PRODUCTIVITY AND OTHER PERFORMANCE MEASURES IN COLLEGE AND UNIVERSITY FOODSERVICE

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TABLE OF CONTENTS

Chapter Page

I. INTRODUCTION....1

Purpose of the Research....2
Objectives of the Study....2
Hypotheses of the Study....4
Assumptions and Limitation of the Study....8
Definition of Terms....9

II. REVIEW OF LITERATURE....11

Introduction....11
Productivity....12
Effectiveness....17
Quality....21
Efficiency....28
Quality of Work Life....29
Innovation....35
Profitability....39
Summary....43

III. METHODS....45

Introduction....45
Research Design....45
Population....46
Data Collection....46
The Instrument....46
Distribution Procedure....48
Data Analysis....48

IV. RESULTS AND DISCUSSION....50

Characteristics of Survey Participants....50
Age and Years of Education....50
Years of Experience and Salary....51
Position Title and Productivity Training....51
ADA Registration and Route to ADA....54
Characteristics of the Institutions....54
Type of Foodservice System and Contracted Foodservice....54
Offsite Meal Distribution....56
Number of Meals Served Daily....56

Chapter Page

Performance Criteria....57
Productivity....57
Inputs....57
Outputs....65
Ratios and Indexes Used to Assess Productivity....69
Discussion of Productivity....73
Inputs....73
Outputs....74
Ratios and Indexes....75
Effectiveness....76
Discussion of Effectiveness....84
Quality....86
Discussion of Quality....104
Efficiency....105
Discussion of Efficiency....110
Quality of Work Life....111
Discussion of Quality of Work Life....121
Innovation....123
Discussion of Innovation....131
Profitability....133
Discussion of Profitability....142
Performance Criteria Ranking by Time Spent and Importance....144
Hypotheses Testing....146

V. SUMMARY, RECOMMENDATIONS, AND IMPLICATIONS....152

Introduction....152
Description of the Sample....153
Performance Criteria....154
Recommendations....161
Questionnaire....161
Recommendations Based on the Results of the Study....162
Implications....163

BIBLIOGRAPHY....165

APPENDIX A - CORRESPONDENCE....173

APPENDIX B - RESEARCH INSTRUMENT....176

APPENDIX C - CHI SQUARE TABLES....186

LIST OF TABLES

Table		Page
I.	Annual Salary Earned by Respondents	53
II.	Significant Associations Found in Productivity Controls	58
III.	Significant Associations Found in Effectiveness Controls	77
IV.	Significant Associations Found in Quality Controls	88
V.	Significant Associations Found in Efficiency Controls	107
VI.	Significant Associations Found in Quality of Work Life Controls	112
VII.	Significant Associations Found in Innovation Techniques	124
VIII.	Significant Associations Found in Profitability Controls	135

LIST OF FIGURES

Figure — Page

1. Relationship Between Three Conceptualizations of Organizational Systems Performance Criteria.....3

2. Years of Experience in Foodservice Management.....52

3. Route to ADA Membership.....55

4. Performance Criteria Ranking.....145

CHAPTER I

INTRODUCTION

American managers have become more aware of the necessity of improving productivity (Brayton, 1983), but at the same time realize their inadequacy to define, measure, analyze, and manage it (Sink, 1983). A study by Sumanth (1981) revealed that less than 3% of United States businesses have systems or tools for measuring total productivity. According to Mundel (1976),

> If we are to measure improvement, we must have a datum from which to measure our progress. We measure productivity as a prelude to enhancing it. (p.24).

According to Sink (1983), productivity is only one of seven measures of organizational performance, the other six include: efficiency, effectiveness, quality, quality of work life, profitability, and innovation. Drucker (1954) lists organizational evaluations and controls as: customer satisfaction, social responsibility, employee performance, management, performance, internal productivity, employee attitude, management development, operating budget, and innovation. Peters and Waterman (1982) termed organizational performance criteria by the following phrases: stick to

the knotting, have a bias for action, stay close to the customer, hands-on valued driven approach, simple form-lean staff, productivity through people, and automony-entrepeneurship. Figure 1 illustrates the relationships between these three conceptualizations of organizational systems performance criteria.

Robertson (1982), whose research was the first in a series of foodservice productivity studies conducted by Oklahoma State University's Department of Food, Nutrition, and Institution Administration, found that many dietitians and supervisors tended to use surrogate measures of productivity, indicating criteria such as quality of work life, efficiency, or effectiveness.

Purpose of the Research

To continue foodservice productivity studies conducted by Oklahoma State University's Food, Nutrition, and Institution Administration Department, productivity ratios and indexes used by dietitians with management responsibilities in college and university foodservice will be investigated along with the extent of their use. Methods of measuring the other six organizational performance criteria as listed by Sink (1983) will also be analyzed.

Objectives of the Study

The objectives of this research are:

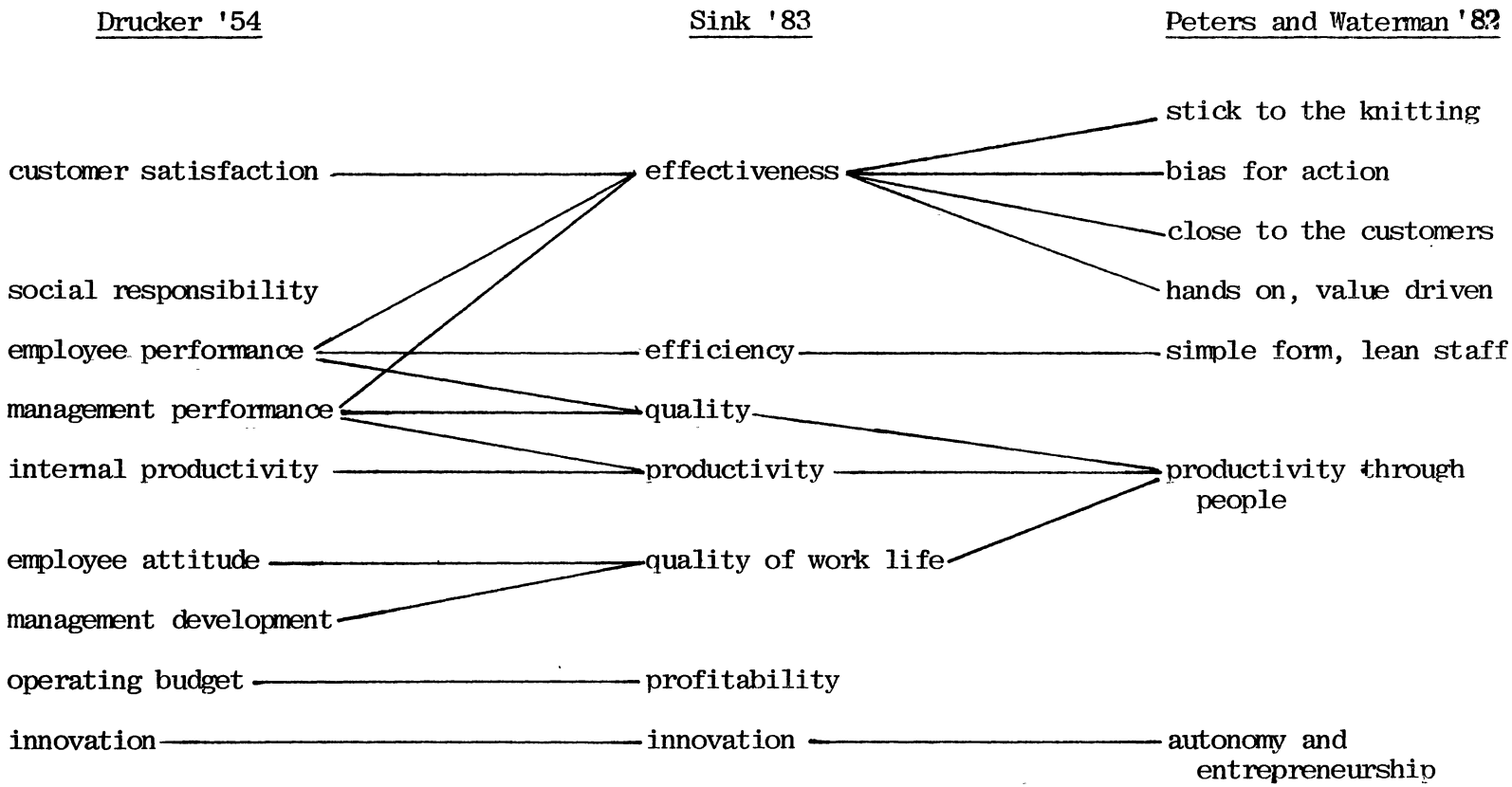


Figure 1. Relationships Between Three Conceptualizations of Organizational Systems Performance Criteria

1. Identify current performance measures being used by dietitians in college and university foodservice systems.

2. Determine importance placed on the criteria and the amount of time spent in evaluating them.

3. To aid in further establishment of performance criteria standards for foodservice systems.

4. To formulate suggestions as to how these standards may be used by dietitians in college and university foodservice.

Hypotheses of the Study

The hypotheses postulated for this study are:

H1 - There will be no significant difference in the control outputs and control inputs used by dietitians in college and university foodservice based on selected personal variables:

a. age
b. years of education
c. position title
d. registration status
e. route to ADA membership
f. annual salary
g. number of years experience
h. training in productivity measurement

H2 - There will be no significant difference in the control outputs and control inputs used by dietitians in

college and university foodservice based on selected institutional variables:

a. type of foodservice system utilized

b. number of meals served per day

c. preparing meals for sites other than regular foodservice

d. contracting the foodservice to a foodservice management company

H3 - There will be no significant difference in the productivity ratios used by dietitians in college and university foodservice based on selected personal variables as stated in H1.

H4 - There will be no significant difference in the productivity ratios used by dietitians in college and university foodservice based on selected institutional variables as stated in H2.

H5 - There will be no significant difference in the effectiveness measures used to evaluate goal attainment by dietitians in college and university foodservice based on selected personal variables as stated in H1.

H6 - There will be no significant difference in the effectiveness measures sued to evaluate goal attainment by dietitians in college and university foodservice based on selected institutional variables as stated in H2.

H7 - There will be no significant difference in the quality control measures used by dietitians in college and

university foodservice based on personal variables as stated in H1.

H8 - There will be no significant difference in the quality control measures used by dietitians in college and university foodservice based on the institutional variables as stated in H2.

H9 - There will be no significant difference in the type of resources controlled used to monitor efficiency by dietitians in college and university foodservice based on selected personal variables as stated in H1.

H10 - There will be no significant difference in the type of resources controlled used to monitor efficiency by dietitians in college and university foodservice based on selected institutional variables as stated H2.

H11 - There will be no significant difference in the QWL measurements used by dietitians in college and university foodservice based on the personal variables as stated in H1.

H12 - There will be no significant difference in the QWL measurements used by dietitians in college and university foodservice based on the institutional variables as stated in H2.

H13 - There will be no significant difference in the rewards linked with performance measures used by dietitians in college and university foodservice based on personal variables as stated in H1.

H14 - There will be no significant difference in the rewards linked with performance measures used by dietitians in college and university foodservice based on institutional variables as stated in H2.

H15 - There will be no significant difference in the innovation techniques used by dietitians in college and university foodservice based on personal variables as stated in H1.

H16 - There will be no significant difference in the innovation techniques used by dietitians in college and university foodservice based on institutional variables as stated in H2.

H17 - There will be no significant difference in the processes, methods, products or technology used within the last three years by dietitians in college and university foodservice based on personal variables as stated in H1.

H18 - There will be no significant difference in the processes, methods, products or technology used within the last three years by dietitians in college and university foodservice based on institutional variables as stated in H2.

H19 - There will be no significant difference in profitability control measures used by dietitians in college and university foodservice based on selected personal variables as stated in H1.

H20 - There will be no significant difference in

profitability control measures used by dietitians in college and university foodservice based on selected institutional variables as stated in H2.

H21 - There will be no significant difference in meal prices used by dietitians in college and university foodservice based on selected personal variables as stated in H1.

H22 - There will be no significant difference in meal prices used by dietitians in college and university foodservice based on selected institutional variables as stated in H2.

Assumptions and Limitation of the Study

The following assumptions are identified for this study:

1. Dietitians surveyed have adequate knowledge of performance measures, and will respond to the questions objectively.

2. Performance assessment will be among the duties of the respondent in his/her position.

3. Membership in the American Dietetic Association and the practice group, Dietitians in College and University Foodservice are not mutually exclusive.

There is one limitation of this study: only members of the ADA practice group, Dietitians with management responsibilities in College and University Foodservice will be

surveyed, therefore, the results can only be generalized to this group.

Definition of Terms

The following definitions were accepted for this study:

Effectiveness. The degree of achievement of objectives (Smalley and Freeman, 1966).

Efficiency. Resources expected to be consumed divided by resources actually consumed (Sink, 1983).

Innovation. Deliberate, novel, specific change aimed at accomplishing the goals of the system more effectively (Mueller, 1971).

Multifactor Productivity Ratio. A productivity ratio which includes some or all of the outputs and some of the inputs (Swaim and Sink, 1983).

Partial Factor Productivity Ratio. A productivity ratio which includes some or all of the outputs and only one type of input (Swaim and Sink, 1983).

Performance. Measures of organizational performance are primarily comprised of seven criteria: efficiency, effectiveness, quality, quality of work life, innovation, profitability, and productivity (Swaim and Sink, 1983).

Productivity. The ratio of quantities of outputs to quantities of inputs (APC, 1979).

Productivity Index. Successive productivity measurements, usually in the form of the percentage difference

between the measurements for two periods (Swaim and Sink, 1983).

Productivity Measurement. Consists of the selection of physical, temporal, and/or perceptual measures for both input variables and output variables and the development of a ratio of output measure(s) to input measure(s) (Sink, 1980).

Productivity Ratio. A static ratio referring to a particular period of time (Swaim and Sink, 1983).

Profitability. The earned return on investment (owner equity) or the return on all things a business owns (Rausch, 1982) or the relationship of revenue to cost.

Quality. The degree to which the system conforms to specifications (Sink, 1983), or at the consumer level, fitness for use.

Quality of Work Life. Work with meaning (Mali, 1978) or the degree to which work provides an opportunity for an individual to meet a variety of personal needs, to survive with security, to interact with others, to feel useful, to be recognized for achievement, and to have an opportunity to improve one's skill and knowledge (Lippitt, 1978).

Surrogate Productivity Measures. Substitute performance measures which are highly correlated with productivity (Swaim and Sink, 1983).

Total Factor Productivity Ratio. A ratio which includes all output measures and all input measures (Sink, 1980).

CHAPTER II

REVIEW OF LITERATURE

Introduction

According to Nash (1983), the word perform means to do, or to accomplish a task, and in Drucker's (1974) view, the primary function of management is to make the organization perform. Organizational performance is dependent on control measures from which management can plan their business strategies and make forecasts. There is confusion, however, among the business community concerning the definitions of specific performance criteria and the corresponding control measures. In order for a control measure to be meaningful, it must measure the performance criteria that it is intended to. Drucker listed the following seven specifications that controls must meet in order to aid management:

1. Control is a principle of economy: the less effort that is needed to obtain control, the better the design, and also fewer controls are more effective than many.

2. Controls must be meaningful; they must measure significant events.

3. Controls have to be appropriate: they must

represent the performance criteria in a structurally true form.

4. Measurement must be congruent with the events measured: the outcome values must be interns that most accurately describe the quantity assigned to each criteria.

5. Controls must be timely; they must correspond to the time span of the event that is measured.

6. Measurement controls need to be simple, otherwise they will be confusing and misdirected, leading to unnecessary expense.

7. Controls have to be operational, reaching the individual who is capable of taking controlling action.

Sink (1983) listed seven organizational performance criteria by which to categorize and develop control measures. The seven criteria include: effectiveness efficiency, innovation, quality, quality of work life, productivity, and profitability. The criteria are interrelated and the identification if each helps to clarify the measurement process somewhat. Included in this chapter is the definition and discussion of each performance criteria.

Productivity

Total factor productivity of the United States rose at a 3% rate from 1948 to 1965 and declined to 2.1% between 1965 and 1973. During the 1973 energy crisis and the 1974-75 recession, total factor productivity declined to

0.2%, and in 1978-79, it hit an all time low of 0.9% (Grossman, 1980). This slowdown in productivity has served to increase the awareness of United States business leaders. If the Gross National Product decreases, there are less goods and services to divide up among the people, which will result in a lower standard of living (Boss and Shuster, 1981). The decline in our nation's output of goods and services has been caused by a number of factors. According to Thurow (1984), America's main productivity problem lies among managers and their supporting staff.

There are too many white collar workers who are performing their jobs inefficiently. Boss and Shuster (1981) reported that the productivity rate in food service is at 45%, one of the lowest in all businesses and industry. Freshwater and Bragg (1975) suggested that this low productivity rate is due to the fact that the majority of foodservice managers do not understand what a standard productivity measure is nor how to use it. They also pointed out that since this industry is labor intensive, scheduling problems, which are management's responsibility have caused many financial collapses. Magill (1973) also identified employee downtime, poor kitchen design, poor motivation, inadequate incentives, and sloppy hiring practices as contributing causes to the low rate of productivity.

Mali (1978) defined productivity as reaching the

highest level of performance with the least expenditure of resources. This performance criteria can also be thought of as how much output is produced compared to how much input is required for production, where making more for less is the objective (Boss and Shuster, 1981). Stein (1979) stated that productivity is a rough measure of the effectiveness with which we use out most valuable resource-labor. The definition of productivity accepted for this study, however, is simply outputs/inputs (APC, 1979).

According to Sink (1980), an effective productivity measurement system should tell management something they don't know, point to the direction of productivity improvement, and confirm when the improvements are effective. As with any organizational improvement program, the first step is to identify precise, accurate measurements which specify the unit of analysis,and should be done by key individuals in management. There are three types of productivity measures: a ratio which compares outputs to inputs, an index which is a ratio divided by the same ratio from another time period, and surrogate measures which are not actually productivity measures but are closely correlated.

Theoretically, a productivity ratio should consist of all organizational outputs divided by all inputs, but a partial productivity measure (the ratio of outputs to one input) is very useful in that it allows management to assess the rate of each individual input. In the labor intensive

foodservice industry, the standard unit of measure for employee production is man-hours or man-minutes and a partial productivity measure such as meals/labor hour provides management with the needed information to monitor one of its greatest inputs (Freshwater and Bragg, 1975). Other productivity measures used in foodservice today include: meals served/employee, sales/man hours, sales/food cost, and surrogate indicators such as turnover, absenteeism, and tardiness. Productivity measurement can be viewed as a yardstick that can gauge management's competence and allow comparison between management of different units within the organization and also with competitors (Drucker, 1974).

Productivity improvement must be viewed as a continuous objective where all members of the organization accept responsibility and management recognizes the fact that there is always room for improvement (Tate, 1984). Productivity improvements can be done by improving the blend of labor, capital, raw materials, and increasing the motivation or skill of the worker. Wise (1980) identified three basic groups for productivity improvement as: work simplification; major procedural changes such as information systems; and major structural changes such as redefining market segments, or relocating. Thurow (1984) suggested that a high quality, well motivated work force that works together as a team will ultimately raise productivity. He also

identified other contributing factors as: long term investments, better job security, more education, and greater employee participation. Areas in the foodservice industry that can be manipulated in order to improve productivity include: the simplification of work processes through improvements in materials handling, standardization of menu items, off-premise preparation of food to reduce on-premise preparation time and employee hours, and innovation in food preservation methods and equipment (Carnes and Brand, 1977). Boss and Shuster (1981) identified other areas in foodservice for improvement such as: a motion-efficient layout of the facility's equipment, training for management and supervisors in time and motion principles, utilization of participative management techniques, documenting the program for productivity improvement, and extensive training of employees.

In order to be effective, a productivity improvement program must have the commitment of top management. Management should be sure that productivity measures are developed, accurate reports are generated regularly, follow-up actions are taken, and recognition given where productivity is successfully improved (White, 1979). Increasing productivity is a way of allowing people to spend more of their time the way they would like to by making accessible an increased standard of living, and providing more leisure time such as holidays, vacations, and early retirement.

Higher productivity can also provide resources for improving the quality of the environment (Stein, 1971).

Effectiveness

In 1957, Georgopoulos and Tannenbaum stated that organizational effectiveness was sometimes termed as organizational "success" or organizational "worth". They went ahead to define this performance criteria as the extent to which an organization fulfills its objectives, given certain resources and means, without depleting its resources or placing undue strain upon its members. Other definitions of effectiveness include: doing the right things (Drucker, 1974), the extent to which all forms of energic return to the organization are maximized (Friedlander and Pickle, 1968), and how well an organization acquires and utilizes its resources in a changing environment (Steers, 1975). The definition accepted for this study was: the degree of achievement of objectives (Smalley and Freeman, 1966).

According to Drucker (1974), effectiveness in an organization is the foundation of success. The organization must be effective in order to be successful, and after success has been achieved it must then, for survival purposes, direct its efforts towards efficiency. Effectiveness is a complex performance criteria and little research has been conducted in order to obtain a useful and valid set of effectiveness measures (Steers, 1975). Georgopoulos and

Tannenbaum (1957) found that effectiveness was often based on value judgements and/or surrogate measures such as : organizational productivity, net profit, the organization's success at expanding or maintaining itself, employee absenteeism, turnover, and commitment. These particular measures are what Steers (1975) termed univariate measures of effectiveness that represent an ultimate approach. Since there are a large number of variables that are capable of influencing an organization's effectiveness, it is difficult to defend the use of one variable as being a comprehensive or adequate effectiveness measure. Multivariate models, however, focus on relationships between variables as they jointly influence the organization's success. This type of effectiveness model is more comprehensive and flexible than the univariate model.

Selection of the appropriate evaluation criteria for organizational effectiveness depends, in part, on who is doing the evaluation and their particular frame of reference. Variables chosen as criteria of effectiveness must be consistent with organizational objectives (Georgopoulos and Tannenbaum, 1957). An organization should be oriented towards high output (both quantity and quality), able to change with the times, and preserve its resources. With these objectives in mind, Georgopoulos and Tannenbaum (1957) identified three general criteria for evaluating organizational effectiveness: organizational productivity,

organizational flexibility, and the amount of intraorganizational strain. Steers (1975) reviewed 17 multivariate models of organizational effectiveness in terms of their evaluation criteria and found little consistency among the criteria that were used for each model.

There are many ways of looking at the topic of effectiveness, most models found in the literature fall into one of three classifications: the goal achievement approach, the open systems approach, and the process and structure approach (Bluedorn, 1980). The goal achievement approach is the oldest, and most predominant theory in the field of effectiveness as can be seen by the commonly held definition - the degree to which an organization achieves its goals; hence the greater the degree of goal achievement, the more effective the organization is. The goal achievement approach sounds simple but gains in complexity when one considers that goals differ from one organization to the next. There are usually multiple goals within an operation, and many times these goals are in conflict with each other. Many organizational goals are of a general nature than specific, and do not take a time factor into consideration (Hall, 1980). Effectiveness in the short run may lead to disaster in the long run. In spite of the complexities, before beginning to evaluate effectiveness, one needs to have a clear understanding of the organization's goals and environment. The manager should keep in mind that in

business, 10 or 15 percent of the phenomena (products, customers, orders, markets) produce 80 to 90 percent of the results (Pareto Principle) (Drucker, 1974). With this principle in mind, the manager should channel his energy into developing the effectiveness of the small core of activities that produce the most results, and strive to bring the organization closer to its goals.

The open systems approach theorists would define effectiveness as the ability of an organization to obtain needed resources from the environment in order to sustain its functioning processes (Hall, 1980). This approach is based on the following basic premises: (1) an organization is a social entity, (2) this entity is located in an environment from which it must obtain scarce resources, (3) the value of these resources is determined by what they contribute to the organization's ability to act and function, (4) the organization must compete with others in the same business, and therefore, (5) the effectiveness of an organization is based on its ability to secure resources from its environment (Bluedorn, 1980). With this systems theory in mind, some researchers have made an effort to combine it with the goal achievement approach and define an organization's goals as: obtaining and maintaining both an adequate bargaining position, and optimal resources.

The structures and process theory is not yet well developed and its approach is directed towards the assumed

determinants of effectiveness rather than effectiveness itself (Hall, 1980, Bluedorn, 1980). Factors such as job satisfaction, absenteeism, turnover rate, availability of equipment, and programs offered are measured in order to determine the achievement of a goal but are not the actual goal.

Effectiveness can be viewed as a state which organizations strive to attain or as a dynamic process in which a social system is at work. No matter what concept of effectiveness is applied to an organization, the aim should be to achieve effectiveness in as efficient a way as possible. In distinguishing effectiveness from efficiency, Smalley and Freeman (1966) relate these two performance criteria to the concepts of production and productivity. Production and effectiveness refer to the output of a system whereas productivity and efficiency refer to the ratio of output over input (or results to costs). Going a step farther, they state that just as it is possible to achieve high production with low productivity, it is also possible to be effective without being efficient. Conversely, Drucker (1974) warns that even the most efficient business cannot survive if it is ineffective (doing the wrong things).

Quality

Until recently, American business has expressed little interest in the quality of its goods and services and has

placed more priority on cost reductions, prompt delivery, and production efficiency (Cole, 1981). The massive flow of Japanese products into our American marketplace has caught the attention of the management community and has stimulated a renewed interest in the quality of goods and services. Feigenbaum (1985) has identified three current characteristics of today's international marketplace. The first characteristic is that there is an ever increasing variety of the products and services being offered, therefore, a customer-selective buyers' market exists to an extent that has not been seen for many years. The second characteristic mentioned by Feigenbaum (1985) is that companies are developing and producing new products at a rapidly accelerating pace in order to appeal to the market before their competitors do. The third characteristic concerns the quality leader companies. It seems that quality leadership has no regional identity and the higher quality products are emerging in an increasingly international distribution pattern. Today's buyer will support the company that he or she perceives as offering the best quality product, regardless of regional origin.

Garvin (1984) has reported that in several surveys, American consumers have clearly stated that they are dissatisfied with the existing levels of quality and service of the products they purchase. In order for American businesses to not only survive, but grow, management must take a

second look at the meaning of quality and the effect it has on their company. Cole (1983) stated that a desirable management strategy is one of "competition through quality", which companies should incorporate into their basic management philosophy. The definition of quality accepted for this study demonstrates that quality can be defined on two levels: the degree to which the system conforms to internal specifications (Sink, 1983) or at the consumer level, fitness for use (Cole, 1981). Thurston (1985) described quality as producing products that will work for a reasonable amount of time, and feels that quality reflects how much the customer perceives his need, the product, and his expectations for the product to overlap. The following five approaches to defining quality were given by Garvin (1984). The transcendent approach philosophy suggests that quality cannot be specifically defined and can be recognized only through experience. The product based approach utilizes precise and measurable standards by which the product can be ranked in terms of quality. The user based approach refers to quality as being "in the eyes of the beholder" and the extent to which a product or service satisfies the consumer's needs determines the perception of quality. Conformance to requirements and making a product right the first time is how quality is viewed by the manufacturer based approach. The fifth approach to this performance criteria is the value-based approach where quality is defined in

terms of providing conformance at an acceptable price and/or cost.

McKinsey and Company did a study of excellent companies in the United States and found two quality related characteristics in common: dedication to high-quality products, and involvement of the entire work force in attaining quality (Pascarella, 1983). Pascarella also stated that quality requires a blending of scientific management techniques with human resources, of the tangible with the intangible. Quality can be viewed in many different ways, and when considering this particular performance criteria, one must recognize the difference between the service industry and manufacturing. In King's (1984) discussion of service quality, she identified five distinguishing characteristics of a service. A service company is in the business of selling an intangible product. The services offered to the public are not only intangible, but perishable, and must be provided on demand. Service delivery involves a carefully scheduled integration of the company's primary system and its support systems. Another characteristic of the service industry is that of immediacy; hotels and restaurants must perform in the presence of their guests and a substandard product may not be caught before it reaches the end user. The last characteristic discussed by King was amorphous: guests' expectations and standards are not always easy to identify and vary widely with personal

preference and mood.

The primary goal of a service organization should be to tailor its services according to the needs of its customers (Shaw and Capoor, 1979). Wyckoff (1984) suggested that the service company look at quality as the degree of excellence desired, and also the control of variability in achieving that excellence. In order to develop and maintain a quality reputation, a company should have a well organized, scientific approach to quality management (Scanlon and Hagan, 1983). Scanlon and Hagan (1983) listed three problems with using a quality control system in a service organization. The first obstacle is that managers in the service industry are usually unfamiliar with the value of quality control principles. An investment in this type of control program is usually viewed as an unnecessary expense with no regard to the positive effects. The third problem is that service personnel often do not really listen to customers and view their complaints as irritants rather than opportunities.

Quality control can be defined as the process by which conformance to standards is measured and any resulting difference is acted upon (Juran and Gryna, 1980). Implementation of a quality improvement control program should consist of the following events: management acceptance, establishment of quality standards, development and implementation of a quality measurement program, and feedback opportunity. Management may be more easily persuaded to

accept such a program if it is informed of the specific benefits that may result such as: improved image, improved productivity, reduced expenses, improved marketability, increased management of quality and quality costs, improved employee environment, and therefore, improved profitability (Scanlon and Hagan, 1983).

Once management has accepted the improvement program, quality standards must be developed. Such standards are needed for every department in an organization and the first step in developing these standards is to decide exactly what is intended to be delivered to the customer. Scanlon and Hagan (1983) suggested that standards be in the form of a product description or specification designed around what the customer wants and expects, and also considering the image management wishes to project. Wyckoff (1984), however, warned service organizations against over standardization of customer-employee relations as this could be the major differentiation between the choice of one service company over another.

Scanlon and Hagan (1983) listed three reasons why quality measurement should take place: to determine where the organization stands in relation to standards, to identify and justify needed improvements, and to establish a baseline for the measurement of progress. In foodservice organizations, internal quality is measured against predetermined standards. The Hazard Analysis Critical Control

Point (HACCP) system was developed for foodservices to provide quality control from the raw product to consumer evaluation (Bobeng and David, 1978). It is a preventative system designed to inform management of potential dangers so that corrective action can be taken and is designed around the critical food points: microbiology, sanitation, time-temperature, and employee cleanliness. On the consumer level, King (1984) reminds those dealing with quality measurement that the guests in a service organization are the only ones who really experience the operation's output, therefore, their evaluations are the most accurate measure of quality. Unsolicited comments in a service organization tend to be very biased and many unhappy customers will complain to their friends rather than to management (Wyckoff, 1984), therefore, a controlled sample of customer satisfaction is one of the most accurate measures of quality. To obtain the controlled sample, Ferderber (1981) suggested the use of a specifically designed questionnaire based on predetermined standards set by both management, and the health department.

