

AN ABSTRACT OF THE THESIS OF

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Title: Productivity Analysis of Adult Basic Education Programs:
An Analytic Model

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The central purpose of this study was to develop a model for the examination of productivity in Adult Basic Education. To that end, an instrument developed for use in the field of business was adapted for use with an educational audience. It examined the relationship of adult education staff decision making, job satisfaction, background and training, and codification of rules to program productivity within seven Adult Basic Education programs in the western United States.

The productivity measure utilized in the study was represented by the grade level growth achieved by the individual students as reported in the Adult Education Annual Performance Report.

The sample of this study was selected from Adult Basic Education staff members employed by seven programs within four western states: Oregon, Washington, Idaho, California. A total of 199 subjects responded.

Both partial correlation and multiple regression were used to test the following four hypotheses.

1. There is a positive relationship between centralization and production.
2. There is a positive relationship between formalization and production.
3. There is a negative relationship between complexity and production.
4. There is a negative relationship between job satisfaction and production.

Statistical tests administered to the data revealed the following results. Job satisfaction proved to be the only positive predictor of productivity. Centralization (decision making) negatively influenced productivity through the intervening variable of job satisfaction. Formalization (codification of rules) also was found to influence productivity negatively through the intervening variable of job satisfaction. Both centralization and formalization were shown to be positively correlated with each other. Complexity (level of staff training) was shown to be related positively to formalization and negatively related to centralization.

As a consequence of these statistical findings, all the research hypotheses were rejected.

The original hypotheses which proposed the existence of positive relationships between productivity, centralization, and formalization, and negative relationships between productivity, complexity, and job satisfaction were not supported by the findings

in this study. Job satisfaction proved to be the only independent predictor of productivity, and that relationship was shown to be a positive one rather than the negative one originally proposed.

Based upon the findings of this study, the following conclusions were drawn:

1. Centralization and Production. Increased productivity rates will occur when personnel are allowed to share in decision making regarding program and personnel matters.
2. Formalization and Production. In this study higher productivity rates occurred when adult education personnel perceived formalization to be at a minimum, and innovation and creativity were not restrained by standardized procedures but rather encouraged by the absence of them.
3. Complexity and Production. According to the data generated by this study, it was shown that complexity was not related to productivity.
4. Job Satisfaction and Production. In matters pertaining to working conditions and supervision, a satisfied staff is a more productive one.

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Productivity Analysis of Adult
Basic Education Programs:
An Analytic Model

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Ellen Louise West

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Associate Professor of Education

Redacted for Privacy

Professor in Charge of Major

Redacted for Privacy

Dean of Graduate School

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Typed by Barbara J. Wiegele for Ellen Louise West

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TABLE OF CONTENTS

I. INTRODUCTION	1
Background	2
Statement of the Problem	4
Rationale	5
Definition of Terms	9
Limitations of the Study	11
II. REVIEW OF RELATED LITERATURE	13
Introduction	13
Educational Accountability	14
Productivity Analysis Within an Educational Setting	17
Hage and Aiken: A Possibility for a Research Model	22
The Evolution of Hage's Axiomatic Model	23
Summary of the Review of Literature	35
III. METHODOLOGY	37
Introduction	37
Problem Restatement	37
Hypotheses	38
Data Collecting Instrument	39
The Procedures	41
Sample	42
Demographics of the Sample	42
Method of Analysis	45
IV. ANALYSIS AND DISCUSSION OF FINDINGS	47
Overview	47
Hypothesis 1	50
Hypothesis 2	53
Hypothesis 3	57
Hypothesis 4	60
Summary of the Statistical Findings	63
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS	66
Summary	66
Conclusions	69
Recommendations	73
Bibliography	74
Appendix A	81
Appendix B	82
Appendix C	83
Appendix D	86
Appendix E	87
Appendix F	88
Appendix G	89

TABLE OF CONTENTS (continued)

Appendix H	90
Appendix I	91
Appendix J	92
Appendix K	93
Appendix L	94

LIST OF ILLUSTRATIONS

<u>Figure</u>	<u>Page</u>
1 Design of the Study	45
2 Analytical Model Produced by the Study	63

<u>Table</u>	
I Adult Basic Education Program Population	43
II Zero Order Correlations of Variables	49
III Zero Order Correlations Including Structural Variables . .	51
IV Partial Correlation Coefficients Between Formalization and Productivity Controlling for the Independent Variables	55
V Partial Correlation Coefficients Between Complexity and Productivity Controlling for the Independent Variables . .	57
VI Partial Correlation Coefficients Between Job Satisfaction and Productivity Controlling for the Independent Variables	60
VII Partial Correlation Coefficients for Selected Sets of Variables	64

PRODUCTIVITY ANALYSIS OF ADULT BASIC EDUCATION PROGRAMS: AN ANALYTIC MODEL

CHAPTER I

INTRODUCTION

"Productivity is the first test of management's competence" (Drucker, 1973:111).

A major challenge to educational management today is to identify plans for increasing efficiency and productivity without jeopardizing the quality of educational programs; "...to get bigger, better, and more useful results from their available resources" (Coombs, 1968:125). The spectre of a horn-rimmed efficiency expert complete with clipboard and visor eager to suggest methods to increase productivity is bound to elicit anxiety from educators. Yet as awesome a challenge as evaluating productivity appears to be, the need for this type of analysis is great in the field of education. There is indisputable evidence that the per unit cost of education is rising faster than the rise attributed to inflation and that productivity has not kept pace with educational costs (Hostrop, 1975:13).

Productivity is related to the larger problems of accountability and evaluation in the field of education, both of which represent significant issues in their own right. Roueche wrote that in contrast to the "good old days" when educators justified program expenses by describing educational processes and the amounts needed for

implementation, today's questions focus on results obtained for resources utilized. The questions are "pointed, caustic, and abrasive" and reflect increasing concern over accelerating costs. Today educators are being asked by concerned citizens, "What am I receiving for my investment? What does the process produce? Is it worth it? Why?" (Roueche, 1975:15)

In this era of inflation, educational personnel need to account to the public for expenditures in businesslike terms. Additionally they need to structure their organizations in such a manner to assure that learning requires the shortest amount of time at the lowest possible cost for the student, teacher, school, and public. The relationship of the structure of an organization to productivity, a crucial question in the whole concept of accountability, represented the central problem of this study.

Background

In his book on educational management, Hostrop (1975) points out that productivity has not kept pace with educational costs, a condition caused in part by the pressures due to inflation. As evidence of the gravity of the problem of production in education, Hostrop cited a "pioneering study" in the United Kingdom which concluded that education's productivity has actually been declining. He suggested that similar studies made elsewhere would probably reach similar conclusions.

Coombs, in his writing about the worldwide "crisis" in education, has advanced the idea that "every educational system--including the

most modern--has abundant room for improvement of its efficiency and productivity" (Coombs, 1968:127). Though the improvement is desperately needed, Coombs maintains that it is much simpler to suggest solutions than to implement them. This is due to a combination of factors: lack of institutional means or resources, the absence of analytical tools for identifying potential improvements, and resistance by the staff to needed changes.

The call for the review of productivity in education is in part a response to the public's demand for accountability in schools. "The public is demanding that trustees and administrators, teachers and students, prove that society is getting value for dollars received" (Hostrop, 1975:4). This public concern is manifested through rejected tax rate increases, school levies, and bonding issues.

In 1970 U.S. Commissioner James E. Allen stated before the American Association of School Administrators that the public's disenchantment and lack of confidence in their schools was the result of "...our inability to substantiate results." He emphasized that "the strengthening of the concept of accountability is imperative" (Hostrop, 1975:3).

No level of education has escaped this concern. In discussing evaluation in Adult Basic Education (which is primarily a federally funded branch of adult education which serves the instructional needs of undereducated adults), Grotelueschen (1976) pointed out that accountability has become a "big word." He stressed that program personnel must utilize formal evaluation techniques to demonstrate fulfillment of their responsibility for accountability.

Roueché (1974) wrote that accountability in adult education must be systematic and based on hard data, not simply "gut feelings." He further stated:

American education is facing a crucial hour. The multi-billion dollar system is now imperiled by its own dramatic failure to produce effective and pertinent learning....the American public is becoming more concerned and less patient. Disenchanted taxpayers, considering the vast resources already lavished upon education, are beginning to wonder what they are getting for their tax money. Across the nation... parents are demanding evidence that students have been provided the knowledge necessary to become contributing members of society (Roueché, 1971:3).

Fischer (1973), writing in the Community College Review, commented that an economic analysis of instruction was one of the more difficult phases of accountability in a business-oriented society but also one of the most vital. Grotelueschen (1976) concurred with him by saying that most people who view Adult Basic Education programs will look first at the outcomes or consequences of the programs. They will want to know who gained what, who lost what, and was it all worthwhile. A productivity analysis of an educational program may be one way to provide the answer to these questions.

Statement of the Problem

The central problem of this study was to develop a model for the examination of productivity in Adult Basic Education.

The major objectives of this study were:

1. To review the existing research related to productivity in postsecondary education.

2. To develop a methodology including the identification of appropriate instrumentation for research in educational productivity.
3. To administer this instrumentation to a population consisting of staff members of selected Adult Basic Education programs in the states of Oregon, Washington, Idaho, and California.
4. To determine if there is a relationship between selected organizational characteristics and program productivity.
5. To utilize the findings to suggest changes in organizational structure in order to increase program productivity.

Rationale

The fact that educational managers need now, more than ever, to be concerned with effecting optimum results in their programs has been established earlier in this chapter (Coombs, 1968; Hostrop, 1975). Coombs maintains that education faces its "greatest crisis of efficiency and productivity" due to rising costs of programs which threaten to "undo the fondest hopes of educators" (Coombs, 1968:129). He stressed that educational managers must mount major campaigns aimed at raising educational efficiency and productivity (Coombs, 1968:132).

In an article in Time entitled "The Perils of the Productivity Sag," the author pointed out that although the 1970's have been plagued by inadequate expansion, high unemployment, and runaway inflation, the major culprit in the economic lag was productivity. The growth of productivity has slowed sharply in the decade of the 1970's, and since

1976 has stopped. In a paragraph devoted to explaining the forces which are working to slow productivity further, the author pointed out that the switch to a service economy has had a major effect on this process. As he indicated, "...it is much harder for doctors, credit counselors, teachers, and policemen to raise or even measure their productivity than for steel workers" (Time, 1979:127).

In the Encyclopedia of Educational Evaluation in a section entitled "Cost Considerations and Economic Analysis," the authors suggested the need for the use of economic techniques in studying the educational systems (Anderson et al., 1975). They further maintained that improved information can contribute to productivity of resource use in education. Callahan (1962) cautioned, however, that procedures developed in business and industry cannot be translated without modification to activities in the public sector primarily because the inputs and outputs of an educational system do not lend themselves to being quantified as easily as they do in business.

Although the evidence pointed to the fact that productivity analyses were needed throughout education, little definitive research in the field of postsecondary education has been conducted. Malcolm S. Knowles, (1970), who has been termed by some as the "Father of Adult Education," suggested that educational administration has lagged behind industrial management in establishing a balance between the values of human growth and satisfaction on the one hand and operational efficiency on the other. He maintained in his chapter, "Evaluating Comprehensive Programs," that a recurrent frustration of adult educators throughout the nation was the fact that more scientific

evaluation should take place in adult education programs than can capably be handled now.

Burton Kreitlow (1964:5) suggested that too often programs in adult education are based on "...tradition, guess, or blithe assumption--rarely on scientific study." He asked a select group of leaders in adult education what research they thought was most needed in the field. Thirty-five percent of those queried felt that determining the effectiveness of adult education programs was of vital concern. Echoing this sentiment, Axford (1969) maintained that the need for research in adult education is great, particularly in the areas of instruments used for program evaluation and improvement.

In a discussion of the changing adult education agency and its implications for the administrator, William S. Griffith (1964) pointed out that there is an increasing interest in systems research by adult education administrators as one method by which to understand organizational processes. If educational programs are to remain intact during this inflationary period, increased program productivity is one way to convince the public that the expenditure is justified.

Gerald Hage (1965), a sociologist writing in the Administrative Science Quarterly, has provided a model that might be useful for examining productivity in adult education organizations. He viewed an organization as a social system with each portion of it operating interdependently with the rest. He identified and defined several major characteristics of organizations, five of which were:

Complexity -- The number of organizational specialties and the level of training required.

Centralization -- The proportion of jobs that participate in decision making and the number of areas in which decisions are made by decision makers (that is, the smaller the proportion of jobs participating in decision making, the higher the degree of centralization).

Formalization -- The proportion of jobs that are codified and the range of variation allowed within jobs (that is, the larger the proportion of jobs that are codified, the higher the degree of formalization).

