

NEEDS ASSESSMENT IN NATURAL GAS
PUBLIC UTILITIES

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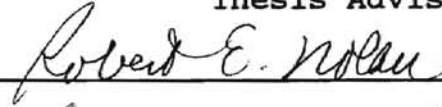
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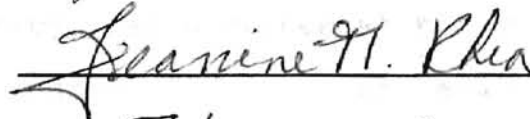
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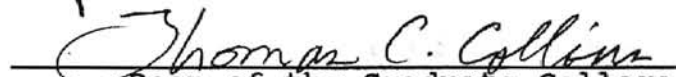
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CHAPTER I

INTRODUCTION

Natural gas utilities have traditionally held a monopoly on providing natural gas fuel to residential, commercial, and industrial customers within the geographic areas they serve. Natural gas utilities have provided safe, reliable, gas service to customers while maintaining a consistent return on investment for shareholders, and a safe, secure, working environment for employees.

Federal deregulation of natural gas has more recently made the industry more competitive. The ways natural gas is bought, moved, marketed, and sold have dramatically changed the way the industry does business. Many utilities are expanding into new markets for natural gas. It is predicted that recent federal environmental regulations will create greater opportunities for natural gas as a "clean air fuel," but they may also affect the industry in ways unforeseen at this time.

Other factors are effecting changes in natural gas utilities. Increased use of technology in daily operations such as meter reading; billing; and planning, building, and repairing pipeline systems puts greater demands on workers

to use these technologies efficiently and effectively. Klass (1991) estimates that the widespread use of computers may be one reason why the employee complement in the natural gas utility industry decreased from a high of about 228,000 in 1982 to about 204,000 in 1989.

Various levels of government regulate operations of the gas industry. The Department of Transportation mandates safety standards regarding the construction, maintenance, and operations of natural gas pipeline systems. The Occupational Safety and Health Administration maintains safety standards for the performance of field work under its purview. Environmental Protection Agency regulations affect virtually all gas industry construction and maintenance operations. State public utilities commissions regulate what natural gas utilities can charge their customers. These commissions are changing their rate making standards in line with growing competition in the industry.

In response to these changes, natural gas utilities have been reducing employee complements and restructuring corporate environments in an effort to improve their human performance productivity. Outside consultants, in-house training departments, and regional and national associations are involved in these utilities' productivity enhancement measures. Local distribution companies..., "having led a sheltered life, now confront a truly defining moment. These trends represent threats to survival. Right or wrong choices can lead to assertive prosperity or befuddled extinction" (Dar, 1995).

Problem Statement

Current human performance literature suggested the use of needs assessment as a systematic way to approach the enhancement of performance productivity. Discrepancies between actual and ideal work place accomplishments, and addressing these deviations from the ideal with appropriate training or non-training interventions, were emphasized.

Are utilities aware of and do they take advantage of this systematic needs assessment approach? Do they integrate needs assessment into preparing employees for the future demands of the work place? Is needs assessment driven by the overall mission, goals, and objectives of the corporation itself?

Purpose

The purpose of this study was to determine how training and development practitioners in the natural gas utility industry describe and conduct needs assessment, and the extent to which these practitioners make use of needs assessment to determine training needs and other human performance improvement interventions.

Objectives

The objectives of this study were:

- a) to identify the ways in which trainers in the natural gas industry describe needs assessment;

- b) to identify the processes of conducting needs assessment by trainers in the natural gas industry; and
- c) to identify ways in which trainers relate needs assessment to organizational goals in the natural gas industry.

Definition of Terms

To clarify the focus of this study, the following terms were defined as they related to needs assessment and the natural gas utility industry.

1. Needs assessment: a process which identifies needs and problems which affect human productivity in the work place.

2. Discrepancy model of needs assessment: the conception of need as a discrepancy or gap between the actual and the ideal (Lewis & Bjorkquist, 1992).

3. Gas utility: a company that is primarily a distributor of natural gas to ultimate customers in a given geographic area.

4. Gas distribution company: a company that obtains the major portion of its gas operating revenue from the operation of a retail gas distribution system.

5. Class of service: a type of service and a type of customer. The common classes of service applied to ultimate consumers are:

- a) residential service - service to customers for domestic purposes. In residential service, the number of housing units within a structure determines the customer classification.
- b) commercial service - service to customers engaged in wholesale or retail trade, agriculture, communications, finance, insurance, and real estate, and to customers not directly involved in other classes of service.
- c) industrial service - service to customers engaged primarily in a process which either involves the extraction of raw materials from the earth or a change of raw unfinished materials into another form or product (American Gas Association, 1990).

Assumptions

It was assumed that all respondents to this study were primarily engaged in training and development activities for natural gas local distribution utilities that are regulated by state public utility commissions.

It was assumed that the training and development staffs in natural gas public utilities, as listed in the utilities groups of the directories of the American Society for Training and Development and the National Society for Performance and Instruction, would provide the best source of information about needs assessment and its use in their organizations.

Limitations

The small number of subjects and natural gas utilities represented in the study was a limitation. A total of 163 training and development practitioners representing 56 of the largest natural gas distribution utilities in the United States were surveyed. A directory of natural gas companies indicated that there were over 1,000 natural gas utilities in the United States.

Some of the utilities represented in the population offered utility services for other sources of energy in addition to natural gas. It was not known before the survey was sent whether or not subjects provided training and development for natural gas services or for other utility services. Forty seven percent of the population responded to the questionnaire. Only 49 percent of those responding or 23 percent of the total population of 163 subjects surveyed were involved in training and development activities for natural gas utility services.

In the following chapters, industrial and organizational changes in the natural gas utility industry that affect human performance productivity are reviewed. Chapter II reviews the literature relevant to needs assessment and training and development activities underway in the natural gas utility industry. The methodology is

presented in Chapter III. The results and discussion are presented in Chapter IV. Chapter V includes information on the summary, conclusions, and recommendations of the study.

CHAPTER II

LITERATURE REVIEW

Needs assessment is a first step in the analysis of issues affecting human performance in the work place. The use of a systematic approach to needs assessment to devise valid, reliable, training or non training interventions has been reported by some of the nation's largest natural gas utilities.

Based in San Francisco and serving 12.8 million customers, Pacific Gas & Electric Company (PG&E) has been positioning itself for widespread deregulation and greater competition in the energy industry (Morris, 1986). PG&E analyzed how managers and other employees perform their jobs. The company also changed the standards by which it measures its customer service.

In 1984 the company initiated a formal productivity enhancement project focusing on customer satisfaction and aimed at linking productivity and goals with performance review criteria and management compensation.

PG&E used an instructional systems design approach to assess, implement, and evaluate its productivity enhancement program. Links were established between the aims of the training system and the goals of PG&E. In their training

programs with managers and supervisors, facilitators from the training and management development department referred to the program as a "system of structures and processes" (Morris, 1986). As the key feature of all workshops, participants applied the skills and techniques they learned in class to an on the job project.

The fourth largest combination (electric and gas) energy utility in the United States, Consumers Power serves about two-thirds of Michigan's nine million residents (Lee, 1989). Faced with deregulation and a competitive marketplace on the gas side of the business and with the eminent deregulation of electricity, Consumers Power in 1985 began cost reduction and performance improvement programs.

The company implemented a systematic approach to performance improvement through a newly created performance improvement, planning and training department. Consumers Power made use of Joe Harless' front end analysis model and accomplishment based curriculum development system. Thomas Gilbert's performance improvement potential analysis, a method of defining exemplary performance by comparing other workers' performance to that of master performers, was also used to make sure solutions to performance discrepancies were cost effective.