Snyder (1983) defined quality assurance as the management process by which customer expectations are met without error every time. He goes on to say that quality assurance is a function of employees knowing exactly what to do and how to do it. Management must develop thinking employees who can understand quality control and make suggestions for

improvement (Wyckoff, 1984). Continuous feedback from customers and employees is essential in order for the service organization to perform its operations smoothly and provide quality assurance.

Efficiency

Management literature concerning the topic of efficiency tends to be generalized and not clear in definition. Systems for measuring efficiency are often misunderstood and can lead to complex problems. In many instances, value judgements based on profitability tend to form the grounds for management's evaluation of this performance criteria, and such personal opinion may not be backed up by any concrete data. One could consider a generic definition for the term efficiency as producing more goods via the use of a better, faster, and less expensive method. Drange (1985) defined efficiency as performing a function using the least amount of resources and completing it on time. Smalley and Freeman (1966) viewed this performance criteria as the relation between the achievement of objectives and the consumption of resources while Drucker (1974) defined it simply as doing things right. For purposes of this research, the accepted definition of efficiency is resources expected to be consumed/resources actually consumed (Sink, 1983).

Efficiency, like productivity, can be measured by

outputs/inputs, but is a more wholistic ratio than productivity. In many productivity ratios, the output number is quantified in terms of one, two, or more outputs whereas the efficiency ratio represents the total outputs of the organization (Smalley and Freeman, 1966). Efficiency measurement systems must be tailored to each specific organization and based on the quantification of inputs and outputs. For identification purposes, an output should be: the final product, easy to count, defined in terms of acceptable quality, and should not vary from one production run to the next. When an organization is measuring inputs, it should consider both direct and indirect costs in the analysis. Once the quantification process has taken place, a recording system should be developed in order to keep work counts, and provide daily reports. These reports could reveal data concerning seasonal fluctuations, provide time comparisons, interdepartmental comparisons, and yield figures with which to compare to predetermined standards.

Quality of Work Life

Today there is an increasing interest in greater productivity; Hackman and Oldham (1980) have suggested that one of the major influences on organizational productivity is the quality of the relationship between workers and the job they perform. Organizational behavior can be defined as the interaction between the person and his environment, and

the purpose of a quality of work life program is to provide a means for identifying behavioral problems which inhibit productivity (Terry and Dar-El, 1980).

Quality of work life (QWL) can be thought of as both a goal for an organization and also an ongoing process for achieving that goal. As a goal, QWL is the commitment of the organization to improving work by creating more involved, satisfying, and effective jobs and work environments for all employees. As a process, QWL requires efforts to realize this goal from the active involvement of the employees (Burke, 1982). Walton (1973) defined QWL as a process for humanizing the work place. Nadler (1981) expanded on the humanizing concept and stated that an environment should be created that will allow people to find work personally satisfying along with economically rewarding. General Motors has implemented a successful QWL program and according to Fuller (1980), QWL is a process concerned with utilizing all of an organization's resources, especially human, in a better way each day. It is developing a sense of awareness and understanding of employees' needs and concerns, and therefore, being more responsive. On an overall basis, QWL is directed toward improving the way organizational activities get carried out in order to assure long-term effectiveness and success. On the individual level, General Motors aims for more employee involvement, improved relationships among all levels of workers, better

cooperation between the union and management, redesign of jobs, and the improved integration of people and technology. The definition of QWL accepted for this study is: work with meaning (Mali, 1978), or the degree to which work provides an opportunity for the employee to meet a variety of personal needs, to survive with security, to interact with others, to feel useful, to be recognized for achievement and to have an opportunity to improve one's skill and knowledge (Lippitt, 1978).

In the 1970's the dissatisfaction of American workers was beginning to receive attention. Between the late 60's and the late 70's, the work force in this country experienced a change. Many workers no longer believed in the theory that hard work always pays off (Yankelovich, 1982), and the standards by which workers now measure themselves are more elusive and internal rather than concerned with satisfying basic needs. Surveys done by Yankelovich show that three-fourths of the American work force are no longer content to work at boring jobs just because the pay is good. A worker with a negative attitude tends to be unproductive, while positive attitudes can lead to a more effective work force. Mai-Dalton, Latham, and Fiedler (1978) did a survey of the literature dealing with the selection, management, and performance of foodservice personnel and found that of the over five million employees in this industry, most complain about low wages, poor working conditions, erratic

work shifts, long hours, and a poor public image of their occupation. The fourth annual Restaurants and Institutions report (1982) showed that foodservice workers have a strong desire to contribute suggestions to management and also to participate in decisions that affect their jobs, but do not usually have the opportunity. Changes in the attitudes of the work force have prompted a shift in the focus of today's managers (Bowditch and Buono, 1982).

Carl Rogers (1980) stated that persons have within themselves the resources needed to develop, grow, and solve their problems; the way employees are treated and the organizational climate they are exposed to will help determine their motivation. Productivity tends to be highest in organizations where groups are encouraged to utilize their creative potential in seeking out problems and solutions (Terry and Dar-El, 1980). In order to help employees reach their optimal work performance, an increasing number of workplaces have started to find ways to give employees more autonomy in their jobs and more input into decisions that affect them (Herrick, 1981). Phillips (1983) reported that QWL programs are now widespread in this country. Most QWL programs originate with a measure of the workers' attitudes in order to learn more about job satisfaction (Lawler and Porter, 1967).

Woolf (1970) identified two methods for measuring QWL in an organization: the collection of direct data and the

use of surrogate measures. Direct data can be collected by a generic QWL survey instrument or by an organization-specific questionnaire. Surveys are the most widely used technique for measuring QWL and yield good data for statistical analysis in an economical way. Four of the popular generic QWL survey instruments available are the Job Diagnostic Survey (JDS), the Job Descriptive Index (JDI), the Job Characteristics Inventory (JCI), and the Brayfield-Rothe Job Satisfaction Index. Surveys and questionnaires are impersonal, the questions must be carefully formulated keeping validity in mind, and there is the problem of a low response rate. Surrogate measures, such as absenteeism, turnover rate, and tardiness, are calculated from existing personnel records and present no problem of respondent bias. The researcher must, however interprit the necessary coding to obtain the desired data. Bowditch and Buono (1982) recognized the use of interviewing as another method of collecting information about employees' needs and attitudes in the work place. Interviews allow questions to be posed directly to the employees and provide a means for clarification of subjective data. Interviews also yield more in depth data, and allow the measurement process to be more flexible. Disadvantages of interviewing include administration expense, and the need for highly skilled interviewers. Other disadvantages are that the data gathered by interviews is not easily comparable, there is a

problem of self-report and interviewer bias, and it is time consuming (Hackman and OLdham, 1980).

When considering the method for QWL measurement, the assessment needs of the organization should be the major determining factor in order for management to produce the desired data. Macy and Mirvis (1976) suggested that the measures of QWL should be suitable for comparison over time and take into consideration the specific needs of the employees. Lawler and Mirvis (1981) viewed QWL measurement as the classic organization development opportunity to constructively integrate the needs of its employees with the needs of the corporation. Information on pay, benefits, and employee QWL perceptions should be given high priority in the data gathering phase. A study done at the Graphic Controls Corporation in Buffalo, New York, identified job performance, job security, wages and benefits, and the opportunity to develop skills and abilities as the most important QWL issues (Lawler and Mirvis, 1981).

QWL programs can be costly to administer but the real question is whether the organization can afford not to measure QWL. New age benefits such as: child care facilities, flextime, and job sharing, have emerged as a result of QWL programs and help employees to integrate work into their private life. Decreased turnover and absenteeism, along with an increase in product quality and productivity have also been connected to QWL improvement efforts.

Innovation

Challenges facing the United States today are more intense than they ever have been. This country is looked upon to help satisfy many basic needs of the world's population. At the same time, United States citizens expect to maintain, if not improve, their current standard of living. We cannot meet these needs and expectations if we depend on today's technologies, much less yesterday's (Quinn, 1983). In order to contribute to world development and improve our own quality of life, we must be willing to make changes. Changes are associated with risks, and innovation is one of the most important change agents (Drucker, 1985). Early innovations in this country helped to establish the United States as a world leader and without a continued flow of new technology, we stand the chance of losing our international competitive edge in industry.

Many definitions of innovation can be found in the literature. Quinn (1983) defined this performance criteria as the ability to create and introduce solutions to new or existing problems, while Zaltman and Lin (1971) defined it as any idea, practice, or material artifact perceived to be new by the adopting organization. Innovation can be thought of as the renewal or improvement of old capacities and the development of new capacities of people and the organization in which they are employed (Morton, 1971). Lawrence and Lorsch (1967) referred to innovation as change and newness

in the ideas, methods, and products of an organization. The definition accepted for this study differentiates innovation from change in that it is a deliberate, novel, specific change aimed at accomplishing the goals of the system more effectively, or in other words, applied creativity (Mueller, 1971).

Innovation usually begins with two tangible assets: people and cash, and is coupled with two intangible assets: management and ideas. The objective of the innovation process is to combine these four assets in a way that will produce marketable products, processes, and services (Steele, 1975). According to Drucker (1985) managers need to be informed that innovation does not happen by a "blinding flash" but through the careful implementation of a systematic management discipline. Entrepreneurs need to purposefully search for sources of new opportunities, however, these opportunities exist only in a few situations. Drucker lists the sources as those within the organization and those without. The four areas of opportunity within the company are: unexpected occurrences, incongruities, process needs, and industry and market changes. Three other sources existing outside the company are: demographic changes, changes in perception, and new knowledge.

Bellas and Olsen (1978) also stressed the systematic approach to innovation in order to evaluate and develop new concepts. They found that foodservice operators tend to

direct their innovative efforts towards short term projects rather than the organized research and development that is characteristic of long term projects. Since these short term innovations are usually not expensive or time consuming, the ideas and products are quickly copied and the competitive edge is lost.

VanGundy (1984) categorized organizational problems into two groups: the structured problems, and the unstructured problems. Structured problems have a systematic solution that can be applied when the need arises, whereas unstructured problems have no routine solution and require an innovative idea in order to be solved. He stresses the importance of establishing a creative climate in the work group in order to maintain a free and open environment that encourages innovation. The factors that determine the creative climate can be grouped into three categories. The external environment includes factors that affect tasks or people and influence how creative the group perceives its climate to be. The second factor, individual internal climate, determines how creative we perceive ourselves to be, and the third element is based on the quality of interpersonal relationships among the group members. People cannot be ordered to be more creative, it has to emerge from a carefully developed atmosphere within the organization.

In order to be innovative, Eaton (1982) suggested that the person or organizational department must be excited

about the possibility of solving a problem. It should be kept in mind, however, that the process of innovation is one of creating change and any change can be disruptive and lead to uncertainty. Steele (1975) remarked that an organization should keep in mind that innovation does not pay off until the entire process is complete. The journey, from the conception of an idea to its commercialization, is usually a long and tough road. An innovative idea, especially if it involves a new process or product that is not directly related to the established organizational interests and activities, tends to get molded by many hands, needs to be understood and accepted by many minds, and must overcome many problems in order for it to pay off (Steele, 1975).

For organizational innovation, Drucker (1985) suggested the following principles. All sources of new opportunities must be analyzed, and since innovation is both conceptual and perceptual, the researcher should go out into the field and look, ask, and listen. In order for the innovation to be effective, it must be simple and focused. If it gets complicated, the idea will only serve to confuse people, therefore, an innovation should start small. Although the idea starts small, the entrepreneurs behind it should not underestimate the innovation and should aim towards staying "ahead of the pack". The most important principle to remember is that innovation is work, it requires knowledge, ingenuity, and focus.

Profitability

Anthony and Herzlinger (1980) defined profitability as the difference between an organization's revenue and expenses, where revenue is a monetary measure of outputs and expenses are a monetary measure of inputs (or resources consumed). Another way of viewing profitability is the dollar value that remains after expenses are deducted from the sales volume (Dukas, 1976). Profitability can also be thought of in terms of the percentage of return on sales, owner's equity, or assets (Villano, 1977). The definition accepted for this study is the earned return on investment (owner equity) or the return on all things a business owns (Rausch, 1982) or the relationship of revenue to cost.

Profitability is essential to every organization including the non-profit type and it affects all persons involved with the business, including customers. This criteria is the ultimate goal of the organization owner, although it should not be the only goal. It is an indirect goal of the organization's members due to the fact that profits are the ultimate source of funds for the survival and growth of a business, and therefore their jobs (Keiser and Kallio, 1974). Customers are affected by this measure in a similar way as the employees, an operation not showing a profit will soon go out of business.

Profitability is the easiest criteria to quantify out of the seven which are addressed in this study, due to the

fact that it is a monetary measure. Measures of productivity and profitability are closely related to each other, both of which are derived using outputs and inputs. Productivity is calculated by dividing outputs by inputs, whereas profitability is figured by subtracting inputs (expenses) from outputs (revenue) (Dudick, 1972). As an organization is more productive, profitability is enhanced. Expressing profitability as a ratio rather than an absolute dollar amount provides more of an aid to management in diagnosing any problem areas within the organization (Dudick, 1972). Rausch (1982) referred to profitability ratios as "weathervane ratios" which point management in the direction where a problem may occur. He listed four such ratios.

1. Profit-on-production ratio = gross margin / sales. In this ratio, gross margin is defined as sales minus the cost of sales. Profit-on-production measures the percentage of remaining profit after the cost of buying or producing the goods or services has been deducted, and shows the profit earned on production but not the administrative or selling costs of the organization.

2. Return-on-sales ratio = net profit / sales. This ratio shows the profitability of all the combined phases of the organization.

3. Return-on-assets = net profit / total sales. This figure shows the profit that is earned on all assets used in conducting business.

4. Return-on-equity = net profit / net worth. This particular ratio is sometimes referred to as return on investment and it measures earnings that have been generated by a particular capital investment. This ratio can offer guidance to management when deciding between proposed capital investments.

Break even analysis is another method that can be used when planning for profitability. This method helps management determine how high their sales must be in order to cover all costs of doing business and provides an estimate of the sales volume required to earn a given amount of profit. The break even point is vital to management as planning and decision are based on how well the business stands in relation to this point. Due to the flexibility of costs incurred by an organization, however, the break even point can only be an estimate, not an exact measure of the required sales volume needed to obtain a profit.

Financial reports such as the income statement, balance sheet, and profit and loss statement of an organization can be valuable resources for evaluating profitability. The income statement is a continuing record of the accumulated results of operations from one accounting period to the next. This statement shows the net profit earned for each period, which is a value used to calculate many profitability ratios. The balance sheet represents the assets, liabilities, and owner's equity of an organization at a particular

point in time.

The profitability of an organization is succeptable to outside influences such as various environmental factors and the nature of the operation (Dukas, 1976). Profitability improvement can be accomplished through the manipulation of sales volume, operating expenses, or price increases. The best method for improvement is through the increase of sales volume. In a business, the fixed costs remain constant regardless of the sales volume while the variable costs increase with sales increase but usually at a lesser rate. Although it is best to improve profitability by increasing sales, there are times when operating expenses can be reduced (Lines, 1973). If a reduction strategy is chosen, management should choose the expense and determine if further reduction is a necessary step. Such a plan should then be developed and implemented in order to make the desired correction (Dukas, 1976). If a reduction in manpower is targeted for profitability improvement, then the most unproductive manpower should be altered. A longer term strategy of cost reduction is that of saving on raw material costs which can be done through product redesign, testing, and marketing. This plan should not significantly affect the quality of the product. Increasing the prices of an organization's products may be a quick profitability improvement plan but may also reduce sales. If this method is chosen, management should be selective about which products

can bear the increase and also related these new prices to what customers are willing to pay.

Rausch (1982) suggests that there are two ways of assessing the potential profit of an organization: the past organizational performance or the expected future activities. Anthony and Herzlinger (1980) feel that it is best to compare profitability with a standard or expected figure rather than past years because even though profits have increased, it may be questionable whether they have increased enough or if they could have expanded more.

A profitability plan in the form of a budget acts as a guide for management to plan the future course of the business. When a problem arises, management can consult the budget, be better able to cope with the situation, and steer the organization back on track.

Summary

Although some confusion exists concerning the seven performance criteria which guided this study, it is clear that they are all interrelated and they each possess distinct characteristics. Literature was reviewed in this chapter in order to gain a more knowledgeable understanding of the performance criteria and to discover the controls that would best aid management in efforts to improve organizational functioning.

Productivity is the ratio of quantities of outputs to

quantities of inputs (APC, 1979), while effectiveness is defined as the degree of achievement of objectives (Smalley and Freeman, 1966). Quality is defined on two levels: the degree to which the system conforms to specifications (Sink, 1983), or at the consumer level, fitness for use (Juran and Gryna, 1980). The criterion, efficiency, refers to the resources expected to be consumed / the resources actually consumed (Sink, 1983). Quality of work life is defined as work with meaning (Mali, 1978), or the degree to which work provides an opportunity for an individual to meet a variety of personal needs, to survive with security, to interact with others, to feel useful, to be recognized for achievement and to have an opportunity to improve one's skill and knowledge (Lippit, 1978). Innovation, as a performance criterion, is a deliberate, novel, specific change aimed at accomplishing the goals of the system more effectively (Mueller, 1971) or applied creativity. Profitability is the earned return on investment (owner equity) or the return on all things a business owns (Rausch, 1982) or the relationship of revenue to cost.

The performance criteria which are emphasized the most differ from organization to organization, depending on many factors such as the type of business, management philosophy, and present economic state. All of the criteria have important implications for any organization and should be given due consideration.

CHAPTER III

METHODS

Introduction

The foodservice study of managers in health care delivery systems done by Robertson (1982) revealed that productivity was being monitored to a great extent through the use of surrogate measures. Shaw (1983) went a step further and surveyed managers in health care delivery systems to determine how six other organizational performance criteria were measured when productivity was defined as output/input. Similar to Shaw's (1983) study, Pickerel and Lamb (1984) surveyed restaurant owners in Missouri to identify which performance measures they used. The purpose in this study was to investigate how dietitians in college and university foodservice measure performance when productivity is specifically defined. Hopefully, results of this study can contribute towards the development of productivity standards for the foodservice industry.

Research Design

Because this research is seeking to identify specific

performance criteria measures currently being used by management dietitians in college and university foodservices, the descriptive research method has been chosen. Descriptive research is based on certain conditions which are studied and analyzed in order to answer questions (Best, 1981) or establish existence of a difference (Huck, Cormier and Bounds, 1974). Fox (1969) further characterizes descriptive research as describing a specific set of phenomena at a given point in time.

Population

The population chosen for this research was the American Dietetic Association practice group, Dietitians in College and University Foodservice. Address labels for this practice group were obtained upon request from ADA. Since the population numbered 242, the whole group was surveyed rather than a sample.

Data Collection

The Instrument

Two existing questionnaires were used as the basis in developing the instrument distributed for this research. The questionnaire used by Shaw (1983) in her study of productivity and six other interrelated organizational performance criteria in health care delivery systems was used for this instrument along with Pickerel (1984) and Lamb's (1984)

questionnaire used in their study of performance measures in Missouri restaurants.

The instrument for this research contained two main sections: demographic data (entitled "General Information") and performance criteria (Appendix B). The performance criteria section of the survey was divided into seven subsections, each dealing with a specific criteria. The instrument also provided an opportunity for the respondent to rank the seven criteria in terms of importance and time spent on each one.

The instrument contained three types of questions. In the "Productivity" section, a Likert type scale was used where respondents could circle from 1 (always) to 5 (never), according to how often they use the control measures listed. The majority of the questions in the instrument required the respondent to check "yes" or "no" or to place a check in the blank beside an evaluation or control measure used. The ranking question required the respondent to use a scale of 1-7, where "one" was given to the criteria on which the dietitian spends the most time (or feels is most important), and "seven" was given to the criteria which he or she spends the least time (or feels is least important).

Content validity, and clarity of Shaw's (1983) instrument were reviewed by a panel of Oklahoma State University graduate faculty members from the Departments of Food Nutrition, and Institution Administration; Hotel and

Restaurant Administration; Industrial Engineering; and Statistics. The Pickerel (1984) and Lamb (1984) questionnaire was examined by the Oklahoma Restaurant Association (ORA) board members, graduate faculty members of the Departments of Food Nutrition, and Institution Administration; Hotel and Restaurant Administration; and Statistics at Oklahoma State University. The Educational Director of the Missouri Restaurant Association also reviewed this particular instrument. The present questionnaire was reviewed for format, content validity and clarity by the research committee.

Distribution Procedure

The instrument was printed on four sheets of orange paper (front and back). A cover letter, placed on the front of the questionnaire, explained the project and instructed the respondents on how to complete and return the survey (Appendix A). Mailing information and codes (along with return postage) were printed on a separate sheet and placed at the back of the instrument. This format enabled the instrument to be mailed without being placed in an envelope and returned by refolding and stapling. The questionnaire was distributed and returned by First Class Mail.

Data Analysis

Data collected from the survey were coded and entered

into the computer using four data sets per respondent. The information was then analyzed using the Statistical Analysis System (SAS) (Barr, 1976). The occurrence of each method of performance evaluation or control was shown by frequency distribution. Chi square was used to study the relationship between selected demographic variables and the methods of evaluation and importance to the various types of foodservice operations. The arithmetic mean of each of the criteria in the ranking questions was determined by statistical analysis in order to assign a percentage of total points to each criterion. A 5 percent level of significance was used for the purposes of this study.

CHAPTER IV

RESULTS AND DISCUSSION

Data for the study were obtained via the instrument described in Chapter III. The survey instrument was mailed to all members of the ADA practice group "Dietitians in College and University Foodservice". The response rate was 30 percent (N=72), however, three questionnaires were unusable for reasons of missing data, retirement, or employment outside the college and university foodservice setting. After omitting these three questionnaires, the useable response rate was 28.5 percent (N=69).

Characteristics of Survey Participants

Age and Years of Education

Twenty percent (N=14) of the participants were between 20 and 29 years of age, 39 percent (N=27) were from 30 to 39 years old, 16 percent (N=11) were between 30 and 49 years of age, 12 percent (N=8) were between 50 and 59 years of age, and 13 percent (N=9) were 60 years of age or older. Thirty-five of the survey respondents (51%) had attained a bachelor of science degree, 49 percent (N=34) had received a

master's degree, and one respondent had earned a Ph.D.

Years of Experience and Salary

The experience of dietitians in college and university foodservice ranged from one to over 16 years (Figure 2). Twenty-five percent (N=17) of the respondents had from one to five years of management experience, 24 percent (N=16) had six to ten years experience, and 33 percent (N=23) had 16 or more years of experience (Figure 2). The annual salaries of the respondents ranged from below $15,000 to above $35,000 and about one third (N=24) earned from $20,000 to $24,000, as shown in Table I.

Position Title and Productivity Training

Director was the position title held by 23 percent (N=16) of the survey participants while 16 percent (N=11) held the title of assistant director. Three percent (N=2) of the respondents held the title of nutritionist, 22 percent (N=15) were administrative dietitians, and 36 percent (N=25) checked their title under the "other" category. Other position titles were reported as: assistant foodservice manager, regional director, foodservice manager, dining hall manager, unit food manager, senior dietitian, assistant cafeteria manager, dining center manager, senior foodservice coordinator, assistant food supervisor, kitchen assistant, food production supervisor, and district manager.

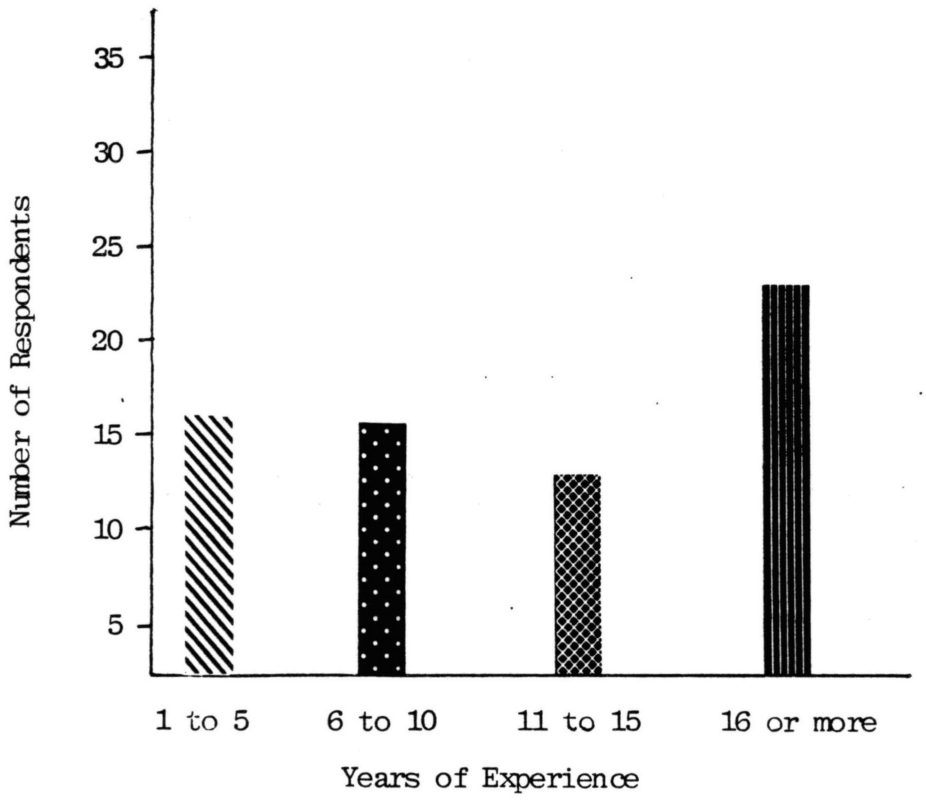


Figure 2. Years of Experience in Foodservice Management

TABLE I

ANNUAL SALARY EARNED BY RESPONDENTS

Annual Salary in $	Number of Respondents
15,000 and below	4
15,000 - 19,000	10
20,000 - 24,000	24
25,000 - 29,000	15
30,000 - 34,000	8
35,000 - 39,000	6
40,000 - 44,000	1
45,000 and above	1

Fifty-eight percent (N=40) of the respondents indicated that they had not received any productivity measurement training, while 42 percent (N=29) had received such training.

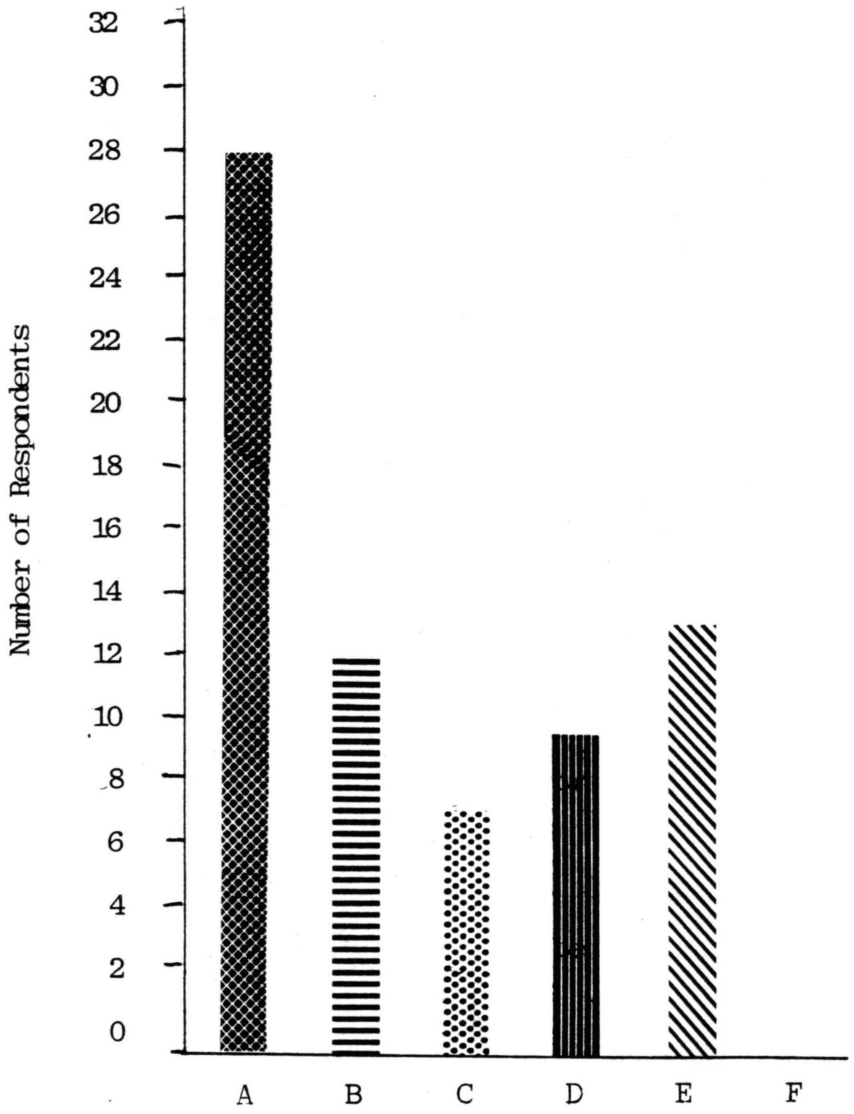
ADA Registration Status and Route to ADA

Eighty-five percent (N=59) of the survey participants indicated that they were registered dietitians, while the remaining 15 percent (N=10) were not registered dietitians. Although the survey instrument was sent to registered dietitians, they were asked to pass it on to the person who was responsible for that duty if they were not involved in the evaluation of organizational performance. The route to ADA membership for the 69 respondents varied although the majority completed a dietetic internship (Figure 3). About one-fifth of the survey participants obtained registration status by earning a master's degree and completing six months of work experience.

Characteristics of the Institutions

Type of Foodservice System and Contracted Foodservice

All (N=69) of the respondents indicated that their foodservice systems utilized the conventional method of food preparation. In addition to the conventional system, three percent (N=2) of the foodservices indicated that they used assembly/serve, 4 percent (N=3) used cook/chill, and one



A = Internship
B = CUP Program
C = Traineeship
D = Three years preplanned work experience
E = M.S. and six months work experience
F = Ph.D. and six months work experience

Figure 3. Route to ADA Membership

percent (N=1) used cook/freeze in their facility. Twelve percent (N=8) of the respondents were employed by institutions that had contracted their foodservices to a foodservice management company.

