
		Feedback	0

Worker 1 returns to table with Worker 3, talks (general)
Worker 1 compares her writing style with Worker 3
Supervisor comes out with dress and shows to Worker 1, Worker 3 comments about fading of color
Worker 1, Worker 3 agree, continue talking
Worker 1 still talking with Worker 3
Worker 1, Worker 3 sitting at table talking, comparing handwriting
Worker 1 gets up and gets candy behind her, sits back down at table

Task Episode (TE) Number[1] 7 — Split TE 0 — Simultaneous 0 — Task 1 — Non-Task

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation[5]	2
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational[3]	0	Solo/Group[6]	2
		Feedback	0

Supervisor: "Need ____ card, please"
Worker 1 gets card, takes to Supervisor behind counter
Worker 1 returns to table

Task Episode (TE) Number[1] 8 — Split TE 0 — Simultaneous 0 — Task 1 — Non-Task

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	1	Centrality	1
Reading	1	Articulation	1
Computing	0	Initiation[5]	2
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational[3]	1	Solo/Group[6]	2
		Feedback	0

Worker 1 asks Worker 3 if thirsty, Worker 3 says yes
Worker 1 goes behind pharmacy counter and gets soft drink for herself, and for Worker 3

Task Episode (TE) Number[1] 9 — Split TE 0 — Simultaneous 0 — Task 1 — Non-Task

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation[5]	1
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational[3]	0	Solo/Group[6]	2
		Feedback	0

Supervisor "Can one of you girls process film for me?"
Worker 1 says yes and gets film
Goes to front counter, gets marker
Returns to table and begins to fill in information on the mailer

Task Episode (TE) Number[1] 10A — Split TE 1 — Simultaneous 0 — Task 0 — Non-Task

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	0	Centrality	0
Reading	1	Articulation	0
Computing	0	Initiation[5]	2
Speaking	1	Negotiation	0
Reasoning	1	Supervisor Present	1
Writing	1	Co-Worker Present	1
Relational[3]	1	Solo/Group[6]	2
		Feedback	0

one rings, Worker 1 gets up, answers, gives to Supervisor

Task Episode (TE) Number(1) 11 — 0 Split TE, 0 Simultaneous — 1 Task, 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	1
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	1	Negotiation	0
Reasoning	1	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational(3)	1	Solo/Group(6)	2
		Feedback	0

Worker 1 returns to filling in information on mailer
Asks Worker 4 question about negative
Worker 4 provides information, Worker 1 says OK and continues to fill in information
Worker 1 goes to Supervisor, do you want regular or glossy?
Supervisor says doesn't care, Worker 4 says doesn't matter
Worker 1 says "Oh," Worker 1 completes information
Puts film into mailer

Task Episode (TE) Number(1) 10B — 1 Split TE, 0 Simultaneous — 1 Task, 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	0
Reading	1	Articulation	0
Computing	1	Initiation(5)	1
Speaking	1	Negotiation	0
Reasoning	1	Supervisor Present	1
Writing	1	Co-Worker Present	1
Relational(3)	2	Solo/Group(6)	2
		Feedback	0

Worker 1 goes to front counter, comes back with film record book
Supervisor: "Need _____'s and _____'s card"
Worker begins looking in file
Asks how to spell _____
Worker 4 says _____ or _____
Worker 1 not finding
Worker 1 keeps looking, finds both cards
Takes to Supervisor behind counter

Task Episode (TE) Number(1) 12 — 0 Split TE, 0 Simultaneous — 1 Task, 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	1	Articulation	1
Computing	1	Initiation(5)	1
Speaking	1	Negotiation	0
Reasoning	1	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational(3)	1	Solo/Group(6)	2
		Feedback	0

Worker 1 returns to table, begins writing film information in record book
Worker 1 gets up, puts film in mail bag
Worker 1 takes record book to front of store
Worker 1 returns to table

Task Episode (TE) Number(1) 10C — 1 Split TE, 0 Simultaneous — 1 Task, 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	0
Reading	1	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	1
Writing	1	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	2
		Feedback	0

Pours coke
Worker 1 asks Worker 2 if gets paid tonight?
Worker 2 says no, Worker 1 says have to pay for ____
Worker 1 sits down at table and drinks coke

Task Episode (TE) Number[1] 13 — Split TE: 0 / Simultaneous: 0 — Task: 0 / Non-Task: 1

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation[5]	1
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational[3]	0	Solo/Group[6]	2
		Feedback	0

Salesperson brings in merchandise and asks Worker 1 to "Check it in"
Worker 1 watches as salesperson counts items
Salesperson asks Worker 1 to sign it
Worker 1: "Do I sign it? My name?"
Salesperson says need cash
Worker 1--Where do I get it from, the cash drawer?
Worker 1 finds Worker 4 who tells Worker 1 to take it out of the cash drawer
Worker 1 pays salesperson, carries on conversation with salesperson and Worker 4
Worker 1 puts receipts in drawer
Worker 1 returns to table, sits down