Southern California Gas Company (SoCal), headquartered in Los Angeles, used a training approach to handle the rising level of on the job stress of customer service representatives who dealt directly with the public (Lee,

1987). SoCal implemented a system wide customer service training program for its customer service representatives. The program taught employees ways to handle customers so that a decrease in stress resulted.

A formal evaluation conducted in the second year of the program reinforced the findings from informal post training questionnaires that the overall quality of customer contact sessions had improved as a result of the program.

Peoples Natural Gas Company (PNG) in Pittsburgh revamped its pay for performance program in 1987, to strengthen its competitive edge (Guinn & Corona, 1991). Individual performance expectations and results were linked to the utility's business plan. The new performance management system focused on results, objectives and behavioral skills critical to the accomplishment of an employee's specific goals.

Training was used for implementing the revised merit review and performance appraisal process. Feedback was received from two-thirds of the employees surveyed about the program. A range of 84 percent to 95 percent of the responses to every phase of the performance management process were positive.

Federally Mandated Training on the Requirements
for Testing, Refresher Training and
Natural Gas Pipelines

Congress first addressed the subject of training for pipeline safety in the Natural Gas Pipeline Safety Act of 1968. The Congress believed that failures had occurred on natural gas and hazardous liquid pipelines because not all personnel who worked on the pipelines had been adequately trained.

Although the Department of Transportation's Office of Pipeline Safety believed that personnel competency was a problem generally limited to small municipal and privately held gas distribution systems, draft regulations regarding training were applicable to all gas systems subject to the Natural Gas Pipeline Safety Act of 1968.

Congress began recommending in 1986 that the Office of Pipeline Safety establish requirements for qualifying pipeline operators. In 1988 legislation was passed that authorized the Office of Pipeline Safety to establish standards for testing and qualifying pipeline operating and maintenance personnel. Congress, as part of the Pipeline Safety Act of 1992, mandated DOT action. The final regulations have not yet been issued.

The proposed regulations address training and qualifications standards for personnel involved in the operations, maintenance, and emergency response functions of both natural gas pipelines and hazardous liquid pipelines.

Covered personnel would be required to complete requirements for qualification training, testing, refresher training and, in some cases, competency reviews. The intended effect of this rule making is to minimize personnel incompetence as a factor in gas and hazardous liquid pipeline accidents.

At this time, none of the regulations mandates employee certification which would entail training procedures and examinations controlled by the government. The regulations will require training and qualification, but not the certification or licensing of employees. This training and qualification of employees is being left to individual companies.

The development of training programs must follow an established criteria of instructional systems design, including needs assessment, program design and development, implementation, and evaluation. Training must adhere to performance based standards and pipeline personnel must perform to standard on valid and reliable hands on, written, and/or oral tests.

Some pipeline operators already have training programs in place that they believe will meet the Department of Transportation's qualification standards. Among several external training systems available to the gas industry is one developed by the Midwest Gas Association (MGA), a trade association based in Minneapolis, Minnesota, in conjunction with over 100 natural gas utilities in the United States.

Performance based training modules have been developed for 46 topics related to the safety of operating and maintaining natural gas pipelines. Task information for these performance based modules has been subjected to rigorous analysis by training and development practitioners with whom the MGA has contracted and subject matter experts employed by the participating utilities.

Williams Knowledge Systems (WKS), one of The Williams Companies, Inc., based in Tulsa, Oklahoma, provides a comprehensive, computer based training system which offers over 80 modules for pipeline operator personnel. Both the MGA system and the WKS efforts are designed in conjunction with valid and reliable testing procedures and include documentation of each employee's training.

These two systems appear to be the largest and most comprehensive of their kind available for natural gas companies to use to comply with the Department of Transportation's regulations. Some states, such as Tennessee, Kentucky, and Missouri, have worked with their state trade associations and public utilities commissions to develop performance based, validated training programs.

Many companies have developed or are developing training programs on their own, or with the assistance of consultants. They expect that these programs will comply with the final regulations handed down by the Department of Transportation.

A Theoretical Basis of Needs Assessment

Needs assessment has been variously known as needs assessment, needs analysis, gap analysis, front end analysis, and performance discrepancy analysis. For the purposes of this study, determining interventions that will affect human productivity in the work place will be referred to as needs assessment.

Although needs assessment has been used as a first step in a performance problem solving strategy, there is little agreement about its definition or its use. A systems approach, however, is central to its strategy. "Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than 'snapshots.'" (Senge, 1990, page 7).

A prominent needs assessment paradigm is the discrepancy model, or the conception of need as a discrepancy or gap between the actual and the ideal. In this model the object of a needs assessment is to reduce this gap through training or other interventions (Lewis & Bjorkquist, 1992). Needs assessment can be the first step in a systematic program of instructional systems design.

Theorists and practitioners who have been involved in affecting human performance have developed discrepancy analysis models. These models allow them to take an orderly look at organizational performance issues.

Early Studies of Human Productivity

Enhancing human productivity in the work setting has been the subject of intense study since the middle of the twentieth century. Behavioral learning psychologists in the 1950s experimented with structuring and presenting information in such a way that people might learn most efficiently and effectively.

Skinner contributed to a systematic process through his work on programmed instruction, task analysis, behavioral objectives, and criterion referenced evaluation. This system eventually became known as instructional systems design.

In 1933 Dewey urged educators to respond to the needs of learners. Tyler, in 1949, emphasized the questioning process as the means of determining objectives. Mager, in 1970, provided tools to find and write useful instructional objectives (Stolovitch & Keeps, 1992).

McGehee and Thayer (1961) advanced the systematic understanding of training needs analysis with their development of an integrated, three-faceted program designed to objectively determine training needs. In their model, organizational analysis included a holistic analysis of organizational objectives, the organizational climate, and the organization's human resources.

Operations analysis involved study of a series or group of jobs, standards of job performance, and the skills,

knowledge, and attitudes necessary to perform these the functions appropriately. art, 1978

Person analysis used objective measures to find out how well each employee is performing the tasks that make up his or her job.

These three facets, while put forth separately, worked together to produce a unified set of training requirements.

Later Foundations for Needs Assessment as A Part of Improving Human Performance

The works of Gilbert, Mager, Harless, Rummier, and Kaufman were integral in discussing human performance analysis. Gilbert talked about measuring human competence not through behavior but through accomplishments. Once exemplary performance had been identified, he believed the "potential for improving performance" could be quantified to measure the overall worth of specific other employees compared to the worth of the exemplary performer.

Gilbert established clear, valued, and measurable goals and determined the potential for accomplishing them. While his emphasis was on accomplishments, he believed that in order to engineer performance, one must deal with behavior.

Gilbert noted that all behavior was a product of two components of equal importance, a person with a repertory of behavior, and a supporting environment. Together these two components formed a transaction called "behavior."

Improving performance meant altering the repertory, the environment, or both (Gilbert, 1978).

Gilbert's work may be compared to that of McGehee and Thayer with its emphasis on an integrated, observation-based approach to improving performance (Dean, 1992).

Joe Harless, influenced by Gilbert, contended that human performance problems were defined by their contexts. Harless' "diagnostic front end analysis" was a method of diagnosing a performance deficiency. Like Gilbert, he defined the goals of the organization or the expected outcome of the situation at hand. From there he conducted a front end analysis to determine what he needed to know to design and implement an appropriate intervention.

A front end analysis involved looking at an organization from several perspectives. A vertical slice of the organization showed both the pattern and the magnitude of needs. Looking at both long term and short term requirements of the organization reflected the context and priority of needs. A front end analysis helped ensure that training and non training resources were directed toward the most pivotal organizational issues (Hobbs, 1990).

For Harless, a performance problem was an element of social circumstance and had four basic referents, information or knowledge, environment, affect (motivation), and personnel (Westgaard, 1992). Only four interventions could take place to resolve the performance issue. Personnel selection was an intervention as was training.