Offsite Meal Distribution

Six percent (N=4) of the foodservices represented in the study prepared meals for satellite schools. Four percent (N=3) distributed food to meals on wheels or congregate meals, while 16 percent (N=11) checked the "other" category and listed the following responses: a convent, a day care center, and patient services.

Number of Meals Served Daily

Twenty-nine percent (N=13) of the institutions represented in the study served up to 250 daily breakfast customers, 37 percent (N=17) served between 251 and 500 breakfasts, and 34 percent (N=15) served 501 or more breakfasts each day. Six percent (N=3) of the foodservices prepared 250 or less lunches, 29 percent (N=13) served from 251 to 500 lunches per day, and 65 percent (N=29) prepared 501 or more lunches daily. Six percent (N=3) of the survey participants prepared dinner for 250 or less customers, 32 percent (N=14) served from 251 to 500 dinners, and 62 percent (N=28) served 501 or more dinners each day.

Performance Criteria

Productivity

Inputs. In the survey instrument, productivity was defined as the relationship of outputs to inputs (APC, 1979). The respondents were asked to indicate how frequently they made use of certain input and output control measures in their foodservice. A five point, Likert type scale was used for the answer selections which ranged from "Always" to "Never" (Appendix B).

The first input control measure listed in the questionnaire was the "use of detailed specifications when purchasing equipment and supplies" (Table II). Most of the respondents indicated that they made use of this control measure. An association ($p=0.0193$, $x2=11.749$, $df=4$) existed between this control and if the foodservice was contracted to a management company. All of the contracted foodservices (N=8) used this control measure frequently along with 95 percent (N=57) of those not contracted.

"Check labor usage (and adjust if necessary) at least quarterly" was the second input measure listed, and was used by 91 percent (N=62) of the respondents. Ninety-four percent (N=33) of the participants who held bachelor's degrees used this measure, along with 90 percent (N=29) of those with master's degrees, while the one Ph.D. indicated that labor was rarely checked. Another significant

TABLE II

SIGNIFICANT ASSOCIATIONS FOUND IN PRODUCTIVITY CONTROLS

Productivity Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Inputs			
Detailed specifications in purchasing supplies and equipment	Contracted foodservices ($p=0.0193$, $x^2=11.749$, $df=4$)	65	95
Labor usage is checked and adjusted quarterly	Highest educational degree obtained ($p=0.0309$, $x^2=16.926$, $df=8$)	62	91
	Conventional foodservice system ($p=0.0027$, $x^2=16.239$, $df=4$)	62	91
Comparison shopping for food and supplies	Contracted foodservices ($p=0.002$, $x^2=19.851$, $df=3$)	66	97
Take advantage of seasonal food buys	Highest educational degree obtained ($p=0.0204$, $x^2=11.621$, $df=4$)	68	100

TABLE II (Continued)

Productivity Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Take advantage of seasonal food buys	Prepare meals for satellite schools ($p=0.0323$, $x^2=6.865$, $df=2$)	68	100
Monitoring energy usage of specific pieces of equipment	Prepare meals for satellite schools ($p=0.0021$, $x^2=16.866$, $df=4$)	23	33
Routinely conduct physical inventory of storeroom	Years of experience ($p=0.0364$, $x^2=13.451$, $df=6$)	67	99
Periodically review and revise job descriptions in order to prevent duplication of tasks	Training in productivity management ($p=0.0046$, $x^2=13.008$, $df=3$)	65	95
	Age ($p=0.0395$, $x^2=8.337$, $df=3$)	65	95
Outputs			
Production records kept for cafeteria and/or catering	Years of experience ($p=0.0328$, $x^2=18.215$, $df=9$)	68	98
	Registration status ($p=0.0427$, $x^2=8.164$, $df=3$)	68	98

TABLE II (Continued)

Productivity Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Check daily census reports and plan production accordingly	Assembly/serve foodservice system ($p=0.0009$, $x^2=16.376$, $df=3$)	67	97
	Cook/chill foodservice system ($p=0.0092$, $x^2=11.526$, $df=3$)	67	97
Have system for utilizing leftover food	Contracted foodservice ($p=0.0065$, $x^2=12.275$, $df=3$)	68	98
Meals served daily	Prepare meals for Meals on Wheels ($p=0.0157$, $x^2=10.366$, $df=3$)	68	98
	Contracted foodservice ($p=0.0448$, $x^2=8.062$, $df=3$)	68	98
Dollar Sales Daily	Prepare meals for satellite schools ($p=0.0005$, $x^2=20.060$, $df=4$)	38	55
	Route to ADA membership ($p=0.0085$, $x^2=32.546$, $df=16$)	38	55
Sales last year versus sales this year	Prepare meals for satellite schools ($p=0.0027$, $x^2=16.220$, $df=4$)	53	77

TABLE II (Continued)

Productivity Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Ratios			
Use of ratio: Meals/labor hours worked	"Other" off site meals ($p=0.0243$, $x^2=5.073$, $df=1$)	38	57
	Training in productivity management ($p=0.0399$, $x^2=4.220$, $df=1$	38	57
Use of ratio: Sales/labor hours worked	Contracted foodservice ($p=0.0002$, $x^2=13.769$, $df=1$)	11	17
	"Other" off site meals ($p=0.0316$, $x^2=4.620$, $df=1$)	11	17
Use of ratio: Meals/labor hours paid	Registration status ($p=0.0225$, $x^2=5.211$, $df=1$)	22	33
Use of ratio: Sales/labor hours paid	Contracted foodservice ($p=0.0469$, $x^2=3.947$, $df=1$)	5	7

TABLE II (Continued)

Productivity Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Use of ratio: Meals/total food cost	Number of dinners served per day ($p=0.0075$, $x^2=9.778$, $df=2$)	40	61
	Age ($p=0.0011$, $x^2=10.631$, $df=1$)	40	61
Use of inverse productivity ratios	Prepare meals for Meals on Wheels ($p=0.0028$, $x^2=8.946$, $df=1$)	8	12

association (p=0.0027, x2=16.239, df=4) found with this input control measure concerned the type of foodservice system used. Ninety-two percent (N=62) of the operations that utilized the conventional and assembly/serve or cook/chill foodservice system used this control measure quite often, while the only operation that used cook freeze checked labor only rarely.

Almost all of the survey participants (N=66, 97 percent) indicated that they "comparison shop for food and supplies" frequently. A significant association (p=0.0002, x2=19.857, df=3) was observed with contracted foodservices. Ninety-eight percent (N=59) of the noncontracted operations comparison shopped at least sometimes along with 87 percent (N=7) of the contracted operations.

The input control, "take advantage of seasonal food buys", was used by almost all (N=68) of the responding dietitians. This particular measure was associated (p=0.0204, x2=11.621, df=4) with the highest degree obtained by the respondents. Eighty-six percent (N=30) of those with bachelor's degrees, and 78 percent (N=25) of the dietitians with master's degrees used this control measure always or usually, while the one Ph.D. always took advantage of seasonal food buys. A second association (p=0.0323, x2=6.865, df=2) revealed that while 22 out of 64 (34%) of the foodservices that did not prepare meals for satellite schools always used this control measure, all four of those

actually preparing these meals always shopped for seasonal food buys.

"Standardized recipes" were used frequently by 87 percent (N=59) of the institutions and sometimes or rarely by the remaining 13 percent (N=9). The "evaluation of kitchen energy costs" was done rarely or never by the majority of the respondents (59%, N=40). In contrast, 41 percent (N=28) used this control measure at least sometimes.

"Monitor energy usage of specific pieces of equipment" (input control #7) was used rarely or never by 66 percent (N=45) of all respondents and 22 percent (N=15) indicated using this control measure sometimes. Seventy-five percent (N=3) of the foodservices preparing meals for satellite schools used this measure frequently while only eight percent (N=5) of the operations that did not prepare satellite meals used it on a frequent basis.

The eighth input control measure listed was "routinely conduct physical inventory of storeroom". Ninety-eight percent (N=67) of the respondents used this control measure always or usually while only one indicated rare usage. Years of experience was associated ($p=0.0364$, $x2=13.451$, $df=6$) with physical inventory and all the respondents in each category of years of experience used this measure frequently except one person with 16 or more years experience who rarely used this method. "Monitor breakage and pilferage of supplies" was the ninth input control measure.

Three-fourths (N=51) of the respondents implemented this control measure always or usually while the remaining 25 percent (N=17) used it on an infrequent basis.

The tenth input listed on the questionnaire was "periodically review and revise job descriptions in order to prevent duplication of tasks". This measure was frequently used by 96 percent (N=65) of the participants and rarely used by four percent (N=3). Ninety-eight percent (N=39) of the individuals who did not receive training in productivity measurement employed this input method, along with 93 percent (N=26) of those who did have productivity training ($p=0.0046$, $x2=13.008$, $df=3$). Age was associated ($p=0.0395$, $x2=8.337$, $df=3$) with the review of job descriptions in that all of those 40 years old and older performed this task while all but three (N=37) of those 39 years of age and younger did likewise.

The last input control measure listed on the survey instrument was "routinely follow food costs". This measure was frequently performed by 95 percent (N=65) of the represented participants in contrast to the five percent (N=3) who rarely used it.

Outputs. The first output control (#13 on the questionnaire) was listed as "keep production records for cafeteria and/or catering". All but one respondent (98%) used this output control either always, usually, or sometimes while one indicated never using it. Years of

experience in foodservice management showed a relationship ($p=0.028$, $x2=18.215$, $df=9$) with this control in that all of the respondents used it frequently except one person with 11 to 15 years of experience who never kept such records. A second association ($p=0.0427$, $x2=8.164$, $df=3$) was found with this output control measure and the participants' registration status with the American Dietetic Association (ADA). All but one (N=58) of the registered dietitians used this measure along with all (N=10) of the non-registered participants. "Check production sheets at least quarterly to see that production was appropriate for demand" was the second output control measure to which 96 percent (N=66) of the respondents indicated usage.

The conventional type of foodservice system was widely used, as all (N=69) respondents indicated having this system in their operation. Six out of 69, however, also indicated that they had assembly/serve (N=2), cook/chill (N=3), and cook/freeze (N=1) in addition to the conventional system. The third output control measure, "check daily census reports and plan production accordingly" was employed always (N=53) or usually (N=11) by the respondents. Five other respondents used the output control measure rarely or never. A significant association ($p=0.0009$, $x2=16.378$, $df=3$) was found between the foodservice system, assembly/serve, and the control measure. One of the respondents where an assembly/serve system was in place used the control

measure always, while another one indicated not having used the control measure. A significant association (p=0.0092, x2=11.526, df=3) was also found between the foodservice system, cook/chill, and this control measure. Two respondents used the control measure frequently, while one respondent indicated not using this output at all.

"A system for utilizing leftover bulk foods" (output control measure #4 or #16 on the survey instrument) was a method used by 98 percent (N=68) of the total respondents. All (N=61) of the foodservices that were not contracted to a management company frequently used leftover bulk foods, in contrast to seven out of eight contracted foodservices (p=0.0065, x2=12.275, df=3).

The fifth output control measure was to keep track of "meals served daily". All but one (N=68) of the respondents used this measure. An association (p=0.0157, x2=10.366, df=3) showed that 65 out of 66 foodservices not preparing food for meals on wheels frequently used this measure along with all (N=3) of the operations that did prepare food for meals on wheels. A second association (p=0.0448, x2=8.062, df=3) existed between this control measure and contracted foodservices. All (N=8) of the contracted foodservices and all but one (N=60) of the noncontracted operations kept track of meals served daily. The sixth output control measure (#18 on the questionnaire) was "follow amounts

prepared versus amounts served", of which 96 percent (N=66) of the respondents answered affirmatively.

Keeping a record of "dollar sales daily" was the seventh output control listed (#19 on the questionnaire). Fifty-five percent (N=38) of the participants frequently used this measure in contrast to 45 percent (N=31) who rarely or never used the control measure. Two associations were found with this output control measure. First, the institutions which prepared meals for satellite schools were negatively related (p=0.0005, x2=20.060, df=4) with keeping track of dollar sales daily: 59 percent (N=38) of the foodservices that did not prepare meals for satellite schools frequently used this measure while all (N=4) of the foodservices that did prepare food for satellite schools very rarely made use of such a measure. The route taken to ADA membership showed an association (p=0.0085, x2=32.546, df=16) with this measure. The dietitians who had completed an internship showed the highest frequency for using dollar sales daily both always (59%) and rarely or never (50%) .

"Profit and loss statement", the eighth output control measure (#20 on the questionnaire) was utilized frequently by 87 percent (N=60) of the respondents but rarely or never used by 13 percent (N=9). Sixty-one percent (N=42) of the managers did not make use of "computerized cash registers" (output control #9, #21 on the questionnaire) while 39 percent (N=27) did. The 10th output control measure listed

was the use of "daily operation control sheets". Two-thirds (N=46) of the survey participants used this measure frequently while the other third (N=23) very rarely used it.

"Sales last year versus sales this year" was the 11th output control measure. Of the 69 respondents, 77 percent (N=53) used this measure, while 23 percent (N=16) did not. Seventy-eight percent (N=51) of the foodservices that did not prepare meals for satellite schools used this measure frequently in comparison to 50 percent (N=2) of the operations that did prepare such meals ($p=0.0027$, $x2=16.220$, $df=4$). The 12th output control measure listed (#24 on the survey instrument) was "customer count daily", to which all but three (97%) of the respondents answered affirmatively.

Ratios and Indexes Used to Assess Productivity. In the second section under "Productivity", the survey participants were asked if they developed ratios and/or indexes to use in their assessment of productivity, and if so, to indicate which ones. Seventy-four percent (N=51) of the dietitians responded that they were using ratios and/or indexes in their place of employment. An association ($p=0.0397$, $x2=10.046$, $df=4$) was identified with this survey question and the route taken to ADA membership. Of those who completed an internship, 78 percent (N=22) responded positively to the question regarding the use of ratios and/or indexes. Ninety percent (N=11) of the CUP graduates, 77 percent (N=10) of the dietitians who earned a master's degree and

did six months work experience, and 67 percent of those who completed the three year's preplanned work experience responded affirmatively, while only 29 percent (N=2) of those who completed a traineeship did likewise. Another association (p=0.0020, x2=9.555, df=1) showed that 93 percent (N=27) of the respondents who had received productivity training developed and used ratios and/or indexes compared to only 60 percent (N=24) of those with no such training.

Six productivity ratios were listed on the survey instrument; the first was "meals/labor hours worked" to which 57 percent (N=38) of the respondents answered positively. This ratio showed a significant association with three other factors. Of the foodservices that prepared meals for sites other than those listed on the questionnaire, nine out of 10 used this productivity ratio, while only about half (52%) of those foodservices that did not prepare meals for other sites did likewise (p=0.0243, x2=5.073, df=1). A second association (p=0.0399, x2=4.220, df=1) with this ratio showed that 73 percent (N=19) of the survey participants who had received productivity measurement training used this ratio; in contrast, only 47 percent (N=19) of those with no productivity training did the same.

The next productivity ratio listed was "sales/labor hours worked". Only 17 percent (N=11) of the respondents indicated use of this ratio. An association (p=0.002,

x2=13.769, df= 1) showed that five out of eight (62%) contracted foodservices used this ratio; in contrast, six out of 58 (10%) noncontracted operations did likewise. Another significant association (p=0.0316, x2=4.620, df=1) identified with the use of this ratio revealed that 40 percent (N=4) of the foodservices preparing meals for sites other than those specifically listed on the questionnaire used sales/labor hours worked to measure productivity, while only 12 percent (N=7) of those not preparing other meals used this ratio.

"Meals/labor hours paid" was the third productivity ratio listed. One-third (N=22) of the respondents used this ratio. Thirty-eight percent (N=22) of the registered dietitians utilized this ratio in contrast to the non-registered respondents of whom none indicated usage. "Sales/labor hours paid" was used by seven percent (N=5) of the respondents. Two out of eight (25%) of the contracted foodservice operations (p=0.0469, x2=3.947, df=1) used this ratio along with three out of the 58 noncontracted operations. The next ratio listed was "customers/labor hour", to which twenty-seven percent (N=18) of the respondents answered affirmatively.

Sixty-one percent (N=40) of the participants used the ratio, "meals/total food cost" to measure productivity. Two associations were related to this ratio, age (p=0.0011, x2=10.631, df=1) and the number of dinners served per day

(p=0.0075, x2=9.778, df=2). Seventy-seven percent (N=30) of the respondents who were 39 years of age and younger used this ratio while only 37 percent (N=10) of those 40 years old or more did likewise. Seventy-three percent (N=19) of the operations that served 250 or less dinners each day utilized this ratio, along with 67 percent (N=18) of those serving 501 or more meals. In contrast, only 23 percent (N=3) of the foodservices preparing between 251 and 500 dinners daily used this ratio.

Respondents were asked if they made use of any other ratios that were not listed on the questionnaire. Although several other ratios were listed, sales per operation hour was the only true productivity ratio given. The other ratios that were listed were either productivity indexes or surrogate measures. The survey participants were also asked if they used the inverse of any of the productivity ratios. Labor hours paid/meals served, labor hours worked/meals served, cost/100 meals served, and food cost/customers served were the inverse ratios that were given. An association (p=0.0228, x2=8.946, df=1) was identified with this question and the institutions that prepared meals for meals on wheels. Two out of three respondents involved with meals on wheels used inverse productivity ratios while only nine percent (N=6) of those that did not prepare food for meals on wheels answered this question positively.

Discussion of Productivity

Inputs. Over 90 percent of the respondents used nine of the 11 input control measures on a frequent basis. In contrast, the two input control measures that involved monitoring energy usage were rarely or never used. These results were very similar to those found by Shaw (1983) and Lamb (1984). It is of interest to the researcher that in the two studies just mentioned and also in this particular study, energy usage was not frequently monitored by the responding dietitians. This poses the question of who actually is monitoring energy. Since many college and university foodservices are located in residence halls that serve other functions, perhaps the energy costs incurred by the foodservice are assumed by the residence halls and are therefore not readily available to the administrative dietitians.

Contracted foodservices showed some expected characteristics relating to input control measures. All of the contracted foodservices made use of detailed specifications when purchasing equipment and supplies. This could be due to the fact that these types of operations employ extensive use of operating and procedure manuals. Contracted foodservices also did not comparison shop for food and supplies as frequently as the noncontracted foodservices did which seems logical since most of their purchasing is controlled by detailed specifications.

Institutions preparing 501 or more meals per day and/or sending meals to satellite schools tended to keep track of labor usage, and/or take advantage of seasonal food buys more so than smaller operations. Perhaps larger institutions are more apt to monitor efficient use of labor and attend to savings in food cost. They may also need to keep track of costs from which they can base their charges to the satellite schools.

Outputs. The output control measure, meals served daily was used most frequently by the respondents. In contrast, computerized cash registers received the least amount of response. Daily meal counts is a standard, easily executed procedure, whereas having cash registers may not only require a small investment of money, but may not be necessary in most operations where meals are prepaid in a contract. The operations in which the customers prepay their meals may have some cash customers but the number would probably be too small to warrant owning a cash register.

Meals served daily was associated with those institutions that prepare food for meals on wheels and also with contracted foodservices. As expressed in the discussion of inputs, the contracted foodservices and meals on wheels foodservices may be more apt to keep tighter control of their operations due to larger size and/or specific operating policies.

The association between the output control, dollar sales daily, and the route taken to ADA membership revealed that those who had completed a traineeship were the most likely to make use of this measure. This relationship could be due to the practical, on the job training that this group of dietitians have received in daily operating procedures.

Ratios and Indexes. Over 70 percent of the respondents indicated that they were using ratios and indexes to assess productivity. The most popular ratio used was meals/total food cost. This was similar to Shaw's (1983) findings but different from Lamb's (1984) data which identified sales/labor hours worked as the most popular ratio used among restauranteurs. According to Shaw (1983), meals/total food cost is a ratio that is easily determined by checking production and purchasing records. The accessibility of this data could be a factor in the popularity of this ratio.

Meals/labor hours worked received the second highest number of responses. The respondents who had received training in productivity measurement exhibited greater use of this ratio than those who had not received such training. This could be due to the dietitians' recognition that this ratio is an accurate reflection of an operation's productivity since it excludes hours used for sick leave, vacation time, and other hours paid that are not actually worked.

More than 90 percent of the surveyed dietitians indicated that they used the majority of input and output

measures listed on the questionnaire. In contrast, the response rate for the productivity ratios listed was only 61 percent or lower. The researcher questions why dietitians are not pairing up the outputs with the inputs in order to produce a measure of productivity. One possible reason for the lack of productivity measures could be that there has not been much emphasis on this performance criteria until recently.

Effectiveness

Effectiveness was defined for the participants as the degree of achievement of objectives (Smalley and Freeman, 1966). When asked whether or not they "set specific goals for their operation", 74 percent (N=49) of the respondents answered positively (Table III). A significant association ($p=0.0352$, $x2=6.693$, $df=2$) existed between setting goals and salary levels. Thirty-one (82%) of the participants who earned $20,000 to $29,000 annually set goals. In contrast, 12 (80%) earning $30,000 and more, along with 13 (46%) of those receiving $19,000 or less set goals for their organization. The foodservices that prepared meals for meals on wheels showed an association ($p=0.0026$, $x2=9.059$, $df=1$) with this measure: 77 percent (N=49) of the foodservices that did not prepare meals on wheels set specific goals while none of the operations preparing meals on wheels did so. The final association ($p=0.0432$, $x2=4.089$, $df=1$) identified

TABLE III

SIGNIFICANT ASSOCIATION FOUND IN EFFECTIVENESS CONTROLS

Effectiveness Control	Factors Showing Correlation	Respondents Using Control Measures N	%
Setting specific goals	Annual salary ($p=0.0352$, $x^2=6.693$, df=2)	49	74
	Prepare meals for satellite schools ($p=0.0026$, $X^2=9.059$, DF=1)	49	74
	Prepare "other" meals ($p=0.0432$, $x^2=4.089$, df=1)	49	74
Profit and loss statement	Highest degree obtained ($p=0.0315$, $x^2=6.916$, df=2)	48	73
	Position title ($p=0.0054$, $x^2=10.443$, df=2)	48	73
	Annual salary ($p=0.0001$, $x^2=20.869$, df=2)	48	73
Sales volume	Annual salary ($p=0.0084$, $x^2=9.569$, df=2)	23	35
	Prepare "other meals ($p=0.0113$, $x^2=6.414$, df=1)	23	35

TABLE III (Continued)

Effectiveness Control	Factors Showing Correlation	Respondents Using Control Measures N	%
Sales volume	Assembly/serve foodservices ($p=0.0496$, $x^2=3.856$, $df=1$)	23	35
	Cook/chill foodservice ($p=0.0496$, $x^2=3.856$, $df=1$)	23	35
Percent profit	Annual salary ($p=0.0031$, $x^2=11.572$, $df=2$)	26	39
Actual performance compared with forecasted performance	Annual salary ($p=0.0196$, $x^2=7.866$, $df=2$)	37	56
	Number of breakfasts/day ($p=0.0317$, $x^2=6.900$, $df=2$)	37	56
Personnel audit	Cook/freeze foodservice ($p=0.0326$, $x^2=4.569$, $df=1$)	12	18
MBO for management staff	Prepare "other" meals ($p=0.0164$, $x^2=5.762$, $df=1$)	24	36
	Age ($p=0.0469$, $x^2=3.949$, $df=1$)	24	36
Break goals into small measurable sub-goals	Prepare "other" meals ($p=0.0110$, $x^2=6.467$, $df=1$)	35	53

TABLE III (Continued)

Effectiveness Control	Factors Showing Correlation	Respondents Using Control Measures N	%
Personnel statistical reports	Number breakfasts per day ($p=0.0022$, $x^2=12.274$, $df=2$)	18	27
	Number lunches per day ($p=0.0147$, $x^2=5.955$, $df=1$)	18	27

with goal setting indicated that all (N=10) of the foodservices preparing meals for sites other than those specifically listed on the questionnaire set goals, along with 70 percent (N=39) of those that did not prepare other meals.

After asking about goal setting, the survey instrument listed 11 methods by which to evaluate goal attainment. The first method listed was the use of a "profit and loss statement". Forty-eight (73%) of the respondents indicated use of this method. Three associations were identified with this measure. The first association ($p=0.0315$, $x2=6.916$, $df=2$) found with this measure was the level of education. As with goal setting, those respondents who held master's degrees used profit and loss statements the most (87%, N=27) while only 59 percent (N=20) of those with bachelor's degrees used this measure. Ninety-two percent (N=24) of the respondents with the title of director or assistant director, and 73 percent (N=11) with the title of nutritionist or administrative dietitian used this measure while only 52 percent (N=13) of the dietary consultants used it ($p=0.0054$, $x2=10.443$, $df=2$). The amount of annual salary received by the respondents affected ($p=0.0001$, $x2=20.869$, $df=2$) the use of profit and loss statements. Ninety-three percent (N=14) of the dietitians earning $30,000 or more checked effectiveness with profit and loss statements, compared to 82 percent (N=31) of those earning from $20,000 to $29,000. In

contrast, only 23 percent (N=3) of those earning $19,000 or less utilized this measure.

Thirty-four percent (N=23) of the participants evaluated goal attainment by monitoring "sales volume". Fifteen (39%) of those earning $20,000 tO $29,000 annually used this measure along with over half (53%, N=8) of those receiving $30,000 or more (p=0.0084, x2=9.569, df=2). In contrast, none of the respondents earning $19,000 or less employed this control measure. The second association (p=0.0113, x2=6.414, df=1) revealed that seven out of 10 (70%) of the foodservices preparing meals for sites other than those listed on the survey instrument used sales volume to evaluate goal while only 16 out of 56 of those not preparing other meals did likewise. Twenty-one (33%) of the foodservices that did not make use of the assembly/serve food preparation system used this measure in comparison with two out of two using assembly/serve (p=0.0496, x2=3.856, df=1). The fourth association (p=0.0496, x2=3.856, df=1) found with this measure was the cook/chill food preparation method. As in the third association, 21 (33%) of those not using the cook/chill method used sales volume compared with two out of two of those operations employing this evaluation technique.

"Percent profit" was used to evaluate effectiveness by 39 percent (N=26) of the participants. Sixty percent (N=9) of the respondents earning $30,000 and more annually used

this measure while only 45 percent (N=17) of those receiving salaries of $20,000 to $29,000 did likewise (p=0.0031, x2=11.572, df=2). In contrast, none of the respondents who earned $19,000 or less evaluated goal attainment by using percent profit.

The next measure listed on the questionnaire was to compare an "increase in sales over the previous year", which was utilized by only 33 percent (N=22) of the respondents. Another goal attainment measure listed was "actual performance compared with forecasted performance". Fifty-six percent (N=37) of the dietitians used this measure and two associations were identified with it. Salary showed an association (p=0.0196, x2=7.866, df=2) with this measure of goal attainment: 73 percent (N=11) of those receiving salaries of $30,000 or more and 60 percent (N=23) of the respondents earning $20,000 to $29,000 annually used the measure. Only 23 percent (N=3) of those earning $19,000 or less compared actual versus forecasted performance. The second association (p=0.0317, x2=6.900, df=2) identified with this goal attainment measure was the number of breakfasts served per day. The highest usage occurred among those foodservices that served over 501 or more breakfasts daily (71%, N=10). Sixty-three percent (N=22) of the institutions serving 250 or less breakfasts per day used this measure, while only 29 percent of the operations serving 251 to 500 breakfasts did likewise.

Eighteen percent (N=12) of the survey participants conducted "personnel audits" in order to measure effectiveness. An association (p=0.0326, x2=4.569, df=1) showed that 17 percent of the foodservices that did not use the cook/freeze food preparation system employed personnel audits, along with the one operation that did use cook/freeze.

"Management by objectives (MBO) for management staff" was the next effectiveness measure listed and it received a response rate of 36 percent (N=24). Seven out of 10 foodservices that prepared meals for sites other than those listed on the survey instrument employed MBO, while only 30 percent (N=17) of those not preparing other meals did the same (p=0.0164, x2=5.762, df=1). Age also showed an association (p=0.0469, x2=3.949, df=1) with this measure. Forty-six percent (N=18) of the respondents aged 39 and under used this measure: in contrast, only 22 percent (N=6) of those 40 years of age and older managed by objectives.

Over half (53%) of the participants indicated that they "break goals into small measureable sub-goals". This measure was associated (p=0.0110, x2=6.467, df=1) with the foodservices that prepared meals for sites other than the ones listed on the questionnaire. Nine out of 10 foodservices preparing other meals answered affirmatively to the measure, while only 46 percent (N=26) of those operations not preparing other meals responded affirmatively.

The next measure of goal attainment was listed as "evaluation meetings". This method received a positive response rate of 62 percent (N=41). Another measure identified that 47 percent (N=31) of the survey participants were employed in foodservices where the "administration evaluated goal attainment".

"Personnel statistical reports" were compiled by 27 percent (N=18) of the respondents and showed two significant associations. The first association ($p=0.0022$, $x2=12.274$, $df=2$) revealed that 64 percent (N=9) of the foodservices serving 501 or more breakfasts per day used this effectiveness method. In contrast, only six out of 35 of those operations serving 250 or less breakfasts, and three out of 17 serving from 251 to 500 breakfasts used this measure. Daily lunch counts also showed a significant association ($p=0.0147$, $x2=5.955$, $df=1$) with preparing these reports. Of the operations serving 501 or more lunches per day, 43 percent (n=12) answered affirmatively, while 16 percent (N=6) of those serving 251 to 500 lunches did likewise.

Discussion of Effectiveness

The effectiveness measures used by the majority of the survey participants were: setting specific goals, profit and loss statements, actual performance compared with forecasted performance, break goals into small measurable

sub-goals, and evaluation meetings. Annual salary was the factor showing the most associations with the various measures of goal attainment. In most cases, the more annual earnings the respondents received, the more likely they were to measure this performance criteria. This relationship could be tied in with the highest educational degree obtained. Perhaps goal setting is taught extensively in higher education, and one could assume that the more education a respondent received, the more likely he or she would be to set goals, measure effectiveness, and also to earn a higher salary.

The effectiveness measures, sales volume, percent profit, setting specific goals, profit and loss statements, and actual performance compared with forecasted performance were directly affected by the variable, annual salary.

MBO for the management staff was used more by the younger group of respondents than the 40 and over age group. This could be due to the fact that younger managers are more up to date with the latest management techniques and also, they may be more open to change.