Job Satisfaction -- Satisfaction with working conditions and personnel.

Productivity -- The number of units produced per year and the rate of increase in units produced per year.

Each variable represented a formal characteristic of an organization and referred to a major issue in organizational life. "Welfare agencies, manufacturing plants, research institutes, retail stores, and many other kinds of organizations can be described with these same characteristics."

He wrote further that each organization has a number of characteristics that make it different from other organizations. For instance, the degree of centralization (or the proportion of employees who participate in the decision-making process) could vary along a continuum from high to low. That is, the degree of centralization may

be very high in the Army, yet low in a university. By learning how centralized an organization is, one could learn and better understand something about the operation of the organization.

The Hage thesis that there is a relationship between productivity and certain organizational variables would seem to have a logical and obvious relationship to an educational setting. However, the Hage research methodology has not been applied to an educational setting and, thus, the feasibility of this application has not been proven. This study was designed to develop a research problem that would examine the feasibility of the use of the Hage methodology in an educational setting.

Definitions of Terms

For purposes of definition and continuity, terms used frequently will be defined in the section.

Accountability

An obligation of an educational institution to answer to its constituency for carrying out designated responsibilities and to produce and report in terms of objectives or assignments which have been delegated.

Adult Basic Education

An instructional program for the undereducated adult planned around those basic and specific skills most needed to help him/her function adequately as a member of society.

Centralization

The proportion of jobs that participate in organizational decision making and the number of areas in which decisions are made.

Complexity

The number of organizational specialties and the level of training required.

Formalization

The proportion of jobs that are codified and the range of variation allowed within jobs.

General Educational Development Test

A test designed to measure whether or not an adult possesses knowledge equivalent to that of a high school graduate.

Job Satisfaction

Satisfaction with working conditions and personnel.

Multiple Regression

A statistical technique used to analyze the relationship between a dependent variable and a set of independent variables.

Partial Correlation

A statistical technique used to obtain measures of the degree of relationship between a dependent variable and an independent variable while controlling for the effects of one or more other variables in the relationship.

Productivity

The grade level growth achieved by individual students as reported in the Adult Education Annual Performance Report submitted to the U.S. Office of Education by each Adult Basic Education program on a yearly basis. The terms productivity and production will be used synonymously throughout this study.

Undereducated Adult

An eighteen-year-old having less than a high school diploma.

Limitations of the Study

The study was limited in the following fashion:

1. The study was limited to seven Adult Basic Education Programs operating in the states of Oregon, Washington, Idaho, and California. They were: Mt. Hood Community College, Gresham, Oregon; Chemeketa Community College, Salem, Oregon; Linn-Benton Community College, Albany, Oregon; Walla Walla Community College, Walla Walla, Washington; Vocational Technical Learning Center, Boise State University, Boise,

Idaho; La Puente Adult School, La Puente, California; and Inglewood Adult School, Inglewood, California.

2. The productivity index utilized in this study was limited to measuring student growth in the cognitive domain.
3. The analysis of productivity dealt with four organizational characteristics only: centralization, complexity, formalization, and job satisfaction.
4. The sample utilized in this study cannot be considered as necessarily representative of the national population of Adult Basic Education staff.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

While a great deal of literature in the field of education is devoted to a discussion of accountability and the larger question of evaluation (Dailey, 1976; Farmer, 1975; Monsen, 1973; Warner, 1975), studies relating directly to the issue of program productivity in adult education are conspicuous by their absence. In contrast to education, however, the field of business has recognized the critical importance of the role of productivity within an organization (Behling, 1976; Carty, 1980; Douglass, 1980; Drucker, 1973; Fryer, 1975; Paul, 1969; Swallow, 1975). The Business Periodicals Index listed more than 150 separate articles dealing with the issue of productivity for the 1978-1979 time period. The productivity issue is viewed by the business community as being vital to the economic health of the nation and a crucial factor in the country's destiny.

The material in this chapter is divided into three sections. The first segment deals with the issue of accountability in education and the controversy this term generates within educational circles. Part two deals with the issue of productivity analysis within an educational setting. The final section presents a description of the business model which was adapted for use with an educational audience in the present study.

Educational Accountability

"Accountability may demand the best from us all" (Gooler, 1971:63).

Accountability is still largely an untested concept in the field of education (Anderson et al., 1975). It has typically been used with reference to service in the public interest when the responsibility for public funds requires periodic and public accounting.

Kaufman defines accountability as "the ability to show that one has done what he said he would do" (Kaufman, 1972:25). Another definition suggests that "accountability represents acceptance of responsibility for consequences by those to whom citizens have entrusted the public service of education" (Anderson et al., 1975:1). Accountability acknowledges the public's right to know what actions have been taken in the schools it supports and how effective these actions have been. It signifies a quest for efficiency and conveys the demand that public money not be wasted through fraudulence or incompetence. Earle W. Clifford suggested in a speech given to the Adult Student Personnel Association that the public has a right to know that tax dollars are not being spent frivolously (Clifford in Miller, 1974).

The move for accountability also suggests that educators should be required to redesign educational activities to enhance educational efficiency and effectiveness. This task of redesign is not without its challenges, however, as Green has written:

It has often seemed to me one of the inherent difficulties of a life of teaching (is) that one can seldom, if ever, point to the product of one's energies and, with any sense of assurance, claim that the result is the consequence of one's efforts. How after all, is one to point to the results? A teacher is one of those people who, like a pastor, must always live with inadequate evidence that his efforts are consequential (Green, 1968:42).

Schultheis (1979) called the accountability movement "...our most recent educational shibboleth." He suggested that rising taxes, increasing cost of school services, inflation, expanding expectations of schools and teacher supply problems in the 60's have led to greatly enlarged school budgets. Additional billions funneled through federal educational agencies currently support the educational process. Motivated by the tax crunch, many citizens regard educational budgets as more responsive to their examination because these budgets are administered locally.

Roueché pointed out that one of the main reasons accounting for learning is not more widespread in education is simply because the term tends to generate fear and suspicion. Teachers feel that they will be held accountable for variables beyond their control and consequently are reluctant to institute measures to implement new programs. He wrote:

Teachers are given a number of unpredictable students, a stack of untested text materials, an assigned teaching location and schedule, and told to teach; and if the materials, location, or schedule are not effective, there is little the teacher can do to overcome these limitations. Schools give teachers yesterday's tools and expect them to prepare students for tomorrow's society (Roueché, 1974:45).

Several other authors have written supporting Roueché's description of why teachers are reluctant to embrace accountability systems (Anderson et al., 1975; Moore, 1971; Schultheis, 1979).

Roueche (1974) suggested that one answer to this problem would be for those who would institute accountability systems to make it clear that all levels of educational personnel and structure be held accountable. Then teachers would not feel victimized by it, but liberated. It must be a complete effort at all levels.

Kastner (1974) suggested that a preliminary question concerning accountability that needs answering is, "accountability to whom?" He continued by stating that the current demands of the public appear to be directed toward three major aspects of accountability: (1) a management control system designed to produce effective as well as efficient decision making; (2) instructional relevance; and (3) desirable social benefits. Each of these three goals involves a different strategy for its achievement and consequently compounds the accountability question.

But, despite these problems, Roueche (1974) maintained that accountability must be systematic and based on hard data, not simply "gut feelings." Other authors have written of the need for accountability systems to be instituted in education (Anderson et al., 1975; Miller, 1974; Roueche, 1971). As Kastner wrote:

Instructional accountability...is as needed today as it has ever been in the history of public education...educators should heed the public's demands for accountability (Kastner, 1974:40).

Evidence in the literature suggests that the question of accountability is a crucial concern for the health of education but that the methodology regarding the implementation of accountability systems is highly controversial. Accountability systems designed to measure

program productivity were not a topic given appropriate attention by educators.

Productivity Analysis Within an Educational Setting

Ambiguity occurs when the term productivity is taken from its legal and financial context and applied specifically to education where there does not yet exist a body of tradition to explain and support its application. This may well be due to the realization that procedures developed in business and industry for productivity examination cannot be translated and subsequently put to use in viewing and understanding activities in the public sector without change. Callahan (1962) cautioned that the ideas from the business world can be used to advantage in educational administration but the wholesale adoption of basic values as well as techniques from business is a serious mistake without modification due to the difference in goals between education and industry.

Clifford continued by warning that if educators did not hasten to design an accountability system that is suitable for their field, then they "by default will be confronted by a system geared to assembly line process and designed on the efficiency objectives of the big business model." He feared that the outcome of this model would create an evaluation system in which the educator would be "graded" in terms of quantitative output (Clifford in Miller, 1974:10).

Carlson identified productivity as "the efficient and effective use of scarce resources to produce some level and mix of outcomes"

(Carlson, 1975:40). Another definition suggested that productivity is "the ratio of output to input, or the amount of output per unit of input." However, this source echoed Callahan's caution by stating that in education there are usually no clear prices for output (Anderson et al., 1975:96)

Although economic analysis, using the concepts of productivity and efficiency, may offer some help in establishing more effective managerial systems, care needs to be taken with this approach. The problem appears to center around the difficulties inherent in attempting to quantify the inputs and outputs of the educational system.

In the usual application of economic analysis to industrial problems, production functions are developed that relate the inputs (resources) to the outputs (benefits), using market prices for all inputs and outputs. In the educational sector, it is reasonable to assume that market prices are available for some inputs (e.g., teacher time in terms of salary), but it is more difficult to assign market prices to educational outputs. What market price, for example, is to be assigned to the specific achievement level of a group of trainees or students in a particular educational or training program? The problem of assigning monetary values to the outputs of highly specific training efforts (e.g., trained pilots for commercial airlines) may be somewhat less difficult than for the outputs of general education programs (e.g., high school graduates). However, it is still of a very different order from assigning values to the products of a manufacturing process (Anderson et al., 1975:92).

In the light of this situation, the concepts of productivity and efficiency should be modified when applied to the educational realm.

Coombs (1968) writing in The World Educational Crisis maintained that every educational system has ample room for the improvement of its efficiency and productivity and that educational managers must work to this end.

The Maryland State Department of Education (1975) stressed the need for program evaluation in Adult Basic Education and said that accountability is possible only when evidence of things achieved is systematically collected and organized. Yet this same source pointed to the absence of any large-scale studies in A.B.E. due to the lack of varying approaches to evaluation.

Typical of studies conducted in evaluation of programs in Adult Basic Education is one which Northern Illinois University administered. The authors pointed out in their section on "Efficiency and Accountability," that there was no commonly accepted description of sound program and institutional practice or much in the way of qualitative criteria for determining efficiency. Despite encouragement to do more documentation with regard to results, local staff members were apt to find that "the system" seemed to engender over-reliance on enrollment, daily attendance, and the G.E.D. certificate as measures of effectiveness (Smith, Lopez, and Mason, 1976).

Thomas (1971) maintained that it was the primary responsibility of the administrator to create and operate a "productive system" through effective utilization of resources and monitoring of the system. Yet as crucial a goal as educators acknowledged it to be, there appear to be few large-scale studies in adult education which would aid practitioners in their quest for efficient and effective operation of their programs. One major reason for the existence of this condition is due to the shortage of available funds for research.

Although the National Institute of Education is developing and expanding its programs sponsoring research about post-secondary education, as of March, 1979, no study was being conducted which addressed the issue of management styles as they related to the effectiveness of a program (Hammond, 1979).

The newly formed Post-Secondary Organization and Management Studies Team of the N.I.E. is focusing on three major topics: equity, diversity, and adaptation to change. The Team is also responsible for the work of the National Center for Higher Education Management Systems (N.C.H.E.M.S.) in Boulder, Colorado. During 1979 the National Center was pursuing five programs designed to help improve planning and management in post-secondary education, none of which examined program productivity and management styles (Hammond, 1979).

One study which did link educational assessment and instructional strategies utilized achievement test scores to measure student growth, a common characteristic of studies in Adult Basic Education. This research, however, failed to equate these scores with any component of program management (Bingham et al., 1978).

Although several studies dealt with the evaluation of adult education programs, none addressed the issue of program effectiveness as it related to management approaches (Aschner, 1965; Bowen, 1973; Gold, 1955; Warner, 1975; Weiss, 1972).

Perhaps the state of the art of measuring productivity in post-secondary education is best reflected through the use of economic analysis. Cost-benefit studies ask questions such as: are the benefits that result from this program in education worth the costs involved?

Can some benefits be obtained at less cost? Can larger benefits be obtained at the same cost? Cost-effectiveness analysis attempts to provide an answer to the question of how the total cost and optimal choice of inputs vary as a function of prices and output. Perhaps the most important aspect of this approach is the challenging task of generating alternative strategies.