Engineering the environment and providing incentives to affect motivation were also interventions. Front end analysis diagnosed which of these four interventions or a combination of them would resolve the performance discrepancy. Harless like Gilbert emphasized the accomplishment base of a job (Carnevale, 1991).

"Accomplishment based curriculum development" (ABCD) was a systematic process for establishing and maintaining personnel development. It used front end analysis, and further encompassed design, development, delivery, and evaluation of training.

ABCD started with an examination of the organization's mission and goals. From this examination, the specific behaviors or accomplishments that were necessary to carry out the organization's goals or generate its products were determined. After this analysis, the appropriate information was delivered within the organization to make sure that these behaviors or accomplishments were carried out.

Mager and Pipe, Rummler and Brache, and Kaufman used systems methods for analyzing performance problems and their causes. Mager and Pipe's human performance model was presented as a flow chart.

Assuming an important performance discrepancy existed, Mager and Pipe determined whether or not the workers had the knowledge, skills, and abilities to do the job. An analysis of the environment in which employees worked gave

information about whether the desired performance was being punished; about whether incorrectly doing the job was rewarding in some way; about whether doing the job right really mattered; and about whether there were other obstacles to performing the job.

Mager and Pipe evaluated the tangible and intangible costs to the organization of solutions to the performance discrepancy. The solution which was most practical, feasible, and economical, and the remedy which was likely to give the most benefit for the least cost were all factors to be considered (Mager & Pipe, 1984).

Rummler and Brache put forth two fundamental premises in their work with human performance. First, every individual operated within the context of a performance system. Second, improvements in individual and organizational performance occurred only if the variables in that system were understood and managed. Their work reflected the influence of Gilbert.

Rummler and Brache believed a horizontal rather than a vertical view showed that work gets done through processes that cut across functional boundaries. It also showed the internal customer/supplier relationships through which products and services were produced. The greatest opportunities for performance improvement lay in these functional interfaces (Rummler & Brache, 1991).

Effective management of performance required goal setting, designing, and managing each of three levels of

performance: the organizational level, the process level, and the job/performer level. These three levels were interdependent. Any attempt to implement one level without the other two would fail (Rummler & Brache, 1990).

Rummler and Brache combined the three levels of performance with the three performance needs of goal setting, designing, and managing results to come up with nine "performance variables." Rummler and Brache's "three levels" viewpoint lead to performance driven training and development based on the needs assessment approach outlined above.

Rummler and Brache echoed factors defined by others as affecting the human performance system, such as performance specifications; task interference; consequences, feedback, knowledge and skill, and individual capacity (Rummler & Brache, 1990).

Kaufman used a holistic, systematic approach to the performance management effort. Needs assessment provided the foundation for an overall proactive approach to identifying problems and opportunities and then resolving or realizing them.

Kaufman established a clear statement of direction for any level of performance intervention. He noted that almost all theorists agreed that the emphasis must be on results or accomplishments and not on means or resources (Gilbert, 1971; Harless, 1975; Kaufman & Thiagarajan, 1987; Mager,

1976; as cited in Kaufman & Valentine, 1989). He also espoused the definition of needs as gaps in results.

He redefined, however, the extensive writings concerning the concepts of systems and the systems approach, needs assessment, needs analysis, strategic planning, front-end analysis, problem analysis, performance analysis, goal analysis, task analysis, training, and human resource development (Rossett, 1986 & 1987; Benjamin, 1989; Witkin, 1984; Kaufman, 1988a, Kaufman & Valentine, 1989, et al. [cited in Kaufman & Bowers, 1990]).

Kaufman differentiated between needs assessment and needs analysis. A need meant a gap in results. For Kaufman needs assessment was the identification, prioritization, and selection of gaps in results.

Needs analysis was the process for identifying the causes of the needs. Kaufman first selected needs through a needs assessment, then identified their causes through needs analysis. After these two processes were completed, measurable objectives and possible ways to meet them were identified (Kaufman & Valentine, 1989).

Kaufman differentiated between three levels of planning based on appropriate levels of the organization. Mega-level results, macro-level results, micro-level results, and an ideal vision which, when used together, guided and delivered desired and required results.

Techniques and Tools Commonly Used to Assess Needs

A needs assessment plan is a blueprint for collecting information about the gap between actual and ideal human performance. Conducting a needs assessment is one of the competencies identified for instructional designers by the International Board of Standards for Training, Performance, and Instruction. Foshay, Silber and Westgaard noted that needs assessment is used to uncover what a performance problem is, whom it affects, how it affects them, and what results are to occur through training or other interventions (cited in Rothwell & Kazanas, 1992).

In their reiteration of the standards for instructional design competencies, Foshay, Silber and Westgaard said that needs assessment plans should contain the following elements: (1) needs assessment objective(s), (2) identification of the target audience, (3) procedures for sampling the target audience and organizational objectives, (4) strategy and tactics for data collection, (5) specifications of instruments or protocols to be used, (6) data analysis methods, and (7) a description of how decisions will be made based on the data (cited in Rothwell & Kazanas, 1992). Conducting a needs assessment assumes that sufficient justification already exists to solve a performance problem.

Various techniques and tools are used to assess the gap between actual and ideal human performance. Gilbert devised a formula for defining a performance gap. The "potential for improving performance" (PIP) is the ratio between value and cost. Value is defined as productivity multiplied by quality. Gilbert included rate of production, timeliness of production, and volume of production in his definition of productivity. Quality is determined through accuracy, class or superiority of accomplishment, novelty, and quality combinations. Cost encompasses labor, material and management.

The three parts of the PIP equation, productivity, quality, and cost must be defined and calculated to pinpoint desired performance. An analysis of the organization, the work flow or process, and the individual job/performer must take place to determine what may be preventing the desired performance.

McGehee and Thayer's model is worked from the top down. Organization analysis starts as high in the organization as possible to determine gaps between what is going on and organizational performance and goals. Operational analysis involves evaluation of the jobs and tasks used to make up operational processes. Individual analysis looks at each employee's performance on prescribed tasks.

The organization may be analyzed through organizational goals and objectives, manpower and skills inventories, and organizational climate indices such as turnover, accidents,

and absenteeism. Job descriptions, job specifications or task analysis, performance standards, work sampling, and an analysis of operating problems are some of the tools used to identify analyses of operations or jobs. Person or individual analysis is obtained by gathering personal data through interviews, tests, observation, work sampling, observing and documenting critical incidents, assessment centers (Moore & Dutton, 1978).

Mager and Pipe used a flow chart to direct the assessor through a series of questions about the discrepancy between actual and ideal. Each point on the flow chart calls for various questions to be asked to determine the gap between actual and ideal performance.

Rossett laid down two rules of thumb in deciding which tools to use to identify needs. "TNA purposes influence the techniques you select and questions you ask. The context influences the tools you employ and sources you contact" (1987, p. 217). She listed three techniques which must be linked to the analyses of the needs for which they are appropriate. Extant data analysis draws inferences about performance from data sources such as accident reports, turnover, and repair call-backs. Extant data analysis determines what is actually happening and grounds the needs assessment in performance and accomplishments. The second technique, needs assessment uses systematic processes to gather opinions and feelings from a variety of sources on performance issues or new technologies. Subject matter

analysis includes task analyses, and focuses on what ought to be happening.

Some of the more common tools Rossett uses to implement extant data analysis, needs assessment, and subject matter analysis include questionnaires, interviews, observations, evaluating work samples, and reviewing records and reports. Different tools may be used to gather data on performance discrepancies. Certain tools are more appropriately used to gather specific data than are others. Data gathered by means of one tool may be used to complement and verify data gathered by means of other tools.

Zemke and Kramlinger (1982) said that the most important consideration in selecting tools with which to assess needs was to use those that would answer the questions that needed to be answered. They emphasized the importance of following a model of human performance that was organizationally relevant.