Personnel statistical reports were used as an effectiveness measure the most by the foodservices that prepared 501 or more breakfasts and lunches. Perhaps these foodservices have such a large number of employees that personnel statistical reports are an important tool in comparing the labor hours worked with the labor hours

scheduled. No associations existed between the measures of effectiveness and training in productivity measurement which was contrary to the researcher's expectations.

Quality

Quality was defined on the survey instrument as the degree to which the system conforms to specifications (Sink, 1983), or at the consumer level, fitness for use. In the section on quality, respondents were asked if they have specific quality standards for their operation, who developed the standards, how they control quality, the involvement of employees in quality standards, who is in charge of quality control, and the organizations that govern quality standards for the operation. Ninety-two percent (N=61) of the survey participants indicated that they have "quality standards that are specific to their operation". Similarly, Shaw (1983) found that 98 percent and Pickerel (1984) found that 96 percent of the responding operations utilized specific quality standards.

In the questionnaire section that asked who developed quality standards for their operation, the participants checked one or more responses. Fifty-four percent (N=37) of the respondents indicated that the "manager" developed quality standards while 32 percent (N=22) checked "assistant manager".

The foodservice "directors" received the highest response (67%) for developing quality standards. Eighty-nine percent (N=8) of those who completed three years of preplanned work experience in order to obtain registration status with ADA identified the director as being responsible for developing quality standards, along with 83 percent (N=10) who graduated from the CUP program, and 71 percent (N=20) of the interns. In contrast, only 43 percent (N=3) of those completing a traineeship and 38 percent (N=5) of those with master's degrees and six months work experience chose this response ($p=0.0368$, $x2=10.225$, $df=4$) (Table IV). An association ($p=0.0128$, $x2=8.720$, $df=2$) also found with this response was the number of dinners served per day. The director set standards for 81 percent (N=22) of the institutions serving 250 or less dinners, along with 68 percent (N=19) of those serving 501 and above, while only 36 percent (N=5) of those serving between 251 and 500 dinners each day indicated the same. Almost half (49%, N=34) of the participants indicated that the "assistant director" developed quality standards.

"Dietitians" determined quality standards in 39 percent (N=27) of the represented foodservices while only 20 percent (N=14) indicated that the "production manager" had this task. The number of lunches served each day influenced ($p=0.0126$, $x2=6.231$, $df=1$) whether the production manager developed quality standards: 34 percent (N=10) of the

TABLE IV

SIGNIFICANT ASSOCIATIONS FOUND IN QUALITY CONTROLS

Quality Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Director	Route to ADA membership ($p=0.0368$, $x^2=10.225$, $df=4$)	46	67
	Dinners served per day ($p=0.0128$, $x^2=8.720$, $df=2$)	46	67
Production Manager	Lunches served per day ($p=0.0126$, $x^2=6.231$, $df=1$)	14	20
Foodservice Management Company	Age ($p=0.0211$, $x^2=5.320$, $df=1$)	7	10
	Contracted foodservice ($p=0.0001$, $x^2=59.401$, $df=1$)	7	10
Other	Annual salary ($p=0.0235$, $x^2=7.504$, $df=2$)	12	17
Temperature check of food	Prepare meals for satellite schools ($p=0.0066$, $x^2=7.369$, $df=1$)	67	97

TABLE IV (Continued)

Quality Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Taste testing/can cutting of new food items by managment	Contracted foodservice ($p=0.0001$, $x^2=22.878$, $df=1$)	61	88
	Dinners served per day ($p=0.0062$, $x^2=10.166$, $df=2$)	61	88
Written standards for quality of food	Years of experience ($p=0.0015$, $x^2=15.361$, $df=3$)	47	68
Written standards for quality of service	Route to ADA membership ($p=0.0204$, $x^2=11.624$, $df=4$)	41	59
	Position title ($p=0.0309$, $x^2=6.954$, $df=2$)	41	59
	Years of experience ($p=0.0111$, $x^2=11.119$, $df=3$)	41	59
Manager personally tasting all food	Route to ADA membership ($p=0.0291$, $x^2=7.072$, $df=2$)	39	56
Detailed instructions to employees	Training in productivity measurement ($p=0.0314$, $x^2=4.633$, $df=1$)	53	77

TABLE IV (Continued)

Quality Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Use of fresh food	Age ($p=0.0179$, $x^2=5.609$, $df=1$)	58	84
Manager	Position title ($p=0.0326$, $x^2=6.845$, $df=2$)	48	69
Assistant manager	Breakfasts per day ($p=0.0491$, $x^2=6.026$, $df=2$)	31	45
Production manager	Age ($p=0.0107$, $x^2=6.510$, $df=1$)	34	49
	Dinners served per day ($p=0.0089$, $x^2=9.453$, $df=2$)	34	49
	Lunches served per day ($p=0.0216$, $x^2=5.280$, $df=1$)	34	49
	Years of experience ($p=0.0077$, $x^2=11.910$, $df=3$)	34	49
Contract company	Contracted foodservice ($p=0.0001$, $x^2=19.445$, $df=1$)	6	9
	Training in productivity measurement ($p=0.0319$, $x^2=4.601$, $df=1$)	6	9

TABLE IV (Continued)

Quality Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Contract company	Assembly/serve foodservice ($p=0.0354$, $x^2=4.426$, $df=1$)	6	9
Director	Training in productivity measurement ($p=0.0216$, $x^2=5.280$, $df=1$)	34	49
	Annual salary ($p=0.0336$, $x^2=6.789$, $df=2$)	34	49
Assistant director	Training in productivity measurement ($p=0.0356$, $x^2=4.418$, $df=1$)	28	41
Dietitian	Position title ($p=0.0134$, $x^2=8.620$, $df=2$)	26	38
Other	Registration status ($p=0.0115$, $x^2=6.383$, $df=1$)	14	20
	Prepare Meals on Wheels ($p=0.0411$, $x^2=4.171$, $df=1$)	14	20
State health codes	Position title ($p=0.0195$, $x^2=7.878$, $df=2$)	57	83
County health codes	Years of experience ($p=0.0277$, $x^2=9.119$, $df=3$)	35	51

TABLE IV (Continued)

Quality Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
City health codes	Contracted foodserice ($p=0.0270$, $x^2=4.888$, $df=1$)	27	39
	Registration status ($p=0.0042$, $x^2=8.201$, $df=1$)	27	39
Contract company standards	Contracted foodservice ($p=0.0001$, $x^2=50.867$, $df=1$)	8	12
	Breakfasts served per day ($p=0.0168$, $x^2=8.178$, $df=2$)	24	35

institutions serving 501 or more lunches daily employed the production manager in this function while only 10 percent (N=4) of those serving from 251 to 500 lunches did the same.

Of the eight contracted foodservice operations, 87 percent (N=7) responded that the "foodservice management company" developed their quality standards ($p=0.001$, $x2=59.401$, $df=1$). Another association ($p=0.0211$, $x2=5.320$, $df=1$) revealed that 17 percent (N=7) of the respondents who were 39 years of age or younger were employed by an operation that relied on a foodservice management company for quality standards, while none of those participants who were 40 years old or above relied on a contract company for such standards.

Seventeen percent (N=12) of the respondents replied that "other" persons such as the: purchasing agent, local health board, safety and sanitation officers, customers, ARA, and residence halls headquarters developed quality standards for their foodservices. An association ($p=0.0235$, $x2=7.504$, $df=2$) was found between this response and salary. Twenty-eight percent (N=11) of the respondents earning $20,000 to $29,000 annual salary indicated other persons developed standards, while only six percent (N=1) of those earning $30,000 and more, and none of those earning $19,000 or less chose this response.

Conducting a "temperature check of food in the steamtable" was the quality control that was most frequently

utilized (97%, N=67) by the survey participants. Sixty-four out of 65 of those foodservices that did not prepare food for meals on wheels checked food temperature while three out of four operations that did prepare food for meals on wheels used this measure (p=0.0066, x2=7.369, df=1).

All but six (91%) respondents "periodically surveyed their customers as to the quality of foodservice" and 85 percent (N=59) "conducted regular (unannounced) sanitation inspections". "Taste testing/can cutting of new food items by management" was used by 88 percent (N=61) of the respondents and showed two significant associations. The first association (p=0.0001, x2=22.878, df=1) revealed that noncontracted foodservices were more likely (95%, N=58) to use this quality control measure than contracted foodservices (37%, N=3). The next association (p=0.0062, x2=10.166, df=2) indicated that institutions serving 501 or more dinners per day were the most likely (96%, N=27) to utilize management for taste testing and can cutting, along with 93 percent (N=25) of the smaller operations serving 250 or less dinners daily. In contrast, 64 percent (N=9) of the establishments serving between 251 to 500 dinners each day used this measure.

"Written standards for quality of food" were used by 47 (68%) of the respondents and associated with two personal variables. Twelve out of 13 respondents with 11 to 15 years of experience in foodservice management used this quality

control measure along with 20 out of 23 (87%) of those with 16 or more years of experience (p=0.0015, x2=15.361, df=3). In contrast, written standards were used by half (N=8) of those with six to 10 years of experience and by seven out of 10 (41%) with one to five years of experience.

"Written standards for the quality of service" were used by 59 percent (N=41) of the participants. This quality control measure was found to be related (p=0.0204, x2=11.624, df=4) to the route taken to ADA membership. Interns were the most likely (82%, N=23) to employ written service standards and CUP program graduates ranked second (50%, N=6), while 55 percent (N=5) of those who had completed three years preplanned work experience, 38 percent (N=5) of the master's degree and six months work experience graduates, and two (28%) of the traineeship dietitians used it. The position title held by the respondents also influenced (p=0.0309, x2=6.954, df=2) this control measure. Dietary consultants and those holding titles other than the ones listed on the questionnaire used this measure most often (76%, N=19). Eleven out of 17 (65%) of the nutritionists or administrative dietitians used written food service standards while 11 out of 27 (49%) of the directors or assistant directors indicated usage. The last association (p=0.0111, x2=11.119, df=3) with this measure revealed that a larger number of dietitians with 16 or more years of experience (N=14, 61%) used this control measure than those

with 11 to 15 years of experience (N=12, 92%). In contrast, 10 out of 17 of those respondents with one to five years of experience, and only five out of 16 of those with six to 10 years experience relied on these standards.

The "manager personally inspected all food deliveries" in 48 percent (N=33) of the foodservices represented. The "manager personally tasted all cooked foods for quality" in 56 percent (N=39) of the respondents' places of employment. This control measure had an association (p=0.0197, x2=11.699, df=4) with the route taken to ADA membership in that the greatest number of respondents was found among the internship graduates (N=16, 57%). Likewise, 10 out of 13 (77%) of those who had completed a master's degree and six months work experience used this measure, while seven (58%) of the CUP program dietitians, and six (67%) of those who had completed three years preplanned work experience made use of this quality control. None of the dietitians who had completed a traineeship used this measure. The position title of the respondents also influenced (p=0.0291, x2=7.072, df=2) whether or not the manager personally inspected food deliveries. Eighteen (72%) of the dietary consultants or those holding titles not specifically listed on the questionnaire identified use of this variable. In contrast, 11 out of 17 (65%) of the nutritionists and administrative dietitians and 10 out of 27 (37%) employed as directors or assistant directors responded affirmatively.

"Purchasing specifications" were utilized by 88 percent (N=61) of the survey participants. "Detailed instructions to employees" were used by 77 percent (N=53) of the respondents. This measure was associated ($p=0.0314$, $x2=4.633$, $df=1$) with training in productivity measurement. Of those who had not received training, 27 (67%) replied positively to this measure compared to 26 (90%) of those who had such training.

"Menus, charts, and production schedules" were used by 93 percent (N=64) of the foodservices represented in this study. The "use of fresh food, if available and economical" was a quality control that was used by 84 percent (N=58) of the dietitians. Ninety-three percent (N=38) of the respondents who were 39 years old and younger in age used fresh food in comparison with 71 percent (N=20) of those who were at least 40 years old. Fourteen percent (N=10) of the respondents indicated that they used "other" quality controls and listed them as: testing recipes, ongoing employee training, service reports, daily production staff meetings, standardized recipes, student taste testing panel, and preparing food from scratch.

Respondents were asked if "quality standards were discussed with employees at any time beyond their initial training". This question was answered affirmatively by 93 percent (N=64) of the dietitians. "Managers" were indicated most frequently (69%, N=48) as being in charge of quality

control. Twenty-one (84%) of those with the title of dietary consultant or other indicated (p=0.0326, x2=6.845, df=2) that the manager was in charge of quality control, while only 14 (52%) of those employed as director or assistant director and 13 (76%) of the nutritionists and administrative dietitians replied in the same manner.

Forty-five (N=31) of the participants viewed the "assistant manager" as being in charge of quality control. The number of breakfasts served per day was related (p=0.0491, x2=6.026, df=2) to this question: the assistant manager was in charge of quality control in 17 (46%) of the foodservices serving 250 or less breakfasts per day along with 10 (67%) of those serving 501 or more. In contrast, only four (23%) of the respondents serving between 251 and 500 indicated that the assistant manager was responsible for quality control.

The "production manager" was in charge of quality control for 49 percent (N=34) of the represented institutions. Four associations were found with this question. The first association (p=0.0107, x2=6.510, df=1) revealed that 19 (68%) of those 40 years of age and over, along with 15 (37%) of those 39 years of age and below were employed in foodservices that relied on the production manager for quality control. The second association (p=0.0089, x2=9.453, df=2) revealed that 18 (64%) of the institutions serving 501 or more dinners each day held the production

manager responsible for quality control along with 14 (52%) of those serving 250 or less dinners. In contrast, only two (14%) of the foodservices serving 251 to 500 dinners responded affirmatively to this question. The number of lunches served daily also influenced ($p=0.0126$, $x2=5.280$, $df=1$) this factor in that 19 (65%) of those operations serving 501 or more lunches per day and 15 (37%) of those serving from 251 to 500 indicated that the production manager was in charge of quality control. Years of foodservice management experience was the last association ($p=0.0077$, $x2=11.910$, $df=3$) identified with this question. Eighteen (78%) of the respondents with 16 or more years of experience replied that the production manager was in charge of quality control, whereas only six (37%) of those in the six to 10 years experience category, five (38%) in the 11 to 15 year category, and five (29%) with one to five years experience also answered affirmatively.

Nine percent (N=6) of the participants relied on "contract companies" to control quality. Four out of eight contracted foodservices identified ($p=0.0001$, $x2=19.445$, $df=1$) that the contract company was in charge of quality control, while only two (33%) of the noncontracted operations answered positively. Training in productivity measurement also showed a significant association ($p=0.0319$, $x2=4.601$, $df=1$) with contract companies: five (17%) of the respondents with training in productivity measurement

replied that contract companies were in charge of quality control while only one person (2%) without training answered in a similar manner. The foodservices that used the assembly/serve food preparation system influenced ($p=0.0354$, $x2=4.426$, $df=1$) the response to contract companies. Five (75%) of the operations not using assembly/serve relied on contract companies for quality control while one out of two operations using assembly/serve did the same.

The "director" was in charge of quality control in 49 percent (N=34) of the represented foodservices. The respondents who had received training in productivity measurement indicated ($p=0.0216$, $x2=5.280$, $df=1$) that the director was responsible for quality control more often (65%, N=19) than those who had not received training (37%, N=15). Another association ($p=0.0336$, $x2=6.789$, $df=2$) with the director response identified that this person controlled quality in 18 out of 21 (46%) foodservices where the respondents earned $20,000 to $29,000 annually, and in 12 (75%) operations where the respondents earned $30,000 and more. In contrast, only four (29%) participants earning $19,000 or below identified the director as being in charge of quality control.

Forty-one percent (N=28) of the survey participants indicated that the "assistant manager" controlled quality at their foodservice. Once again, training in productivity measurement influenced ($p=0.0356$, $x2=4.418$, $df=1$) this

response: assistant managers were more likely to be in charge of quality control (55%, N=16) at the institutions employing trained individuals in productivity than at those where the respondents had received no such training (30%, N=12). "Dietitians" were identified as being in charge of quality control by 38 percent (N=26) of the survey participants. The position title of the participants influenced ($p=0.0134$, $x2=8.620$, $df=2$) response to this question: 65 percent (N=11) of the nutritionists and administrative dietitians answered this question affirmatively as did 10 (37%) of those employed as director or assistant director. Only five (20%) of the dietary consultants and those with other titles, however, indicated that dietitians controlled quality.

"Other" persons were responsible for quality control in 20 percent (N=14) of the represented foodservices and these people were identified as: the purchasing agent, employees, chef, assistant production manager, supervisor, and a management team. The first association ($p=0.0115$, $x2=6.383$, $df=1$) identified that nine (15%) of the registered dietitians checked other while only five (50%) of the non-registered respondents did likewise. A second association ($p=0.0411$, $x2=4.171$, $df=1$) revealed that 12 (18%) of the foodservices that did not prepare food for meals on wheels checked other while only two out of three of those

that did send out meals on wheels relied on these persons for quality control.

In asking which organizations govern quality standards, 83 percent (N=57) of the respondents checked "state health codes". The respondents' position title influenced ($p=0.0195$, $x2=7.878$, $df=2$) this choice: 23 (92%) of the dietary consultants and those with other titles, along with 16 (94%) of the nutritionists and administrative dietitians were governed by state health codes while only 18 out of 27 (74%) of the directors and assistant directors were also governed by the same organization.

"County health codes" governed quality standards for 51 percent (N=35) of the represented operations. An association ($p=0.027$, $x2=9.119$, $df=3$) existed which revealed that 15 (65%) of the respondents with 16 or more years of experience and nine (53%) of those with one to five years of experience were governed by county health codes. Only eight (61%) with 11 to 15 years and three (19%) with six to 10 years experience, however, were also governed by the county health codes.

Thirty-nine percent (N=27) of the survey participants identified themselves as being governed by "city health codes". An association ($p=0.0270$, $x2=4.888$, $df=1$) that was found revealed that 75 percent of the contracted foodservices (N=6) answered this question affirmatively, while a greater number of responses (N=21, 34%) was received

from those noncontracted foodservices. The ADA registration status of the respondents also identified (p=0.0042, x2=8.201, df=1) that those who were non-registered tended to be governed by city health codes more (80%, N=8) than the registered dietitians (32%, N=19). Twelve percent (N=8) of the respondents indicated that "contract company standards" influenced their quality standards. As expected, the contracted foodservices showed an association (p=0.0001, x2=50.867, df=1) with this question: 87 percent of the contracted operations were governed by their company's standards while only one (2%) foodservice that was not contracted was governed by the contract company standards.

Thirty-five percent (N=24) of the respondents answered that their foodservice was governed by "other" organizations such as: the university health inspector, their own foodservice administration, university codes, the Seventh Day Adventist Church, National Association of College and University Foodservices, federal standards, and JCAH. An association (p=0.0168, x2=8.178, df=2) was found with this response and the number of breakfasts served per day: 13 out of 37 (35%) foodservices serving 250 or less breakfasts checked other, and nine (60%) operations serving 501 or more breakfasts each day responded affirmatively, while only two (12%) of those serving between 251 and 500 breakfasts per day did likewise.

Discussion of Quality

Over 90 percent of the survey participants indicated that they had specific quality standards in their operation. Shaw (1983) and Pickerel (1984) also received over 90 percent response to this question in their research. Foodservice management companies set quality standards for almost all of the contracted foodservices which seems natural since these foodservices are directly linked to the management companies.

The most frequently used quality control measure was a temperature check of food in the steamtable. This could be due to the fact that food temperature is one of the first things a customer may notice and also, temperature can have a great effect on the flavor of food. Taste testing/can cutting of new food items by management was used more by noncontracted foodservices than contracted. Perhaps this is because noncontracted foodservices have more freedom to experiment with new food items and are not bound to routine policies and procedures as contracted operations might be. This quality control was also used by operations preparing 250 or less dinners per day. The managers roles may not be as specifically defined in smaller foodservices, and the number of employees would most likely be fewer than in large operations, therefore, the manager may have more time for "hands-on" activities such as taste testing and can cutting during the course of the day.

Interns most frequently responded to the quality control measure of the manager personally tasting all cooked foods. Detailed instructions were given to employees by those survey participants who had received training in productivity measurement. Productivity training classes usually stress the relationship between quality and employee participation, autonomy and input. By providing detailed instructions, managers are attempting to delegate some of the responsibility for quality into the hands of their employees.

Respondents who were 39 years of age and less used fresh food more often than those 40 years of age and older. This is not surprising since the public is becoming increasingly aware of health benefits associated with the use of fresh foods.

Efficiency

Efficiency on the survey instrument was defined as resources expected to be consumed / resources actually consumed (Sink, 1983). This section was included to identify which of the four resource categories (labor, materials, capital, energy) the respondents kept usage records of. "Materials" usage was the only resource monitored by all (N=68) of the respondents. This resource was also monitored most frequently (96%) by restauranteurs according to Lamb's (1984) research.

"Labor usage records" were kept by all but one (98%, N=67) of the respondents. Likewise, Lamb's (1984) research revealed that all but three (N=49, 94%) of the respondents kept labor records. Six significant associations were identified with this resource (Table V). All (N=58) of the foodservices that did not prepare meals for sites other than those listed on the questionnaire kept labor records, while 90 percent (N=9) of those preparing other meals kept such records (p=0.0153, x2=5.887, df=1). The influence (p=0.0001, x2=68.000, df=2) of the highest degree obtained revealed that all (N=35) of the participants with a bachelor's degree and all (N=32) with a master's degree monitored labor while the one respondent who held a Ph.D. did not. The registration status of each participant also influenced (p=0.0153, x2=5.887, df=1) who kept labor records: all (N=58) of the registered dietitians kept labor usage records while nine out of 10 (90%) of the non-registered respondents did so. The type of foodservice system used influenced labor monitoring in three ways. All (N=66) of the respondents not using assembly/serve kept labor records while only one out of two operations that did use assembly/serve kept such records (p=0.0001, x2=33.493, df=1). Similarly, all (N=65) of the foodservices not using cook/chill (p=0.0001, x2=21.990, df=1) and all of those not using cook/freeze (p=0.0001, x2=68.000, df=1) kept track of labor usage while

TABLE V

SIGNIFICANT ASSOCIATIONS FOUND IN EFFICIENCY CONTROLS

Efficiency Controls	Factors Showing Correlations	Respondents Using Control Measures N	%
Records kept of labor usage	Prepare other meals ($p=0.0153$, $x^2=5.887$, $df=1$)	67	98
	Highest degree obtained ($p=0.0001$, $x^2= 68.0001$, $df=2$)	67	98
	Registration status ($p=0.0153$, $x^2=5.887$, $df=1$)	67	98
	Assembly/serve ($p=0.0001$, $x^2=33.493$, $df=1$)	67	98
	Cook/chill ($p=0.0001$, $x^2=21.990$, $df=1$)	67	98
	Cook/freeze ($p=0.0001$, $x^2=68.000$, $df=1$)	67	98
Records kept of capital usage	Prepare other meals ($p=0.0481$, $x^2=3.908$, $df=1$)	51	75
Records kept of energy usage	Age ($p=0.0038$, $x^2=8.381$, $df=1$)	26	38
Compare resources used with resource utilization target	Contracted foodservices ($p=0.0441$, $x^2=4.051$, $df=1$)	47	69

TABLE V (Continued)

Efficiency Controls	Factors Showing Correlations	Respondents Using Control Measures N	%
Compare resources used with resource utilization target	Prepare meals for satellite schools ($p=0.0490$, $x^2=3.875$, $df=1$)	47	69
	Prepare other meals ($p=0.0221$, $x^2=5.238$, $df=1$)	47	69

only two out of three using cook/chill, and none using cook/freeze did likewise.

The next resource listed on the questionnaire, "capital" was followed by 75 percent (N=51) of the respondents. One association ($p=0.0481$, $x2=3.908$, $df=1$) with capital revealed that 41 (71%) of the foodservices that did not prepare meals for sites other than those listed on the survey instrument kept capital usage records while all (N=10) of those preparing other meals did so.

The last resource listed was "energy". Only 38 percent (N=26) of the respondents indicated that they kept records of energy usage. Age influenced ($p=0.0038$, $x2=8.381$, $df=1$) this resource in that those 40 years old and more followed energy usage more frequently (N=16, 59%) than those who were 39 years old and less (N=10, 24%).

The last question in the efficiency section asked the respondents if they "compared resources used with resource utilization targets". Sixty-nine percent (N=47) participants answered yes and three associations were identified. All (N=8) of the contracted foodservices compared resources with targets and only 65 percent (N=39) of the noncontracted operations answered this question positively ($p=0.0441$, $x2=4.051$, $df=1$). The next association ($p=0.0490$, $x2=3.875$, $df=1$) revealed that 72 percent (N=46) of the foodservices not preparing satellite meals compared resources with targets while only one out of three of those that prepared

meals for satellite schools did likewise. The last association (p=0.0221, x2=5.238, df=1) showed that all (N=10) of the operations preparing meals for sites other than those listed on the survey instrument responded positively to this question while 37 (64%) of those not preparing other meals also compared resources used with resource utilization targets.

Discussion of Efficiency

All of the respondents kept track of materials used by their foodservice and all but one monitored labor. The respondent with a Ph.D. was the only one not keeping track of labor usage. It is possible that he could have developed a sense of labor usage in his mind due to his experience and education and did not feel the need for recording labor usage on paper.

All of the survey participants who indicated preparing meals for sites other than those specifically listed on the questionnaire kept records of capital usage. This association may exist because if the foodservice sent meals out to other sites, it may have a greater cash flow than if it didn't and would therefore need to monitor capital usage on the premises, as well as for the other sites.

Energy was followed more by the 40 and over age group than by the dietitians who were 39 years and younger. It is possible that these older respondents had more

responsibility and the recording of this resource was within the scope of their duties.

All of the contracted foodservices indicated that they compared resources used with resource utilization targets. Because of the policy oriented nature of contract foodservice management companies, comparison of resources used with targets may be a common requirement.

Quality of Work Life

Quality of work life (QWL) was defined on the research instrument as work with meaning (Mali, 1978) or the degree to which work provides an opportunity for an individual to meet a variety of personal needs, to survive with security, to interact with others, to feel useful, to be recognized for achievement and to have an opportunity to improve one's skill and knowledge (Lippitt, 1978). The questionnaire section on QWL began by asking the respondents if they measured QWL in their operation. Forty percent (N=27) indicated that they measured QWL. Years of foodservice management experience influenced ($p=0.0212$, $x2=9.714$, $df=3$) whether QWL was measured: 63 percent (N=14) of those with 16 or more years of experience answered yes, while only seven (41%) of those with one to five years, three out of 13 (23%) with 11 to 15 years, and three out of 16 (91%) with six to 10 years of experience measured QWL (Table VI).

TABLE VI

SIGNIFICANT ASSOCIATIONS FOUND IN QUALITY OF WORK LIFE CONTROLS

QWL Control	Factors Showing Correlations	Respondents Using Control N	%
QWL measurement	Years of experience ($p=0.0212$, $x^2=9.714$, $df=3$)	27	40
Employee participation through suggestion	Cook/chill foodservice system ($p=0.0025$, $x^2=9.113$, $df=1$)	60	88
	Lunches served daily ($p=0.0489$, $x^2=3.880$, $df=1$)	60	88
Job redesign, enrichment, task identification	Prepare other meals ($p=0.0129$, $x^2=6.184$, $df=1$)	24	35
Provide promotion opportunities	Prepare other meals ($p=0.0399$, $x^2=4.221$, $df=1$)	50	73
	Annual salary ($p=0.0254$, $x^2=7.344$, $df=2$)	50	73
Provision of supplies, materials, and assistance to employees	Productivity Measurement Training ($p=0.0218$, $x^2=5.263$, $df=1$)	54	79
Raises based on performance appraisals	Annual salary ($p=0.0162$, $x^2=8.250$, $df=2$)	42	62
	Prepare congregate meals ($p=0.0243$, $x^2=5.070$, $df=1$)	42	62

TABLE VI (Continued)

QWL Control	Factors Showing Correlations	Respondents Using Control N	%
Commendation letters	Prepare other meals ($p=0.0059$, $x^2=7.592$, $df=1$)	22	32
Merit pay for management staff	Dinners served daily ($p=0.0063$, $x^2=10.131$, $df=2$)	27	39
Non-monetary performance awards	Annual salary ($p=0.0213$, $x^2=7.694$, $df=2$)	20	29
Monetary performance awards	Age ($p=0.0145$, $x^2=5.971$, $df=1$)	8	12
	Contracted foodservice ($p=0.0162$, $x^2=5.785$, $df=1$)	8	12
Plaques and certificates	Contracted foodservice ($p=0.0045$, $x^2=8.059$, $df=1$)	32	47
Bonuses (time, pay)	Prepare other meals ($p=0.0106$, $x^2=6.535$, $df=1$)	6	9
	Annual salary ($p=0.0279$, $x^2=7.158$, $df=2$)	6	9

TABLE VI (Continued)

QWL Control	Factors Showing Correlations	Respondents Using Control N	%
Suggestion system	Productivity Measurement Training ($p=0.0055$, $x^2=7.709$, $df=1$)	15	22
	Prepare other meals ($p=0.0375$, $x^2=4.326$, $df=1$)	15	22
Quality Circles	Cook/chill foodservice ($p=0.0087$, $x^2=6.889$, $df=1$)	10	14
	Cook/freeze foodservice ($p=0.0144$, $x^2=5.987$, $df=1$)	10	14
	Years of experience ($p=0.0097$, $x^2=9.685$, $df=3$)	10	14
	Highest degree obtained ($p=0.0097$, $x^2=9.279$, $df=2$)	10	14

Fifteen percent (N=10) of the survey participants indicated that they "used written job satisfaction questionnaires" as a QWL control measure. Eighty-eight percent (N=60) of the participants "encouraged employees to make suggestions, participate and cooperate with management on new projects, problem solving, goal setting, etc."; this measure was influenced ($p=0.0025$, $x2=9.113$, $df=1$) by the cook/chill foodservice system. Ninety-one percent of the foodservices that did not use cook/chill made use of this measure while only one out of three foodservices that use cook/chill encouraged employee suggestions, participation, and cooperation with management. The institutions serving between 251 and 500 lunches per day indicated the use of this QWL control measure more frequently (95%, N=37) than those serving 501 or more lunches daily (79%, N=23) ($p=0.0489$, $x2=3.880$, $df=1$).