Planning-Programming-Budgeting-System (P.P.B.S.) provides a method for determining the costs of program goals and objectives. Hostrop (1975) wrote that it was one method of cost-effectiveness which attempted to make the best use of available resources in the achievement of system goals through budgeting on a program rather than on a line-item basis.

Although one source found the use of economic analysis in studying the educational system one of the most promising developments in education today (Anderson, et al., 1975), several other authors agreed that caution needed to be exercised when applying the cost-benefit model to the evaluation of an educational program or else, as Schultheis wrote, school personnel could be "smothered in a paper blizzard" (Schultheis, 1979:32; Harrison, 1976; Wallhaus, 1975).

Research dealing with the use of management styles designed to increase program effectiveness in adult education appears to be lacking. Indeed, many writers in the field acknowledged the need for research to be done in this area. Axford, for instance, wrote that "giant strides still need to be taken in adult education research" (Axford, 1969:211). Irwin Jahns writing in Adult Basic Education: The State of the Art conceded the lack of appropriate research when he stated,

One wonders, after reviewing the research that has been conducted, where the guidelines and principles have come that the practitioner--administrator and teacher alike--uses. Certainly not from previous adult education research (Jahns, 1970:216).

As one indication of the importance some place upon the topic of productivity, top officials of thirteen large corporations and nineteen colleges and universities met in 1979 to explore how to increase the country's sluggish productivity rate through various research projects (Magarrell, 1979). Although this is certainly a step in the right direction, it is apparent that additional research is definitely needed if educators are to avoid what one author referred to as "academic arteriosclerosis" (Coombs, 1968:166).

The bulk of the studies conducted in adult education concerning program evaluation were descriptive in nature and lacked any quantitative component which analyzed program productivity (Lindsay et al., 1976; Smith, 1976; Walker et al., 1975). This research was intended to begin to remedy this situation.

Hage and Aiken: A Possibility for a Research Model

A major problem in the study of organizations has been the analysis and understanding of organizational change. In a study published in The American Journal of Sociology, Gerald Hage and Michael Aiken approached this problem in an article entitled "Program Change and Organizational Properties: A Comparative Analysis" (Hage and Aiken, 1967a).

In their study they measured the rate of program change in sixteen social welfare organizations over a five-year period. This rate was then related to other organizational properties such as job satisfaction, codification of rules, and decision making. This allowed them to examine how different rates of program change were associated with various organizational properties.

From ideas contained in a doctoral dissertation Hage wrote in 1963 entitled Organizational Response to Innovation, came almost two decades of theories and studies (Hage, 1963). Hage's work produced a model which was chosen for the general framework of this study. It was possible to take Hage's original research ideas in addition to several of his original hypotheses concerning productivity within an organizational setting and apply the principles to a study of productivity within an educational framework (Hage, 1965).

The following is a discussion of the evolution of the model used in this study with particular attention paid to an explanation of terminology and hypotheses as they relate to this study.

The Evolution of Hage's Axiomatic Theory

In "An Axiomatic Theory of Organization," a definitive article written in 1965, Hage explained the organizational variables of centralization, complexity, formalization, job satisfaction and productivity, among others.

These variables (or organizational characteristics) were then shown to be interrelated--as within a system--in several propositions as suggested by the writings of Weber (1947), Barnard (1946), and Thompson (1961). In a series of twenty-two additional statements, he identified organizational tendencies (or axioms or their corollaries) based upon his seven basic propositions which helped to explain the functioning of an organization (Appendix A).

He defined centralization as the hierarchy of authority in an organization which can be identified by noting the proportion of jobs or occupations whose occupants participate in decision making and the number of areas in which they participate. The lower the proportion of occupations or jobs whose occupants participate and the fewer the decision areas in which they become involved, the more centralized the organization.

On the basis of Max Weber's writing concerning bureaucracy, Hage suggested that the higher the level of centralization within an organization, the higher the productivity rate. This was due primarily to the greater efficiency and production an organization could achieve by centralized decision making. Weber (1947) wrote that this would result in fewer errors being made, greater precision and speed, reduced costs, and greater productivity.

Organizations must divide work into jobs in order to achieve their specific goals. The complexity in an organization can be measured by the number of occupational specialties present in a company and the length of training required by each. The greater the number of

occupations and the longer the period of training required for them, the more complex the organization. Hage proposed that the lower the level of complexity, the higher the rate of production. He explained:

In an organization with high complexity, there is apt to be less efficiency or lower productivity because of higher cost for the specialists' salaries....The lower volume of production is, as a consequence of high complexity, likely to result from an organizational emphasis on the quality of product or service being produced. The differences between craft and mass-production industries are examples of this phenomenon of low-volume, high-quality production versus high-volume, low quality production (Hage, 1965:304).

Organizations utilize rules to provide guidelines for their operations. The degree of formalization in an organization is measured by the proportion of codified jobs and the range of variation or innovation allowed within the rules which define the jobs. Hage theorized that the higher the level of formalization in an organization, the higher the rate of production. The reasons for this occurring are basically similar to his ideas concerning the relationship between centralization and productivity. As he wrote:

The high formalization of offices or jobs results in the development of expertise in a limited area and therefore greater efficiency in performance with fewer errors being made. The combination of centralization and formalization is nothing more than coordination (Hage, 1965:297).

Productivity or the effectiveness of an organization can be measured, according to Hage, by the number of units produced per year or within a designated time period and the rate of increase in these per year. The higher the volume of production and increase in volume, the more productive the organization. Additionally, all organizations

have some choice between low and high productivity and between quantity and quality as a demonstration of achievement.

Finally, all organizations should maintain a certain level of satisfaction among their members. Some organizations promote good working conditions, while others are less concerned about the welfare of their employees. Job satisfaction, or morale, can be one way to measure the satisfaction of working conditions by the employer. Hage proposed that higher production rates would lower job satisfaction in an organization. "...High production is associated with low satisfaction because high volume indicates an emphasis on speed...."

He did indicate, however, later in the article that this is probably the most controversial hypothesis in his theory due to the conflicting findings in the literature with regard to the relationship between job satisfaction and productivity.

There have been many studies of morale and volume of production, but the results have been conflicting. About one-half of them report a small positive correlation between high morale and high production, contrary to the hypothesis. Another third of the studies indicate that there is no relationship (Hage, 1965:314).

He concluded this section by suggesting that the relationship between job satisfaction and volume of production was not "completely clear," quietly observing that his theory might provide some clarification on the subject.

In this article Hage "tested" his axiomatic theory against a number of research studies and concluded that his ideas were substantiated by much of the current research. He found his axiomatic theory especially useful in analyzing the problems of organizational

change, centralization versus decentralization, and morale (Hage, 1965).

Criticism dealing with Hage's axiomatic model centered upon the kinds of organizational relationships he described, the rules of logic he utilized, and some of his definitions of the variables.

In response to these comments, Hage defended his theory in a "Letter to the Editor" in the Administrative Science Quarterly. In this letter he further clarified the relationship that existed between several of the variables. With reference to the negative relationship between job satisfaction and production that he had hypothesized, he wrote:

Suppose that job satisfaction is measured by a four-point scale; very satisfied, satisfied, dissatisfied, very dissatisfied. What the proposition is suggesting is that the relatively less satisfied (not necessarily the very dissatisfied), will work harder in order to get out of their position. For example, an unhappy assistant professor might work very hard in order to be promoted, or more particularly to get tenure, and thus out of his present circumstances of publish or perish. Some managers believe in creating a certain sense of insecurity, so that workers will maintain high job performance. In other words, too much satisfaction can lead to a relaxation of effort (Hage, 1966:143).

He wrote that he considered the axiomatic format to be a "useful beginning for the ordering of ideas and findings." He also argued for the testing of each proposition and corollary independently which was the technique utilized in this research.

In "Program Change and Organizational Properties: A Comparative Analysis" written in 1967, Hage and Aiken described in detail the study of program change in sixteen welfare organizations over a five-year period (Hage and Aiken, 1967a).

Based upon much of Hage's earlier theories regarding the relationships among his "organizational variables," the authors developed empirical indicators for measuring the organizational properties of complexity, centralization, formalization, and morale. Their purpose was to relate the organizational characteristics of complexity, centralization, formalization, and job satisfaction to the rate of program change. They hypothesized that the rate of program change was positively related to the degree of complexity and job satisfaction. and negatively related to the degree of centralization and formalization.

They conducted interviews with 314 staff members in the sixteen organizations. The data were analyzed using the Pearson Product Moment Correlation statistic. The authors found that a high degree of participation in agency-wide decisions, a low degree of job codification, and a high degree of job satisfaction were most highly associated with a high rate of program change (Appendix B).

In an article published shortly thereafter, Hage and Aiken (1967b) focused upon the relationship of centralization to the other structural variables. The contents of this article were similar to their earlier work regarding program change in organizations, except that they centered their investigation upon centralization and its impact on the functioning of an organization; specifically the degree of formalization and complexity.

A major difference between this study and their earlier work was that partial correlation statistical analysis was utilized in addition to their work with the Pearson Product Moment Correlation.

Specifically they were looking to see if the centralization of power tended to be associated with a high degree of formalization and a low degree of complexity as had been suggested earlier. They found that participation in decision making about the allocation of organizational resources and the determination of organizational policy was strongly related to the degree of complexity and weakly related to the degree of formalization.

In 1968 Hage and Aiken collaborated on an article entitled "Organizational Interdependence and Intra-Organizational Structure." They investigated the relationships between organizational interdependence, particularly the number of joint programs, and internal organizational behavior, utilizing the same sample provided by their earlier work with welfare organizations.

A model of organizational interdependence produced five hypotheses about organizations which were tested with the data collected from sixteen welfare organizations. They found that organizations with many joint programs tended to be more complex, more innovative, have more active internal communication channels, and somewhat more decentralized decision-making structures.

Both the terminology and the sample were similar to those employed in their earlier studies; but rather than examining organizations from an internal view, they turned their attention to the relationships that existed among organizations while still utilizing many similar concepts from their earlier research (Hage and Aiken, 1968).

Published in 1970, Social Change in Complex Organizations was a logical outgrowth of earlier research on the subject of organizational change that Hage and Aiken had conducted.

The book focused on three basic questions:

1. What organizational characteristics affect the rate of organizational change? Here they amplified their earlier definitions and explanations of the structural variables and their relationship to change. Also included were the hypotheses linking the variables to program change.
2. What environmental factors account for variations in the rate of organizational change?
3. What is the process of adopting new programs or other changes in organizations?

The book was filled with examples drawn from both the academic and business spheres that illustrated the theories they were explaining. The suggestion was also made that through an understanding of productivity and the factors which affected it, managers would be able to better control and direct this vital organizational process (Hage and Aiken, 1970).

In an article entitled "Organizational Structure and Communications," Hage and Aiken (1971) applied their axiomatic model to a study of the field of communication within organizations.

In this study they related organizational structure (as measured by the variables of complexity, formalization, and centralization) to the type of communication in an organization. They reasoned that the nature of the mechanism of coordination employed in the organization

in turn affected the volume and direction of communications. Examining again the sixteen health and welfare organizations used in earlier studies with a number of different measures of communication, they concluded that both scheduled and unscheduled interdepartmental communications were affected most by the structural characteristics.

Hage applied his model to the subject of values in a 1973 study written with Robert Dewar. They reported their findings in an article for the Administrative Science Quarterly entitled "Elite Values Versus Organizational Structure in Predicting Innovation." The study compared the predictive power of the concept of elite values with leader values, member values, and the three structural variables of complexity, centralization, and formalization. Data were collected twice. In 1964, 320 staff members and sixteen executive directors were interviewed. In 1967, the executive directors were interviewed again to find out how many new programs had been added in the preceding three years. An index of values favorable to change was computed from the responses. Elite values emerged as better predictors of program change than any of the structural variables.

The values of the elite inner circle were found to be more important than those of the executive director or of the entire staff in predicting innovation. Hage and Dewar's findings supported the idea that organizations develop an inner circle, and the values of this circle determine largely, though not completely, organizational policy (Hage and Dewar, 1973).

In an unpublished paper entitled "A Longitudinal Test of an Axiomatic Organizational Theory" written in 1973, Hage reviewed ten years of work involved with testing his axiomatic theory in a three-wave panel design of sixteen organizations. He wrote in detail concerning his original design:

Ten organizations were in the experimental group and six in the control group. The former were health and welfare organizations that provided at least some services for the mentally retarded; the latter were family agencies. Each of the ten were to receive the same stimulus. Specifically they were to be asked to develop new programs for the mentally retarded and were offered some money to do so. Measures were made before the stimulus...and three years later, in the spring of 1967 (Hage also did a third wave of the study in the spring of 1970). The theory predicts on the basis of their structural characteristics as of 1964, which organizations are likely to be more open to creating new programs. To make these predictions quite clear, the more an organization was complex, decentralized, deformed, de-stratified, had high morale, and was more concerned with quality than efficiency, the more likely it was to develop the new programs.... (Hage, 1973:10)

He discussed several problems with his research design. One concern of Hage's was the small "n," because the units of analysis in his study were the sixteen organizations not individuals within the organizations. He considered the question of how frequently measures should be taken in a longitudinal study; how to deal with the restricted scope of his sample; consistency in measurement in a longitudinal study; and problems he experienced with his measurement scales and procedures.