Practitioners' Use of Needs Assessment

The theoretical emphasis is on a systematic, interrelated approach to needs assessment, although a discrepancy still exists between what theoreticians advise and what practitioners use.

Mahler and Monroe in 1952 (cited in Moore & Dutton, 1978) found that most methods for determining training needs were informal. Only about one in ten companies in a variety of industries reported using systematic methods to determine

training needs. A 1962 Bureau of National Affairs (BNA) survey noted that 41 percent of firms questioned used observation and analysis of job performance to determine training needs.

In 1969, the BNA's survey showed an increase of eight percent to 49 percent of firms questioned used these two methods to determine training needs. These studies showed some movement toward a more systematic, formalized approach to needs assessment (cited in Moore & Dutton, 1978). Fewer than 50 percent of surveyed organizations in any industry still did not use any method to determine training needs, and only about ten percent made use of any systematic research techniques (cited in Oboh, 1990).

Oboh (1990) found discrepancies between the theory and practice of needs assessment. Despite the potential gains to be derived from conducting needs assessment, 26.5 percent of the organizations who responded to his survey did not use it. The reasons most often given were "no time," "lack of sufficient resources," and "management skepticism."

The highest percentage of respondents to Oboh's survey indicated that they performed needs assessment as the need arose. Twenty percent of respondents reported they used the intuition of the training staff as a foundation for training programs.

Conclusion

Certain techniques and tools for enhancing employee productivity improvement have been outlined and categorized. Some natural gas utilities are making greater use of various needs assessment techniques and a variety of human performance interventions to improve employee productivity. This study will explore whether or not training and development practitioners in natural gas utilities are generally aware of these techniques and are making use of them to help them improve performance productivity.

discrepancy analysis model allows training
planners to take an orderly look at

CHAPTER III

METHOD

The purpose of this study was to determine the extent to which training and development practitioners in the natural gas utility industry were familiar with needs assessment and the extent to which these practitioners made use of it to determine training needs and other human performance improvement interventions in the work place.

The objectives of this study were:

- a) to identify the ways in which trainers in the natural gas industry describe needs assessment;
- b) to identify the processes of conducting needs assessment by trainers in the natural gas industry; and
- c) to identify ways in which trainers relate needs assessment to organizational goals in the natural gas industry.

A review of the literature regarding needs assessment indicated that the discrepancy analysis model is a primary method of determining the difference or gap between actual and expected results in human performance in the work place. In this model the object of a needs assessment is to reduce this gap by means of training or other work place

interventions. A discrepancy analysis model allows training and development practitioners to take an orderly look at organizational systems. Needs assessment within the context of the discrepancy model can be the first step in a systematic program of instructional systems design.

Information about the use of needs assessment to improve labor productivity in the natural gas industry was limited to descriptions of specific gas utilities' training or other labor productivity improvement programs. It was noted that natural gas utilities are beginning to take a more aggressive approach to improve human performance as competitive and regulatory demands become more stringent.

Research on the use of needs assessment in business and industry as a whole indicated that most methods for determining needs are informal rather than structured. The research indicated that there has been a trend to a more systematic, defined approach to needs assessment over the past few years.

Subjects

The subjects for the study were training and development practitioners who were associated with natural gas distribution utilities in the United States, and who were members of two human resource development organizations, the American Society for Training and Development (ASTD) and the National Society for Performance & Instruction (NSPI). Members of ASTD's utility industry

group listed in the 1994 membership directory and NSPI's utility or communications group listed in the 1993-1994 membership directory were reviewed for those who were training and development practitioners in natural gas utilities.

A total of 188 practitioners were selected as subjects. Some of the subjects worked for the same utility company.

Seven duplicate listings were found in the ASTD and NSPI groups. Each subject in the duplicate listings was used only once in the study, reducing the total number of subjects in the population to 181. The pilot questionnaire was sent to ten percent, or 18, of the population. The final questionnaire was sent to a total of 163 members of the population.

All companies listed in the population were checked against a listing of North American gas company members in the 1994 membership directory of the American Gas Association, a listing of gas companies and municipal systems found in the 1993-94 Brown's Directory of North American and International Gas Companies; and a listing of the 300 largest natural gas utilities in the magazine Pipeline and Gas Journal. If the company was listed in these resources as a provider of natural gas utility services, the ASTD or NSPI member was included in the population.

The American Gas Association is the natural gas industry's national trade association. Brown's Directory

provides a source of information on the worldwide gas industry with detailed listings of North America and international gas companies and municipal systems, as well as gas brokers, transporters and government regulatory agencies.

It was found that the members of the population which included both ASTD and NSPI gas distribution utility members were affiliated with 56 companies in the United States. All but two of these companies were listed on Pipeline and Gas Journal's listing of the 300 largest natural gas distribution utilities in the United States.

Twenty five of these utilities provided distribution services for electricity as well as gas. One provided distribution services for water as well as for natural gas and electricity. Brown's 1993-94 Directory of North American and International Gas Companies listed more than 1,000 utilities that provide gas distribution services in the United States.

Instrumentation

The instrument was developed from information derived from an open ended survey (Appendix A, page 76) and was sent to four experienced training and development practitioners in the natural gas utility industry and four experienced training and development practitioners in other industries and vocational education.

Input from those surveyed led to a redefinition of the study's objectives as well as a reorganization of the questionnaire. The revised questionnaire (Appendix B, page 78) focused on forced choice and multiple answer questions that asked for answers to specific aspects of needs assessment (Appendix C, page 87).

The revised questionnaire was pretested by the eight practitioners initially surveyed. These practitioners were asked to make sure that each item was relevant and contributed to the study objectives. All of the practitioners agreed that the questionnaire was valid in terms of content and relationship to the study objectives.

The questionnaire was pilot tested by a random sample of ten percent or 18 members of the population to check for clarity, readability, and errors. Sent to the pilot population were the questionnaire, a cover letter (Appendix D, page 89), and a stamped, addressed envelope to be returned to the researcher. The cover letter explained the study and urged participants to respond as soon as possible.

The final questionnaire was sent to all 163 members of the subject population. Included with the questionnaire were a cover letter explaining the survey and asking for a response and a stamped return envelope addressed to the researcher.

Post cards were sent to the subject population approximately ten days after the original questionnaire was

sent. The cards reminded the group of the study and asked for their responses if they had not already returned their questionnaires.

CHAPTER IV

RESULTS AND DISCUSSION

Introduction

This study investigated the perception and use of needs assessment in the natural gas utility industry.

Purpose

The purpose of the study was to determine how training and development practitioners in the natural gas utility industry describe and conduct needs assessment, and the extent to which these practitioners make use of needs assessment to determine training needs and other performance improvement interventions.

Objectives

The objectives of this study were:

- a) to identify the ways in which trainers in the natural gas industry describe needs assessment;
- b) to identify the processes of conducting needs assessment by trainers in the natural gas industry; and

TABLE I
c) to identify ways in which trainers relate needs
assessment to organizational goals in the natural
gas industry.

Response Rate

A total of 163 letters of transmittal, questionnaires, and stamped return envelopes addressed to the researcher were sent to the population. Forty seven percent or a total of 76 responses were returned.

Questionnaire respondents were initially screened to determine whether their utilities provided other distribution services in addition to natural gas.

Forty nine percent or 37 respondents were primarily involved in natural gas training and development activities. These 37 respondents made up 23 percent of the original sample of 163 persons involved in utility training and development and 49 percent of the responses received.

Fifty one percent or 39 of the respondents provided training and development services primarily for utility distribution services other than natural gas.

Table I shows the number and percentage of respondents involved in utility services by source of energy.

or and percentage of respondents

TABLE I

TRAINING AND DEVELOPMENT PROVIDERS INVOLVED IN
UTILITY SERVICES BY SOURCE OF ENERGY

Source of Energy	Frequency	Percent of Responses
Natural gas utility services	37	49
Other utility services	39	51
Total	76	100

Table II shows the number and percentage of respondents whose primary training and development activities were for utility services other than natural gas.