"Turnover, absenteeism, and tardiness was monitored" by 79 percent of the dietitians, however, only 35 percent (N=24) of the respondents "made the job more interesting by redesigning, job enrichment, task identification, etc." An association ($p=0.0129$, $x2=6.184$, $df=1$) showed that more respondents (N=17, 29%) not preparing meals for sites other than those listed on the questionnaire used this measure than those preparing other meals (N=7, 70%). Seventy-three percent (N=50) of the respondents "provided promotion opportunities" to their employees. Forty out of 58 (69%) of

the foodservices that did not prepare meals for other sites provided promotion opportunities while all (N=10) of those that prepared these meals did likewise (p=0.0399, x2=4.221, df=1). Although this control measure was used the most by the group of respondents earning from $20,000 to $29,000 (N=28, 74%), the highest percentage of utilization (95%, N=15) occurred among those earning $30,000 and over. The participants who received annual salaries of $19,000 and below used this QWL measure the least (N=7, 50%) (p=0.0254, x2=7.344, df=2).

"Provide supplies, materials, and assistance to employees as needed" was a QWL control measure that 79 percent (N=54) of the respondents employed in their operation. A significant association (p=0.0218, x2=5.263, df=1) revealed that a higher percentage of respondents who had received training in productivity measurement (93%, N=26) used this control than those who had not received training (70%, N=28). Sixty-two percent (N=42) of the survey participants replied yes when asked if they "linked performance to rewards". "Raises were based upon performance appraisals" according to 62 percent (N=42) of the respondents. Two significant associations were found with this QWL control measure: the first association (p=0.0162, x2=8.250, df=2) revealed that those earning between $20,000 and $29,000 were the most likely (71%, N=27) to use this measure, and those earning $30,000 and over used it more (69%, N=11) than the

group earning $19,000 and below (28%, N=4). The second association (p=0.0243, x2=5.070, df=1) showed that 64 percent (N=42) of the participants not serving congregate meals used performance appraisals to determine raises while none of those who did serve congregate meals (N=3) employed the measure.

"Commendation letters" were used by 32 percent (N=22) of the dietitians as a QWL control measure. Those employed by institutions serving meals to sites other than the ones listed on the survey instrument used this response (p=0.0059, x2=7.592, df=1). Although the number of respondents serving other meals (N=7) was less than those not serving other meals (N=15), commendation letters were used by 70 percent of the managers serving other meals while only 26 percent not serving these meals did the same. "Verbal recognition" was given to employees by 90 percent (N=61) of the respondents. This QWL control measure was identified as the one used most frequently by the participants of this study and the same result was found by Shaw (1983). Verbal recognition was the second most frequently used QWL measure in Pickerel's (1984) study of Missouri restaurants.

"Merit pay for management staff" was provided by 39 percent (N=27) of the foodservices. The foodservices serving 250 or less dinners per day provided merit pay to their management staff (63%, N=17). In contrast, only 25 percent (N=7) of those serving 501 or more dinners daily

used this measure along with 23 percent (N=3) of those serving between 251 and 500 dinners (p=0.0063, x2=10.131, df=2).

"Non-monetary performance rewards" were used by the respondents more (29%) than monetary (12%) in this study and also in the Shaw (1983) and Pickerel (1984) studies. Salary influenced (p=0.0213, x2=7.694, df=2) the use of non-monetary performance rewards by the survey respondents. The greatest usage of this QWL control measure was among those earning $30,000 and over (56%, N=9). Those earning $20,000 to $29,000 used this measure the second most frequently (24%, N=9) while those receiving the lowest annual salary used non-monetary rewards the least (14%, N=2). Nineteen percent (N=8) of the respondents 39 years of age and younger used "monetary performance rewards" while none of those 40 years old and over utilized this control measure (p=0.0145, x2=5.071, df=1). Another association (p=0.0162, x2=5.785, df=1) revealed that three out of five of the contracted foodservices provided monetary performance rewards while only five out of 55 of the noncontracted operations did likewise.

Almost half (47%) of the participants indicated use of a "plaque, certificate, or another form of recognition" for their employees' efforts. Contracted foodservices influenced (p=0.0045, x2=8.059, df=1) the usage of plaques and certificates in that over half (53%) of the noncontracted

operations used this measure, while none of the contracted operations answered positively.

Employees were "recognized in newsletters and newspapers" by 44 percent (N=30) of the survey participants. "Bonuses" were used by only eight percent (N=6) of the respondents. The foodservices that prepared meals for sites other than those listed on the questionnaire influenced ($p=0.0106$, $x2=6.535$, $df=1$) the use of bonuses: 30 percent (N=3) of these operations replied that they used bonuses while only five percent (N=3) of the foodservices not preparing other meals did the same. Another association ($p=0.0279$, $x2=7.158$, $df=2$) revealed that 25 percent (N=4) of the highest paid dietitians used this measure, while only two out of 38 of those who received earnings in the middle salary bracket, and none of those in the lowest salary category used bonuses.

Twenty-nine percent (N=20) of the respondents employed the use of "scheduling preferences". Three percent (N=2) of the respondents indicated the use of "other" QWL measures such as an employee recognition day and an employee advisory committee. Twenty-two percent (N=15) of the dietitians indicated that they used "a participative management suggestion system". Thirty-eight percent (N=11) of those with productivity measurement training provided a suggestion system to employees while only 10 percent (N=4) of those without training used this system ($p=0.0375$, $x2=4.326$,

df=1). Pickerel (1984) also found a similar association: restauranteurs with training in productivity were more likely to use a suggestion system than those without training. Another association (p=0.0375, x2=4.326, df=1) revealed that five out of 11 respondents (45%) preparing meals for sites other than those listed on the questionnaire employed a suggestion system compared to 10 out of 58 (17%) of those not preparing other meals who also used this method. The respondents were asked to indicate the approximate number of suggestions accepted in the last year: answers ranged from four to 20, or many, and some remarked that suggestions were accepted daily. They were also asked what type of reward was given to the employees whose suggestions were accepted and the responses consisted of: verbal recognition, written recognition, a free meal, reflection on annual performance evaluation, and participation in actions to implement the suggestion.

"Fifteen percent (N=10) of the surveyed dietitians employed quality circles in their foodservices. Four significant associations were found with this QWL control measure. Two out of three of the foodservices using the cook/chill foodservice system used quality circles while only 12 percent (N=8) of those not using cook/chill employed this participative management technique (p=0.0087, x2=6.889, df=1). The cook/freeze foodservice system also showed an association (p=0.0144, x2=5.987, df=1) with this QWL control

measure: nine out of 68 of the respondents who did not use cook/freeze employed quality circles. Years of foodservice experience influenced ($p=0.0214$, $x2=9.685$, $df=3$) the use of this measure in that 31 percent (N=5) of those with six to 10 years and 22 percent (N=5) of those with 16 or more years of experience used this measure. In contrast, those with one to five and 11 to 15 years of experience did not use quality circles. The last association ($p=0.0097$, $x2=9.279$, $df=2$) showed that 21 percent (N=7) of those with master's degrees used this technique, while only two (6%) of those with bachelor's degrees also used it. The one respondent with a Ph. D. indicated that he used quality circles. The participants were also asked to describe their particular quality circle group and responses included: subcommittees within each department, departmental monthly meetings, a group of supervisors, daily production meetings, employee involvement circles that were active throughout the entire division of housing and food, meetings of employees from different areas, and problem identification, resolution, and implementation.

Discussion of Quality of Work Life

Quality of Work Life was measured most frequently by respondents who had over 16 years of experience in foodservice management. This could be the result of observing throughout the years the positive influence QWL programs

have on employees' work efforts and attitudes, and the fact that in the last decade QWL has become more popular in the business community. Provision of supplies, materials, and assistance to employees was a QWL measure used by respondents who had received training in productivity measurement. Perhaps the productivity training stressed the need for adequate materials, supplies and assistance to employees in order to eliminate possible delays in the transformation process, keep input quantities to a minimum, and also reduce frustration. Non-monetary rewards were used the most by the participants earning higher salaries, possibly because these dietitians had more responsibility and realized the value of such rewards in the motivation of their employees. Monetary rewards were used by the younger respondents (39 and below) than those 40 years of age and above. Perhaps younger dietitians are more money oriented and may not realize the value of non-monetary rewards, or they may have less experience in using other forms of rewards. These younger dietitians may also see the impact of monetary rewards as a more appropriate work incentive.

Suggestion system was a participative management technique used by those who had received productivity measurement training. This technique has attracted a great amount of attention in recent years and its affect on productivity is most likely a major topic in such training.

Innovation

Innovation was defined on the questionnaire as a deliberate, novel, specific change aimed at accomplishing the goals of the system more effectively (Mueller, 1971) or applied creativity. "Brainstorming" was used an an innovation technique by over half (55%) of the respondents. Those with productivity measurement training influenced ($p=0.0482$, $x2=3.902$, $df=1$) the use of brainstorming in that 69 percent (N=20) of these respondents used the technique while only 45 percent (N=18) of those without productivity training used it (Table VII). Similar significant findings were also identified in Pickerel's (1984) study ($p=0.0076$, $x2=7.123$, $df=1$) and Shaw's (1983) study ($p=0.0017$, $x2=9.815$, $df=1$). Another association ($p=0.0092$, $x2=6.792$, $df=1$) revealed that 10 out of 11 (91%) of the foodservices preparing meals for other sites used this technique while only 48 percent (N=28) of the operations that did not prepare other meals used it.

An "active suggestion system" was used by 36 percent (N=25) of the respondents and four associations were identified. The first association ($p=0.0053$, $x2=7.767$, $df=1$) revealed that 55 percent (N=16) of those with productivity training employed an active suggestion system while only 23 percent (N=9) of those without training used such a system. All (N=4) of the foodservices that prepared satellite meals used a suggestion system while only 32 percent (N=21) of those not involved with satellite schools had this system

TABLE VII

SIGNIFICANT ASSOCIATIONS FOUND IN INNOVATION TECHNIQUES

Innovation Technique	Factors Showing Correlation	Respondents Using Technique N	%
Brainstorming sessions	Productivity measurement training ($p=0.0482$, $x^2=3.902$, $df=1$)	38	55
	Prepare other meals ($p=0.0092$, $x^2=6.792$, $df=1$)	38	55
Active suggestion system	Productivity measurement training ($p=0.0053$, $x^2=7.767$, $df=1$)	25	36
	Prepare satellite meals ($p=0.0063$, $x^2=7.463$, $df=1$)	25	36
	Prepare other meals ($p=0.0392$, $x^2=4.254$, $df=1$)	25	36
	Age ($p=0.0345$, $x^2=4.469$, $df=1$)	25	36
Employee participation	Productivity measurement training ($p=0.0020$, $x^2=9.536$, $df=1$)	48	69
	Prepare other meals ($p=0.0167$, $x^2=5.725$, $df=1$)	48	69
	Registration status ($p=0.0237$, $x^2=5.117$, $df=1$)	48	69

TABLE VII (Continued)

Innovation Technique	Factors Showing Correlation	Respondents Using Technique N	%
Reward employee input	Route to ADA membership ($p=0.0260$, $x^2=11.047$, $df=4$)	4	6
	Highest degree obtained ($p=0.0001$, $x^2=19.059$, $df=2$)	4	6
	Assembly/serve foodservice ($p=0.0066$, $x^2=7.369$, $df=1$)	4	6
	Cook/chill foodservice ($p=0.0369$, $x^2=4.355$, $df=1$)	4	6
	Cook/freeze foodservice ($p=0.0001$, $x^2= 16.486$, $df=1$)	4	6
Other innovation techniques	Prepare other meals ($p=0.0207$, $x^2=5.350$, $df=1$)	1	1
Computer, word processor	Dinners served daily ($p=0.0121$, $x^2=8.834$, $df=2$)	39	56
	Productivity measurement training ($p=0.0234$, $x^2=5.141$, $df=1$)	39	56
	Annual salary ($p=0.0020$, $x^2=12.457$, $df=2$)	39	56
	Route to ADA membership ($p=0.0391$, $x^2=10.079$, $df=4$)	39	56

TABLE VII (Continued)

Innovation Technique	Factors Showing Correlation	Respondents Using Technique N	%
New equipment	Dinners served daily ($p=0.0139$, $x^2=8.555$, $df=2$)	60	87
	Productivity measurement training ($p=0.0062$, $x^2=7.504$, $df=1$)	60	87
Participative management method/quality circles	Years of experience ($p=0.0081$, $x^2=11.803$, $df=3$)	12	17
	Age ($p=0.0429$, $x^2=4.100$, $df=1$)	12	17
Watt mizer light bulbs	Prepare other meals ($p=0.0151$, $x^2=5.900$, $df=1$)	3	4

(p=0.0063, x2=7.473, df=1). An association (p=0.0392, x2=4.254, df=1) also revealed that 31 percent (N=18) of the foodservices not preparing other meals used this innovation technique compared to seven out of 11 of the foodservices that did prepare other meals. The last significant association (p=0.0345, x2=4.469, df=1) identified that 46 percent (N=19) of the respondents who were 39 years of age and under used an active suggestion system while only 21 percent (N=6) of those in the 40 and over age group used this technique.

Sixty-nine percent (N=48) of the dietitians responded positively to the innovation technique of "employee participation at meetings". Eighty-nine percent (N=26) of those who had received productivity training used this technique while only 55 percent (N=22) of those with no training used it (p=0.0020, x2=9.536, df=1). Another association (p=0.0167, x2=5.725, df=1) revealed that all (N=11) of the foodservices preparing meals for sites other than those specifically listed on the survey instrument encouraged employee participation at meetings. In comparison, 64 percent (N=37) of those not preparing other meals encouraged employee participation. All of the respondents not registered with ADA (N=10) used this innovation technique while 64 percent (N=38) of the registered dietitians did likewise (p=0.0237, x2=5.117, df=1).

Only four out of 69 respondents "rewarded employee input". Five associations were found with this technique. The only two routes that respondents had taken to ADA

membership which showed an association (p=0.0260, x2=11.047, df=4) with rewarding employees were the master's degree and six months work experience (23%, N=3) and the traineeship (14%, N=1) routes. None of the dietitians completing other routes indicated usage of employee rewards. The second association (p=0.0001, x2=19.059, df=2) identified that three out of 33 respondents with master's degrees and the one Ph.D. rewarded employee input. Another association (p=0.0066, x2=7.369, df=1) revealed that three out of 67 foodservices not using assembly/serve and one out of two that did use this system rewarded employees. Three out of 66 participants not using a cook/chill foodservice system and one out of three that did use cook/chill employed this innovation technique (p=0.0369, x2=4.355, df=1). The last association (p=0.0001, x2=16.489, df=1) found identified that this innovation method was utilized by three out of 68 foodservices not using cook/freeze and by the one operation that did use cook/freeze. "Employee training seminars" were provided for workers by 74 percent of the respondents.

One survey participant (1%) indicated that "other" innovation techniques were used such as visiting other foodservices to stimulate ideas. A significant association (p=0.0207, x2=5.350, df=1) revealed that one out of 11 of the foodservices preparing meals for sites other than those listed on the questionnaire used other innovation techniques

while the operations that did not prepare other meals answered this question negatively.

A "computer or word processor" was added to 56 percent (N=39) of the represented foodservices. Seventy-two percent (N=21) of the respondents who had received productivity measurement training added such new technology in contrast to only 45 percent (N=18) of those with no training ($p=0.0234$, $x2=5.141$, $df=1$). The number of dinners served per day showed an association ($p=0.0212$, $x2=8.834$, $df=2$) in that 67 percent (N=18) of those serving 250 or less, and 64 percent (N=18) of the foodservices preparing 501 or more dinners made this addition while only 21 percent (N=3) of those serving from 251 to 500 did likewise. Annual salary also influenced ($p=0.0020$, $x2=12.457$, $df=2$) this innovation technique as the greatest number of users occurred in the highest salary range. Ninety-four percent (N=15) of those earning $30,000 or more annually added computers or word processors compared to almost half (49%) of the respondents earning $20,000 to $29,000. Those earning the lowest salary ($19,000 and below) were the least likely to add such new technology (36%, N=5). The last association ($p=0.0391$, $x2=10.079$, $df=4$) that was found revealed that the route to ADA membership influenced the addition of a computer or word processor within the represented foodservices. Nineteen out of 28 (68%) of those completing an internship and nine out of 13 (69%) of those graduating with a master's degree and

six months work experience answered the question affirmatively compared to six (50%) who had graduated from the CUP program and four (57%) who had completed a traineeship. In contrast, only one out of nine (11%) of those obtaining registration through three years work experience added computers or word processors. "New menus and recipes" was included as an innovation technique in all of the represented foodservices.

"New equipment" was added in 87 percent (N=60) of the foodservices represented in the study. All (N=29) of the participants with training in productivity measurement added new equipment to their operation as compared to 77 percent (N=31) of those without training ($p=0.0062$, $x2=7.504$, $df=1$). It was also found ($p=0.0139$, $x2=8.555$, $df=2$) that the institutions serving the least number of dinners per day (250 or less) added new equipment the most (96%, N=26). Eighty-nine percent (N=25) of the foodservices preparing 501 or more dinners compared to only 64 percent (N=9) of those serving between 251 and 500 also answered this question positively. A "new kitchen or new services" was incorporated into 32 percent (N=22) of the represented institutions.

Seventeen percent (N=12) of the survey participants indicated use of "participative management method/quality circles". Eight out of 23 respondents with 16 or more years of foodservice experience used ($p=0.0081$, $x2=11.803$, $df=3$) this innovation technique in contrast to four out of 16

managers with six to 10 years experience. None of the respondents with one to five or 11 to 15 years experience indicated usage of quality circles. Respondents 40 years of age and older indicated use of this technique more frequently (28%, N=8) than those 39 years old or less (10%, N=4) ($p=0.0429$, $x2=4.100$, $df=1$).

A "new benefits plan" was used by 22 percent (N=15) of the participants. "Watt mizer light bulbs " were used by four percent (N=3) of the respondents and an association ($p=0.0151$, $x2=5.900$, $df=1$) was found with those preparing other meals. Two (19%) of the operations that prepared meals for sites other than those listed on the questionnaire used the light bulbs in contrast to only one out of 57 foodservices not preparing other meals. "New cleaning agents" were utilized by 47 percent (N=32) of the survey participants.

Discussion of Innovation

The survey participants with training in productivity measurement used brainstorming sessions more often than those with no training. This could be due to the fact that it is common for such training to emphasize the importance of participative management techniques. Active suggestion systems were also used more by those who had received productivity training than those who had not, perhaps for the same reason. The younger age group (39 and below)

exhibited a tendency to use an active suggestion system. This could be due to the fact that participative management techniques have been more popular in the business community recently than in the past. Employee participation at meetings was encouraged by the managers with productivity training which, again, could be the result of the training program stressing the importance of employee input.

Institutions represented by the respondents earning the highest annual salaries were the most likely to add computers or word processors. A possible explanation for this could be that the foodservices that can afford to pay their managers higher salaries may also have more capital with which to purchase new equipment. The ADA members who had graduated from internships or completed a master's degree and six months work experience showed a tendency to add new computers or word processors to their foodservice. These two groups of dietitians could have been exposed to more innovative techniques in their academic programs and/or clinical experience. Those with productivity measurement training also showed a tendency to add computers to their operation, perhaps for the same reason mentioned earlier.

The use of new menus and recipes, a standard foodservice practice, was an innovation method that was employed by all the respondents. New equipment was incorporated into the food transformation process by all of the managers who had received productivity training. These

particular managers may have realized the importance of work improvement methods and of providing their employees with the needed tools as a result of their training.

Profitability

Profitability was defined on the survey instrument as the earned investment (owner equity) or the return on all things a business owns (Rausch, 1982) or the relationship of revenue to costs. The first question in the profitability section asked the respondents to state the formulas that they used to measure this particular performance criterion. Thirteen percent (N=9) of the dietitians responded to this question with answers such as control of food and labor costs as related to sales, profit and loss statement, weekly operation statement, and revenue divided by costs. The next question in this section asked the respondents what happened when their budget was exceeded and listed 15 response choices, the first of which was "nothing in particular". Twelve percent (N=8) of the respondents worked in institutions where nothing in particular was done when the budget was exceeded. Seventy-two percent (N=49) of the participants indicated that exceeding the budget resulted in an "investigation of causes and budget readjustment". This response was chosen more frequently than any of the other 14 choices that were listed on the questionnaire.

A "written justification" was required when the budget was exceeded by 22 percent (N=15) of the represented foodservices. An association (p=0.0425, x2=4.117, df=1) showed that half (N=4) of the contracted foodservices were required to submit a written justification when the budget was exceeded while only 18 percent (N=1) of the noncontracted operations did so (Table VIII). The foodservices that prepared congregate meals influenced (p=0.0009, x2=11.089, df=1) this measure in that all (N=3) of these operations prepared a written justification when the budget was exceeded and only 12 out of 65 of those not preparing congregate meals did likewise. The fourth budget control measure listed was "demerits", of which none of the dietitians responded to. One participant indicated that a "cut off of funds" was implemented when the budget was exceeded.

"Price increases" were used by 21 percent (N=14) of the respondents to correct an overextended budget. Three associations were found with this measure, all dealing with the type of foodservice system used. Price increases were enforced to correct an exceeded budget by 18 percent (N=12) of the operations that did not use assembly/serve as a method of food preparation. In contrast, all (N=2) of those that did use this method raised their prices (p=0.0048, x2=7.948, df=1). The second association (p=0.0435, x2=4.076, df=1) revealed that 18 percent (N=12) of the

TABLE VIII

SIGNIFICANT ASSOCIATIONS FOUND IN PROFITABILITY CONTROLS

Profitability Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Exceeding budget results in written justification	Contracted foodservices ($p=0.0425$, $x^2=4.117$, $df=1$)	15	22
	Prepare congregate meals ($p=0.0009$, $x^2=11.089$, $df=1$)	15	22
Exceeding budget results in price increases	Assembly/serve foodservice ($p=0.0048$, $x^2=7.948$, $df=1$)	14	21
	Cook/chill foodservice ($p=0.0435$, $x^2=4.076$, $df=1$)	14	21
	Cook/freeze foodservice ($p=0.0479$, $x^2=3.915$, $df=1$)	14	21
Exceeding budget results in sales analysis	Prepare other meals ($p=0.0040$, $x^2=8.296$, $df=1$)	11	16
	Cook/freeze foodservice ($p=0.0218$, $x^2=5.259$, $df=1$)	11	16
Exceeding budget results in performance audit	Contracted foodservice ($p=0.0091$, $x^2=6.800$, $df=1$)	17	25
Exceeding budget results in volume increase	Registration status ($p=0.0399$, $x^2=4.221$, $df=1$)	4	6

TABLE VIII (Continued)

Profitability Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Exceeding budget results in cutting costs	Productivity measurement training ($p=0.0325$, $x^2=4.570$, $df=1$	22	32
	Annual salary ($p=0.0427$, $x^2=6.308$, $df=2$)	22	32
Exceeding budget results in portion controls	Lunches served daily ($p=0.0381$, $x^2=4.300$, $df=1$)	27	40
Meal Prices			
Meal prices determined by food cost + labor costs	Route taken to ADA ($p=0.0381$, $x^2=10.143$, $df=4$)	11	16
	Registration status ($p=0.0267$, $x^2=4.907$, $df=1$)	11	16
	Dinners served daily ($p=0.0053$, $x^2=10.484$, $df=2$)	11	16
Meal prices determined by food cost + overhead + labor + markup	Assembly/serve ($p=0.0262$, $x^2=4.945$, $df=1$)	20	29

TABLE VIII (Continued)

Profitability Controls	Factors Showing Correlation	Respondents Using Control Measures N	%
Meal prices determined by cost of meal, popularity of item	Registration status ($p=0.0093$, $x^2=6.756$, $df=1$)	3	4
	Age ($p=0.0342$, $x^2=4.484$, $df=1$)	3	4

operations not using the cook/chill method increased food prices when the budget was exceeded, compared to two out of three of those who used this method. The third association ($p=0.0479$, $x2=3.915$, $df=1$) showed that 19 percent of the foodservices that did not employ the method of cook/freeze used this profitability control measure along with the one operation that used cook/freeze.

The seventh profitability control measure listed on the questionnaire as "sales analysis" was used by 16 percent (N=11) of the respondents. When the budget was overspent, 45 percent (N=5) of the foodservices that prepared meals for sites other than those listed on the questionnaire conducted a sales analysis, compared to 10 percent (N=6) of those that did not prepare other meals ($p=0.0040$, $x2=8.296$, $df=1$). Fifteen percent (N=10) of the represented institutions not using the cook/freeze method of food preparation used this profitability control measure while the one institution using cook/freeze used sales analysis.

"Performance audits" were conducted by 25 percent (N=17) of the survey participants in order to identify problems with their budgets. An association ($p=0.0091$, $x2=6.800$, $df=1$) identified with this control measure showed that 12 out of 60 foodservices that were not contracted out to management companies used performance audits, in comparison to five out of eight of the contracted operations. Thirty-two percent (N=22) of the dietitians indicated that a

"review of funds" was performed when their budget was exceeded. "Labor control" was implemented in 54 percent (N=37) of the foodservices in an effort to control profitability. The eleventh measure listed on the questionnaire was "inventory control" and 48 percent (N=33) of the respondents indicated using this measure.

Six percent (N=4) of the survey participants employed a "volume increase" when their foodservice exceeded its budget. An association ($p=0.0399$, $x2=4.221$, $df=1$) with this measure showed an inverse relationship in that only two (20%) of the respondents not registered with ADA indicated use of this control measure along with two of the registered dietitians.

The next profit control measure listed on the questionnaire was to "cut costs". This measure was used by 32 percent (N=22) of the respondents and showed two significant associations. The first association ($p=0.0325$, $x2=4.570$, $df=1$) revealed that the respondents with no productivity training were more likely (42%, N=17) to cut costs than those with productivity measurement training (18%, N=5). The amount of annual salary received also affected ($p=0.0427$, $x2=6.308$, $df=2$) the use of this measure. Forty-five percent (N=17) of the dietitians earning $20,000 to $29,000 per year resorted to this measure when the budget was exceeded. In contrast, 21 percent (N=3) of those earning $19,000 or less, and 12 percent (N=2) of those

earning $30,000 or above employed this measure when the budget was overextended.

Forty percent (N=27) of the participants indicated the use of portion controls as a profit measure. Half (N=20) of the operations preparing lunches for 251 to 500 patrons indicated usage of this control measure, while only one-fourth (N=7) of those serving 501 or more lunches employed portion controls (p=0.0381, x2=4.300, df=1).

The last part of the profitability section asked the respondents to indicate how they determined meal prices. "Food cost + markup" was used by 23 percent (N=16) of the dietitians. "Food cost + labor costs" was used by 16 percent (N=11) of the participants and showed three associations. The route taken to ADA membership revealed an inverse association (p=0.0381, x2=10.143, df=4) with the method of determining meal prices. The dietitians who had completed a master's degree and six months work experience used this method the most (42%, N=5), and 25 percent (N=3) of the CUP program graduates employed this method, while only 11 percent of those graduating from an internship did so. The respondents who had completed three years pre-planned work experience along with those completing a traineeship did not use food cost + labor costs at all in the determination of meal prices. Seven (12%) of the registered dietitians used this method while only four (40%) of those who were not registered with ADA did likewise

(p=0.0267, x2=4.907, df=1). The third association (p=0.0053, x2=10.484, df=2) showed that 43 percent (N=6) of the foodservices preparing 251 to 500 dinners per day were the most likely to use this method. In contrast, 15 percent (N=4) of those serving 250 or less dinners and only one (4%) of the operations serving 501 or more dinners per day responded affirmatively to this method.

Forty-two percent (N=20) of the participants identified "food costs + overhead + labor + % markup" as the method used to determine food prices in their foodservices. Twenty-seven percent (N=18) of those who did not incorporate assembly/serve into their food transformation processes used this method while the only two operations using assembly/serve employed this method (p=0.0262, x2=4.945, df=1).

The "cost of meal, and popularity of item" was identified as a method of price determination by four percent (N=3) of the respondents and showed two associations. The first association (p=0.0093, x2=6.756, df=1) revealed that two out of 10 of the non-registered dietitians used this method in contrast to one out of 57 registered dietitians. Three (10%) of the respondents 40 years of age and over indicated use of this measure while none of the participants 39 and younger employed it (p=0.0342, x2=4.484, df=1).

Nine percent (N=6) of the dietitians determined meal prices by "volume sold and cost". Another 10 percent (N=7) of the participants answered that their meal prices were

"state regulated". "Other" ways of determining prices were used by 15 percent (N=10) of the respondents and included methods such as: arbitrary judgments; the use of food, labor, and overhead costs based on past years and projected inflation costs; and regulated by the board of directors.

Discussion of Profitability

The survey instrument asked respondents what happened when their foodservice's budget was exceeded. Investigation of causes and budget readjustment was the response most frequently indicated. Shaw's (1983) research identified the same measure as the most frequently used budget control. Labor control and inventory control were indicated by the respondents as the second and third most frequently used measures. These two responses showed similar usage frequencies (first and second respectively) in Lamb's (1984) study of Missouri restauranteurs. The popularity of labor and inventory control could be due to the fact that these are major inputs in the productivity process which ultimately affects profitability.

Written justification for an overextended budget was used by contracted foodservices and by those preparing congregate meals. Perhaps the contracted operations were required to keep extensive written records due to management policies. The demand for congregate meals may fluctuate thus making budget forecasting difficult. An unexpected

increase in the number of congregate meals may result in an overspent budget which could be easily justified by a written report. Also, congregate meals are perhaps monitored extensively by the area Agency on Aging, thus the need for written records.