In writing about his theory, Hage stated that it was basically "a technique for developing hypotheses and checking consistency in reasoning" (p. 56) and was "designed to make clear all the implied hypotheses in some interdependent system" (p. 54).

In his concluding section he suggested that ten years of study of the theory was long enough; and that although the longitudinal study had provided illuminating results, "...there is a point to stop. A decade is at least enough for me" (p. 57). He also mentioned that his future writing would be focused upon integrating his axiomatic theory with other themes that had been written and other studies that had been made in the last ten years.

In 1974 Hage published a book entitled Communication and Organizational Control: Cybernetics in Health and Welfare Settings which integrated much of his earlier work on the axiomatic theory with organizational control and the concept of cybernetics. Much of the research reported is familiar with regard to studies involving structural variables, and he explained his decision to include cybernetics in his analysis by stating:

...cybernetics appears to be a useful candidate as a paradigm in organizational analysis. The best paradigm is one that can handle new problems as well as old ones and synthesize as well as suggest new avenues of research. Cybernetics would seem to have this capacity for growth (Hage, 1974:243).

In a subsequent article entitled "The First Steps Toward the Integration of Social Theory and Social Policy," he continued his mission of synthesizing his axiomatic theory with other themes and studies. Written with J. Rogers Hollingsworth, Hage discussed the need for better communication and understanding between "those who engage in theory construction and those who are policy-makers," and offered a theoretical framework as an initial step for building a body of theory for understanding certain types of policy outcomes. Hage and

Hollingsworth suggested that by knowing the relative power of specific interest groups, it would be possible to increase the predictability of what policy outcomes would prevail (Hage and Hollingsworth, 1977).

In "Size, Technology, Complexity, and Structural Differentiation: Toward a Theoretical Synthesis" written with Robert Dewar, the authors discussed the problem of whether the size of an organization has the same impact on complexity as it appeared to have on "structural differentiation" (Hage and Deward, 1978). Structural differentiation was measured by job titles, number of departments, and number of levels whereas complexity was measured by the number of different occupations, the level of training, and the extent of professional activity.

The authors concluded that the most important determinant of differentiation in the division of labor was the scope of an organization's task, a technological dimension, and not organizational size.

In the preface of his latest work entitled Theories of Organizations: Form, Process, and Transformation, Hage discussed the evolution of his research:

Much of my work for the first decade, in the sixties, was an attempt to indicate how one could write structural-functional theories...(with the intent) of designing organizations that would facilitate innovation. It was only in the seventies that I moved into system analysis and concerns about cybernetic control, specifying the key variables in that system, and finally became concerned with the larger problem of adaptiveness (Hage, 1980:vii).

He also spoke about the funding for his three-panel research.

The federal government has been a long silent partner in these twenty years. They gave Community Hospital a large grant to study physicians' resistance to change, which paid my way through graduate school (1960-62) and allowed me to do my first panel study. Then in 1964-67 and 1968-70, the Vocational Rehabilitation Administration, now the Social Rehabilitation Services made two large grants to Michael Aiken and myself so that we could do a number of propositions in the axiomatic theory. This first-hand confrontation with data considerably enriched my thinking (Hage, 1980:x).

In this latest work, one still sees many traces of his earlier research. Evidence of his axiomatic theory permeates this work as does his preoccupation with the subject of adaptiveness or organizational change.

Fourteen years earlier in an article Hage had defended his axiomatic theory as being a "useful first step" because it could bring "much order to disparate ideas and findings" (Hage, 1966: 146). Certainly a survey of almost twenty years of his research and writing indicates that this was his goal.

The intellectual strategy I am suggesting is that the best way to understand complexities of the real world is over the pathway of simplicity. And this is the great virtue of axiomatic reasoning (p. 146).

Summary of the Review of the Literature

The review of literature indicated that although educators have been concerned about the issues of accountability and evaluation, the problem of the improvement of program productivity has not been given appropriate attention. Cost-benefit studies were one method of analysis that utilized a quantitative approach, but there was no research found that linked increasing program effectiveness with management styles.

The Hage and Aiken model presented a possibility for use in examining this relationship due to its flexibility in application. Throughout the review of literature, no evidence could be found that the axiomatic theory had ever been applied to a productivity problem in education. Hence, this study was designed to develop a research problem that would examine the feasibility of the use of the Hage methodology in an educational setting.

CHAPTER III

METHODOLOGY

Introduction

Included in this chapter is a restatement of the problem, the hypotheses tested in the study, a description of the sample, a description of the instrument used to collect the data, and the steps taken in implementing the research project as well as the statistical treatment utilized in analyzing the data.

Problem Restatement

The central purpose of the study was to develop a model for the examination of productivity in Adult Basic Education.

The model examined the relationship of the following variables (or organizational characteristics) to program productivity within several Adult Basic Education programs.

Centralization (X_1) - The proportion of jobs that participate in decision making and the number of areas in which decisions are made by decision makers (that is, the smaller the proportion of jobs participating in decision making, the higher the degree of centralization).

Formalization (X_2) - The proportion of jobs that are codified and the rate of variation allowed within jobs (that is, the larger the proportion of jobs that are codified, the higher the degree of

formalization).

Complexity (X_3) - The number of organizational specialties and the level of training required.

Job Satisfaction (X_4) - Satisfaction with working conditions and personnel.

Productivity (\hat{Y}) - This measure was represented by the grade level growth achieved by individual students as reported in the Adult Education Annual Performance Report submitted to the U.S. Office of Education by each A.B.E. program on a yearly basis (Appendix C).

Hypotheses

Based on the research done by Hage, it seemed reasonable to formulate and test the following hypotheses in this study:

1. There is a positive relationship between centralization and production.
2. There is a positive relationship between formalization and production.
3. There is a negative relationship between complexity and production.
4. There is a negative relationship between job satisfaction and production.

Specifically, this study considered the following model:

$$\hat{Y} = P_{Y.1}X_1 + P_{Y.2}X_2 - P_{Y.3}X_3 - P_{Y.4}X_4$$

where: \hat{Y} = Productivity; P = Regression Coefficient; X_1 = Centralization; X_2 = Formalization; X_3 = Complexity; and

X_4 = Job Satisfaction.

Data Collecting Instrument

Gerald Hage and Michael Aiken (1967a) reported in The American Journal of Sociology on research that they had conducted to examine and relate the organizational characteristics of complexity, centralization, formalization, and job satisfaction to the rate of program change within social welfare agencies. They hypothesized that the rate of program change was positively related to the degree of complexity and satisfaction, and negatively related to the degree of centralization and formalization. For the purposes of their research, data collection methodology and instrumentation were developed to measure these characteristics. Their instrumentation and methodology provided the model used in the present study.

The productivity measure was represented by the grade level growth achieved by individual students as reported in the Adult Education Annual Performance Report submitted to the U.S. Office of Education by each Adult Basic Education program on a yearly basis. This index was determined by dividing the total number of students completing Levels I and II (corresponding to grades 1-12) by the total number of students enrolled in Levels I and II (Appendix C).

The instrument utilized by Hage and Aiken was submitted to a jury panel composed of eight representatives of Oregon Adult Basic Education programs. Four of these people were Adult Basic Education

instructors while the remaining four were program administrators (Appendix J). These individuals were selected from community college Adult Basic Education Programs to serve as the advisory committee for research and program development for the Adult Education Department at Oregon State University. In each institution they supervised aides and tutors; and in the process of the jury panel review, suggested several changes that could have represented the points of view of the total population under study.

The group assembled on the Oregon State University campus on October 12, 1978, and was asked to assist in adapting the instrument for use with an educational audience. Their comments ranged from concerns dealing with the title and instructions utilized on the questionnaire to suggestions for additions to the categories dealing with the location of teaching assignments, staff positions, educational training, and teaching experience.

The amended instrument was then pilot tested with adult education graduate students and field tested with members of the Adult Basic Education staff of Chemeketa Community College, Salem, Oregon, during the fall of 1978 prior to final revision and data collection. Suggestions that were proposed included: modifying the instructions to improve their clarity; changing certain categories utilized in the scales; stylistic changes to provide for parallelism among items and to clarify their intent; elimination of unclear or redundant questions; and rearrangement in the order of some items.

In its final form the questionnaire consisted of 37 items (Appendix L). Nine questions were asked which pertained to the level of staff training, teaching experience, and outside professional involvement (complexity); ten questions dealt with the topic of decision making within an organization (centralization); seven items were concerned with the question of codification of the rules (formalization); and eight questions dealt with the subject of job satisfaction. Three additional questions were included that pertained to the age, teaching location and sex of the respondents. Final data collection occurred between December 1978 and March 1979.

The Procedures

The following procedures were utilized in this study:

1. Developed an instrument based upon Hage and Aiken's original interview form (Appendix L).
2. Submitted this instrument to a jury panel of experts.
3. Pilot tested the instrument with adult education graduate students.
4. Field tested the instrument with an Adult Basic Education community college staff.
5. Distributed the instrument to approximately 300 A.B.E. program personnel at seven educational institutions located in four western states by sending packets of questionnaires and accompanying cover letters to each A.B.E. Director (Appendix K, L).

6. Collected the data from the program personnel in the participating A.B.E. programs in person or by the mail.
7. Analyzed the data through the use of the statistical methods of multiple regression and partial correlation.
8. Prepared the final report of the research findings.

Sample

The sample of this study was selected from Adult Basic Education staff members employed by seven programs within four western states: Oregon, Washington, Idaho, and California (Table 1). These seven institutions were suggested by each State Director as being most comprehensive and representative of Adult Basic Education programming in their states.

The Adult Basic Education staff at each institution was composed of some or all of the following staff members: program director; coordinator; full-time and part-time teachers; teacher aides; counselors; counselor aides; clerical aides; and volunteer tutors.

It was requested that all members of each staff in the participating programs complete a questionnaire. A total of 199 staff members in the participating programs completed questionnaires which represented a 69.1 percent rate of return.

Demographics of the Sample

Several questions contained within the questionnaire revealed certain demographic characteristics of the sample.

TABLE I. ADULT BASIC EDUCATION PROGRAM POPULATION

Educational Institution	Number of Program Sites	Number of Students Served 1977-1978	Number of Staff 1977-1978
Mt. Hood Community College Gresham, Oregon (suburban)	6	1,778	40
Linn-Benton Community College, Albany, Oregon (suburban)	4	1,300	30
Chemeketa Community College Salem, Oregon (urban and rural)	17	2,500	76
Walla Walla Community College Walla Walla, Washington (rural)	4	805	25
Boise State University Boise, Idaho (urban and rural)	33	3,500	70
La Puente Adult School La Puente, California (urban)	15	2,000	32
Inglewood Adult School Inglewood, California (urban)	15	1,500	15
Total (four states)	94	13,383	288

The sample was found to have a wide age range. The bulk of the sample (46.7 percent) was between the ages of 30 and 44 years while 5.5 percent of the sample was 22 years old or younger. Four percent of the sample was 60 years or older (Appendix D).

With reference to gender, 27.6 percent of the population was male and 72.4 percent was female (Appendix E).

With regard to position held at their respective academic institutions, 39.7 percent were part-time teachers. Additionally another 21.6 percent classified themselves as teacher aides. Only a small percent of the sample was administrative in nature (Appendix F).

Twelve of the respondents held the General Educational Development Certificate (6.0 percent), while 70 members of the sample had received the Baccalaureate degree "plus hours" (35.2 percent). Thirty-eight of the respondents possessed a Master's degree "plus hours" (19.1 percent), and one individual had received a doctorate degree (Appendix G).

Sixty respondents were teaching at the main campus location of their academic institution (30.2 percent). An unusually large number of respondents (52 or 26.1 percent) checked the "other" category for this question. Upon further investigation, staff members of at least one school were found to be doing a great deal of their teaching in their students' homes, a choice not contained within those offered by this question (Appendix H).

With reference to teaching experience, 72.4 percent of the population (144 people) had five years or less of experience while

four individuals had twenty years or more (Appendix I).

Method of Analysis

Two statistical tools, partial correlation and multiple regression, were used to analyze the data in this study.