Use of Needs Assessment

Thirty three of the respondents involved in natural gas training indicated that their utilities used needs assessment in their organizations. Thirty two respondents completed the questionnaire. One respondent indicated that many different kinds of needs assessment were used for many different purposes in the organization. This respondent did not complete the questionnaire.

Four respondents indicated that they did not have needs assessment programs in their organizations.

Table III shows the number and percentage of respondents involved in training and development for natural gas distribution services and whether or not they used needs assessments in their organizations.

Four respondents said that they did not use needs assessments.

One respondent said, "there is no formal process: Needs are addressed on a number of items by law (DOT) requirements and industry changes."

Another respondent commented on a lack of time for needs assessments. "There is usually not enough time to invest in analysis. Downsizing affected the availability of all personnel for all but essential activities."

TABLE II
TRAINING AND DEVELOPMENT ACTIVITIES REPORTED BY
RESPONDENTS FROM UTILITIES OTHER
THAN NATURAL GAS

Training/development by utility service	Frequency	Percentage
Electric service	23	58
Nuclear energy	8	20
Corporate planning	2	5
Giving customer service info	2	5
Water service	1	3
Computer technology	1	3
Managerial/supervisory training in natural gas & electric services	1	3
No answer	1	3
Total	39	100

TABLE III
USE OF NEEDS ASSESSMENT IN THE ORGANIZATION

Use of needs assessment	Frequency	Percentage
Needs assessment used	33	89
Needs assessment not used	4	11
Total	37	100

Training and development practitioners in one utility were beginning their work with needs assessment, "Just starting to work with needs assessments, as to date nothing being used formally."

One respondent gave no reason for not using needs assessments.

Demographics

A description of the respondents' characteristics were provided in response to several demographic questions. Table IV shows a frequency distribution of the number of times respondents reported a job title and the percentage of each title's occurrence based on the number of questionnaires returned.

This question was asked in order to determine the respondents' general level of responsibility in the organization, and whether or not the respondent was involved in managing the training and development function or in delivering training and development activities. Seventeen or 55 percent of the respondents worked at the level of vice president, director, manager, or supervisor. The greatest number of respondents reported titles in the category of training director, manager, or supervisor.

In answer to the question on the survey concerning length of time in the training and development profession, respondents indicated that their median length of service in the profession ranged from 11 through 20 years. Evaluation

TABLE IV
DISTRIBUTION OF RESPONDENTS' TITLES

Respondents' Titles	Frequency	Percentage
Vice president	1	3
Training director/ manager/supervisor	10	31
Technical training/ director/manager/supervisor	6	19
Instructional designer	2	6
Trainer/technical trainer	5	16
Other	5	16
Total	32	100

of the mode also showed that the greatest number of respondents had worked in the profession between 11 and 20 years.

Table V illustrates the responses to the question concerning length of time in the profession.

In response to the question, "How large is your organization," 65 percent of respondents indicated that they were involved with natural gas distribution utilities that employed between 1,001 to 2,500 persons and that employed more than 5,001 persons.

Table VI shows the number of respondents who were employed in organizations of various sizes.

These results are consistent with the demographics of the population to which the survey was sent. All but two of the 56 companies represented in the population were included on Pipeline & Gas Journal's list of the 300 largest natural gas distribution utilities in the United States. In addition some of the utility companies had more than one representative who was a member of the NSPI or the ASTD and was therefore included in the sample. Some companies were therefore more highly represented in the sample.

In the survey question regarding numbers of customers, respondents indicated the number of customers, by classification, that their natural gas utilities served. For industry reporting purposes, natural gas utility customers were classified as residential, commercial, and industrial.

TABLE V
LENGTH OF TIME IN THE PROFESSION

Time in profession	Frequency	Percentage
Less than two years	2	6
Two through five years	7	22
Six through ten years	5	16
Eleven through twenty years	13	40
Over twenty years	5	16
Total	32	100

TABLE VI
NUMBER OF EMPLOYEES IN COMPANY

Number of employees	Frequency	Percentage
100 employees or fewer	0	0
101 to 250 employees	0	0
251 to 500 employees	0	0
501 to 1,000 employees	6	19
1,001 to 2,500 employees	12	37
2,501 to 5,000 employees	5	16
5,001 or more employees	9	28
Total employees	32	100

Of the 32 respondents to the questionnaire, 26, or 81 percent, listed the number of customers they served according to customer classification. Six respondents did not answer the question or gave incomplete answers.

The 26 respondents who answered noted that their gas utilities served an average of 1,266,200 residential customers. Residential customers served by a single gas utility in the sample ranged from a high of 6,000,000 to a low of 52,000.

The 26 respondents noted that their natural gas utilities served a combined average of 170,095 commercial and industrial customers. Commercial and industrial customers served by natural gas utilities in the sample ranged from a high of 1,066,317 served by one company, to a low of 3,000 served by one company.

These results, as were those shown in Table VI, were consistent with the demographics of the population to which the survey was sent.

Conducting Needs Assessment in

the Organization

Respondents in natural gas utilities who used needs assessment were asked to identify the persons who carried out the assessments in their organizations. Several respondents indicated that persons in more than one

discipline conducted needs assessment. The 32 total respondents gave 64 replies to this question.

Table VII shows those who respondents indicated carried out needs assessment in their organizations. Half of those who carried out needs assessment were the training and development practitioners themselves. The next most frequently listed group who provided needs assessment were outside consultants.

When asked who should carry out needs assessments, 39 percent of respondents indicated that training and development practitioners should be involved. Seventeen percent noted that line managers should be included. Only seven percent of respondents indicated that line managers were currently involved in needs assessments.

Sixteen percent of respondents said that strategic planners should be involved in carrying out needs assessments while only nine percent indicated that they were currently involved in this activity.

Table VIII shows the distribution of respondents' answers to the question of who should be carrying out needs assessments in their organizations.

Respondents were asked to list the steps they took in conducting a needs assessment. Responses were compared with a list of key issues to be addressed in a needs assessment plan as put forth in the Instructional Design Competencies of the International Board of Standards for Training, Performance, and Instruction. These steps include (1)

TABLE VII
UTILITY REPRESENTATIVES WHO DO NEEDS ASSESSMENT

Do needs assessment	Frequency	Percentage
Training/development practitioners	32	50
Line managers	7	11
Outside consultants	13	21
Strategic planners	6	9
Other	6	9
Total responses	64	100

TABLE VIII
WHO SHOULD DO ASSESSMENTS

Who Should Do Assessments	Frequency	Percentage
Training/development practitioners	30	39
Line managers	17	22
Outside consultants	14	18
Strategic planners	12	16
Other	4	5
Total responses	77	100

Objectives, (2) Target audience, (3) Sampling procedures, (4) Data collection methods, (5) Specifications for instruments and protocols, (6) Methods of data analysis, and (7) Descriptions of how decisions are to be made based on the data (Foshay, Silber, & Westgaard, 1988; as cited in Rothwell & Kazanas, 1992).

Twenty seven or 84 percent of the 32 respondents involved in natural gas training and development listed steps that were generally consistent with these key issues. Other steps also mentioned by this group of respondents included reporting results to management, recommending training or other interventions, tying the needs assessment to the corporation's strategic plan and objectives, pilot testing the use of interventions, and measuring the value of interventions.

One respondent noted that gas training was being directed by the proposed skills training requirements of the federal Department of Transportation. One respondent noted that there was no formal or standard procedure for constructing a needs assessment. Three respondents did not answer the question.