Task Episode (TE) Number[1] 14 — Split TE: 0 / Simultaneous: 0 — Task: 1 / Non-Task: 0

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	1	Initiation[5]	2
Speaking	1	Negotiation	0
Reasoning	1	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational[3]	2	Solo/Group[6]	2
		Feedback	0

Talks to Worker 2 and Customer 2, drinks coke
Worker 1 talks to Worker 2 about writing style
Worker 1 compares her writing to Worker 2's writing
Worker 1 talks to Customer 2, Worker 2-Non-task--senior dance, etc.
Worker 1 explains something that happened at school to Worker 2

Task Episode (TE) Number[1] 15A — Split TE: 1 / Simultaneous: 0 — Task: 0 / Non-Task: 1

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation[5]	1
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational[3]	0	Solo/Group[6]	2
		Feedback	0

Worker 1 gets receipt from cabinet

Task Episode (TE) Number[1] 16A — Split TE: 1 / Simultaneous: 1 — Task: 1 / Non-Task: 0

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	0	Centrality	1
Reading	0	Articulation	0
Computing	0	Initiation[5]	1
Speaking	0	Negotiation	0
Reasoning	0	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational[3]	0	Solo/Group[6]	2
		Feedback	0

Worker 1 sits down at table and continues conversation with Worker 2, Customer 2
Worker 4 brings chair back to table

Task Episode (TE) Number[1] 15B — Split TE: 1 — Simultaneous: 1 — Task: 0 — Non-Task: 1

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation[5]	1
Speaking	1	Negotiation	0
Reasoning	0	Supervisor Present	2
Writing	0	Co-Worker Present	1
Relational[3]	0	Solo/Group[6]	1
		Feedback	0

Worker 1 begins to record receipt information onto file card
Worker 1 asks Worker 2 - What is this (name of medicine)?
Worker 2 tells her
Worker 1 finishes card
Worker 1 files card in file, marks X on receipts

Task Episode (TE) Number[1] 16B — Split TE: 1 — Simultaneous: 1 — Task: 1 — Non-Task: 0

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	0	Initiation[5]	1
Speaking	0	Negotiation	0
Reasoning	2	Supervisor Present	1
Writing	1	Co-Worker Present	1
Relational[3]	2	Solo/Group[6]	2
		Feedback	0

Worker 1 gets card from file, begins copying information
Puts X on receipts, files card

Task Episode (TE) Number[1] 17 — Split TE: 0 — Simultaneous: 0 — Task: 1 — Non-Task: 0

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	0	Initiation[5]	1
Speaking	0	Negotiation	0
Reasoning	2	Supervisor Present	2
Writing	1	Co-Worker Present	1
Relational[3]	0	Solo/Group[6]	1
		Feedback	0

Worker 1 gets card from file, records information on card, puts X on receipts, files card

Task Episode (TE) Number[1] 18 — Split TE: 0 — Simultaneous: 0 — Task: 1 — Non-Task: 0

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	0	Initiation[5]	1
Speaking	0	Negotiation	0
Reasoning	2	Supervisor Present	2
Writing	1	Co-Worker Present	1
Relational[3]	0	Solo/Group[6]	1
		Feedback	0

Worker 1 gets card from file, records information on card, puts X on receipts, files card

Task Episode (TE) Number(1) 19	0 Split TE / 0 Simultaneous	1 Task / 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	2	Supervisor Present	2
Writing	1	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Worker 1 gets card from file, records information on card, puts X on receipts, files card

Task Episode (TE) Number(1) 20	0 Split TE / 0 Simultaneous	1 Task / 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	2	Supervisor Present	2
Writing	1	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Worker 1 gets card from file, records information on card, puts X on receipts, files card

Task Episode (TE) Number(1) 21	0 Split TE / 0 Simultaneous	1 Task / 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	2	Supervisor Present	2
Writing	1	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

The following set of observation data was collected in a pharmacy located within a metropolitan hospital. The subject of the observations, a white twelfth-grade female, was employed as a clerical technician within the pharmacy in conjunction with an experience-based career education program offered through her high school. Her direct supervisor is a white female. The pharmacy itself is approximately one hundred feet long by eighty feet wide, with many separate working areas. There are approximately ten other workers present, which makes the pharmacy a very busy, bustling place. The subject's job duties primarily involve clerical work and filing. Observation of the subject lasted approximately sixty-eight minutes in this case.