According to Borg and Gall (1971), partial correlation is a technique which can be useful in exploratory relationship studies. Blaylock (1971) suggested that this model can be used to obtain measures of the degree of relationship between a dependent variable (the productivity index in the present study) and any of a set of independent variables (complexity, centralization, formalization, and job satisfaction), while controlling for one or more of the other independent variables in the set (Figure 1).

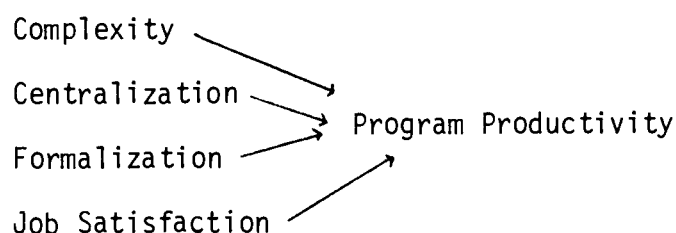


Figure 1. Design of the Study

Multiple regression was used to determine the extent to which all variables contributed to the prediction of productivity. According to Nie et al. (1975), multiple regression is a general statistical technique through which one can analyze the relationship between a dependent or criterion variable (program productivity in this study) and a set of independent or predictor variables

(complexity, centralization, formalization and job satisfaction). It can be viewed as both a means of evaluating the overall contribution of the independent variables and as a means of evaluating the overall contribution of a particular independent variable with the influence of other independent variables controlled.

A confidence level of .05 was selected for use in this study. Individual data cards were prepared for each respondent, and the Statistical Package for the Social Sciences (SPSS) computer package available at the Milne Computer Center at Oregon State University was used to analyze the data.

CHAPTER IV

ANALYSIS AND DISCUSSION OF FINDINGS

Overview

This chapter is devoted to the presentation of the statistical analysis of data relevant to this study. Tables with accompanying analyses of the data will be presented according to each hypothesis.

The central purpose of this study was to develop a model for the examination of productivity in Adult Basic Education. The model examined the relationship of centralization, complexity, formalization, and job satisfaction to program productivity within several A.B.E. programs.

The analysis of data consisted of two procedures. Multiple regression was used to determine the extent to which all variables contributed to the prediction of productivity. This statistical technique provided information relative to the relationship between the dependent variable (program productivity) and a set of independent variables (complexity, centralization, formalization, and job satisfaction). Multiple regression can be viewed both as a means of evaluating the overall contribution of the independent variables and as a method of evaluating the contribution of a particular independent variable when the influence of other independent variables is controlled (Nie et al., 1975).

Partial correlation was also utilized to examine the relationship between the dependent variable (program productivity) and any of the independent variables (centralization, complexity, formalization, and job satisfaction) while controlling for one or more of the independent variables (Figure 1, page 45).

According to Borg and Gall (1971), partial correlation techniques are most valuable when the researcher wishes to rule out the influence of one or more variables upon the dependent variables in order to clarify the role of the other independent variables.

The discussion of the results was organized in the following manner. Within the context of this introductory statement, initial tests of both correlation and multiple regression were presented. The remainder of the discussion of the results followed a framework established by the four hypotheses in this research. These sections dealt with an examination of the effects of the correlation statistical tests administered to the variables. A summary of the findings was also included.

The zero order correlations among the variables are presented in Table II for the reader's interest.

The multiple correlation coefficient was significant and positive ($R = .306$, $F = 5.014$, $ndf = 4$, 194 , $p = .001$). It should be mentioned that the multiple correlation coefficient was depressed due to the scaling of the dependent variable. While the productivity score utilized in the study represented an institutional score, the independent variables represented individual scores. Therefore, one would expect that this coefficient would be an underestimation of the

TABLE II. ZERO ORDER CORRELATIONS OF VARIABLES

Variable	Prod.	Complex.	Cent.	Form.	Job Sat.
Productivity	1.000				
Complexity	-.039	1.000			
Centralization	-.179	-.417	1.000		
Formalization	-.214	-.028	.438	1.000	
Job Satisfaction	.248	.143	-.324	-.403	1.000

relationship between the dependent and independent variables in the study.

The results of the multiple regression analysis indicated that all variables were contained in the equation although job satisfaction (X_4) proved to be the only positive predictor of productivity. The R Square value for the equation was .09.

$$\hat{Y} = -.27X_1 - .26X_3 + .46X_4 - .24X_2$$

Hypothesis 1

There is a positive relationship between centralization and productivity.

The results of the zero order correlation coefficient revealed a negative and significant relationship between productivity and centralization ($r = -.179$, $ndf = 197$, $p = .006$). To further examine this relationship statistical tests of partial correlation were

computed.

Some variation in the relationship between these two variables was evident in a series of second and third-order partial correlation coefficients. Second and third-order partials are those in which the relationship between two variables (program productivity and centralization in this case) is computed with the effects of two or three other variables (complexity, formalization and job satisfaction) partialled out. The third-order partial correlation coefficient did not reveal a significant relationship between these two variables when complexity, formalization, and job satisfaction were held constant ($r = -.110$, $ndf = 194$, $p = .062$).

However, a significant result was obtained when only complexity and job satisfaction were partialled out ($r = -.153$, $ndf = 195$, $p = .017$). Additionally, a similar significant result occurred when complexity and formalization were held constant ($r = -.132$, $ndf = 195$, $p = .032$). This would indicate that the relationship between centralization and productivity is not a clear one; other variables appear to be intervening.

An additional test was conducted that was not projected in the original research design which examined the effect of certain demographic variables (age, staff position, educational training, teaching experience, and gender) upon the individual hypotheses. The zero order correlation coefficient table is included (Table III).

When these demographic variables as well as the variables of complexity, formalization, and job satisfaction were partialled out, the relationship between productivity and centralization remained

TABLE III. ZERO ORDER CORRELATIONS INCLUDING STRUCTURAL VARIABLES

Variable	Prod.	Form.	Age	Position	Training	Exp.	Comp.	Cent.	Job Sat.
Formalization	-.214								
Age	-.153	.057							
Staff Position	.014	.122	-.144						
Training	.001	-.185	.182	-.613					
Experience	-.212	.064	.440	-.291	.253				
Sex	-.051	.024	.158	.137	-.248	-.098			
Complexity	-.039	-.028	.185	-.452	.430	.426	-.177		
Centralization	-.179	.438	-.072	.445	-.392	-.217	.123	-.417	
Job Satisfaction	.248	-.408	-.004	-.100	.075	.067	-.135	.143	-.324

significant ($r = -.137$, $ndf = 189$, $p = .03$).

Discussion

Gerald Hage originally hypothesized that there was a positive relationship between centralization and productivity (Hage, 1965). He identified centralization as the hierarchy of authority in an organization which can be identified by noting the proportion of jobs or occupations whose occupants participate in decision making and the number of areas in which they participate. The lower the proportion of occupations or jobs whose occupants participate and the fewer the decision areas in which they participate, the more centralized the organization.

This view of the positive relationship between centralization and productivity was not verified by the findings of this study; hence this alternative hypothesis could not be accepted. The data suggested by this present study indicated that the relationship between these two variables was an inverse one: and that the greater the centralization of decision making, the lower the rate of productivity.

Based on these findings, it would appear that basic education personnel view centralization as being counterproductive and value their independence with respect to decision making within their organizations.

The partial correlation analyses which were conducted did not reveal a significant relationship between productivity and centralization at the third-order level ($r = -.110$, $ndf = 194$, $p = .062$). However, this relationship was significant when complexity and job satisfaction were partialled out ($r = -.153$, $ndf = 195$, $p = .017$). A similar result occurred when complexity and formalization were controlled for ($r = -.132$, $ndf = 195$, $p = .032$). This would indicate that the other independent variables in certain second-order combinations appear to be intervening in the relationship between centralization and productivity.

Hypothesis 2

There is a positive relationship between formalization and productivity.

The results of the zero order correlation coefficient indicated a significant negative relationship between productivity and formalization ($r = -.214$, $ndf = 197$, $p = .001$). However, the third order correlation coefficient which examined the relationship of productivity and formalization without the effects of complexity, centralization, and job satisfaction, revealed a nonsignificant relationship which would indicate that formalization has no significant effect upon productivity unless the other variables in the equation are included ($r = -.073$, $ndf = 194$, $p = .152$).

Other significant relationships between productivity and formalization were revealed through a series of first and second-order partial correlation coefficients which would indicate that the

relationship between formalization and productivity is not a clear one; other variables appear to be intervening (Table IV).

With the addition of the demographic variables (age, staff position, educational training, teaching experience, and gender), other significant relationships were revealed which would indicate that all of these additional variables exert a significant effect upon the relation between productivity and formalization (Table IV).

Formalization demonstrated a significant relationship with complexity when the variables of age, staff position, educational training, teaching experience, productivity, gender, centralization, and job satisfaction were partialled out ($r = .152$, $ndf = 189$, $p = 0.17$).

An additional significant relationship was shown to exist between formalization and centralization when the variables of age, staff position, educational training, teaching experience, gender, productivity, complexity and job satisfaction were controlled for ($r = .365$, $ndf = 189$, $p = .001$).

Discussion

Hage's idea that the higher the level of formalization, the higher the level of production (1965), was not supported by the results of this study; hence this alternative hypothesis could not be accepted. On the contrary, it would appear that Adult Basic Education personnel appreciate the absence of formalization in their jobs as reflected by their higher productivity rates.

TABLE IV. PARTIAL CORRELATION COEFFICIENTS BETWEEN
FORMALIZATION AND PRODUCTIVITY CONTROLLING
FOR THE INDEPENDENT VARIABLES

Controlled Variables	r	ndf	p
Complexity	-.216	196	.001
Centralization	-.154	196	.015
Job Satisfaction	-.129	196	.034
Complex. & Centralization	-.133	195	.031
Complex. & Job Satisfaction	-.127	195	.037
Age	-.208	196	.002
Staff Position	-.218	196	.001
Educational Training	-.218	196	.001
Educational Experience	-.206	196	.002
Sex	-.214	196	.001

A major method of determining the presence of formalization is the existence of direct supervision. Both Hage and Aiken (1970), have suggested that many professionals, such as teachers, are in occupations so structured that direct supervision is not practical and that the presence of rules is not appropriate or suitable. Indeed, it would appear that the present research validates their suggestion as well as demonstrates that higher rates of productivity will result when formalization is perceived to be at a minimum among A.B.E. personnel.

The third order correlation coefficient revealed a non-significant relationship between formalization and productivity ($r = -.073$, $ndf = 194$, $p = .152$). Additional statistical tests of partial correlation did not reveal a clear relationship between productivity and formalization when the other independent variables were partialled out.

Also, formalization demonstrated both a significant relationship with complexity ($r = .152$, $ndf = 189$, $p = .017$) and with centralization ($r = .365$, $ndf = 189$, $p = .001$). Consequently, on the basis of these statistical tests, it would appear that the relationship between formalization and productivity is not a clear one; other variables seem to be intervening.

Hypothesis 3

There is a negative relationship between complexity and productivity.

The results of the zero order correlation coefficient revealed

an insignificant negative relationship between complexity and productivity ($r = -.039$, $ndf = 197$, $p = .288$).

Additionally, the third-order correlation coefficient indicated a nonsignificant relationship between complexity and productivity when the effects of centralization, formalization and job satisfaction were removed ($r = -.115$, $ndf = 194$, $p = .053$).

However, in a series of first and second-order partial correlation statistical tests when centralization and job satisfaction were controlled for, a significant relationship resulted between productivity and complexity indicating that these variables (centralization and job satisfaction) may be acting as intervening forces in this relationship (Table V).

TABLE V. PARTIAL CORRELATION COEFFICIENTS BETWEEN COMPLEXITY AND PRODUCTIVITY CONTROLLING FOR THE INDEPENDENT VARIABLES.

Controlled Variables	r	ndf	p
Centralization	-.128	196	.036
Centralization & Job Satisfaction	-.132	196	.031

Additional tests of partial correlation which were conducted involving a variety of the demographic variables revealed a significant positive relationship between complexity and educational training ($r = .165$, $ndf = 189$, $p = .011$) and complexity and teaching experience ($r = .262$, $ndf = 189$, $p = .001$). This would appear to verify the assumption that the more experienced and trained

employees, the greater specialization of the positions which they held.

To further investigate the relationship between complexity and centralization, a series of partial correlation statistical tests were conducted. When the effects of the other independent variables as well as the demographic variables of age, staff position, educational training, educational experience, and gender were removed, the relationship between complexity and centralization remained significant ($r = -.249$, $ndf = 189$, $p = .001$). This would indicate a stronger relationship between complexity and centralization than between complexity and productivity.