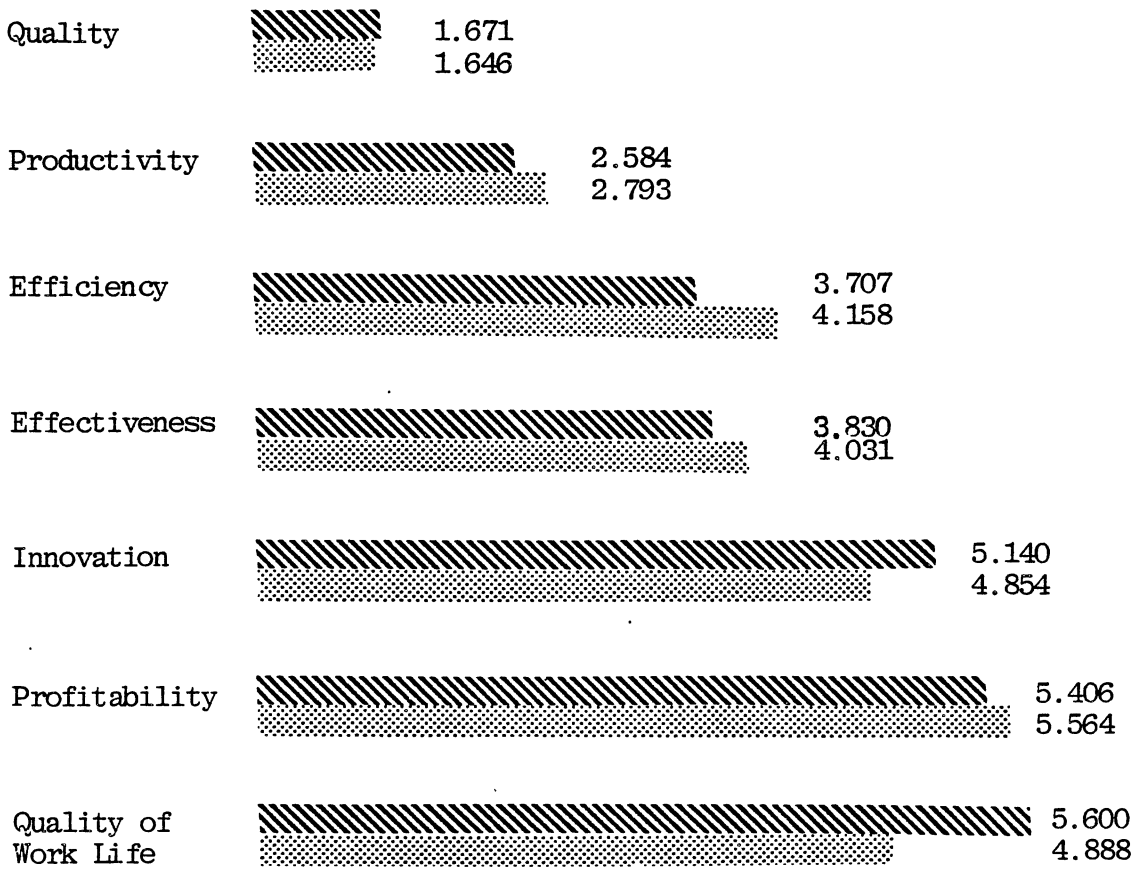
The foodservices that prepared meals for sites other than those listed specifically on the questionnaire indicated the use of a sales analysis when their budget was exceeded. An analysis of this type could show management where the overspending occurred and if it was justifiable. The responses to this section implied that in order to compensate for an exceeded budget, dietitians placed more emphasis on internal control devises rather than on price adjustments.

The most frequently used method for determination of meal prices was the calculation of food cost + overhead + labor + % markup. The finding is similar to Lamb's (1984) results, along with the second most frequently used method of food cost + markup. The method of calculating food cost + labor costs to determine meal prices was used the most by non-registered respondents and by the foodservices preparing 251 to 500 dinners per day. This method does not take into consideration the overhead operating costs. Those respondents who were not registered with the ADA may not have had the extensive management training that the registered members received and may not be adequately aware of the

affect that overhead costs can have on an operation. Some colleges and universities may also subsidize overhead expenses or count them under housing expenses instead of foodservice, therefore absorbing this cost of the foodservice. The foodservices preparing 251 to 500 dinners daily may be located within another building such as a student union where overhead costs are not readily available. They also may not add a percent markup to the cost of meals if their goals are more service oriented that profit oriented.

Performance Criteria Ranking by Time Spent and Importance

The last two sections of the survey instrument asked the respondents to rank the seven performance criteria on the basis of the time spent in evaluating each and how important each is to the successful operation of the foodservice. Quality and productivity were both ranked the same in terms of time spent in evaluation and perceived importance. The other five performance criteria were ranked differently depending on time or importance (Figure 4). These results are different from those of Pickerel (1984) and Lamb (1984) which showed the performance criteria to be ranked the same both in evaluation time and perceived importance. Shaw (1983) also found similar results in that



Arithmetic mean for each individual criteria

Ranking on the basis of:

= time spent in evaluation
= importance to the foodservice

where "1" is high and "7" is low

Figure 4. Performance Criteria Ranking

all of the performance criteria were ranked the same except for QWL and innovation.

Quality was considered to be the most important criteria, based on both the amount of evaluation time and perceived importance. This same performance criteria emerged as the most important in Shaw's (1983) research and in the Pickerel and Lamb (1984) studies. Productivity ranked second in both evaluation time and importance for success. Likewise, Shaw's (1983) research showed productivity to be second, but the Pickerel and Lamb (1984) studies identified profitability as the second most important criteria with productivity ranked third. This is not surprising when one considers that the present research was conducted with college and university foodservices, Shaw (1983) studied those in health care delivery systems, and Pickerel and Lamb (1984) researched Missouri restaurants.

QWL received the least amount of attention by the survey participants and was ranked six out of seven in terms of perceived importance for a successful operation. Profitability was ranked sixth based on evaluation time and last in determining the success of the represented foodservices.

Hypotheses Testing

In H1, the respondents' years of education, years of experience, training in productivity measurement, and age affected the use of inputs, while years of experience,

registration status, and route to ADA membership affected the use of outputs (Figure 3). Based on these results, the researcher rejected H1.

In H2, the factors that affected the use of inputs included: contracted foodservices, type of foodservice system utilized, number of meals served per day, and meals prepared for sites other than regular foodservice. In contrast, the institutional variables that influenced the use of outputs were: type of foodservice system utilized, contracted foodservices, meals prepared for sites other than the regular foodservice, and the number of meals served per day. Due to these associations, the researcher rejected H2.

In H3, productivity ratios were affected by training in productivity measurement, the route to ADA membership, registration status, and age. Based on these results, H3 was rejected by the researcher.

Meals prepared for sites other than the regular foodservice, contracted foodservices, and the number of meals served per day affected the productivity ratios used in H4, therefore, the researcher rejected H4.

The effectiveness measures used to evaluate goal attainment in H5 were affected by the personal variables: highest degree obtained, position title, annual salary, years of experience, and age. Since five out of eight personal variables affected goal attainment measures, the researcher rejected H5.

In H6, meals prepared for sites other than the regular foodservice, the type of foodservice system utilized, and the number of meals served daily affected the measures used to evaluate goal attainment, therefore, the researcher rejected H6.

In H7, the personal factors that affected quality control measures were the route to ADA membership, training in productivity measurement, age, annual salary, years of experience, position title, highest degree obtained, and registration status. Based on these results, the researcher rejected H7.

Institutional variables that significantly affected quality control measures in H8 consisted of: number of meals served per day, contracted foodservices, type of foodservice system utilized, and the meals prepared for other sites than the regular foodservice. Since all four institutional variables affected this criteria, H8 was rejected.

The personal variables that affected the type of resources used to monitor efficiency in H9 by dietitians were: the highest degree obtained, registration status, and age. Although only three out of eight variables affected this performance criteria, the researcher rejected H9.

Institutional variables that affected the type of resources used to monitor efficiency in H10 by the survey participants included: meals prepared for sites other than

the regular foodservice, the type of foodservice system utilized, and contracted foodservices. Based on these results, H10 was rejected by the researcher.

QWL measures used by the respondents were affected in H11 by the personal variables of : years of experience, annual salary, productivity measurement training, and the highest degree obtained. Based on these results, the researcher rejected H11.

In H12, QWL measures were affected by the type of foodservice system utilized, the number of meals served each day, and the meals prepared for sites other than the regular foodservice. Based on these results, the researcher rejected H12.

In H13, annual salary, training in productivity measurement, and age were the personal factors that affected the rewards linked with performance measures. Based on these three variables, the researcher rejected H13.

Three out of four institutional variables affected the rewards linked with performance measures in H14: meals prepared for sites other than the regular foodservice, number of meals served per day, and contract foodservices. Because these variables were identified with rewards, H14 was rejected.

In H15, the innovation techniques used by dietitians were affected by personal variables; ~~included:~~ productivity measurement training, age, registration status, route to ADA membership, and the highest degree

obtained. Since five out of eight personal variables had an affect on innovation techniques, H15 was rejected.

In H16, the type of foodservice system utilized, and meals prepared for sites other than the regular foodservice significantly affected the innovation techniques used by the survey respondents, therefore, H16 was rejected.

Processes, methods, products, or technology used within the last three years in H17 were affected by: annual salary, productivity measurement training, route to ADA membership, years of experience, and age. Based on these results, the researcher rejected H17.

In H18, the number of meals served per day and meals prepared for sites other than the regular foodservice affected the processes, methods, products, or technology used within the last three years. Based on these results, the researcher rejected H18.

In H19, the profitability measures used by dietitians were affected by registration status, productivity measurement training, and annual salary. Based on these results, the researcher rejected H19.

In H20, meals prepared for sites other than the regular foodservice, contracted foodservices, the number of meals served per day, and the type of foodservice system utilized all affected the profitability measures used by the respondents. Since all of the institutional variables influenced H20, it was rejected.

The meal prices used by dietitians in H21 were affected by the personal variables of age, registration status, and route to ADA membership, therefore, the researcher rejected H21.

In H22, the number of meals served per day, and the type of foodservice system utilized affected the meal prices used by dietitians. Based on these results, the researcher rejected H22.

CHAPTER V

SUMMARY, RECOMMENDATIONS, AND IMPLICATIONS

Introduction

The objectives of this research were as follows: to identify current performance measures that were being used by dietitians in college and university foodservice systems; to determine the importance placed on the defined organizational performance criteria and the amount of time spent in evaluating them, to aid in the further establishment of performance standards for foodservice operations, and to formulate suggestions as to how these standards could be used by dietitians in college and university foodservice.

A closed-question survey instrument was used to accomplish the objectives of this study. Questionnaires were mailed to 242 dietitians who were members of the American Dietetic Association practice group, Dietitians in College and University Foodservice. Sixty-nine (28.5%) usable responses were analyzed using frequency distribution and Chi Square.

Description of the Sample

Fifty-nine percent of the 69 survey participants were 39 years of age or less, while 41 percent were 40 years old or more. Approximately one-half (51%) of the respondents had earned a bachelor's degree, while the remaining dietitians held a master's degree, along with one Ph.D.

Eighty-five of the respondents were registered dietitians in contrast to the other 15 percent who were not. An internship was the most frequently used route to ADA membership (41%) while the traineeship was the least used route (Figure 3).

Thirty-three percent of the dietitians had 16 or more years of experience, 19 percent had 12 to 15 years of experience, 23 percent had six to ten years of experience, and one-fourth of the respondents had one to five years of experience (Figure 2). Thirty-nine percent of the respondents held position titles of director or assistant director, one-fourth were nutritionists or administrative dietitians, and 36 percent held other titles. Over half (57%) of the sample earned between $20,000 and $29,000 annually, while 20 percent received $19,000 or below and 23 percent received $30,000 or above (Table I). Fifty-eight percent of the participants had received training in productivity measurement in contrast to 42 percent who had not received such training.

All of the foodservices used a conventional foodservice system. In addition to conventional, two respondents used assembly serve, four used cook/chill, and one used cook/freeze foodservice systems. Eight of the represented foodservices were managed by contract companies. Four foodservices prepared meals for satellite schools, three prepared food for meals on wheels, while three facilities prepared food for congregate meals. Lunch was the meal prepared for the largest amount of customers in most of the represented foodservices.

Performance Criteria

Over 90 percent of the respondents were controlling all input measures listed with the exception of the two energy controls. Only 41 percent of the respondents were evaluating energy costs along with 29 percent who were monitoring the energy usage of equipment. These findings are similar to Shaw's (1983) and Lamb's (1984) data concerning input controls.

Outputs were also being followed by most of the respondents. A system for utilizing leftover bulk foods, keeping production records for cafeteria and/or catering, and monitoring the meals served daily were three output control measures being used by 98 percent of the respondents. Years of experience and registration status were two factors that showed an association with keeping production records for

cafeterias and/or catering; the registered dietitians used this measure, perhaps because of the education and training required to obtain registration status. The only foodservice that did not use a system for leftover bulk foods was one that was contracted to a management company. Meals served daily was evaluated by all of the foodservices that were contracted to a management company and that prepared meals for meals on wheels. This particular output measure is relatively easy to obtain and can be widely used. The only output measure associated with training in productivity measurement was that of periodically reviewing and revising job descriptions in order to prevent duplication of of tasks. Perhaps this was due to these respondents having the knowledge that time taken out to revise a job description will be more than compensated for by the resulting decrease in labor input.

The most popular productivity ratio was identified as meals/total food cost and was used by 61 percent of the survey participants. This ratio is easily determined by gathering pre-existing data from production and purchasing records. The productivity ratio, meals/labor hours worked was ranked second in usage frequency and was related to training in productivity measurement. This ratio is an accurate measure of productivity due to the fact that it excludes hours paid that are not actually worked.

The effectiveness measures used most often were:

setting specific goals, profit and loss statements, evaluation meetings, actual performance compared with forecasted performance, and breaking goals into small measurable subgoals. The participants with master's and Ph.D. degrees responded the most frequently to setting specific goals. Those earning $30,000 or more were identified as the salary group that was most likely to use profit and loss statement. Years of foodservice management experience affected the use of comparing actual performance with forecasted performance in that those participants with the most experience utilized the measure the most, and those with the least experience compared performance the least. Those earning the highest salaries also used this measure the most.

There was a tendency for foodservices that prepared other meals to break goals into small measurable subgoals. Training in productivity measurement showed no associations with the effectiveness control measures which was contrary to the researcher's expectations.

Directors developed quality standards most frequently in the represented foodservices and the respondents who had received training in productivity measurement indicated this response more frequently than those who had not received such training. As expected, contracted foodservices relied on their management company to develop quality standards. Most of the foodservices that utilized other persons for the

development of such standards were represented by dietitians earning from $20,000 to $29,000 annually.

The most popular quality control measure used by the survey participants was a temperature check of food in the steamtable. The respondents who had obtained ADA membership by completing an internship were the most likely to use written standards for the quality of food and service, and to utilize the manager for personally tasting all food. Getting standards down in writing is a very important communication tool which may have been stressed during the internship program.

Dietitians who had received productivity training indicated that they utilized detailed instruction to employees and other quality control measures in their foodservice. Fresh food was purchased more by the dietitians who were 39 years of age and younger than by those 40 and above.

When asked who was in charge of quality control, the response of manager was indicated most frequently. State health codes governed 83 percent of the represented foodservices, and contracted foodservices identified their management company as governing quality standards.

The efficiency controls, labor and materials were recorded by 98 and 100 percent, respectively, by the respondents. Registered dietitians consistently kept records of labor. Capital usage, an efficiency control, was monitored by three-fourths of the dietitians and by all of those

employed in foodservices that prepared meals for sites other than those listed on the questionnaire. Energy usage was followed the least and those who were 40 years old and older were more likely to take interest in this control than the younger respondents. Sixty-nine percent of the survey participants compared resources used with resource utilization targets, and all of the contracted foodservices responded positively to this control measure.

Less than half (40%) of the surveyed dietitians measured QWL in their organizations. Verbal recognition was the most popular reward used for above average employee performance. The second most popular QWL method used was to encourage employees to make suggestions, participate and cooperate with management on new projects, problem solving, goal setting, etc. The foodservices preparing from 251 to 500 lunches daily exhibited usage of such employee participation techniques. Monitoring turnover, absenteeism, and tardiness ranked as the third most popular QWL measure. The provision of supplies, materials, and assistance to employees was done by 79 percent of the dietitians and a greater percentage of those who had received training in productivity measurement answered affirmatively. Merit pay for management staff also was used more often by individuals who had productivity training.

Contracted foodservices made use of monetary performance rewards but did not recognize their employees with

plaques and certificates. Dietitians earning annual salaries of $30,000 and above emerged as the most likely to issue bonuses to their employees. A suggestion system was used by participants with productivity measurement training along with quality circles. These are two effective techniques that permit employee participation and contribute to the meaningfulness of work which are commonly addressed in productivity training programs. Quality circles were used more by respondents with master's degrees and Ph.D.'s than by those with bachelor's degrees. These dietitians who have done post graduate work have had a greater opportunity to receive productivity training during their course of study than those graduating with a bachelor's degree.

New menus and recipes were used as a source of innovation by all of the respondents. New equipment was identified as the second most popular innovation and all the the dietitians who had received productivity measurement training responded affirmatively to this technique. Almost three-fourths of the respondents offered employee training seminars and 69 percent encouraged employee participation at meetings. Nonregistered dietitians and those with productivity training were among the most likely to seek employee participation at meetings.

Other innovative methods associated with training in productivity measurement were: brainstorming sessions, an active suggestion system, and the use of a computer or work

processor. The foodservices that prepared meals for sites other than those listed on the questionnaire showed associations for all but three of the innovation techniques listed in Table 7. All of the innovation techniques associated with these particular foodservices except the use of watt mizer light bulbs were aimed towards the participative management style. Perhaps the reason other meals were prepared by these foodservices is that management was creative in seeking out new clients. This creativity for increasing sales volume, along with the extensive use of participative innovation techniques may be a direct reflection of the entrepreneurial abilities of management.

Over half (56%) of the survey participants had added a computer or word processor to their foodservice within the last few years. These particular foodservices prepared either 250 or less dinners per day or 501 or more dinners daily. The dietitians employed where computers and word processors were added usually had the common characteristics of productivity measurement training, annual salary of $30,000 or more, and had been interns or completed a master's degree and six months work experience.

Similar to Lamb's (1984) research findings, profitability controls were not used as frequently as the productivity controls. When the budget was exceeded, investigation of the causes and budget readjustment was the most frequently used control measure indicated by the respondents in this

study and also Shaw's (1983). Labor control and inventory control were ranked as the second and third most popular profitability control measures. Labor and inventory are two very important inputs which directly affect an organization's profitability, therefore control of these inputs should take high priority in profitability measurement.

The performance criteria, quality, emerged as the most important criteria and also received the largest amount of evaluation time by the respondents (Figure 4). Productivity ranked second out of the seven criteria in both time and importance while quality of work life received the least amount of evaluation time and was considered next to last for importance to the foodservice.

Recommendations

Questionnaire

A major limitation of this study was the low response rate. Although a post card follow up mailing was done to remind dietitians of the survey, a second copy of the questionnaire could have been sent to elicit greater response (Appendix A). In the demographic section of the survey instrument, a question to determine if the foodservice was for profit or not for profit would have yielded additional information for identifying institutional-specific associations with the various perfor-

mance measures listed in the questionnaire. Also in the demographic section of the survey instrument, the question asking the number of years in foodservice management positions contained a typographical error: the 11 to 15 years response option was listed incorrectly as 12 to 15 years.

Recommendations Based on the Results of the Study

1. Since productivity is a current topic of concern, dietitians need to seek additional training in this area of organizational performance in order to become more aware of the benefits of such measurements. Training could be received via seminars, educational material, or graduate courses.

2. Productivity ratios need to be used more extensively in order to contribute to the standardization needed for productivity assessment in the foodservice industry. Minimal instruction on productivity ratios would be required since many of the respondents were controlling inputs and outputs and need only to plug in the appropriate figures in order to obtain such ratios. The standardization of these ratios would contribute to a data base so that comparisons could be made both within and among foodservices.

3. Energy awareness was not of much concern to the respondents of this study as was found by Shaw (1983) and Lamb (1984). Although the foodservice industry is labor

intensive, these organizations could benefit from a partial productivity ratio with energy as the sole input, or a total factor productivity ratio which would incorporate all four resource categories (labor, materials, capital, and energy) as inputs for the ratio. Such ratios would enable management to monitor the affect of energy usage on productivity.

4. The section where respondents ranked the seven criteria in terms of time spent evaluating them and how important they were to their foodservice revealed that quality of work life was not important nor was much time spent evaluating it. The issue of quality of work life should be emphasized in training of dietitians as it plays a major role in employee productivity.

5. The results of this study indicated that organizational performance measures in college and university foodservice can be identified and measured. The performance measures found in this study need to be disseminated to all college and university foodservices so that data can be collected over time. Dietitians in these operations can then "oversee" the performance of their organizations for a period of time to determine where improvements may be made to increase productivity.

Implications

Research regarding organizational performance measures had been conducted by Shaw (1983), Pickerel (1984), and Lamb

(1984), along with the present study. The results of these studies could be incorporated into an independent productivity educational module to be completed by dietitians at their place of employment. Such educational material could instruct managers on the appropriate performance measures so that measurement, evaluation and control of their organization's performance could be done in an efficient manner, contribute to industry standardization, and serve to increase the productivity of foodservice organizations.

BIBLIOGRAPHY

Anthony, R. N. and Herzlinger, R. E. Management Control in Non-Profit Organizations. Homewood, Ill.: Richard D. Irwin, 1980.

Barr, A. J. A User's Guide to SAS 76. Raleigh, N.C.: SAS Institute, 1976.

Bellas, C. J. and Olsen, M. D. Managing innovation in the foodservice organization. The Cornell Hotel and Restaurant Administration Quarterly, 1978, 17(4), pp. 36-39.

Best, J. W. Research in Education. Englewood Cliffs, N.J.: Prentice-Hall, 1981.

Bluedorn, A. C. Cutting the Gordian knot: a critique of the effectiveness tradition in organization research. Sociology and Social Research, 1980, 64(4), pp. 477-496.

Bobeng, B. J. and David, B. D. HACCP models for quality control of entree production in hospital foodservice systems. Journal of the American Dietetic Association, 1978, 73, pp. 524-535.

Boss, D. and Shuster, K. The search is on: productivity in foodservice. Food Management, 1981, 16(3), pp. 42-47.

Bowditch, J. L. and Buono, A. F. Quality of Work Life Assessment: A Survey Based Approach. Boston: Auburn House, 1982.

Brayton, G. Simplified method of measuring productivity identifies opportunities for increasing it. Industrial Engineering, 1983, 15(2), pp. 49-56.

Burke, W. W. Organization Development: Principles and Practices. Boston: Little, Brown, and Co., 1982.

Carnes, R. B. and Brand, H. Productivity and new technology in eating and drinking places. Monthly Labor Review, 1977, 12, pp. 9-15.

Cole, E. R. The Japanese lesson in quality. Technology Review, 1981, 83(7), pp. 29-32, 36-40.

Drange, K. M. Information systems: does efficiency mean better performance: Journal of Systems Management, 1985, p. 22.

Drucker, P. F. The Practice of Management. New York: Harper and Row, 1954.

Drucker, P. F. Management, Tasks, Responsibilities, Practices. New York: Harper and Row, 1974.

Drucker, P. F. Innovation and Entrepreneurship: Practice and Principles. New York: Harper and Row, 1985.

Dudick, R. S. Profile for Profitability: Using Cost Control and Profitability Analysis. New York: John Wiley and Sons, 1972.

Dukas, P. Planning Profits in the Food and Lodging Industry. Boston: Cahners Books, 1976.

Eaton, W. V. The challenge for independents: solve problems with innovation. Foodservice Marketing, December, 1982, pp. 45-50.

Feigenbaum, A. V. Quality: managing the modern company. Quality Progress, 1985, pp. 18-21.

Ferderber, C. J. Measuring quality and productivity in a service and environment. Industrial Engineering, 1981, 13(7), pp. 38-47, 84.

Fourth Annual Jobs Report. Restaurants and Institutions, 1982, 90(1), pp. 29-101.

Fox, D. J. The Research Process in Education. New York: Holt, Rienhart, and Winston, 1969.

Freshwater, J. F. and Bragg, E. K. Improving food service productivity. The Cornell Hotel and Restaurant Administration Quarterly, 1975, 15(4), pp. 12-18.

Friedlander, R. and Pickle, H. Components of effectiveness in small organizations. Administrative Science Quarterly, 1968, 17, pp. 289-304.

Fuller, S. J. Corporate approaches to the quality of work life. Personnel Journal, 1980, 59(8), pp. 632-637.

Garvin, D. A. What does product quality really mean? Sloan Management Review, 1984, pp. 25-43.

Georgopoulos, B. and Tannenbaum, A. S. A study of organizational effectiveness. American Sociological Review, 1957, 22, pp. 534-540.

Grossman, E. S. Recent Trends in Productivity in Total Factor Productivity Index. Houston: American Productivity Center, 1980.

Hall, R. H. Effectiveness theory and organizational effectiveness. Journal of Applied and Behavioral Science, 1980, 16(4), pp. 929-964.

Hackman, J. R. and Oldham, G. R. Work Redesign. The Phillipines: Addison-Wesley, 1980.

Herrick, N. How dissatisfied is the American worker? Society, 1981, 18(2), pp. 26-33.

Huck, S. W., Cormier, W. H., and Bounds, W. G. Reading Statistics and Research. New York: Harper and Row, 1974.

Juran, J. M. and Gryna, F. M., Jr. Quality Planning and Analysis. New York: McGraw-Hill, 1980.

Keiser, J. and Kallio, E. Controling and Analyzing Costs in Food Service Operations. New York: John Wiley and Sons, 1974.

King, C. A. Service-oriented quality control. The Cornell Hotel and Restaurant Administration Quarterly, 1984, pp. 92-98.

Lamb, S. Productivity, profitability, and efficiency as performance measures in restaurants. (Unpub. Master's Thesis, Oklahoma State University, 1984.)

Lawerence, P. R. and Lorsch, J. W. Organization and environment. Homewood, Ill.: Irwin, 1967.

Lawler, E. E. and Mirvis, P. H. Measuring quality of work life...how graphic controls address the human side of the corporation. Management Review, 1981, 70, pp. 54-63.

Lawler, E. E. and Porter, L. W. The effect of performance on job satisfaction. Industrial Relations, 1967, 7(10), pp. 20-28.

Lines, J. Profit Improvement: A Comprehensive Approach to Improving Managerial Effectiveness. New York: John Wiley and Sons, 1973.

Lippitt, G. L. Quality of work life: organization renewal in action. Training and Development Journal, July, 1978, pp. 4-10.

Macy, B. A. and Mirvis, P. J. A methodology for assessment of quality of work life and organizational effectiveness in behavioral-economic terms. Administrative Science Quarterly, 1976, 21 pp. 212-226.

Magill, D. A. Can you increase productivity? Fast Food, February, 1973, pp. 12-16.

Mai-Dalton, R., Latham, G. P. and Fiedler, F. E. Selection, management, and performance of food service personnel: a survey of the literature. The Cornell Hotel and Restaurant Administrative Quarterly, 1978, 19(3), pp. 40-45.

Mali, P. Improving Total Productivity. New York: John Wiley and Sons, 1978.

Morton, J. A. Organizing for Innovation: A Systems Approach to Technical Management. New York: McGraw-Hill, 1971.

Mueller, R. K. The Innovation Ethic. New York: American Management Association, 1971.

Mundel, M. E. Measures of productivity. Industrial Engineering, 1976, 8(5), pp. 24-26.

Nadler, L. Quality of work life, productivity, and ... Training and Development Journal, 1981, 35, pp. 32-35.

Nash, M. M. Measuring Organizational Performance. San Francisco: Jossey-Bass, 1983.

Pascarella, P. Management of quality and the quality of management. Industry Week, 1983, 216(1), pp. 45-48, 55.

Peters, T. J. and Waterman, R. H., Jr. In Search of Excellence: Lessons from America's Best-Run Companies. New York: Harper and Row, 1982.

Phillips, S. B. Dimensions for excellence in quality of work life efforts. Training and Development Journal, 1983, 37(9), p. 73.

Pickerel, A. J. Effectiveness, Quality, Quality of Worklife, and Innovation as Performance Measures in Restaurants. (Unpub. Masters Thesis, Oklahoma State University, 1984.)

Productivity Perspectives: A Chartbook of Key Facts on U. S. Productivity in an Increasingly Competitive World. Houston: American Productivity Center, 1979.

Quinn, J. B. Technological innovation, entrepreneurship, and strategy. English Management Review, 1983, 11(3), pp. 14-25.

Rausch, E. N. Financial Keys to Small Business Profitability. New York: AMACOM, 1982.

Robertson, B. M. Analysis of utilization of partial factor productivity measures for traylines in hospital foodservice. (Unpub. Master's Thesis, Oklahoma State University, 1982.)

Rogers, C. A Way of Being. Boston: Houghton Mifflin, 1980.

Scanlon, F. and Hagan. J. T. Quality management for the service industries, Part 1. Quality Progress, 1983, pp. 18-23.

Shaw, K. K. Measuring Productivity and Six Other Interrelated Organizational Performance Criteria in Health Care. (Unpub. Master's Thesis, Oklahoma State University, 1983.)

Shaw, J. C. and Capoor, R. Quality and Productivity: mutually exclusive or interdependent in service organizations? Management Review, March, 1979, p. 25.

Sink, D. S. Designing successful productivity management systems. 35th ASQC Midwest Conference Transactions, Tulsa, Oklahoma, 1980.

Sink, D. S. Organizational system performance, Part 1. Productivity Management, Spring, 1983, pp. 6-10.

Smalley, H. E. and Freeman, J. R. Hospital Industrial Engineering. New York: Reinhold, 1966.

Snyder, O. P., Jr. A Management system for foodservice quality assurance. Food Technology, June, 1983, pp. 18-23.

Steele, L. W. Innovation in Big Business. New York: American Elsevier, 1975.

Steers, R. M. Problems in the measurement of organizational effectiveness. Administrative Science Quarterly, 1975, 20, pp. 546-558.

Stein, H. The meaning of productivity. The Meaning and Measurement of Productivity. (Bulletin No. 1714). Washington, D. C.: U.S. Government Printing Office, Dept. of Labor, 1971.

Sumanth, D. J. Productivity indicators used by major U. S. manufacturing companies: the results of a survey. Industrial Engineering, 1981, 13(5), pp. 70-73.

Swaim, J. C. and Sink, D. S. Current developments in firm or corporate level productivity measurement and evaluation. Proceedings, 1983 Fall Annual Conference A.I.I.E., I.I.E., Louisville, Kentucky, pp. 69-78.

Tate, W. C. Measuring our productivity improvements. Business Quarterly, 1984, 49, pp. 87-91.

Terry, W. R. and Dar-El, E. M. QWL + IE = Productivity. AIIE Proceedings, Annual Spring Conference, Atlanta, Georgia, May, 1980.

Thurow, L. Revitalizing American industry: managing in a competitive world economy. California Management Review, 1984, 27(1), pp. 9-41.

Thurston, W. R. Quality is between the customer's ears. Across the Board, January, 1985, pp. 29-32.

VanGundy, A. G. How to establish a creative climate in the work group. Management Review, 1984, pp. 24-25, 28, 37-38.

Villano, C. Foodservice Management and Control. New York: Lebhar-Friedman, 1977.

Walton, R. E. Quality of Working Life: What is it? Sloan Management Review, 15(1), 1973, pp. 11-21.