Organizational Factors Relevant to a Needs Assessment

Table IX gives an overview of organizational factors considered when deciding to conduct a needs assessment. The

highest was regulatory mandate
TABLE IX
RANK ORDER OF ORGANIZATIONAL FACTORS

Organizational Factors	n	Mean	Rank
Regulatory mandate	32	3.53	1
Occurrence of changes in the organization	32	3.09	2.5
Performance standards	32	3.09	2.5
Organizational objectives	32	3.06	4
Organizational mission	32	3.03	5
Commitment of management to process	32	3.00	6.5
Management requests	32	3.00	6.5
Acceptance of process by supervisors and employees	32	2.94	8
Introduction of new technology	32	2.91	9
Time constraints	32	2.88	10

factor with the highest mean rating was regulatory mandate. Occurrence of changes in the organization, performance standards, and organizational objectives also ranked highly when deciding to conduct a needs assessment.

The average of the mean scores was calculated to be 3.05. The median lay between 3.00 and 3.03. As a result, the distribution of scores was positively skewed with more respondents indicating that regulatory mandate, occurrence of changes in the organization, performance standards, organizational objectives, and organizational mission were more highly considered organizational factors in doing a needs assessment than were commitment of management to the process, management requests, acceptance of the process by supervisors and employees, introduction of new technology, and time constraints.

Other responses, each noted one time, were given for this question:

- a) external customers' needs,
- b) overall organizational effectiveness,
- c) practicality,
- d) practices and procedures,
- e) work place,
- f) when starting new assignment in training,
- g) when too many requests come in for training--to
prioritize needs,
- h) performance gaps,

- i) misunderstanding of underlying performance problems, and
- j) possible cost savings.

Labor Productivity Indicators
Considered When Conducting a
Needs Assessment

Table X shows that four indicators of labor productivity ranked significantly higher than others that were considered when conducting a needs assessment. Skills deficiencies in the work force was the number one issue of labor productivity to consider when conducting a needs assessment.

Skills deficiencies in the work force were ranked the most highly rated indicators of labor productivity. Line manager comments/complaints, safety/accident records, and deviations from projected performance targets followed, respectively, as the next most highly regarded indicators of labor productivity.

The average of the means was calculated to be 2.79. The median of the distribution was noted as 2.91, the mean for the labor productivity indicator, employee comments/complaints. These measures of central tendency indicate that the distribution was positively skewed with more frequently used indicators of labor productivity lying above the median rather than below it.

TABLE X Category that were not
INDICATORS OF LABOR PRODUCTIVITY

Labor productivity	n	Mean	Rank
Skills deficiencies in work force	31	3.45	1
Line manager comments/complaints	32	3.31	2
Safety/accident records	32	3.25	3
Deviations from projected performance targets	32	3.19	4
Input: training advisory committees	31	3.13	5
Input from subject matter experts	30	3.07	6
Performance reviews	32	3.00	7
Lost time accidents	31	2.93	8
Employee comments/complaints	31	2.91	9
Employee test results	31	2.87	10
Labor productivity reports	31	2.81	11
Repair or rework cost records	32	2.63	12
Error rates	32	2.53	13
Material failure reports	31	2.29	14
Material waste reports	31	2.23	15
Employee turnover rate	31	1.97	16
Employee absenteeism rate	31	1.84	17

Other notations made in this category that were not included in the survey list, but were each noted one time by respondents included:

- a) changes in procedures/practices,
- b) customer satisfaction, and
- c) the use of Mager's model.

Techniques Used to Conduct

Needs Assessment

Table XI notes the frequency with which certain techniques are used in conducting a needs assessment. The most often used techniques according to respondents were the analysis of job requirements and interviews. Job or task analysis and focus groups were also frequently used methods of conducting a needs assessment.

The average of the means used to rank techniques used for needs assessment was calculated to be 2.67. The median of the distribution fell between 2.75, the mean for testing employee knowledge/skills, and 2.78, the mean for questionnaires. Because the median was higher than the mean, the distribution was positively skewed with more weight given to more highly ranked techniques.

The most highly ranked techniques were analysis of job requirements and interviews. The next most highly ranked were job or task analysis and focus groups.

TABLE XI
TECHNIQUES USED FOR NEEDS ASSESSMENTS

Techniques used	n	Mean	Rank
Analysis of job requirements	32	3.19	1.5
Interviews	32	3.19	1.5
Job or task analysis	32	3.09	3.5
Focus groups	32	3.09	3.5
On site observation of job performance	32	2.88	5.5
Surveys	32	2.88	5.5
Review or analysis of records	31	2.87	7
Questionnaires	32	2.78	8
Testing employee knowledge/skills	32	2.75	9
Intuition of training staff	31	2.58	10
Employee attitude surveys	32	2.56	11
Work force skills inventories	31	2.39	12
Analysis of work samples	32	2.31	13
Critical incident technique	30	2.27	14
Nominal group technique	28	2.14	15
Delphi technique	25	1.68	16

Other Comments

Several comments were included in response to the survey question, "What other comments would you like to make?" One respondent said that it was critical that each person in training and development understand needs assessment.

As our group changes from a training organization to more of a performance improvement group, it has become very critical that each of us understands and applies needs assessments whenever possible. This is the only way to effectively analyze and determine the appropriate methods of interventions when dealing with performance issues.

A respondent noted that a more focused approach to needs assessment was being taken.

Our corporate training organization is currently moving in the direction of more focused training based on thorough needs/job task analysis and away from generic programs. As an organization, we provide service to both gas and electric employees.

One utility was following Allison Rossett's Model.

A formal needs assessment process is not in place here, for it is a recent concept in the gas company. We in Training are following Allison Rossett's model with insights from Hale Associates.

It was noted by one respondent that skills training takes precedence over other types of training despite the results of needs assessments that indicate other types of training are necessary.

Your questions are hard to understand/fit to our company. Not all gas companies are the same. Needs assessment can be very formal and expensive or done informally. Big companies had dollars for formal means, small ones don't but are closer to employees they serve. What counts is what you do with data. More importantly, how is the training apportioned by type--technical, customer service, management development. Technical training is king here! Gets funding because of regulatory environment. Supervisors need management training but technical is more critical now despite findings of needs assessment.

Skills training for natural gas employees was exempt from the needs assessment process in one utility.

All of our training and intervention programs, and vast majority of needs assessment activities are for all electric, gas, and water employees, except for skills training specific to gas employees.

One individual noted responsibilities in several areas in addition to training and development.

My particular role was to support training, organizational development, and quality. In addition I

had corporate responsibilities and additional business units (i.e., power delivery, corporate planning).

Using needs assessment of varying degrees of formality was a need of one organization.

We need more than one level of a needs assessment. For large projects a formal process is appropriate to support a large commitment of resources. It is necessary to support less ambitious projects with less formal assessments.

The data suggested that training and development practitioners in natural gas utilities were acquainted with needs assessment systems, but that these systems were not being integrated into organizational strategies for improving human performance.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine how training and development practitioners in the natural gas utility industry described and conducted needs assessment, and the extent to which these practitioners made use of needs assessment to determine training needs and other human performance improvement interventions.

The objectives of the study were:

- a) to identify the ways in which trainers in the natural gas industry describe needs assessment;
- b) to identify the processes of conducting needs assessment by trainers in the natural gas industry; and
- c) to identify ways in which trainers relate needs assessment to organizational goals in the natural gas industry.

Representatives of natural gas utilities who were members of ASTD's utility industry group and NSPI's utility and communications group were surveyed by mail. A total of 163 individuals involved in natural gas training and development from 56 natural gas utilities were surveyed.

All but two of these utilities were on Pipeline & Gas Journal's listing of the 300 largest natural gas distribution utilities in the United States.

Literature sources indicated that the natural gas industry has been undergoing a fundamental change in the way it operates. Natural gas utilities have traditionally held a monopoly on providing service to residential, commercial, and industrial customers within a specified geographic area. Federal regulations aimed at encouraging competition in the energy industry have eroded gas utility markets. Gas utilities are faced with deregulation of their own services, competition from providers of electric service, and enhanced information technology that makes it easier for unregulated gas providers to siphon off utility customers (Dar, 1995).