A similar partial correlation test was conducted examining the relationship between complexity and formalization. A statistically significant relationship was the result ($r = .152$, $ndf = 189$, $p = .017$). This indicates a much stronger intervening relationship between these two variables than between complexity and productivity.

Discussion

Hage and Aiken have written regarding the meaning of complexity in organizations. They have suggested that organizations need to divide work into jobs in order to achieve their specific goals. One method of measuring the complexity in an organization is to examine the number of occupational specialties present in a business, the length of training required by each, and the degree to which members of an organization attempt to gain greater knowledge about their work activities through involvement in professional organizations appropriate

to their field. The larger the number of occupations and the longer the period of training required, the more complex the organization (Hage, 1965; Hage and Aiken, 1970).

In a series of statistical tests of correlation, it was discovered that although complexity had a negative relationship to productivity ($r = -.039$, $ndf = 197$, $p = .288$), the relationship was not a significant one ($r = -.115$, $ndf = 194$, $p = .053$). Additionally, it was shown that centralization, formalization, and job satisfaction in various combinations appeared to be intervening in the relationship between complexity and productivity.

According to the data generated by this study, it was found that complexity was not related to productivity; therefore, the alternative hypothesis posited by Hage could not be accepted. Consequently, it would seem that shared decision making and the lack of standardization within a program are more important predictors of productivity than complexity among adult education personnel.

Hypothesis 4

There is a negative relationship between job satisfaction and productivity.

The results of the zero order correlation coefficient revealed a positive, significant relationship between productivity and job satisfaction ($r = .248$, $ndf = 197$, $p = .001$)

To further examine this relationship, additional statistical tests of partial correlation were utilized. The third-order partial

correlation coefficient indicated a significant relationship between these two variables when centralization, complexity, and formalization were partialled out ($r = .176$, $ndf = 194$, $p = .007$).

In a series of first and second-order partial correlation tests, the relationship between productivity and job satisfaction remained significant (Table VI).

TABLE VI. PARTIAL CORRELATION COEFFICIENTS BETWEEN
JOB SATISFACTION AND PRODUCTIVITY
CONTROLLING FOR THE INDEPENDENT VARIABLES

Controlled Variables	r	ndf	p
Complexity	.256	196	.001
Centralization	.204	196	.002
Formalization	.180	196	.005
Complexity and Centralization	.207	195	.002
Complexity and Formalization	.189	195	.004
Centralization and Formalization	.166	195	.010

In additional statistical tests of correlation at the zero order level, centralization was found to have a significant negative relationship to job satisfaction ($r = -.324$, $ndf = 197$, $p = .001$). The same was true of the relationship between job satisfaction and formalization ($r = -.403$, $ndf = 197$, $p = .001$). Also a positive significant relationship was discovered between job satisfaction and complexity ($r = .143$, $ndf = 197$, $p = .022$).

In a series of second-order partial correlations, job satisfaction was found to be significantly related to centralization when complexity and formalization were held constant ($r = -.130$, $ndf = 195$, $p = .034$). It was also found to have a significant negative relationship to formalization when complexity and centralization were held constant ($r = -.314$, $ndf = 195$, $p = .001$).

When the effects of the demographic variables of age, staff position, educational training, educational experience, and gender as well as complexity, centralization, and formalization were held constant, the relationship between productivity and job satisfaction remained a significant, positive one ($r = .180$, $ndf = 189$, $p = .006$).

Discussion

Gerald Hage originally hypothesized that a lower rate of job satisfaction would lead to a higher rate of production (Hage, 1965). He postulated that high production is associated with a low rate of satisfaction because a high volume denotes an emphasis on speed which would probably indicate little concern with employee morale; hence resulting in a lower rate of job satisfaction. However, the findings in this study refute this conclusion; consequently this alternative hypothesis could not be accepted in lieu of the testable one.

According to the data presented, job satisfaction is a powerful predictor of production (Table VI). Both the zero order correlation coefficient ($r = .248$, $ndf = 197$, $p = .001$) and the third order correlation coefficient ($r = .176$, $ndf = 194$, $p = .007$) attest to this. Job satisfaction continued to have a significant positive relationship

with productivity even when the demographic variables were held constant ($r = .180$, $ndf = 189$, $p = .006$). Although inferring a causal sequence from a correlation may be interpreted variously by different researchers, in this study such inferences have been made for the purpose of making the dissertation of more practical use to the reader.

An enormous amount has been written concerning job satisfaction. One author estimated that since 1969 the number of studies could exceed four thousand (Gruneberg, 1976). Herzberg, among others, has discussed this subject extensively (Herzberg, 1959, 1966, 1968).

The conclusions in the present study regarding job satisfaction and production can only speak to adult education staff; but it does appear clear that in matters pertaining to working conditions and supervision, a satisfied staff leads to a productive one.

Summary of the Statistical Findings

Additional statistical tests of partial correlation administered to the data revealed the following model which was created to illustrate the findings presented earlier in this study (Figure 2, Table VII).

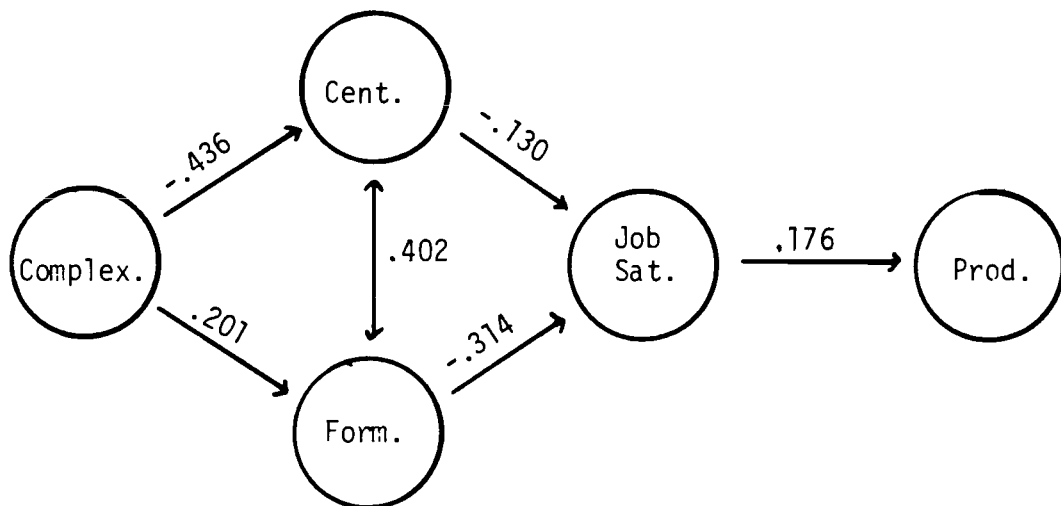


Figure 2. Analytical Model Produced by the Study

Job satisfaction proved to be the strongest predictor of productivity ($r = .176$, $ndf = 194$, $p = .007$). Centralization negatively influenced productivity indirectly through the intervening variable of job satisfaction ($r = -.130$, $ndf = 195$, $p = .034$). A similar relationship existed between formalization and job satisfaction ($r = -.314$, $ndf = 195$, $p = .001$). These two variables were also shown to be correlated with each other ($r = .402$, $ndf = 195$, $p = .001$).

Complexity was shown to be positively related to formalization ($r = .201$, $ndf = 195$, $p = .002$) and negatively related to centralization ($r = -.436$, $ndf = 195$, $p = .001$).

Based on these findings, all the research hypotheses were rejected.

TABLE VII. PARTIAL CORRELATION COEFFICIENTS FOR SELECTED SETS OF VARIABLES

Independent	VARIABLES		r	ndf	p
	Dependent	Control			
Productivity	Complexity	Cent., Form., Job Sat.	-.116	194	.053
Productivity	Centralization	Comp., Form., Job Sat.	-.110	194	.062
Productivity	Formalization	Comp., Cent., Job Sat.	-.074	194	.152
Productivity	Job Sat.	Comp., Cent., Form.	.176	194	.007*
Job Sat.	Complexity	Cent., Formalization	.072	195	.159
Job Sat.	Centralization	Comp., Formalization	-.130	195	.034*
Job Sat.	Formalization	Comp., Centralization	-.314	195	.001*
Centralization	Complexity	Form., Job Sat.	-.436	195	.001*
Centralization	Formalization	Complex., Job Sat.	.402	195	.001*
Formalization	Complexity	Cent., Job Sat.	.201	195	.002*

* = Significant

The original Hage hypotheses which proposed the existence of positive relationships between productivity, centralization, and formalization, and negative relationships between productivity, complexity, and job satisfaction were not supported by the findings in this study. Specifically, it was found that centralization, formalization, and complexity were not independent predictors of productivity as posed by Hage. Only job satisfaction proved to be an independent predictor of productivity, and that relationship was shown to be a positive one rather than the negative one which Hage originally proposed.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

In this time of constant inflation, educational personnel need to account to the public for expenditures in businesslike terms and to structure their organizations in such a manner to assure that learning requires the shortest amount of time at the lowest possible cost for the student, teacher, school, and public. Determining the relationship between management style and program productivity is one method of analyzing productivity and, hopefully, providing suggestions for its improvement.

The central purpose of this study was to develop a model for the examination of productivity in Adult Basic Education. To this end, an instrument borrowed from the world of business was adapted for use in an educational setting. The variables of centralization, complexity, formalization, and job satisfaction were measured in order to determine their effect, if any, upon program productivity.

The major objectives, procedures and findings of the study are summarized in the following section.

Objective #1: To review the existing research related to productivity in postsecondary education.

The review of literature revealed much information which dealt with the issues of accountability and evaluation in education.

However, few studies were found which dealt with the evaluation of postsecondary programs in a quantitative fashion. Cost-benefit studies came the closest to this type of program appraisal.

There were no studies located which addressed the issue of improvement of program quality through the management of job satisfaction, decision making, staff training, or standardization of rules which were the independent variables identified in this study.

The final section examined the business model which was adapted for use with an educational audience in this study.

Objective #2: To develop a methodology including the identification of appropriate instrumentation for research in educational productivity.

The major function of this study was to develop a model for the examination of productivity in Adult Basic Education. To that end, an instrument borrowed from the world of business was adapted for use with an education audience. It examined the relationship of centralization, satisfaction, complexity, and formalization on the part of the adult education staff to program productivity within Adult Basic Education programs in the western United States.

The productivity measure utilized in the study was represented by the grade level growth achieved by the individual students as reported in the Adult Education Annual Performance Report.

The instrument was submitted to a jury panel composed of representatives of Oregon Adult Basic Education programs. The

amended questionnaire was then pilot tested with adult education graduate students and field tested with an Adult Basic Education staff of a community college prior to final revision and data collection.

Objective #3: To administer this instrument to a population consisting of staff members of selected Adult Basic Education programs in the states of Oregon, Washington, Idaho and California.

The sample of this study was selected from Adult Basic Education staff members employed by seven programs within four western states: Oregon, Washington, Idaho, and California. Program directors, coordinators, full-time and part-time teachers, teacher aides, counselors, counselor aides, clerical aides, and volunteer tutors constituted the respondents to the questionnaire. A total of 199 subjects responded.

Objective #4: To determine if there was a relationship that existed between selected organizational characteristics and program productivity.

Both partial correlation and multiple regression were used to test the following four hypotheses.

1. There is a positive relationship between centralization and production.
2. There is a positive relationship between formalization and production.
3. There is a negative relationship between complexity and production.

4. There is a negative relationship between job satisfaction and production.

Statistical tests administered to the data revealed the following results. Job satisfaction proved to be the only predictor of productivity ($r = .176$, $ndf = 194$, $p = .007$). Centralization negatively influenced productivity through the intervening variable of job satisfaction ($r = -.130$, $ndf = 195$, $p = .034$). Formalization also was found to influence productivity negatively through the intervening variable of job satisfaction ($r = -.314$, $ndf = 195$, $p = .001$). Both centralization and formalization were also shown to be positively correlated with each other ($r = .402$, $ndf = 195$, $p = .001$). Complexity was shown to be positively related to formalization ($r = -.201$, $ndf = 195$, $p = .002$) and negatively related to centralization ($r = -.436$, $ndf = 195$, $p = .001$).

Based on these findings, all the research hypotheses were rejected.

The original Hage hypotheses which proposed the existence of positive relationships between productivity, centralization, and formalization, and negative relationships between productivity, complexity, and job satisfaction were not supported by the findings in this study. Specifically, it was found that centralization, formalization, and complexity were not independent predictors of productivity as posed by Hage. Only job satisfaction proved to be an independent predictor of productivity, and that relationship was shown to be a positive one rather than the negative one which Hage originally proposed.

Conclusions

After an analysis of the existing data, the following suggestions for increasing productivity among Adult Basic Education personnel seem appropriate.