White, J. A. Yale Management Guide to Productivity. Atlanta, GA: Eaton Corp., Industrial Truck Division, 1979.

Wise, J. Setting up a company productivity program. Management Review, 1980, 69(6), pp. 15-18.

Woolf, D. A. Measuring job satisfaction. Hospitals, 1970, 44(21), pp. 82-84.

Wyckoff, D. D. New tools for achieving service quality. The Cornell Hotel and Restaurant Administration Quarterly, November, 1984, pp. 78-91.

Yankelovich, D. New Rules: Searching for Self Fulfillment in a World Turned Upside Down. New York: Bantam Books, 1982.

Zaltman, G. and Lin, N. On the nature of innovations. American Behavioral Scientist, 1971, 15(5), pp. 651-673.

APPENDIXES

APPENDIX A

CORRESPONDENCE

Oklahoma State University

Department of Food, Nutrition and Institution Administration

425 HOME ECONOMICS WEST
STILLWATER, OKLAHOMA 74078
(405) 624-5039

March 6, 1985

Dear Colleague:

As a foodservice manager, you are well aware that the productivity of the foodservice industry has traditionally been only half that of the manufacturing industry. Perhaps this is due to the sporadic nature of our industry or to the lack of standardization of terminology and/or measurement practices that exist (or are on-going) in foodservices. This is of critical importance to the industry since the first step toward improvement of productivity is measurement of productivity.

This phase of the study examines seven highly inter-related organizational performance criteria (productivity, profitability, quality, quality of worklife, effectiveness, efficiency, and innovation). These criteria differ in importance from one establishment to another. By better understanding the role each criteria plays in our industry, we can better understand the importance of productivity. We would like to know how you view these performance factors and how you evaluate each in your foodservice department. Will you please read the definitions for each criteria carefully and answer the questions with these definitions in mind. The answers from which you will select were generated from two research studies conducted with DPG-41, ADA Members with Management Responsibilities in Health Care Delivery Systems and with the members of the Missouri Restaurant Association.

If you are not involved in the evaluation of organizational performance in your department, will you please pass this survey on to the person who has this responsibility. The forms are coded for analysis only results will not be identified with your department at any time. After completing the questionnaire please fold, staple and return it to us. We would appreciate hearing from you by March 20, 1985. If you have any questions call us at (405) 624-5039.

Sincerely,

Lea L. Ebro

Lea L. Ebro, Ph.D., R.D.
Professor

Barbara Putz

Barbara Putz
Graduate Research Assistant

CENTENNIAL DECADE 1980•1990

Dear Dietitian in College and University Foodservice:

If you have not yet filled out the orange questionnaire concerning organizational performance, please disregard the due date. Kindly return the completed questionnaire as your input is very important to my study. Thank you.

Sincerely,

Barbara E. Putz

Barbara E. Putz
Graduate Research Assistant

APPENDIX B

RESEARCH INSTRUMENT

OKLAHOMA STATE UNIVERSITY
Department of Food, Nutrition and Institution Administration

FOODSERVICE PRODUCTIVITY STUDY

I. General Information

Directions: Please check or fill in the appropriate answers. It is important that you answer all the questions.

1. Age group: ____(1) 20-29 ____(2) 30-39 ____(3) 40-49 ____(4) 50-59 ____(5) 60-69

2. Degrees attained:
____(1) High School Diploma (5) _____
____(2) B.S. (6) _____
____(3) M.S. (7) _____
____(4) Ph.D. (8) _____

3. Registration Status (R.D.): ____(1) Registered ____(2) Non-registered

4. Route to ADA Membership:
____(1) Internship ____(4) Three year's pre-planned work experience
____(2) CUP Program ____(5) M.S. + 6 months work experience
____(3) Traineeship ____(6) Ph.D. + 6 months work experience

5. Position Title:
____(1) Director ____(4) Administrative Dietitian
____(2) Asst. Director ____(5) Dietary Consultant
____(3) Nutritionist ____(6) Other(please specify)_____

6. Number of years in foodservice management positions:
____(1) 1 - 5 years ____(3) 12 - 15 years
____(2) 6 - 10 years ____(4) 16 or more years

7. Annual Salary:
____(1) Below $15,000 ____(5) $30,000 - $34,000
____(2) $15,000 - $19,000 ____(6) $35,000 - $39,000
____(3) $20,000 - $24,000 ____(7) $40,000 - $44,000
____(4) $25,000 - $29,000 ____(8) $45,000 and above

8. Number of meals served per day:
____Breakfast ____Dinner
____Lunch ____Other(please specify)_____

9. Do you prepare meals for any of the following:
____(1) Satellite schools ____(3) Congregate meals
____(2) Meals on wheels ____(4) Other(please specify)_____

10. Are your foodservices contracted to a foodservice management company?
____(1) No ____(2) Yes(please specify) _____

11. Type of foodservice system:
____(1) Conventional - menu items prepared from basic ingredients on day they will be served and held in hot or cold state until served.
____(2) Assembly/serve - primarily commercially prepared food purchased in ready-to-serve form.
____(3) Cook/chill - menu items prepared one or more days in advance and held in chilled state until served.
____(4) Cook/freeze - menu items prepared one or more days in advance and held in frozen state until served.

12. Have you received any training in productivity measurement?
____(1) No ____(2) Yes (please specify) _____

(over)

II. Performance Criteria

1. PRODUCTIVITY - is defined as the ratio of quantities of outputs to quantities of inputs.

   Directions: Please circle the number which corresponds with the current procedures in your operation.

Which of the following do you use to control inputs?

	Method	Always	Usually	Sometimes	Rarely	Never
(1)	Detailed specifications when purchasing equipment and supplies	1	2	3	4	5
(2)	Check (and appropriately adjust if necessary) labor usage at least quarterly	1	2	3	4	5
(3)	"Comparison shop" for food and supplies	1	2	3	4	5
(4)	Take advantage of seasonal food buys	1	2	3	4	5
(5)	Use of standardized recipes	1	2	3	4	5
(6)	Evaluate kitchen energy costs at least quarterly	1	2	3	4	5
(7)	Monitor energy usage of specific pieces of equipment	1	2	3	4	5
(8)	Routinely conduct physical inventory of storeroom	1	2	3	4	5
(9)	Monitor breakage and pilferage of supplies	1	2	3	4	5
(10)	Periodically review and revise job descriptions in order to prevent duplication of tasks	1	2	3	4	5
(11)	Routinely follow food costs	1	2	3	4	5
(12)	Other (please specify) _____ _____	1	2	3	4	5

Which of the following do you use to control outputs?

	Methods	Always	Usually	Sometimes	Rarely	Never
(13)	Keep production records for cafeteria &/or catering	1	2	3	4	5
(14)	Check production records at least quarterly to see that production is appropriate for demand	1	2	3	4	5
(15)	Check daily census reports and plan production accordingly	1	2	3	4	5
(16)	Have a system for utilizing leftover bulk foods	1	2	3	4	5
(17)	Meals served daily	1	2	3	4	5
(18)	Follow amounts prepared versus amounts served	1	2	3	4	5
(19)	Dollar sales daily	1	2	3	4	5
(20)	Profit and loss statement	1	2	3	4	5
(21)	Computerized cash register	1	2	3	4	5
(22)	Daily operation control sheets	1	2	3	4	5
(23)	Sales last year versus sales this year	1	2	3	4	5
(24)	Customer count daily	1	2	3	4	5
(25)	Other (please specify)	1	2	3	4	5

_____

_____

(26) Do you devleop ratios and/or indexes by which to assess productivity?

_____(1) Yes _____(2) No

Exa. Ratio:

$$\frac{\text{Meals produced}}{\text{Labor hours used}}$$

Exa. Index:

$$\frac{\text{Meals produced, 1984}}{\text{Labor hours used, 1984}} \Big/ \frac{\text{Meals produced, 1983}}{\text{Labor hours used, 1983}}$$

(over)

If yes, do you use any of the following ratios? (please check)

_____(27) Meals/labor hours worked
_____(28) Sales/labor hours worked
_____(29) Meals/labor hours paid
_____(30) Sales/labor hours paid
_____(31) Customers/labor hour
_____(32) Meals/total food cost
_____(33) Others (please specify)
_____

If you use the inverse of any of these ratios (i.e., labor hours worked per meal served), please specify which one in the space below:

2. EFFECTIVENESS - is defined as the degree of achievement of objectives.

Example: Goal is to cut labor hours by 10% in the next quarter--labor records show that goal has been reached.

Do you set specific goals for your operation? _____(1) Yes _____(2) No

Which of the following do you use to evaluate goal attainment? (Please check all that apply):

_____(3) Costs and profit (profit and loss statement)
_____(4) Sales volume
_____(5) % profit
_____(6) Increase in sales over previous year
_____(7) Actual performance compared with forecasted performance
_____(8) Personnel audit
_____(9) MBO for managment staff
____(10) Break goals into small measureable sub-goals
____(11) Evaluation meetings
____(12) Administration evaluates goal attainment
____(13) Personnel statistical reports

3. QUALITY - is defined as the degree to which the system conforms to specifications, or at the consumer level, fitness for use. Example: Meeting health department regulations.

Do you have quality standards which are specific to your operation?

_____(1) Yes _____(2) No

Who developed those standards? (Please check all that apply):

_____(3) Manager
_____(4) Asst. Manager
_____(5) Director
_____(6) Asst. Director
_____(7) Dietitian
_____(8) Production Manager
_____(9) Foodservice Mgt. Company
_____(10) Other(please specify)_____

Which of the following do you use to control quality in your operation?

_____(11) Temperature check of food in steamtable
_____(12) Periodic survey of customers as to quality of foodservice
_____(13) Regular (unannounced) sanitation inspections
_____(14) Taste testing/can cutting of new food items by management
_____(15) Written standards for quality of food
_____(16) Written standards for quality of service
_____(17) Manager personally inspecting all food deliveries
_____(18) Manager personally tasting all cooked foods for quality
_____(19) Purchasing specifications
_____(20) Detailed instructions to employees
_____(21) Menus and charts, production schedules
_____(22) Use of fresh food, if available and economical
_____(23) Other(please specify) _____

Are quality standards discussed with employees at any time beyond their initial training?

_____(24) Yes
_____(25) No

Who is in charge of quality control in your operation? (Please check all that apply):

_____(26) Manager
_____(27) Asst. Manager
_____(28) Production Manager
_____(29) Contract Company
_____(30) Director
_____(31) Asst. Director
_____(32) Dietitian
_____(33) Other (please specify):
_____

Which of the following organizations govern quality standards in your operation? (Please check all that apply):

_____(34) State health codes
_____(35) County health codes
_____(36) City health codes
_____(37) Contract company standards
_____(38) Other (please specify):
_____

(over)

4. EFFICIENCY - is defined as resources expected to be consumed resources actually consumed.

Example: $ budgeted for food, 1984 / $ actually spent on food, 1984

Of the following resources, which do you keep records of the amounts used: (Materials include food and supplies)

	Yes	No
(1) Labor	____	____
(2) Materials	____	____
(3) Capital	____	____
(4) Energy	____	____

(5) Other (please specify): _____

Do you compare resources used with resource utilization targets?

____(6) Yes ____(7) No

5. QUALITY OF WORKLIFE (QWL) - is defined as work with meaning, or the degree to which work provides an opportunity for an individual to meet a variety of personal needs, to survive with security, to interact with others, to feel useful, to be recognized for achievement and to have an opportunity to improve one's skill and knowledge. Example: job satisfaction, motivation, pay satisfaction...

Do you measure the quality of worklife in your operation?

____(1) Yes ____(2) No

Do you perform any of the following? (Please check all that apply):

____(3) Use written job satisfaction questionnaires

____(4) Encourage employees to make suggestions, participate and cooperate with management on new projects, problem solving, goal setting, etc.

____(5) Monitor turnover, absenteeism, and tardiness

____(6) Make the job more interesting by redesigning, job enrichment, task identification, etc.

____(7) Provide promotion opportunities

____(8) Provide supplies, materials, and assistance to employees as needed

Do you link performance to rewards? ____(9) Yes ____(10) No

Which of the following do you use? (Please check all that apply):

____(11) Raises based upon performance appraisals

____(12) Commendation letters

____(13) Verbal recognition

____(14) Merit pay for management staff

_____(15) Performance awards (non-monetary)

_____(16) Performance awards (monetary)

_____(17) Plaque and certificate or other forms of recognition

_____(18) Recognition in newsletter, newspaper

_____(19) Bonuses (time, pay)

_____(20) Scheduling perferences

_____(21) Other (please specify):_____

Do you use any of the following forms of participative management?

_____(23) Suggestion system (if yes, please tell approximately how many suggestions have been accepted in the last year and what type of reward is given)

_____

_____

_____(24) Quality circles - defined as groups of employees, typically drawn from the same department, who meet regularly to identify, analyze, and solve work-related problems. If you use this (or a variation thereof,)please describe : _____

_____

_____(25) Incentive system (usually in the form of pay plans, but not always) - defined as a plan which ties day-to-day earnings or periodic bonuses directly and automatically to relatiavely objective indices of individual, group, or sometimes oraanizational performance. Please describe: _____

_____

6. INNOVATION - is defined as a deliberate, novel, specific change aimed at accomplishing the goals of the system more effectively.

Which of the following do you use to promote innovation? (Please check all that apply):

_____(1) Brainstorming sessions

_____(2) Active suggestion system

_____(3) Employee participation at meetings

_____(4) Reward employee input

_____(5) Incentive systems

_____(6) Employee training seminars

_____(7) Other (please specify) _____

Have you added any of the following in your operation within the last few years?

_____(8) Computer, word processor

_____(9) New menus and recipes

_____(10) New equipment (cooking, catering, etc.)

_____(11) New kitchen, new services, etc.

_____(12) Participative mgt. method/quality circles

(over)

_____(13) New benefits plan

_____(14) Watt mizer light bulbs

_____(15) New cleaning agents

_____(16) Other (please specify):_____

7. PROFITABILITY - is defined as the earned return on investment (owner equity), or the return on all things a business owns, or the relationship of revenue to costs. If your organization is for profit, how do you measure profitability? (Please give formulas):

Exceeding the budget in your operation results in:

_____(1) Nothing in particular

_____(2) Investigation of causes and budget readjustment

_____(3) Written justification

_____(4) Demerits

_____(5) Cut-off of funds

_____(6) Price increases

_____(7) Sales analysis

_____(8) Performance audit

_____(9) Review of funds

_____(10) Labor control

_____(11) Inventory control

_____(12) Volume increase

_____(13) Cut costs

_____(14) Portion controls

_____(15) Other (please specify)

_____

How do you determine meal prices?

_____(16) Food cost + markup

_____(17) Food cost + labor costs

_____(18) Food cost + overhead + labor + % markup

_____(19) Cost of meal, popularity of item

_____(20) Volume sold and cost

_____(21) State regulated

_____(22) Other (please specify):

_____

8. Please rate the 7 performance criteria according to how much time you spend evaluating each of them in your operation. Rank (on a scale of 1 to 7), giving the criteria on which you spend the most time a "1" and so on to "7", which is the criteria you spend the least amount of time. Do not use a number twice.

_____Productivity _____Innovation _____Efficiency _____Profitability

_____Quality _____Effectiveness _____Quality of worklife

9. Please rate the 7 performance criteria according to how important they are to the successful operation of your food service. Rank (on a scale of 1 to 7), giving the criteria which you feel is the most important a "1" and so on to "7", which is the criteria you feel is the least important. Do not use a number twice.

_____Productivity _____Innovation _____Efficiency _____Profitability

_____Quality _____Effectiveness _____Quality of worklife

Please check to see if you have completed eight pages.

THANK YOU FOR YOUR PARTICIPATION

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APPENDIX C

CHI SQUARE TABLES

TABLE OF Q10 BY PC1

Q10 / FREQUENCY	PC1 .	1	2	3	4	5	TOTAL
N	1	40	16	1	2	1	60
Y	0	1	6	1	0	0	8
TOTAL	.	41	22	2	2	1	68

CHI-SQUARE 11.749 DF= 4 PROB=0.0193

TABLE OF HD BY PC2

HD / FREQUENCY	PC2 .	1	2	3	4	5	TOTAL
2	0	18	11	4	1	1	35
3	1	15	9	5	2	1	32
4	0	0	0	0	1	0	1
TOTAL	.	33	20	9	4	2	68

CHI-SQUARE 16.926 DF= 8 PROB=0.0309

TABLE OF Q11_4 BY PC2

Q11_4 / FREQUENCY	PC2 .	1	2	3	4	5	TOTAL
N	1	33	20	9	3	2	67
Y	0	0	0	0	1	0	1
TOTAL	.	33	20	9	4	2	68

CHI-SQUARE 16.239 DF= 4 PROB=0 0027

TABLE OF Q10 BY PC3

Q10 / FREQUENCY	PC3 .	1	2	3	4	TOTAL
N	1	37	19	3	1	60
Y	0	1	2	4	1	8
TOTAL	.	38	21	7	2	68

CHI-SQUARE 19.857 DF= 3 PROB=0.0002

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF HD BY PC4

HD / PC4	.	1	2	3	TOTAL
2	0	8	22	5	35
3	1	17	8	7	32
4	0	1	0	0	1
TOTAL	.	26	30	12	68

CHI-SQUARE 11.621 DF= 4 PROB=0.0204

TABLE OF Q9_1 BY PC4

Q9_1 / PC4	.	1	2	3	TOTAL
N	1	22	30	12	64
Y	0	4	0	0	4
TOTAL	.	26	30	12	68

CHI-SQUARE 6.865 DF= 2 PROB=0.0323

TABLE OF Q9_1 BY PC7

Q9_1 / PC7	.	1	2	3	4	5	TOTAL
N	1	2	3	15	17	27	64
Y	0	1	2	0	0	1	4
TOTAL	.	3	5	15	17	28	68

CHI-SQUARE 16.866 DF= 4 PROB=0.0021

TABLE OF YRSFSM BY PC8

YRSFSM / PC8	.	1	2	4	TOTAL
1	0	15	2	0	17
2	1	15	0	0	15
3	0	9	4	0	13
4	0	22	0	1	23
TOTAL	.	61	6	1	68

CHI-SQUARE 13.451 DF= 6 PROB=0.0364

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q12 BY PC10

Q12 / PC10	.	1	2	3	4	TOTAL
N	0	11	23	5	1	40
Y	1	16	4	6	2	28
TOTAL	.	27	27	11	3	68

CHI-SQUARE 13.008 DF= 3 PROB=0.0046

TABLE OF AGE BY PC10

AGE / PC10	.	1	2	3	4	TOTAL
1	1	17	11	9	3	40
3	0	10	16	2	0	28
TOTAL	.	27	27	11	3	68

CHI-SQUARE 8.337 DF= 3 PROB=0.0395

TABLE OF YRSFSM BY PC13

YRSFSM / PC13	1	2	3	5	TOTAL
1	14	3	0	0	17
2	16	0	0	0	16
3	6	5	1	1	13
4	20	3	0	0	23
TOTAL	56	11	1	1	69

CHI-SQUARE 18.215 DF= 9 PROB=0.0328

TABLE OF RD BY PC13

RD / PC13	1	2	3	5	TOTAL
N	6	3	1	0	10
Y	50	8	0	1	59
TOTAL	56	11	1	1	69

CHI-SQUARE 8.164 DF= 3 PROB=0.0427

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q11_2 BY PC15

Q11_2	PC15				
FREQUENCY	1	2	3	5	TOTAL
N	52	11	3	1	67
Y	1	0	0	1	2
TOTAL	53	11	3	2	69

CHI-SQUARE 16.376 DF= 3 PROB=0.0009

TABLE OF Q11_3 BY PC15

Q11_3	PC15				
FREQUENCY	1	2	3	5	TOTAL
N	52	10	3	1	66
Y	1	1	0	1	3
TOTAL	53	11	3	2	69

CHI-SQUARE 11.526 DF= 3 PROB=0.0092

TABLE OF Q10 BY PC16

Q10	PC16				
FREQUENCY	1	2	3	5	TOTAL
N	52	7	2	0	61
Y	4	3	0	1	8
TOTAL	56	10	2	1	69

CHI-SQUARE 12.275 DF= 3 PROB=0.0065

TABLE OF Q9_2 BY PC17

Q9_2	PC17				
FREQUENCY	1	2	3	5	TOTAL
N	63	1	1	1	66
Y	2	1	0	0	3
TOTAL	65	2	1	1	69

CHI-SQUARE 10.366 DF= 3 PROB=0.0157

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST

TABLE OF Q10 BY PC17

Q10 / FREQUENCY	PC17 1	2	3	5	TOTAL
N	58	2	0	1	61
Y	7	0	1	0	8
TOTAL	65	2	1	1	69

CHI-SQUARE 8.062 DF= 3 PROB=0.0448

TABLE OF Q9_1 BY PC19

Q9_1 / FREQUENCY	PC19 1	2	3	4	5	TOTAL
N	27	2	9	4	23	65
Y	0	0	0	3	1	4
TOTAL	27	2	9	7	24	69

CHI-SQUARE 20.060 DF= 4 PROB=0.0005

TABLE OF ROUTE BY PC19

ROUTE / FREQUENCY	PC19 1	2	3	4	5	TOTAL
1	14	0	0	1	13	28
2	2	1	2	4	3	12
3	3	0	3	1	0	7
4	6	0	1	0	2	9
5	2	1	3	1	6	13
TOTAL	27	2	9	7	24	69