Natural gas utilities have been repositioning themselves in the marketplace to adapt to these changes. Klass (1991) reported that one way utilities have been adapting is by making efforts to improve their human performance productivity.

Current human performance literature suggested needs assessment as part of a systematic way to approach the enhancement of performance productivity. Discrepancies exist between actual and ideal work place productivity. These deviations from the ideal have been addressed with training or non-training interventions. Needs assessment has been identified as a first step in the process of

defining appropriate methods to enhance human performance productivity.

Conclusions

Several conclusions were drawn from the data in relation to the objectives of the study. Eighty nine percent of respondents indicated that some form of needs assessment was used to improve human performance in natural gas utilities. Eleven percent indicated that needs assessment was not used. Of those 89 percent who used needs assessment, regulatory mandate was identified as the most important organizational factor considered when deciding to conduct a needs assessment. One respondent commented, "Technical training is king here! Gets funding because of regulatory environment. Supervisors need management training but technical is more critical now despite findings of needs assessment."

Eleven percent or four natural gas utility respondents indicated that needs assessment was not done in their organizations. One of these respondents said that while there was no formal needs assessment process, "Needs are addressed on a number of items by law (DOT) requirements and industry changes." It would appear that both utilities that have embraced a formal needs assessment process, as well as those that have not, give top priority to regulatory mandate as the driving force behind improving human performance in their organizations.

Respondents indicated that 50 percent of training and development practitioners were involved in conducting needs assessments. Eleven percent of line managers and nine percent of strategic planners were involved in conducting needs assessments. Outside consultants were involved in conducting 21 percent of needs assessments.

Respondents noted that fewer training and development practitioners and outside consultants and greater numbers of line managers and strategic planners should be involved in conducting needs assessments. Organizational concerns such as company objectives, company mission, and commitment of management to the needs assessment process ranked lower than regulatory mandate, occurrence of changes in the organization and performance standards as factors to be considered when conducting a needs assessment. Analysis of job requirements, interviews, and job or task analysis were the top ranked techniques used for needs assessment. These data were interpreted as reflecting the use of needs assessment as a reactive response.

McGehee and Thayer, Harless, and Rummler and Brache espoused an organization-wide systems approach to analyzing performance problems and their causes. Kaufman used a holistic, systematic approach to the performance management effort. Needs assessment should provide the foundation for a proactive approach to identifying problems and opportunities and resolving or realizing them.

Needs assessment in natural gas public utilities should align the performance management system with organizational systems. The needs assessment process should not merely react to, but should become part of the strategic planning process. Needs assessment should be an integrated proactive effort between training and development practitioners, strategic planners and line managers.

Regulatory mandate, performance standards, skills deficiencies in the work force, line manager comments and complaints, safety and accident records, and deviations from projected performance targets were listed as those elements driving needs assessment in natural gas utilities. Existing and proposed regulatory mandates, comments and complaints from line managers and skills deficiencies in the work force were the primary factors used to determine training and development interventions in these utilities.

Of low usage were such labor productivity indicators as employee tests results, repair or rework cost records, material failure reports, and material waste reports. Techniques for conducting needs assessments that ranked low in usage were review or analysis of records, testing employee knowledge and skills, employee attitude surveys, and analysis of work samples.

It was noted that needs assessment was being conducted in natural gas utilities without a well defined analysis of what was actually happening in the work place. Rossett (1987) said three analysis techniques had to be used to

gather data about organizational problems and systems. Extant data analysis gave an indication of what was actually going on in the work place. Needs assessment gave an indication of opinions about what was going on in the work place. Subject matter analysis gave an indication of what performers must know to do their jobs ideally. Analysis of what actually happens in the work place needs to be included in utility needs assessment to make sure that interventions are designed to reflect the realities of the work place and to best enhance human performance productivity.

The fact that 89 percent of respondents said needs assessments were conducted in their organizations did not explain how well those needs assessments were being managed. The study did not support that judicious use of needs assessments was being made in natural gas utilities. Interventions not based on sound data and systematic processes may not improve human or organizational performance (Rummler & Brache, 1988).

Recommendations

This study indicates that industry wide training efforts are occurring in natural gas utilities. The natural gas training and development practitioners surveyed indicated an interest in improving human performance in an orderly manner. Further study should include a greater number of trainers and developers as well as utility companies in the population. It is suggested that further

study be done on how much training is being done as a result of governmental mandate instead of as a result of a well defined needs assessment. It is also suggested that further study be done on what differences there may be between needs assessments conducted for technical and skills performance interventions and needs assessments conducted for professional and managerial performance interventions in natural gas utilities.

Needs assessment was not adequately used as a means to improve human performance productivity in the natural gas utilities studied. For companies in an increasingly competitive industry, enhancement of human performance through efficient and effective use of needs assessment must become a priority.

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APPENDIXES

10/18 1987

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APPENDIX A

QUESTIONS USED TO DEVELOP SURVEY INSTRUMENT

The following questions were derived from the study objectives and were used to develop the final survey instrument:

1. What are indicators of performance improvement needs in a natural gas public utility?
2. What factors should be considered in conducting a needs assessment?
3. What should be done first in conducting a needs assessment?
4. What are the parts that should be included in a needs assessment?
5. What are the methods or techniques that are used in conducting a needs assessment?
6. How often should a needs assessment be conducted?
7. Under what circumstances should a needs assessment be conducted?
8. Who should conduct a needs assessment in a natural gas public utility?
9. What other comments would you like to make?

THE USE OF NEEDS ASSESSMENT
IN THE PUBLIC UTILITIES

21. by (insert date), and
22. by (insert date), and
23. by (insert date), and

to the Development
and Social University
in 1981
and 1982
and 1983

19

20

21

APPENDIX B

SURVEY INSTRUMENT

**DETERMINING THE USE OF NEEDS ASSESSMENT
IN NATURAL GAS PUBLIC UTILITIES**

Please complete this questionnaire by (insert date), and return it in the enclosed, stamped, self-addressed envelope to:

Human Resource Development
Oklahoma State University
c/o Jean Asbury
100 W. 5th Street, 17-6
Tulsa, OK 74102

1. Does your organization provide other utility services in addition to natural gas services?

_____ Natural gas only (Please skip to question 3.)

_____ Other utility services in addition to natural gas (Please answer question 2.)

2. Do your job duties include providing training and development activities primarily for those involved in delivering natural gas utility services?

_____ No If no, for what utility service do you provide training and development activities?

Thank you very much. Please return the questionnaire in the envelope provided.

_____ Yes (If yes, please answer question 3.)

3. Are needs assessments used in your organization?

_____ No If no, for what reasons are needs assessments not used?

Thank you very much. Please return the questionnaire in the envelope provided.

_____ Yes (If yes, please continue with the questionnaire.)

4. How often do you consider the following organizational factors when deciding to conduct a needs assessment? Circle the response which comes closest to your opinion.

	Never	Sometimes	Frequently	Always
Acceptance of process by supervisors and employees	1	2	3	4
Commitment of top management to the process	1	2	3	4
Introduction of new technology	1	2	3	4
Management requests	1	2	3	4
Occurrence of changes in the organization	1	2	3	4
Organizational mission	1	2	3	4
Organizational objectives	1	2	3	4
Performance standards	1	2	3	4
Regulatory mandate	1	2	3	4
Time constraints	1	2	3	4
Other (Please specify)				
_____	1	2	3	4
_____	1	2	3	4
_____	1	2	3	4

Continued on the next page

5. When carrying out a needs assessment, how important is it to consider each of the following indicators of labor productivity. Please circle the response which comes closest to your opinion.