1. Centralization and Production. According to the data generated by this study, increased productivity rates will occur when personnel are allowed to share in decision making regarding program development/operation and personnel matters. Unlike many businesses, the individual program staff responding to this questionnaire were not all housed within one building. Indeed, in some programs, staff were located in more than two dozen learning centers. This would have an impact upon decision making, and in the case of Adult Basic Education personnel, led to a more productive program.

Although some authors have suggested that a decentralized arrangement reduces control over individuals who are subordinates, thus reducing the effectiveness of an organization (Hage and Aiken, 1970; Weber, 1947), in the case of Adult Basic Education programs, the opposite was shown to be the case.

Adult Education administrators would be wise to involve their staff in decision making since this opportunity was shown to lead to increased rates of productivity among adult education personnel.

2. Formalization and Production. Data produced by this study indicated that Adult Basic Education personnel appreciated the absence of standardization in their jobs. "Formalization" refers to the use of rules in an organization--the degree of standardization--and the latitude of behavior that is tolerated from those standards. In this

study higher productivity rates occurred when adult education personnel perceived formalization to be at a minimum, and innovation and creativity were not restrained by standardized procedures but rather encouraged by the absence of them.

Although the literature suggested that a higher level of formalization would result in higher productivity rates (Hage, 1965), the present data indicate that less emphasis on rule following and standardization of conduct will result in greater program productivity among educational personnel. Hage and Aiken have written:

Most professionals, for example, teachers, physicians, psychiatrists, social workers, junior executives, salesmen, researchers, artists, and so forth, are in occupations that are structured so that direct supervision is impractical or impossible. Rules for such jobs are less appropriate and can be emphasized only at the risk of introducing some discord into the organization (Hage and Aiken, 1970:22).

For many, the aspect of independence and autonomy that teaching offers, at least at the adult level, more than offsets the lower monetary rewards. It would appear that staff respond with higher productivity rates in this situation.

3. Complexity and Production. From the results produced by this study, it was found that complexity has no relationship to productivity. Rather, it was found to have a negative relationship with centralization and a positive relationship with formalization. On the basis of this evidence, it would appear that the less well trained the staff member, the more direction needed in decision making within an educational organization.

Additionally, a greater level of complexity within an organization was found to lead to a greater degree of formalization with reference

to job specialization. There were at least eight measurable levels of organizational specialties involved in the Adult Basic Education programs in the present study (Appendix L, Item 2). Hence, it would appear that a more highly specialized staff will result in a greater degree of job codification.

Since a higher level of formalization within an organization was shown to lead to a lower level of job satisfaction, from an administrative standpoint what may make the most sense is to concentrate on influencing the other management variables present in this study in order to increase program productivity.

4. Job Satisfaction and Production. The findings of this study indicated that in matters pertaining to working conditions and supervision, a satisfied staff is a more productive one. "Job satisfaction is a summary measure of many aspects associated with the job, including salary, pace of work, freedom of movement, hours, company regulations and so forth" (Hage and Aiken, 1970:27). In this study job satisfaction was the most consistent indicator of productivity.

Although Hage (1965) wrote that studies of morale and volume of production have produced conflicting results, this study suggests that in matters pertaining to education, administrators would do well to pay attention to factors that increase staff morale, for that is one clear path to increasing program productivity.

Recommendations

Several recommendations are proposed as a result of this study.

1. That efforts be made to create a new program reporting procedure which would be more responsive to the measurement of program productivity in Adult Basic Education programs.
2. That efforts be made to expand the scope of the productivity index utilized by Adult Basic Education programs from one which measures only reading and mathematics scores to one which incorporates the additional subject matter taught by Adult Basic Education programs.
3. That the additional variables of efficiency, stratification, and adaptability from Hage and Aiken's original study be included in future research in order to gain a broader understanding of program productivity.
4. That this study be replicated within another geographical section of the United States or perhaps even nationally in order to determine whether the findings can be generalized.
5. That this study be replicated, with appropriate adaptations, within other types of educational programs in order to provide staff with suitable methods of increasing their program productivity and to help the public gain more efficient use of its tax dollars.

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APPENDICES

APPENDIX A

Major Propositions and Corollaries of Hage's TheoryMajor Propositions

- I. The higher the centralization, the higher the production.
- II. The higher the formalization, the higher the efficiency.
- III. The higher the centralization, the higher the formalization.
- IV. The higher the stratification, the lower the job satisfaction.
- V. The higher the stratification, the higher the production.
- VI. The higher the stratification, the lower the adaptiveness.
- VII. The higher the complexity, the lower the centralization.

Derived Corollaries

1. The higher the formalization, the higher the production.
2. The higher the centralization, the higher the efficiency.
3. The lower the job satisfaction, the higher the production.
4. The lower the job satisfaction, the lower the adaptiveness.
5. The higher the production, the lower the adaptiveness.
6. The higher the complexity, the lower the production.
7. The higher the complexity, the lower the formalization.
8. The higher the production, the higher the efficiency.
9. The higher the stratification, the higher the formalization.
10. The higher the efficiency, the lower the complexity.
11. The higher the centralization, the lower the job satisfaction.
12. The higher the centralization, the lower the adaptiveness.
13. The higher the stratification, the lower the complexity.
14. The higher the complexity, the higher the job satisfaction.
15. The lower the complexity, the lower the adaptiveness.
16. The higher the stratification, the higher the efficiency.
17. The higher the efficiency, the lower the job satisfaction.
18. The higher the efficiency, the lower the adaptiveness.
19. The higher the centralization, the higher the stratification.
20. The higher the formalization, the lower the job satisfaction.
21. The higher the formalization, the lower the adaptiveness.

Limits Proposition

- VIII. Production imposes limits on complexity, centralization, formalization, stratification, adaptiveness, efficiency, and job satisfaction.

Source: Gerald Hage, "An Axiomatic Theory of Organizations."
Administrative Science Quarterly 10:289-320, December, 1965.

APPENDIX B

Rate of Program Change and Other Organizational Properties

Pearson Product-Moment
Correlation Coefficients
of Each Organizational
Characteristic with Rate
of Program Change*

1. Degree of complexity
 - a) Measure of the number of occupational specialities..... .48
 - b) Measure of the amount of extra-organizational professional activity..... .37
 - c) Measure of the amount of professional training..... .14
2. Degree of centralization:
 - a) Measure of the degree of participation in organizational decision making..... .49
 - b) Measure of hierarchy of authority..... -.09
3. Degree of formalization:
 - a) Measure of the degree of job codification..... -.47
 - b) Measure of the degree of rule observation..... .13
4. Degree of satisfaction:
 - a) Measure of job satisfaction..... .38

*The measure of association reported here are Pearson product-moment correlation coefficients. The units of analysis in this report are the sixteen organizations in our study, not our 314 individual respondents. Product-moment correlation coefficients are highly sensitive to even slight modifications of numerical scores with so few cases. We rejected the use of non-parametric measures of association because our scales are lineal and not ordinal; non-parametric statistics necessitate our "throwing away" some of the magnitude of variations in our data. Since these sixteen organizations represent a universe of organization, tests of statistical significance are inappropriate.

(Gerald Hage and Michael Aiken. "Program Change and Organizational Properties: A Comparative Analysis." American Journal of Sociology 2:503-519, March, 1967.)

APPENDIX C

83

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE OFFICE OF EDUCATION WASHINGTON, D.C. 20202 ADULT EDUCATION ANNUAL PERFORMANCE REPORT	PERIOD COVERED		FORM APPROVED O.M.B. NO. 51-R1052 DATE OF REPORT 9/15/77
	From	TO	
	7/1/76	6/30/77	
	State	Oregon	

INSTRUCTIONS

The principal purpose of the report is to allow States to make better use, for planning purposes, of information found in the six tables. The report has several other purposes at the Federal level. It serves the Office of Education by providing a standardized data-collection format for use by all States. The collected information is used to publish reports and respond to inquiries. More importantly, the report is used as a program tool for the Office of Education to assess the impact of adult education at the State, Regional and National levels. Such information provides a basis for changes in National policy, redirection of resources, and provision of various forms of assistance to States.

The first table is concerned with various characteristics of the population served, the second table with instructional levels and participant separations, the third table with number of participants by location of classes and number of day and evening classes by location. The fourth table is related to staffing patterns of paid State and local

personnel and the amount of program-related training in which they are participating. The last tables are concerned with impact of the adult education program.

The new alignments of data in the tables permit the State Administrator to look at the overall performance of the State program. For this report to be of maximum value to both State and Federal program officials it is better that figures which are considered unreliable not be included in the report. *(Where no reliable figures are available, no appropriate spaces in the reporting tables should be lined through*

To make the best possible use of this information system the State Administrator should insist upon timely and accurate reporting of data from local jurisdictions. For Federal purposes, a signed original and two copies of the report should reach the HEW Regional Office no later than October 1.

TABLE 1. NUMBER OF PARTICIPANTS BY RACE, SELECTED ETHNIC GROUPS, AGE AND SEX

AGE (a)	AMERICAN INDIAN OR ALASKAN NATIVE		BLACK		ASIAN OR PACIFIC ISLANDER		HISPANIC		OTHER INDIVIDUALS NOT INCLUDED IN COLS. (b) thru (i)		TOTAL Cols. (b) thru (k)
	Male (b)	Female (c)	Male (d)	Female (e)	Male (f)	Female (g)	Male (h)	Female (i)	Male (j)	Female (k)	(L)
1. 16-44	215	273	198	200	378	520	451	367	4,679	5,532	12,813
2. 45-64	12	12	14	18	59	82	37	57	323	524	1,138
3. 65 plus	3	1	3	0	8	8	12	5	66	59	163
4. TOTAL	230	286	215	218	445	610	500	429	5,068	6,115	14,114

TABLE 2. PARTICIPANT PROGRESS AND SEPARATION DATA BY INSTRUCTIONAL LEVEL
PART A. NUMBER OF PARTICIPANTS

INSTRUCTIONAL LEVEL (a)	TOTAL NUMBER OF ENROLLEES (Unduplicated count) (b)	NUMBER COMPLETED EACH LEVEL (Unduplicated count) (c)	NUMBER SEPARATED FROM EACH LEVEL (Unduplicated count) (d)	
1. Level I	2,749	1,232	1,517	
2. Level II	5,146	2,179	2,967	
3. Ungraded	6,219	2,450	3,769	
4. TOTAL	14,114	5,861	8,253	

PART B. REASONS FOR SEPARATION (Give the number of separations)

1. To take a job (unemployed when entered program)	701	8. Because of child care problems	196
2. To take a better job (employed when entered program)	168	9. Because of family problems	253
3. To enter another training program	479	10. Because of time class/program is scheduled	201
4. Met personal objective	893	11. For other known reasons (Specify)	8,698
5. For lack of interest	403	End of Year or completed program	
6. Because of health problems	209	12. For unknown reasons	1,648
7. Because of transportation problems	265	13. TOTAL	14,114

TABLE 3. NUMBER OF PARTICIPANTS AND NUMBER OF DAYTIME AND EVENING CLASSES BY TYPE OF LOCATION

LOCATION OF CLASSES (a)	NUMBER OF PARTICIPANTS (b)	NUMBER OF DAYTIME CLASSES (c)	NUMBER OF EVENING CLASSES (d)	NUMBER OF SITES OPERATING FULL-TIME PROGRAMS (25 hours or more) (Unduplicated count) (e)
SCHOOL BUILDING				
1. a. Elementary/ Junior	1,020	3	18	NOT AVAILABLE FOR 76-77 REPORT
b. Secondary	741	1	63	
c. Community College (Junior College, Technical Institute, etc.)	6,112	82	110	
2. Learning Center	4,159			
3. Correctional Institute	273	6	2	
4. Hospital	36	7	--	
5. Work Site	213	8	3	
OTHER LOCATIONS				
6. a. 4 Year Colleges	1,560	18	20	
b. Homes or Homebased				
c. State/local Institutions for the Handicapped				
d. Other				
7. TOTAL	14,114	125	216	

TABLE 4. NUMBER OF PAID PERSONNEL, BY LOCATION AND TYPE OF EMPLOYMENT, AND BY AMOUNT OF TRAINING
(NOTE: Include in this table information for only those persons who are paid from funds granted under the Adult Education Act. Please specify the various formulas or methods used in each of the categories. Use a separate sheet of paper and attach.)