On the following pages, the actual field notes and corresponding coding for each task episode are displayed. Field notes are presented in the left column of each page, while the coding for these notes is represented in the right column. The notes are formatted by task episode. The reader will note that a data table listing various basic skills and environmental factors is presented for each different task episode. The presence or absence of these basic skills and environmental factors in each task episode is indicated through the use of a numerical coding system. A key to the coding system follows.

(1) 0 = Absent/No; 1 = Present/Yes
Number and letter represent a split task episode, e.g., 1A, 1 B, 1C, etc. represents a task episode that was split by another task episode
(2) 0 = Absent/No; 1 = Present/Yes, low level; 2 = Present/Yes, medium level
(3) 0 = Absent/No judgment made; 1 = Takes direction; 2 = Works cooperatively; 3 = Gives direction
(4) 0 = Absent/No; 1 = Present/Yes; Blank = No judgment made
(5) 1 = Self initiation; 2 = Other initiated
(6) 1 = Solo; 2 = Group

Worker looks through order forms and Puts in appropriate pile
Looks at order forms and puts into piles
Fixes stack neatly
Picks up one stack and puts it into file box
Looks through another stack of forms
Fixes forms and puts in file box
Thumbs through another stack of forms
Puts into file box
Thumbs through another stack of forms
Puts into file box
Thumbs through another stack and puts into file box
Picks up extra papers and puts into another box

Task Episode (TE) Number(1): 1 | Split TE: 0 | Simultaneous: 0 | Task: 1 | Non-Task: 0

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	2	Articulation(5)	0
Computing	0	Initiation	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Worker goes to Supervisor and asks what to do next
Supervisor tells her

Task Episode (TE) Number(1): 2 | Split TE: 0 | Simultaneous: 0 | Task: 1 | Non-Task: 0

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	1
Reading	0	Articulation(5)	0
Computing	0	Initiation	1
Speaking	1	Negotiation	1
Reasoning	1	Supervisor Present	1
Writing	0	Co-Worker Present	0
Relational(3)	2	Solo/Group(6)	2
		Feedback	0

Goes to another area and gets "narcotic slips"
Asks Supervisor what to do with them
Supervisor tells Worker what to do with them

Task Episode (TE) Number(1): 3 | Split TE: 0 | Simultaneous: 0 | Task: 1 | Non-Task: 0

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	0	Articulation(5)	0
Computing	0	Initiation	1
Speaking	1	Negotiation	1
Reasoning	1	Supervisor Present	1
Writing	0	Co-Worker Present	0
Relational(3)	2	Solo/Group(6)	2
		Feedback	0

Supervisor tells her to get other papers
Worker looks around for the papers
Worker finds them and goes back to work area

Task Episode (TE) Number(1): 4 | Split TE: 0 | Simultaneous: 0 | Task: 1 | Non-Task: 0

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	0	Articulation(5)	0
Computing	0	Initiation	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	1	Solo/Group(6)	1
		Feedback	0

Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile
Looks at slip and checks--puts in pile

Task Episode (TE) Number(1) 5A	1 Split TE	1 Task
	0 Simultaneous	0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Worker looks at slip, checks, puts in second pile
Looks at slip, checks, puts in pile
Looks at slip, checks, puts in pile
Looks at slip, checks and puts in second pile
Fixes up first and second pile
Talks to Supervisor about 2 slips in second pile
Supervisor tells her what to do

Task Episode (TE) Number(1) 6	0 Split TE	1 Task
	0 Simultaneous	0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	1	Negotiation	2
Reasoning	1	Supervisor Present	1
Writing	0	Co-Worker Present	1
Relational(3)	2	Solo/Group(6)	2
		Feedback	0

Worker puts first and second pile in file box

Task Episode (TE) Number(1) 5B	1 Split TE	1 Task
	0 Simultaneous	0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Worker walks through work area and gets a tub and a pen. Picks up a big book and goes back to desk

Task Episode (TE) Number(1) 7	0 Split TE	1 Task
	0 Simultaneous	0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Worker opens drug book
Looks at drug box, reads label
Looks at book and checks price
Writes on credit slip
Puts slip aside
Takes rubber band off box and slip
Reads credit slip
Rips up slip
Opens bottle, empties contents into sink and throws bottle away
Takes another box and slip
Reads label, writes on slip
Opens box and reads label
Puts box in tub
Checks price in book
Writes on credit slip
Puts slip in pile
Worker unwraps medicine and slip
Looks at pills and reads
Writes on credit slip
Looks up price in book
Looks back at box, then checks book again
Writes on credit slip
Puts slip in pile
Opens box, reads label
Checks book
Writes on slip
Puts slip in pile

Task Episode (TE) Number(1) 8A	1 Split TE	1 Task
	0 Simultaneous	0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	2	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Worker 1 asks Worker 2 where credit slips go

Task Episode (TE) Number(1) 9	0 Split TE	1 Task
	0 Simultaneous	0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	1
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	1	Negotiation	2
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	2	Solo/Group(6)	2
		Feedback	0