CHI-SQUARE 32.546 DF= 16 PROB=0.0085

TABLE OF Q9_1 BY PC23

Q9_1 / FREQUENCY	PC23 1	2	3	4	5	TOTAL
N	32	12	7	2	12	65
Y	2	0	0	2	0	4
TOTAL	34	12	7	4	12	69

CHI-SQUARE 16.220 DF= 4 PROB=0.0027

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q9_4 BY RATIO27

Q9_4 / FREQUENCY	RATIO27 N	RATIO27 Y	TOTAL
N	2	27	29	56
Y	1	1	9	10
TOTAL	.	28	38	66

CHI-SQUARE 5.073 DF= 1 PROB=0.0243

TABLE OF Q12 BY RATIO27

Q12 / FREQUENCY	RATIO27 N	RATIO27 Y	TOTAL
N	0	21	19	40
Y	3	7	19	26
TOTAL	.	28	38	66

CHI-SQUARE 4.220 DF= 1 PROB=0.0399

TABLE OF Q10 BY RATIO28

Q10 / FREQUENCY	RATIO28 N	RATIO28 Y	TOTAL
N	3	52	6	58
Y	0	3	5	8
TOTAL	.	55	11	66

CHI-SQUARE 13.769 DF= 1 PROB=0.0002

TABLE OF Q9_4 BY RATIO28

Q9_4 / FREQUENCY	RATIO28 N	RATIO28 Y	TOTAL
N	2	49	7	56
Y	1	6	4	10
TOTAL	.	55	11	66

CHI-SQUARE 4.620 DF= 1 PROB=0.0316

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF RD BY RATIO29

RD RATIO29

FREQUENCY	N	Y	TOTAL
N	1	9	0	9
Y	2	35	22	57
TOTAL	.	44	22	66

CHI-SQUARE 5.211 DF= 1 PROB=0.0225

TABLE OF Q10 BY RATIO30

Q10 RATIO30

FREQUENCY	N	Y	TOTAL
N	3	55	3	58
Y	0	6	2	8
TOTAL	.	61	5	66

CHI-SQUARE 3.947 DF= 1 PROB=0.0469

TABLE OF DINNERG BY RATIO32

DINNERG RATIO32

FREQUENCY	N	Y	TOTAL
1	1	7	19	26
2	1	10	3	13
3	1	9	18	27
TOTAL	.	26	40	66

CHI-SQUARE 9.778 DF= 2 PROB=0.0075

TABLE OF AGE BY RATIO32

AGE RATIO32

FREQUENCY	N	Y	TOTAL
1	2	9	30	39
3	1	17	10	27
TOTAL	.	26	40	66

CHI-SQUARE 10.631 DF= 1 PROB=0.0011

TABLE OF Q9_2 BY RATIO34

Q9_2 RATIO34

FREQUENCY	N	Y	TOTAL
N	2	58	6	64
Y	0	1	2	3
TOTAL	.	59	8	67

CHI-SQUARE 8.046 DF= 1 PROB=0.0028

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF SALARY BY GOALS

SALARY	GOALS		
FREQUENCY	N	Y	TOTAL
1	7	6	13
3	7	31	38
5	3	12	15
TOTAL	17	49	66

CHI-SQUARE 6.693 DF= 2 PROB=0.0352

TABLE OF Q9_1 BY GOALS

Q9_1	GOALS		
FREQUENCY	N	Y	TOTAL
N	14	49	63
Y	3	0	3
TOTAL	17	49	66

CHI-SQUARE 9.059 DF= 1 PROB=0.0026

TABLE OF HD BY GA3

HD	GA3		
FREQUENCY	N	Y	TOTAL
2	14	20	34
3	4	27	31
4	0	1	1
TOTAL	18	48	66

CHI-SQUARE 6.916 DF= 2 PROB=0.0315

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q9_4 BY GOALS

Q9_4 GOALS

FREQUENCY	N	Y	TOTAL
N	2	17	39	56
Y	1	0	10	10
TOTAL		17	49	66

CHI-SQUARE 4.089 DF= 1 PROB=0.0432

TABLE OF POSN BY GA3

POSN GA3

FREQUENCY	N	Y	TOTAL
1	1	2	24	26
3	2	4	11	15
5	0	12	13	25
TOTAL	.	18	48	66

CHI-SQUARE 10.443 DF= 2 PROB=0.0054

TABLE OF SALARY BY GA3

SALARY GA3

FREQUENCY	N	Y	TOTAL
1	1	10	3	13
3	1	7	31	38
5	1	1	14	15
TOTAL	.	18	48	66

CHI-SQUARE 20.869 DF= 2 PROB=0.0001

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF SALARY BY GA4

SALARY	GA4		
FREQUENCY	N	Y	TOTAL
1	1	13	0	13
3	1	23	15	38
5	1	7	8	15
TOTAL	.	43	23	66

CHI-SQUARE 9.569 DF= 2 PROB=0.0084

TABLE OF Q9_4 BY GA4

Q9_4	GA4		
FREQUENCY	N	Y	TOTAL
N	2	40	16	56
Y	1	3	7	10
TOTAL	.	43	23	66

CHI-SQUARE 6.414 DF= 1 PROB=0.0113

TABLE OF Q11_2 BY GA4

Q11_2	GA4		
FREQUENCY	N	Y	TOTAL
N	3	43	21	64
Y	0	0	2	2
TOTAL	.	43	23	66

CHI-SQUARE 3.856 DF= 1 PROB=0.0496

TABLE OF Q11_3 BY GA4

Q11_3	GA4		
FREQUENCY	N	Y	TOTAL
N	2	43	21	64
Y	1	0	2	2
TOTAL	.	43	23	66

CHI-SQUARE 3.856 DF= 1 PROB=0.0496

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF SALARY BY GA5

SALARY	GA5		
FREQUENCY	N	Y	TOTAL
1	13	0	13
3	21	17	38
5	6	9	15
TOTAL	40	26	66

CHI-SQUARE 11.572 DF= 2 PROB=0.0031

TABLE OF SALARY BY GA7

SALARY	GA7		
FREQUENCY	N	Y	TOTAL
1	10	3	13
3	15	23	38
5	4	11	15
TOTAL	29	37	66

CHI-SQUARE 7.866 DF= 2 PROB=0.0196

TABLE OF BFSTG BY GA7

BFSTG	GA7		
FREQUENCY	N	Y	TOTAL
1	13	22	35
2	12	5	17
3	4	10	14
TOTAL	29	37	66

CHI-SQUARE 6.900 DF= 2 PROB=0.0317

TABLE OF Q11_4 BY GA8

Q11_4	GA8		
FREQUENCY	N	Y	TOTAL
N	54	11	65
Y	0	1	1
TOTAL	54	12	66

CHI-SQUARE 4.569 DF= 1 PROB=0.0326

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q9_4 BY GA9

Q9_4 GA9

FREQUENCY	N	Y	TOTAL
N	2	39	17	56
Y	1	3	7	10
TOTAL	.	42	24	66

CHI-SQUARE 5.762 DF= 1 PROB=0.0164

TABLE OF AGE BY GA9

AGE GA9

FREQUENCY	N	Y	TOTAL
1	2	21	18	39
3	1	21	6	27
TOTAL	.	42	24	66

CHI-SQUARE 3.949 DF= 1 PROB=0.0469

TABLE OF Q9_4 BY GA10

Q9_4 GA10

FREQUENCY	N	Y	TOTAL
N	2	30	26	56
Y	1	1	9	10
TOTAL	.	31	35	66

CHI-SQUARE 6.467 DF= 1 PROB=0.0110

TABLE OF BFSTG BY GA13

BFSTG GA13

FREQUENCY	N	Y	TOTAL
1	2	29	6	35
2	0	14	3	17
3	1	5	9	14
TOTAL	.	48	18	66

CHI-SQUARE 12.274 DF= 2 PROB=0.0022

TABLE OF LUNCHG BY GA13

LUNCHG GA13

FREQUENCY	N	Y	TOTAL
2	2	32	6	38
3	1	16	12	28
TOTAL	.	48	18	66

CHI-SQUARE 5.955 DF= 1 PROB=0.0147

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF ROUTE BY DEV5

ROUTE	DEV5		
FREQUENCY	N	Y	TOTAL
1	8	20	28
2	2	10	12
3	4	3	7
4	1	8	9
5	8	5	13
TOTAL	23	46	69

CHI-SQUARE 10.225 DF= 4 PROB=0.0368

TABLE OF DINNERG BY DEV5

DINNERG	DEV5		
FREQUENCY	N	Y	TOTAL
1	5	22	27
2	9	5	14
3	9	19	28
TOTAL	23	46	69

CHI-SQUARE 8.720 DF= 2 PROB=0.0128

TABLE OF LUNCHG BY DEV8

LUNCHG	DEV8		
FREQUENCY	N	Y	TOTAL
2	36	4	40
3	19	10	29
TOTAL	55	14	69

CHI-SQUARE 6.231 DF= 1 PROB=0.0126

TABLE OF Q10 BY DEV9

Q10	DEV9		
FREQUENCY	N	Y	TOTAL
N	61	0	61
Y	1	7	8
TOTAL	62	7	69

CHI-SQUARE 59.401 DF= 1 PROB=0.0001

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF AGE BY DEV9

AGE	DEV9		
FREQUENCY	N	Y	TOTAL
1	34	7	41
3	28	0	28
TOTAL	62	7	69

CHI-SQUARE 5.320 DF= 1 PROB=0.0211

TABLE OF SALARY BY DEV10

SALARY	DEV10		
FREQUENCY	N	Y	TOTAL
1	14	0	14
3	28	11	39
5	15	1	16
TOTAL	57	12	69

CHI-SQUARE 7.504 DF= 2 PROB=0.0235

TABLE OF Q9_1 BY QC11

Q9_1	QC11		
FREQUENCY	N	Y	TOTAL
N	1	64	65
Y	1	3	4
TOTAL	2	67	69

CHI-SQUARE 7.369 DF= 1 PROB=0.0066

TABLE OF Q10 BY QC14

Q10	QC14		
FREQUENCY	N	Y	TOTAL
N	3	58	61
Y	5	3	8
TOTAL	8	61	69

CHI-SQUARE 22.878 DF= 1 PROB=0.0001

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF DINNERG BY QC14

DINNERG	QC14		
FREQUENCY	N	Y	TOTAL
1	2	25	27
2	5	9	14
3	1	27	28
TOTAL	8	61	69

CHI-SQUARE 10.166 DF= 2 PROB=0.0062

TABLE OF YRSFSM BY QC15

YRSFSM	QC15		
FREQUENCY	N	Y	TOTAL
1	10	7	17
2	8	8	16
3	1	12	13
4	3	20	23
TOTAL	22	47	69

CHI-SQUARE 15.361 DF= 3 PROB=0.0015

TABLE OF ROUTE BY QC16

ROUTE	QC16		
FREQUENCY	N	Y	TOTAL
1	5	23	28
2	6	6	12
3	5	2	7
4	4	5	9
5	8	5	13
TOTAL	28	41	69

CHI-SQUARE 11.624 DF= 4 PROB=0.0204

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF POSN BY QC16

POSN FREQUENCY	QC16 N	QC16 Y	TOTAL
1	16	11	27
3	6	11	17
5	6	19	25
TOTAL	28	41	69

CHI-SQUARE 6.954 DF= 2 PROB=0.0309

TABLE OF YRSFSM BY QC16

YRSFSM FREQUENCY	QC16 N	QC16 Y	TOTAL
1	7	10	17
2	11	5	16
3	1	12	13
4	9	14	23
TOTAL	28	41	69

CHI-SQUARE 11.119 DF= 3 PROB=0.0111

TABLE OF ROUTE BY QC18

ROUTE FREQUENCY	QC18 N	QC18 Y	TOTAL
1	12	16	28
2	5	7	12
3	7	0	7
4	3	6	9
5	3	10	13
TOTAL	30	39	69

CHI-SQUARE 11.699 DF= 4 PROB=0.0197

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF POSN BY QC18

POSN	QC18		
FREQUENCY	N	Y	TOTAL
1	17	10	27
3	6	11	17
5	7	18	25
TOTAL	30	39	69

CHI-SQUARE 7.072 DF= 2 PROB=0.0291

TABLE OF Q12 BY QC20

Q12	QC20		
FREQUENCY	N	Y	TOTAL
N	13	27	40
Y	3	26	29
TOTAL	16	53	69

CHI-SQUARE 4.633 DF= 1 PROB=0.0314

TABLE OF AGE BY QC22

AGE	QC22		
FREQUENCY	N	Y	TOTAL
1	3	38	41
3	8	20	28
TOTAL	11	58	69

CHI-SQUARE 5.609 DF= 1 PROB=0.0179

TABLE OF POSN BY IC26

POSN	IC26		
FREQUENCY	N	Y	TOTAL
1	13	14	27
3	4	13	17
5	4	21	25
TOTAL	21	48	69

CHI-SQUARE 6.845 DF= 2 PROB=0.0326

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF BFSTG BY IC27

BFSTG	IC27		
FREQUENCY	N	Y	TOTAL
1	20	17	37
2	13	4	17
3	5	10	15
TOTAL	38	31	69

CHI-SQUARE 6.026 DF= 2 PROB=0.0491

TABLE OF AGE BY IC28

AGE	IC28		
FREQUENCY	N	Y	TOTAL
1	26	15	41
3	9	19	28
TOTAL	35	34	69

CHI-SQUARE 6.510 DF= 1 PROB=0.0107

TABLE OF DINNERG BY IC28

DINNERG	IC28		
FREQUENCY	N	Y	TOTAL
1	13	14	27
2	12	2	14
3	10	18	28
TOTAL	35	34	69

CHI-SQUARE 9.453 DF= 2 PROB=0.0089

TABLE OF LUNCHG BY IC28

LUNCHG	IC28		
FREQUENCY	N	Y	TOTAL
2	25	15	40
3	10	19	29
TOTAL	35	34	69

STATISTICS FOR 2-WAY TABLES

CHI-SQUARE 5.280 DF= 1 PROB=0.0216

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF YRSFSM BY IC28

YRSFSM	IC28		
FREQUENCY	N	Y	TOTAL
1	12	5	17
2	10	6	16
3	8	5	13
4	5	18	23
TOTAL	35	34	69

CHI-SQUARE 11.910 DF= 3 PROB=0.0077

TABLE OF Q10 BY IC29

Q10	IC29		
FREQUENCY	N	Y	TOTAL
N	59	2	61
Y	4	4	8
TOTAL	63	6	69

CHI-SQUARE 19.445 DF= 1 PROB=0.0001

TABLE OF Q12 BY IC29

Q12	IC29		
FREQUENCY	N	Y	TOTAL
N	39	1	40
Y	24	5	29
TOTAL	63	6	69

CHI-SQUARE 4.601 DF= 1 PROB=0.0319

TABLE OF Q11_2 BY IC29

Q11_2	IC29		
FREQUENCY	N	Y	TOTAL
N	62	5	67
Y	1	1	2
TOTAL	63	6	69

CHI-SQUARE 4.426 DF= 1 PROB=0.0354

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q12 BY IC30

Q12	IC30		
FREQUENCY	N	Y	TOTAL
N	25	15	40
Y	10	19	29
TOTAL	35	34	69

CHI-SQUARE 5.280 DF= 1 PROB=0.0216

TABLE OF SALARY BY IC30

SALARY	IC30		
FREQUENCY	N	Y	TOTAL
1	10	4	14
3	21	18	39
5	4	12	16
TOTAL	35	34	69

CHI-SQUARE 6.789 DF= 2 PROB=0.0336

TABLE OF Q12 BY IC31

Q12	IC31		
FREQUENCY	N	Y	TOTAL
N	28	12	40
Y	13	16	29
TOTAL	41	28	69

CHI-SQUARE 4.418 DF= 1 PROB=0.0356

TABLE OF POSN BY IC32

POSN	IC32		
FREQUENCY	N	Y	TOTAL
1	17	10	27
3	6	11	17
5	20	5	25
TOTAL	43	26	69

CHI-SQUARE 8.620 DF= 2 PROB=0.0134

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF RD BY IC33

RD	IC33		
FREQUENCY	N	Y	TOTAL
N	5	5	10
Y	50	9	59
TOTAL	55	14	69

CHI-SQUARE 6.383 DF= 1 PROB=0.0115

TABLE OF Q9_2 BY IC33

Q9_2	IC33		
FREQUENCY	N	Y	TOTAL
N	54	12	66
Y	1	2	3
TOTAL	55	14	69

CHI-SQUARE 4.171 DF= 1 PROB=0.0411

TABLE OF POSN BY ORG34

POSN	ORG34		
FREQUENCY	N	Y	TOTAL
1	9	18	27
3	1	16	17
5	2	23	25
TOTAL	12	57	69

CHI-SQUARE 7.878 DF= 2 PROB=0.0195

TABLE OF YRSFSM BY ORG35

YRSFSM	ORG35		
FREQUENCY	N	Y	TOTAL
1	8	9	17
2	13	3	16
3	5	8	13
4	8	15	23
TOTAL	34	35	69

CHI-SQUARE 9.119 DF= 3 PROB=0.0277

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q10 BY ORG36

Q10	ORG36		
FREQUENCY	N	Y	TOTAL
N	40	21	61
Y	2	6	8
TOTAL	42	27	69

CHI-SQUARE 4.888 DF= 1 PROB=0.0270

TABLE OF RD BY ORG36

RD	ORG36		
FREQUENCY	N	Y	TOTAL
N	2	8	10
Y	40	19	59
TOTAL	42	27	69

CHI-SQUARE 8.201 DF= 1 PROB=0.0042

TABLE OF Q10 BY ORG37

Q10	ORG37		
FREQUENCY	N	Y	TOTAL
N	60	1	61
Y	1	7	8
TOTAL	61	8	69

CHI-SQUARE 50.867 DF= 1 PROB=0.0001

TABLE OF BFSTG BY ORG38

BFSTG	ORG38		
FREQUENCY	N	Y	TOTAL
1	24	13	37
2	15	2	17
3	6	9	15
TOTAL	45	24	69

CHI-SQUARE 8.178 DF= 2 PROB=0.0168

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q9_4 BY EFF1

Q9_4 EFF1

FREQUENCY	.	N	Y	TOTAL
N	0	0	58	58
Y	1	1	9	10
TOTAL	.	1	67	68

CHI-SQUARE 5.887 DF= 1 PROB=0.0153

TABLE OF HD BY EFF1

HD EFF1

FREQUENCY	.	N	Y	TOTAL
2	0	0	35	35
3	1	0	32	32
4	0	1	0	1
TOTAL	.	1	67	68

CHI-SQUARE 68.000 DF= 2 PROB=0.0001

TABLE OF RD BY EFF1

RD EFF1

FREQUENCY	.	N	Y	TOTAL
N	0	1	9	10
Y	1	0	58	58
TOTAL	.	1	67	68

CHI-SQUARE 5.887 DF= 1 PROB=0.0153

TABLE OF Q11_2 BY EFF1

Q11_2 EFF1

FREQUENCY	.	N	Y	TOTAL
N	1	0	66	66
Y	0	1	1	2
TOTAL	.	1	67	68

CHI-SQUARE 33.493 DF= 1 PROB=0.0001

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q11_3 BY EFF1

Q11_3	EFF1		
FREQUENCY	N	Y	TOTAL
N	1	65	65
Y	0	2	3
TOTAL	1	67	68

CHI-SQUARE 21.990 DF= 1 PROB=0.0001

TABLE OF Q11_4 BY EFF1

Q11_4	EFF1		
FREQUENCY	N	Y	TOTAL
N	1	67	67
Y	0	0	1
TOTAL	1	67	68

CHI-SQUARE 68.000 DF= 1 PROB=0.0001

TABLE OF Q9_4 BY EFF3

Q9_4	EFF3		
FREQUENCY	N	Y	TOTAL
N	17	41	58
Y	0	10	10
TOTAL	17	51	68

CHI-SQUARE 3.908 DF= 1 PROB=0.0481

TABLE OF AGE BY EFF4

AGE	EFF4		
FREQUENCY	N	Y	TOTAL
1	31	10	41
3	11	16	27
TOTAL	42	26	68

CHI-SQUARE 8.381 DF= 1 PROB=0.0038

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q10 BY RUT

Q10 RUT

FREQUENCY	.	N	Y	TOTAL
N	1	21	39	60
Y	0	0	8	8
TOTAL	.	21	47	68

CHI-SQUARE 4.051 DF= 1 PROB=0.0441

TABLE OF Q9_1 BY RUT

Q9_1 RUT

FREQUENCY	.	N	Y	TOTAL
N	1	18	46	64
Y	0	3	1	4
TOTAL	.	21	47	68

CHI-SQUARE 3.875 DF= 1 PROB=0.0490

TABLE OF Q9_4 BY RUT

Q9_4 RUT

FREQUENCY	.	N	Y	TOTAL
N	0	21	37	58
Y	1	0	10	10
TOTAL		21	47	68

CHI-SQUARE 5.238 DF= 1 PROB=0.0221

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF YRSFSM BY QWL

YRSFSM	QWL		
FREQUENCY	N	Y	TOTAL
1	10	7	17
2	13	3	16
3	10	3	13
4	8	14	22
TOTAL	41	27	68

CHI-SQUARE 9.714 DF= 3 PROB=0.0212

TABLE OF Q11_3 BY QWLM4

Q11_3	QWLM4		
FREQUENCY	N	Y	TOTAL
N	6	59	65
Y	2	1	3
TOTAL	8	60	68

CHI-SQUARE 9.113 DF= 1 PROB=0.0025

TABLE OF LUNCHG BY QWLM4

LUNCHG	QWLM4		
FREQUENCY	N	Y	TOTAL
2	2	37	39
3	6	23	29
TOTAL	8	60	68

CHI-SQUARE 3.880 DF= 1 PROB=0.0489

TABLE OF Q9_4 BY QWLM6

Q9_4	QWLM6		
FREQUENCY	N	Y	TOTAL
N	41	17	58
Y	3	7	10
TOTAL	44	24	68

CHI-SQUARE 6.184 DF= 1 PROB=0.0129

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q9_4 BY QWLM7

Q9_4 QWLM7

FREQUENCY	N	Y	TOTAL
N	0	18	40	58
Y	1	0	10	10
TOTAL	.	18	50	68

CHI-SQUARE 4.221 DF= 1 PROB=0.0399

TABLE OF SALARY BY QWLM7

SALARY QWLM7

FREQUENCY	N	Y	TOTAL
1	0	7	7	14
3	1	10	28	38
5	0	1	15	16
TOTAL	.	18	50	68

CHI-SQUARE 7.344 DF= 2 PROB=0.0254

TABLE OF Q12 BY QWLM8

Q12 QWLM8

FREQUENCY	N	Y	TOTAL
N	0	12	28	40
Y	1	2	26	28
TOTAL	.	14	54	68

CHI-SQUARE 5.263 DF= 1 PROB=0.0218

TABLE OF SALARY BY REW11

SALARY REW11

FREQUENCY	N	Y	TOTAL
1	0	10	4	14
3	1	11	27	38
5	0	5	11	16
TOTAL	.	26	42	68

CHI-SQUARE 8.250 DF= 2 PROB=0.0162

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q9_3 BY REW11

Q9_3 REW11

FREQUENCY	N	Y	TOTAL
N	1	23	42	65
Y	0	3	0	3
TOTAL	.	26	42	68

CHI-SQUARE 7.592 DF= 1 PROB=0.0059

TABLE OF Q9_4 BY REW12

Q9_4 REW12

FREQUENCY	N	Y	TOTAL
N	0	43	15	58
Y	1	3	7	10
TOTAL	.	46	22	68

CHI-SQUARE 5.070 DF= 1 PROB=0.0243

TABLE OF DINNERG BY REW14

DINNERG REW14

FREQUENCY	N	Y	TOTAL
1	0	10	17	27
2	1	10	3	13
3	0	21	7	28
TOTAL	.	41	27	68

CHI-SQUARE 10.131 DF= 2 PROB=0.0063

TABLE OF SALARY BY REW15

SALARY REW15

FREQUENCY	N	Y	TOTAL
1	0	12	2	14
3	1	29	9	38
5	0	7	9	16
TOTAL	.	48	20	68

CHI-SQUARE 7.694 DF= 2 PROB=0.0213

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF AGE BY REW16

AGE REW16

FREQUENCY	N	Y	TOTAL
1	33	8	41
3	27	0	27
TOTAL	60	8	68

CHI-SQUARE 5.971 DF= 1 PROB=0.0145

TABLE OF Q10 BY REW16

Q10 REW16

FREQUENCY	N	Y	TOTAL
N	55	5	60
Y	5	3	8
TOTAL	60	8	68

CHI-SQUARE 5.785 DF= 1 PROB=0.0162

TABLE OF Q10 BY REW17

Q10 REW17

FREQUENCY	N	Y	TOTAL
N	28	32	60
Y	8	0	8
TOTAL	36	32	68

CHI-SQUARE 8.059 DF= 1 PROB=0.0045

TABLE OF Q9_4 BY REW19

Q9_4 REW19

FREQUENCY	N	Y	TOTAL
N	55	3	58
Y	7	3	10
TOTAL	62	6	68

CHI-SQUARE 6.535 DF= 1 PROB=0.0106

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF SALARY BY REW19

SALARY FREQUENCY	REW19 .	N	Y	TOTAL
1	0	14	0	14
3	1	36	2	38
5	0	12	4	16
TOTAL	.	62	6	68

CHI-SQUARE 7.158 DF= 2 PROB=0.0279

TABLE OF Q12 BY PM23

Q12 FREQUENCY	PM23 N	Y	TOTAL
N	36	4	40
Y	18	11	29
TOTAL	54	15	69

CHI-SQUARE 7.709 DF= 1 PROB=0.0055

TABLE OF Q9_4 BY PM23

Q9_4 FREQUENCY	PM23 N	Y	TOTAL
N	48	10	58
Y	6	5	11
TOTAL	54	15	69

CHI-SQUARE 4.326 DF= 1 PROB=0.0375

TABLE OF Q11_3 BY PM24

Q11_3 FREQUENCY	PM24 N	Y	TOTAL
N	58	8	66
Y	1	2	3
TOTAL	59	10	69

CHI-SQUARE 6.889 DF= 1 PROB=0.0087

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q11_4 BY PM24

Q11_4	PM24		
FREQUENCY	N	Y	TOTAL
N	59	9	68
Y	0	1	1
TOTAL	59	10	69

CHI-SQUARE 5.987 DF= 1 PROB=0.0144

TABLE OF YRSFSM BY PM24

YRSFSM	PM24		
FREQUENCY	N	Y	TOTAL
1	17	0	17
2	11	5	16
3	13	0	13
4	18	5	23
TOTAL	59	10	69

CHI-SQUARE 9.685 DF= 3 PROB=0.0214

TABLE OF HD BY PM24

HD	PM24		
FREQUENCY	N	Y	TOTAL
2	33	2	35
3	26	7	33
4	0	1	1
TOTAL	59	10	69

CHI-SQUARE 9.279 DF= 2 PROB=0.0097

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q12 BY INNOV1

Q12	INNOV1		
FREQUENCY	N	Y	TOTAL
N	22	18	40
Y	9	20	29
TOTAL	31	38	69

CHI-SQUARE 3.902 DF= 1 PROB=0.0482

TABLE OF Q9_4 BY INNOV1

Q9_4	INNOV1		
FREQUENCY	N	Y	TOTAL
N	30	28	58
Y	1	10	11
TOTAL	31	38	69

CHI-SQUARE 6.792 DF= 1 PROB=0.0092

TABLE OF Q12 BY INNOV2

Q12	INNOV2		
FREQUENCY	N	Y	TOTAL
N	31	9	40
Y	13	16	29
TOTAL	44	25	69

CHI-SQUARE 7.767 DF= 1 PROB=0.0053

TABLE OF Q9_1 BY INNOV2

Q9_1	INNOV2		
FREQUENCY	N	Y	TOTAL
N	44	21	65
Y	0	4	4
TOTAL	44	25	69

CHI-SQUARE 7.473 DF= 1 PROB=0.0063

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q9_4 BY INNOV2

Q9_4	INNOV2		
FREQUENCY	N	Y	TOTAL
N	40	18	58
Y	4	7	11
TOTAL	44	25	69

CHI-SQUARE 4.254 DF= 1 PROB=0.0392

TABLE OF AGE BY INNOV2

AGE	INNOV2		
FREQUENCY	N	Y	TOTAL
1	22	19	41
3	22	6	28
TOTAL	44	25	69

CHI-SQUARE 4.469 DF= 1 PROB=0.0345

TABLE OF Q12 BY INNOV3

Q12	INNOV3		
FREQUENCY	N	Y	TOTAL
N	18	22	40
Y	3	26	29
TOTAL	21	48	69

CHI-SQUARE 9.536 DF= 1 PROB=0.0020

TABLE OF Q9_4 BY INNOV3

Q9_4	INNOV3		
FREQUENCY	N	Y	TOTAL
N	21	37	58
Y	0	11	11
TOTAL	21	48	69

CHI-SQUARE 5.117 DF= 1 PROB=0.0237

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF RD BY INNOV3

RD	INNOV3		
FREQUENCY	N	Y	TOTAL
N	0	10	10
Y	21	38	59
TOTAL	21	48	69

CHI-SQUARE 5.725 DF= 1 PROB=0.0167

TABLE OF ROUTE BY INNOV4

ROUTE	INNOV4		
FREQUENCY	N	Y	TOTAL
1	28	0	28
2	12	0	12
3	6	1	7
4	9	0	9
5	10	3	13
TOTAL	65	4	69

CHI-SQUARE 11.047 DF= 4 PROB=0.0260

TABLE OF HD BY INNOV4

HD	INNOV4		
FREQUENCY	N	Y	TOTAL
2	35	0	35
3	30	3	33
4	0	1	1
TOTAL	65	4	69

CHI-SQUARE 19.059 DF= 2 PROB=0.0001

TABLE OF Q11_2 BY INNOV4

Q11_2	INNOV4		
FREQUENCY	N	Y	TOTAL
N	64	3	67
Y	1	1	2
TOTAL	65	4	69

CHI-SQUARE 7.369 DF= 1 PROB=0.0066

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q11_3 BY INNOV4

Q11_3	INNOV4		
FREQUENCY	N	Y	TOTAL
N	63	3	66
Y	2	1	3
TOTAL	65	4	69

CHI-SQUARE 4.355 DF= 1 PROB=0.0369

TABLE OF Q11_4 BY INNOV4

Q11_4	INNOV4		
FREQUENCY	N	Y	TOTAL
N	65	3	68
Y	0	1	1
TOTAL	65	4	69

CHI-SQUARE 16.489 DF= 1 PROB=0.0001

TABLE OF Q9_4 BY INNOV5

Q9_4	INNOV5		
FREQUENCY	N	Y	TOTAL
N	58	0	58
Y	9	2	11
TOTAL	67	2	69

CHI-SQUARE 10.860 DF= 1 PROB=0.001C

TABLE OF Q11_4 BY INNOV5

Q11_4	INNOV5		
FREQUENCY	N	Y	TOTAL
N	67	1	68
Y	0	1	1
TOTAL	67	2	69

CHI-SQUARE 33.993 DF= 1 PROB=0.0001

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q11_3 BY INNOV5

Q11_3	INNOV5		
FREQUENCY	N	Y	TOTAL
N	65	1	66
Y	2	1	3
TOTAL	67	2	69

CHI-SQUARE 10.322 DF= 1 PROB=0.0013

TABLE OF Q11_2 BY INNOV5

Q11_2	INNOV5		
FREQUENCY	N	Y	TOTAL
N	66	1	67
Y	1	1	2
TOTAL	67	2	69

CHI-SQUARE 16.236 DF= 1 PROB=0.0001

TABLE OF HD BY INNOV5

HD	INNOV5		
FREQUENCY	N	Y	TOTAL
2	35	0	35
3	32	1	33
4	0	1	1
TOTAL	67	2	69

CHI-SQUARE 34.547 DF= 2 PROB=0.0001

TABLE OF Q9_4 BY INNOV7

Q9_4	INNOV7		
FREQUENCY	N	Y	TOTAL
N	58	0	58
Y	10	1	11
TOTAL	68	1	69

CHI-SQUARE 5.350 DF= 1 PROB=0.0207

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q12 BY INNOV8

Q12	INNOV8		
FREQUENCY	N	Y	TOTAL
N	22	18	40
Y	8	21	29
TOTAL	30	39	69

CHI-SQUARE 5.141 DF= 1 PROB=0.0234

TABLE OF DINNERG BY INNOV8

DINNERG	INNOV8		
FREQUENCY	N	Y	TOTAL
1	9	18	27
2	11	3	14
3	10	18	28
TOTAL	30	39	69

CHI-SQUARE 8.834 DF= 2 PROB=0.0121

TABLE OF SALARY BY INNOV8

SALARY	INNOV8		
FREQUENCY	N	Y	TOTAL
1	9	5	14
3	20	19	39
5	1	15	16
TOTAL	30	39	69

CHI-SQUARE 12.457 DF= 2 PROB=0.0020

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF ROUTE BY INNOV8

ROUTE	INNOV8		
FREQUENCY	N	Y	TOTAL
1	9	19	28
2	6	6	12
3	3	4	7
4	8	1	9
5	4	9	13
TOTAL	30	39	69

CHI-SQUARE 10.079 DF= 4 PROB=0.0391

TABLE OF Q12 BY INNOV10

Q12	INNOV10		
FREQUENCY	N	Y	TOTAL
N	9	31	40
Y	0	29	29
TOTAL	9	60	69

CHI-SQUARE 7.504 DF= 1 PROB=0.0062

TABLE OF DINNERG BY INNOV10

DINNERG	INNOV10		
FREQUENCY	N	Y	TOTAL
1	1	26	27
2	5	9	14
3	3	25	28
TOTAL	9	60	69

CHI-SQUARE 8.555 DF= 2 PROB=0.0139

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF YRSFSM BY INNOV12

YRSFSM	INNOV12		
FREQUENCY	N	Y	TOTAL
1	17	0	17
2	12	4	16
3	13	0	13
4	15	8	23
TOTAL	57	12	69

CHI-SQUARE 11.803 DF= 3 PROB=0.0081

TABLE OF AGE BY INNOV12

AGE	INNOV12		
FREQUENCY	N	Y	TOTAL
1	37	4	41
3	20	8	28
TOTAL	57	12	69

CHI-SQUARE 4.100 DF= 1 PROB=0.0429

TABLE OF Q9_4 BY INNOV14

Q9_4	INNOV14		
FREQUENCY	N	Y	TOTAL
N	56	1	57
Y	9	2	11
TOTAL	65	3	68

CHI-SQUARE 5.900 DF= 1 PROB=0.0151

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q10 BY EB03

Q10	EB03		
FREQUENCY	N	Y	TOTAL
N	1	49	11	60
Y	0	4	4	8
TOTAL	.	53	15	68

CHI-SQUARE 11.089 DF= 1 PROB=0.0009

TABLE OF Q9_3 BY EB03

Q9_3	EB03		
FREQUENCY	N	Y	TOTAL
N	1	53	12	65
Y	0	0	3	3
TOTAL	.	53	15	68

CHI-SQUARE 4.117 DF= 1 PROB=0.0425

TABLE OF Q11_2 BY EB06

Q11_2	EB06		
FREQUENCY	N	Y	TOTAL
N	1	54	12	66
Y	0	0	2	2
TOTAL	.	54	14	68

CHI-SQUARE 7.948 DF= 1 PROB=0.0048

TABLE OF Q11_3 BY EB06

Q11_3	EB06		
FREQUENCY	N	Y	TOTAL
N	1	53	12	65
Y	0	1	2	3
TOTAL	.	54	14	68

CHI-SQUARE 4.076 DF= 1 PROB=0.0435

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF Q11_4 BY EB06

Q11_4	EB06		
FREQUENCY	N	Y	TOTAL
N	1	54	13	67
Y	0	0	1	1
TOTAL	.	54	14	68

CHI-SQUARE 3.915 DF= 1 PROB=0.0479

TABLE OF Q9_4 BY EB07

Q9_4	EB07		
FREQUENCY	N	Y	TOTAL
N	1	51	6	57
Y	0	6	5	11
TOTAL	.	57	11	68

CHI-SQUARE 8.296 DF= 1 PROB=0.0040

TABLE OF Q11_4 BY EB07

Q11_4	EB07		
FREQUENCY	N	Y	TOTAL
N	1	57	10	67
Y	0	0	1	1
TOTAL	.	57	11	68

CHI-SQUARE 5.259 DF= 1 PROB=0.0218

TABLE OF Q10 BY EB08

Q10	EB08		
FREQUENCY	N	Y	TOTAL
N	1	48	12	60
Y	0	3	5	8
TOTAL	.	51	17	68

CHI-SQUARE 6.800 DF= 1 PROB=0.0091

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF RD BY EB012

RD	EB012		
FREQUENCY	N	Y	TOTAL
N	8	2	10
Y	56	2	58
TOTAL	64	4	68

CHI-SQUARE 4.221 DF= 1 PROB=0.0399

TABLE OF Q12 BY EB013

Q12	EB013		
FREQUENCY	N	Y	TOTAL
N	23	17	40
Y	23	5	28
TOTAL	46	22	68

CHI-SQUARE 4.570 DF= 1 PROB=0.0325

TABLE OF SALARY BY EB013

SALARY	EB013		
FREQUENCY	N	Y	TOTAL
1	11	3	14
3	21	17	38
5	14	2	16
TOTAL	46	22	68

CHI-SQUARE 6.308 DF= 2 PROB=0.0427

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF LUNCHG BY EB014

LUNCHG	EB014		
FREQUENCY	N	Y	TOTAL
2	0	20	20	40
3	1	21	7	28
TOTAL	.	41	27	68

CHI-SQUARE 4.300 DF= 1 PROB=0.0381

TABLE OF ROUTE BY DMP17

ROUTE	DMP17		
FREQUENCY	N	Y	TOTAL
1	0	25	3	28
2	0	9	3	12
3	0	7	0	7
4	0	9	0	9
5	1	7	5	12
TOTAL	.	57	11	68

CHI-SQUARE 10.143 DF= 4 PROB=0.0381

TABLE OF RD BY DMP17

RD	DMP17		
FREQUENCY	N	Y	TOTAL
N	0	6	4	10
Y	1	51	7	58
TOTAL	.	57	11	68

CHI-SQUARE 4.907 DF= 1 PROB=0.0267

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

TABLE OF DINNERG BY DMP17

DINNERG	DMP17			
FREQUENCY	N	Y	TOTAL
1	0	23	4	27
2	0	8	6	14
3	1	26	1	27
TOTAL	.	57	11	68

CHI-SQUARE 10.484 DF= 2 PROB=0.0053

TABLE OF Q11_2 BY DMP18

Q11_2	DMP18			
FREQUENCY	N	Y	TOTAL
N	1	48	18	66
Y	0	0	2	2
TOTAL	.	48	20	68

CHI-SQUARE 4.945 DF= 1 PROB=0.0262

TABLE OF RD BY DMP19

RD	DMP19			
FREQUENCY	N	Y	TOTAL
N	0	8	2	10
Y	1	57	1	58
TOTAL	.	65	3	68

CHI-SQUARE 6.756 DF= 1 PROB=0.0093

TABLE OF AGE BY DMP19

AGE	DMP19			
FREQUENCY	N	Y	TOTAL
1	1	40	0	40
3	0	25	3	28
TOTAL	.	65	3	68

CHI-SQUARE 4.484 DF= 1 PROB=0.0342

WARNING: OVER 20% OF THE CELLS HAVE EXPECTED COUNTS LESS THAN 5.
TABLE IS SO SPARSE THAT CHI-SQUARE MAY NOT BE A VALID TEST.

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