	Very Low	Somewhat Low	Somewhat High	Very High
Employee absenteeism rate	1	2	3	4
Employee turnover rate	1	2	3	4
Deviations from projected performance targets	1	2	3	4
Employee comments/complaints	1	2	3	4
Employee test results	1	2	3	4
Input from subject matter experts	1	2	3	4
Input from training advisory committees	1	2	3	4
Line manager comments/complaints	1	2	3	4
Lost time accidents	1	2	3	4
Review of records & reports				
Error rates	1	2	3	4
Material failure reports	1	2	3	4
Material waste reports	1	2	3	4
Performance reviews	1	2	3	4
Labor productivity reports	1	2	3	4
Repair or rework cost records	1	2	3	4
Safety/accident records	1	2	3	4
Other: _____	1	2	3	4
Skills deficiencies in the work force	1	2	3	4
Other (Please specify) _____	1	2	3	4
_____	1	2	3	4
_____	1	2	3	4

6. Some techniques used to conduct a needs assessment are listed below. Please indicate your use of each of these techniques. Circle the response which comes closest to your opinion.

	never	sometimes	frequently	always
Analysis of job requirements	1	2	3	4
Analysis of work samples	1	2	3	4
Critical incident technique	1	2	3	4
Delphi technique	1	2	3	4
Employee attitude surveys	1	2	3	4
Focus groups	1	2	3	4
Interviews	1	2	3	4
Intuition of training staff	1	2	3	4
Job or task analysis	1	2	3	4
Nominal group technique	1	2	3	4
On-site observation of job performance	1	2	3	4
Questionnaires	1	2	3	4
Review or analysis of records	1	2	3	4
Surveys	1	2	3	4
Testing employee knowledge/skills	1	2	3	4
Work force skills inventories	1	2	3	4
Other				
_____	1	2	3	4
_____	1	2	3	4

7. Please indicate the steps you take in constructing a needs assessment in the natural gas utility.

8. Who carries out needs assessment in your organization? Please circle the numbers of all that apply.

- 1 Training and development practitioners
- 2 Line managers
- 3 Outside consultants
- 4 Strategic planners
- 5 Other (Please specify)

9. Who do you think should carry it out? Please circle the numbers of all that apply.

- 1 Training and development practitioners
- 2 Line managers
- 3 Outside consultants
- 4 Strategic planners
- 5 Other (Please specify)

10. What is your job title? Please circle the number of the title which comes closest to describing your position.

1 Vice president
2 Training director/manager/supervisor
3 Technical training/director/manager/supervisor
4 Training coordinator
5 Technical training coordinator
6 Instructional designer
7 Trainer/technical trainer
8 Other: Please specify

11. How long have you been in the training profession?
(Circle number)

1 Less than two years
2 Two through five years
3 Six through ten years
4 Eleven through twenty years
5 Over twenty years

12. Write the number of customers, by classification, that your natural gas utility serves.

a. Residential _____
b. Commercial _____
c. Industrial _____

13. How large is your company? (Circle number)

1 100 employees or less
2 101 to 250 employees
3 251 to 500 employees
4 501 to 1,000 employees
5 1,001 to 2,500 employees
6 2,501 to 5,000 employees
7 5,001 or more employees

14. What other comments would you like to make?
-
-

If you would like a summary of the results, please detach this page from the rest of the survey, attach a business card or write your name and address, and return this page to the researcher.

Thank you very much for your time and cooperation.

cited for an opinion on
 that factor is that influenced a few
 of the respondents. Literature sources
 included in the survey
 by the respondents
 were
 70% of the
 respondents

APPENDIX C

LITERATURE SOURCES FOR FACTORS USED ON THE SURVEY INSTRUMENT: ORGANIZATIONAL FACTORS, INDICATORS OF LABOR PRODUCTIVITY, AND TECHNIQUES USED TO CONDUCT NEEDS ASSESSMENT

Question 4 on the survey asked for an opinion on specific organizational factors that influenced a decision to carry out a needs assessment. Literature sources for the organizational factors listed on the questionnaire included those cited by McGehee and Thayer (1961), Zemke and Kramlinger (1982), Rossett (1987), and Rothwell and Kazanas (1992).

Indicators of labor productivity that influenced the decision to carry out a needs assessment were listed in question 5. Literature sources for these indicators of labor productivity included McGehee and Thayer (1961), Mager and Pipe (1984), and Zemke and Kramlinger (1982).

In question 6, respondents were asked to choose among a number of techniques used to conduct needs assessment. Literature sources for the list of techniques included Zemke and Kramlinger (1982), McGehee and Thayer (1961), and Rossett (1987).

APPENDIX D**COVER LETTER**

1. The purpose of this letter is to inform you of the results of the investigation conducted by the FBI on the matter of the alleged violation of the Civil Rights Act of 1964, as amended, in the case of the death of Martin Luther King, Jr., on April 4, 1968, in Memphis, Tennessee.

Date

FIELD(1)

FIELD(2)

FIELD(3)

Dear FIELD(4):

I am asking for your assistance in a study to determine the use of needs assessment in the natural gas utility industry. This study is being conducted in conjunction with Oklahoma State University as part of the requirements for a Master of Science Degree in Human Resource Development.

Your name was selected from among representatives of natural gas utilities who are members of the utilities groups of the National Society of Performance & Instruction and the American Society for Training and Development.

You are the centerpiece of this study and your participation is important. You were selected to represent a cross-section of many other individuals, and your response to this questionnaire is essential in assuring the success of this study.

Your responses will be kept in strictest confidence. The questionnaire has an identification number for mailing purposes only. This number will allow us to know which questionnaires have been returned. Your name or organization will not be reported in the findings.

Please take a few minutes of your valuable time to complete this questionnaire and return it by (insert date) in the envelope provided. Thank you for helping with this project.

Sincerely,

Jean Asbury
Researcher
100 W. 5th Street, 17-6
Tulsa, Oklahoma 74102
Enclosures

MISSOURI STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

IRB# 2019-006

NO IRB

NO IRB NO IRB NO IRB NO IRB NO IRB

IRB# 2019-006

IRB# 2019-006

IRB# 2019-006

IRB# 2019-006

IRB# 2019-006

IRB# 2019-006

APPENDIX E

IRB# 2019-006

IRB APPROVAL

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: 01-17-95

IRB#: ED-95-040

Proposal Title: DETERMINING THE USE OF NEED ASSESSMENT IN NATURAL GAS
PUBLIC UTILITIES

Principal Investigator(s): Wm. R. Venable, Jean A. Asbury

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

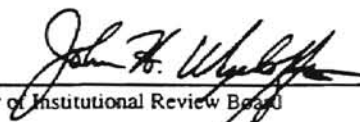
APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT
MEETING.

APPROVAL STATUS PERIOD VALID FOR ONE CALENDAR YEAR AFTER WHICH A CONTINUATION
OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Reasons for Deferral or Disapproval are as
follows:

Provisions received and approved.

Signature:


Chair of Institutional Review Board

Date: February 28, 1995

VITA

Jean Asbury Eames

Candidate for the Degree of
Master of Science

Thesis: NEEDS ASSESSMENT IN NATURAL GAS PUBLIC UTILITIES

Major Field: Occupational and Adult Education

Biographical:

Education: Graduated from Clay High School, Oregon, Ohio; received Bachelor of Arts degree in English from The College of Wooster, Wooster, Ohio; completed 38 hours toward a Master of Business Administration degree at Bowling Green State University, Bowling Green, Ohio. Completed the requirements for the Master of Science degree with a major in Occupational and Adult Education at Oklahoma State University in May 1995.

Experience: Employed as grants writer and director of public relations and marketing in three hospitals in Toledo, Ohio, and Tulsa, Oklahoma. Currently employed as coordinator of technical training at Oklahoma Natural Gas Company, a division of ONEOK Inc., Tulsa, Oklahoma.

Professional Memberships: National Society for Performance and Instruction, American Society for Training and Development, American Management Association.