Worker puts them away

Task Episode (TE) Number(1) 8B	1 Split TE	1 Task
	0 Simultaneous	0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	0	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Worker gets grocery cart with drugs and credit slips
Takes plastic bag out (contains bottles and slips)
Looks at bottle to check if used
Looks at label
Opens book and checks
Closes book, tears up slip and deposits bottle in tub
Takes another plastic bag and bottle from cart
Counts pills inside. Puts into tub
Takes out bottle and puts into tub
Writes on slip
Puts slip in pile
Takes another bag and slip
Rips up slip and
puts pills into tub
Puts slip in pile
Worker takes another bag
Rips off label, puts pills in tub
Writes on credit slip
Puts slip in pile
Takes another bag out

Task Episode (TE) Number(1): 10 | 0 Split TE | 0 Simultaneous | 1 Task | 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	0	Articulation	0
Computing	1	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Opens it and brings it to Worker 2 in room

Task Episode (TE) Number(1): 11 | 0 Split TE | 0 Simultaneous | 1 Task | 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	0	Articulation	1
Computing	0	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	2
		Feedback	0

Takes a credit slip from slip pile
Looks at slip and reads first drug listed
Looks for the drug, finds it and puts it in tub
Crosses off drug on slip
Checks slip for next drug listed
Finds it and puts into tub
Checks slip for next drug listed
Finds it and counts the pills inside
Puts pills in tub
Crosses off on list
Checks slip for next drug
Finds it and empties contents into trash
Checks off on slip
Sets slip aside
Gets another slip and looks at it
Locates bottle. Opens and spills contents into sink
Looks at slip--finds drug
Counts pills in plastic bag
Writes on slip
Looks at slip and finds last drug listed
Counts pills, writes on credit slip
Puts pills into tub and slip in pile
Takes another slip and drug from cart

Task Episode (TE) Number(1): 12A | 1 Split TE | 1 Simultaneous | 1 Task | 0 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	1	Centrality	1
Reading	1	Articulation	0
Computing	1	Initiation(5)	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	0	Solo/Group(6)	1
		Feedback	0

Looks at slip
Locates pills and counts them
Rips off label and throws away
Puts drug in pile in tub
Writes on slip and puts in pile
Takes another slip from pile
Looks at slip
Empties plastic bag of drugs
Opens one bottle
Opens another bottle and sets aside
Writes on slip
Counts pills and rips off label
Puts pills in pile
Writes on slip and puts in pile
Takes another slip and locates bag of drugs
Empties bag
Looks at slip and finds drug listed
Looks at pills. Rips off label and throws out
Puts pills in tub
Crosses off on credit slip
Puts slip in pile
Takes another slip from cart
Locates drug bag
Looks at slip
Takes out pills and counts them
Puts pills into tub and crosses off on slip
Looks at slip again
Finds pills, counts them
Looks at slip and counts again
Writes on sheet

Rips label off bag and puts pills in tub
Looks at slip again
Finds pills, counts them, puts in tub, and puts slip in pile
Looks at another slip
Locates drug bag
Counts pills, rips label off
Puts pills in tub
Puts slip into pile
Takes another slip
Locates pill bag. Throws pills away. Puts slip in pile
Takes another slip

Opens credit book
Takes plastic bag with drugs in it and checks label
Finds in book
Writes on credit slip
Puts drug in tub
Puts slip in pile
Takes another credit slip as she

(Worker 1) speaks to Worker 2 about what he did other day

Task Episode (TE) Number(1) 13	0 Split TE 1 Simultaneous	0 Task 1 Non-Task

Exposure to Basic Skills(2)		Environmental Factors(4)	
Psychomotor	0	Centrality	0
Reading	0	Articulation	0
Computing	0	Initiation(5)	1
Speaking	1	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	0	Co-Worker Present	1
Relational(3)	2	Solo/Group(6)	2
		Feedback	0

Worker flips through book
Reads slip and checks book
Writes on credit slip
Takes another slip
Flips through book
Locates drug listed on slip in book
Writes on slip
Flips through book and finds drug listed
Checks against slip and writes on slip
Flips through book. Finds drug listed
Checks against slip
Writes on slip
Flips through book. Finds drug listed
Checks slip and book
Writes on slip

Task Episode (TE) Number[1] 12B	1	Split TE	1 Task
	1	Simultaneous	0 Non-Task

Exposure to Basic Skills[2]		Environmental Factors[4]	
Psychomotor	1	Centrality	1
Reading	0	Articulation	0
Computing	0	Initiation[5]	1
Speaking	0	Negotiation	0
Reasoning	1	Supervisor Present	0
Writing	1	Co-Worker Present	1
Relational[3]	0	Solo/Group[6]	1
		Feedback	0

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