ORGANIZATIONAL PLACEMENT AND TYPE OF JOB PERFORMED (a)	PAID ADULT EDUCATION PERSONNEL					
	TOTAL NUMBER OF PERSONNEL (b)	EQUIVALENT NUMBER OF FULL-TIME PERSONNEL (c)	NO. TAKING TRAINING (d)			
1. State Level Administrative & Supervisory Personnel	1	1	1			
2. Local Administrative and Supervisory Personnel	22	11	14			
3. Local Teachers	228	61	214			
4. Local Counselors	18	9	5			
5. Local Paraprofessionals	64	17	49			
6. TOTAL	333	99	283			

TABLE 5. STATE ADULT EDUCATION PROGRAM IMPACT DATA

PERSONS WHO—	NO. OF PERSONS	PERSONS WHO—	NO. OF PERSONS
1. Are enrolled in an urban Adult Basic and Secondary Education Program (Community Population over 100,000)	6,040	12. Were removed from public assistance rolls	392
2. Are enrolled in a rural Adult Basic and Secondary Education Program (Community population under 2,500)	1,863	13. Obtained jobs as a result of experience gained in program	819
3. Are on waiting lists to enter program	98	14. Changed to or were upgraded to a better job as a result of experience in program	218
4. Completed Adult Basic and Secondary Education Program through eighth grade	1,973	15. Registered to vote for the first time	404
5. Enrolled in Adult Secondary Education after completing Adult Basic Education	310	16. Received U.S. citizenship	196
6. Passed general education development test	1,522	17. Received driver's license	202
7. Graduated from Adult Secondary Education after starting in Adult Basic Education	252	18. Received training in completing income tax forms	853
8. Enrolled in other education/training program (Employee development, community college, junior college, four-year college, business or technical institute, correspondence, other Federal, State or local manpower program as a result of experience in program)	1,231	19. Are enrolled in Adult Basic Education Programs that were established for institutionalized persons	570
		20. Separated from Adult Basic Education Programs that were established for institutionalized persons	570*
		21. Are enrolled in Adult Secondary Education Programs that were established for institutionalized persons	105
9. Are enrolled in program who are employed	4,691	22. Separated from Adult Secondary Education Programs for institutionalized persons	105*
10. Are enrolled in program who are unemployed	8,635	23. Are enrolled in programs for persons of limited English-speaking ability	2,668
11. Are enrolled in program who are receiving public assistance	2,952	24. Separated from programs for persons of limited English-speaking ability	2,668*

TABLE 6. MONITORING OF PROJECTS FUNDED UNDER SECTION 306(a)(4) AND SECTION 309 OF THE ADULT EDUCATION ACT

	TOTAL (a)		SECTION 306(a)(4) OF THE ADULT EDUCATION ACT						SECTION 309(1) AND (2) OF THE ADULT EDUCATION ACT			
			SPECIAL PROJECTS (b)		TEACHER TRAINING (c)		RESEARCH (d)		SPECIAL PROJECTS (e)		TEACHER TRAINING (f)	
1. Total number of active projects during the fiscal year								3		9		4
2. Total number of projects whose results were disseminated								3		9		4
3. Total number of persons served								NA		300		400
a. State and local personnel								NA		16,000		200
b. Students								NA		16,000		200
4. Total number of projects visited in fiscal year and total number of visits	Projects Visited	No. of Visits	Projects Visited	No. of Visits	Projects Visited	No. of Visits	Projects Visited	No. of Visits	Projects Visited	No. of Visits	Projects Visited	No. of Visits
a. By State staff or consultants							3	6	9	35	4	12
b. By members of State Advisory Council, if in operation							3	4	9	10	4	4

*All students are "separated" at end of each school year

Clifford C. Norris
State Director

- 3 -

Signature

Date

APPENDIX D

Demographic Data: Age

<u>Category</u>	<u>Number</u>	<u>Percent</u>
22 and below	11	5.5
23-29	52	26.1
30-44	93	46.7
45-59	35	17.6
60+	<u>8</u>	<u>4.0</u>
Total	199	100%

APPENDIX E

Demographic Data: Sex

<u>Category</u>	<u>Number</u>	<u>Percent</u>
Male	55	27.6
Female	<u>144</u>	<u>72.4</u>
Total	199	100%

APPENDIX F

Demographic Data: Position

<u>Category</u>	<u>Number</u>	<u>Percent</u>
Administrator	18	9.0
Counselor	6	3.0
Full-time Teacher	35	17.6
Part-time Teacher	79	39.7
Teacher Aide	43	21.6
Counselor Aide	3	1.5
Clerical Aide	12	6.0
Volunteer Tutor	2	1.0
Administrator-Teacher	<u>1</u>	<u>.5</u>
Total	199	100%

APPENDIX G

Demographic Data: Educational Attainment

<u>Category</u>	<u>Number</u>	<u>Percent</u>
High School Diploma	38	19.1
G.E.D.	12	6.0
Associate Degree	15	7.5
Baccalaureate	12	6.0
Baccalaureate & Hours	70	35.2
Master's Degree	13	6.5
Master's + Hours	38	19.1
Doctorate	<u>1</u>	<u>.5</u>
Total	199	100%

APPENDIX H

Demographic Data: Location

<u>Category</u>	<u>Number</u>	<u>Percent</u>
C.C. - Main Campus	60	30.2
C.C. - Satellite	36	18.1
Jr-Hi School Building	16	8.0
Elementary Building	15	7.5
Correctional Institute	3	1.5
Main Campus-Satellite	11	5.5
Main Campus-H.S. Bldg.	3	1.5
Main Campus-Elementary	3	1.5
Other	<u>52</u>	<u>26.1</u>
Total	199	100%

APPENDIX I

Demographic Data: Experience

<u>Category</u>	<u>Number</u>	<u>Percent</u>
Less than 1 year	32	16.1
1-2 Years	43	21.6
3-5 Years	69	34.7
6-9 Years	38	19.1
10-19 Years	13	0.5
20 Years+	<u>4</u>	<u>2.0</u>
Total	199	100%

APPENDIX J

Adult Basic Education Jury Panel
Adult Education Department
Oregon State University

Name	Institution	Title
Linda Oldenkamp	Clatsop Community College	Director
Alan Meyer	Southwestern Oregon Community College	Director
Alta Abrams	Umpqua Community College	Teacher
Carolyn McCord	Rogue Community College	Director
Michael St. John	Portland Community College	Teacher
Gail Hemsoth	Lane Community College	Teacher
Pat Amsberry	Blue Mountain Community College	Director
Mel Gilson	Linn-Benton Community College	Teacher



School of Education

APPENDIX K

Corvallis, Oregon 97331

December 1, 1978

Dear Colleague,

When I made the decision to leave my job as an instructor and coordinator of Adult Basic Education programs at Mt. Hood Community College to return to school, I decided that any research I did would be directed toward improving my ability to function as a staff member when I returned to A.B.E.

One of the questions that has always fascinated me with regard to Adult Basic Education programs is: Do the operational policies and procedures of an A.B.E. program have any effect on the productivity of that program in terms of student growth? I would like to seek your help in looking at that question. I've designed a brief questionnaire which should take you ten minutes or less to complete. I believe it will provide the kind of information that is necessary in order to explore this question in depth.

You should know that the questionnaire will be confidential in all respects; and, although the research findings will be available to all participants, the identity and remarks of all respondents will remain totally anonymous.

Thank you for contributing to this research activity.

Sincerely yours,

Ellen West
Research Associate
Adult Education

APPENDIX L

Oregon State University
Adult Education Department
Adult Education Questionnaire

Instructions: This questionnaire is divided into two parts:

Part I consists of questions which ask for personal information. Place a check in the space that best corresponds to your reaction to the question.

Part II consists of questions which concern your job. You will be asked to select your answer from a wide range of responses: "always" to "never"; "strongly agree" to "strongly disagree"; and "very satisfied" to "very dissatisfied." Place a check in the space that best corresponds to your reaction to the question.

Thank you for taking the time to complete this questionnaire.

Part I

1. Your age:

___ 22 or below ___ 23-29 ___ 30-44

___ 45-59 ___ 60 or over

2. Your position:

___ Director/Coordinator ___ Counselor

___ Full-time Teacher ___ Part-time Teacher

___ Teacher Aide ___ Counselor Aide ___ Clerical Aide

___ Volunteer Tutor

3. Your highest degree attained:

___ H.S. degree ___ G.E.D. ___ Associate degree

___ Bachelor's degree ___ B.A. + hours

___ Master's degree ___ M.A. + hours ___ Doctor's degree

4. The location(s) of your teaching assignment:
- ____ Community College - Main Campus
- ____ Community College - Satellite Center
- ____ Junior High or High School Building
- ____ Elementary School Building
- ____ Correctional Institute ____ Other
5. Your years of experience teaching adults:
- ____ Less than one year ____ 1-2 years ____ 3-5 years
- ____ 6-9 years ____ 10-19 years ____ 20 years or more
6. Your sex:
- ____ Male ____ Female
7. How many professional organizations are you a member of (including associate memberships)?
- ____ None ____ 1 ____ 2 ____ 3 ____ 4 or more
8. In the past three years, how many offices in professional organizations have you held (including committee chairmanships)?
- ____ None ____ 1 ____ 2 ____ 3 ____ 4 or more
9. In the past three years, how many presentations have you made at professional organization meetings?
- ____ None ____ 1 ____ 2 ____ 3 ____ 4 or more
10. In the past three years, how many presentations have you made at in-service workshops?
- ____ None ____ 1 ____ 2 ____ 3 ____ 4 or more
11. In the past three years, how many professional organization meetings have you attended?
- ____ None ____ 1 ____ 2 ____ 3 ____ 4 or more

12. In the past three years, how many of your articles have been published in journals, newsletters, or other professional publications?

____ None ____ 1-3 ____ 4-6 ____ 7-9 ____ 10 or more

Part II

The following questions in Part II deal with how you feel about your job. Please select your answer to each question from the range of responses: "Always" to "Never." Place a check in the space that best corresponds to your reaction to the question.

	Always	Often	Sometimes	Seldom	Never
13. How frequently do you have the opportunity to participate in the decisions to hire new staff?	_____	_____	_____	_____	_____
14. How frequently do you have the opportunity to participate in the decisions on the promotion of the professional staff?	_____	_____	_____	_____	_____
15. How frequently do you have the opportunity to participate in the development of new policies?	_____	_____	_____	_____	_____
16. How frequently do you have the opportunity to participate in decisions on the adoption of new policies?	_____	_____	_____	_____	_____
17. How frequently do you have the opportunity to participate in the decisions on the adoption of new programs?	_____	_____	_____	_____	_____

Now select your answer to each question from the range of responses: "Strongly Agree" to "Strongly Disagree." Place a check in the space that best corresponds to your reaction to the question.

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
18. People who work here are allowed to do almost as they please.	_____	_____	_____	_____	_____
19. Supervisors must approve decisions before action can be taken.	_____	_____	_____	_____	_____
20. Most people who work here make their own rules on the job.	_____	_____	_____	_____	_____
21. The limits of my decision-making authority are well defined.	_____	_____	_____	_____	_____
22. People who work here feel as though they are being watched to see that they obey all the rules.	_____	_____	_____	_____	_____
23. Independent decision making is generally discouraged.	_____	_____	_____	_____	_____
24. Employees who work here are constantly being checked for rule violations.	_____	_____	_____	_____	_____
25. Small matters must be referred to my supervisor for final answers.	_____	_____	_____	_____	_____
26. How things are done is left up to the person doing the work.	_____	_____	_____	_____	_____

	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
27. Personnel are encouraged to confer with supervisors before action is taken on most items.	_____	_____	_____	_____	_____
28. I feel that I am my own boss in most matters.	_____	_____	_____	_____	_____
29. People who work here can make their own decisions without checking with anybody else.	_____	_____	_____	_____	_____

Finally select your answer to each question from the range of responses: "Very Satisfied" to "Very Dissatisfied." Place a check in the space that best corresponds to your reaction to the question.

	Very Satisfied	Satisfied	Uncertain	Dissatisfied	Very Dissatisfied
30. How satisfied are you that your immediate supervisor has given you enough authority to do your job well?	_____	_____	_____	_____	_____
31. How satisfied are you with your present job when you compare it to similar positions in the state?	_____	_____	_____	_____	_____
32. How satisfied are you with the progress you are making toward the goals which you set for yourself in your present position?	_____	_____	_____	_____	_____

	Very Satisfied	Satisfied	Uncertain	Dissatisfied	Very Dissatisfied
33. How satisfied are you that your superior accepts your position, education, and experience as evidence of your ability?	_____	_____	_____	_____	_____
34. How satisfied are you with your present job when you consider the expectations you had when you took the job?	_____	_____	_____	_____	_____
35. How satisfied are you with your present job in the light of your career expectations?	_____	_____	_____	_____	_____
36. How satisfied are you with your supervisor?	_____	_____	_____	_____	_____
37. How satisfied are you with your co-workers?	_____	_____	_____	_____	_____