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A study of the relationships between manufacturing executives' attitudes and participation in adult continuing education

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A STUDY OF THE RELATIONSHIPS BETWEEN MANUFACTURING EXECUTIVES' ATTITUDES AND PARTICIPATION IN ADULT CONTINUING EDUCATION

Iowa State University PH.D. 1987

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A study of the relationships between manufacturing executives' attitudes and participation in adult continuing education

by

David Henry Swanson

A Dissertation Submitted to the
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CHAPTER I. INTRODUCTION

Background

The basic tenants of lifelong continuing adult education are that adults will actively and voluntarily engage in learning activities throughout their lives, and that these learning activities will include a wide variety of stimuli, purposes, educational experiences, and results (Tough, 1979, p. 94; Knowles, 1970, pp. 23-29). Research in education has shown that human beings are inquiring and learning animals that have the ability to seek, organize, plan, and evaluate learning--and that they will do so (Titmus, 1981, p. 3).

The foundations of adult education include the assumption that the individual is relatively free to determine the extent of these educational experiences. There are, however, several significant adult educational studies indicating that many factors may influence the individual's decisions on participation in education. Income, accessibility, age, prior experiences, available time, relevance, psychological health, subject matter, and employment are but some of the factors that influence the selection process (Long, 1983, pp. 90-104). The decision to participate in a particular learning situation can be influenced by many additional factors. The individual may select from accredited academic courses, informal and individual study, employer sponsored training, professional mandated continuing education, or a host of other readily available educational programs.

If individual learning experiences are affected by environmental factors such as the availability and accessibility, cost, rewards, peer pressure, and other factors, then learning can also be negatively influenced by difficulties in finding information, conflicts in scheduling, financial constraints, the fear of failure, the work environment, and conflicting goals (Long, 1983, p. 111).

Educational research also suggests that a large proportion of the adult's learning activities are related to work and that the market for adult education, particularly work related learning, is expanding faster than can be accounted for by population increases or the rise in discretionary spending. The accelerating rate of technological change, the expanding offering of information and educational opportunities, the greater proportion of the population in the work force, the increase in the number of years of formal education, the emphasis upon continuing education in the professions, and many similar factors indicate that people in the work force are likely to engage in learning activities in the future.

Influence of Work

Working adults comprise a large percentage of the population and the economic returns from their employment provides the underpinning for much of the individual's efforts in continuing education. Work also has other effects as it consumes a large part of the adult's waking hours, and often work influences other interests, objectives, and motivations

of the individual. It is, therefore, important to determine some of the work factors that influence participation in learning activities. Do conditions of employment significantly influence participation in continuing education? What influence can the employer leader have upon participation?

Individual Differences in Motivation for Learning

Adults, as complex beings, have distinct differences in their desires in continuing education. Some of these differences are identified in subject matter selection, the location of the learning experience, responses to incentives, prior education experiences, and perceptions about education. Studies suggest that the interests and participation of unskilled or semi-skilled workers may differ markedly from those of executives or professionals. Employer sponsored educational programs for executives and production workers often differ in content and purpose. The programs for production workers are frequently related to immediate skill development, while executive programs have more indirect goals and objectives (Darkenwald, 1983, p. 241). But even among executive educational programs, there are vast differences in participation, interests, and purposes (Andrews, 1966, p. 56). The employer can and often does influence the learning activities of the employee (Bolt, 1985, p. 168).

Role of the Employer

The leader of an organization generally determines the educational and training programs which will be sponsored and offered to employees (Miles, 1982, p. 12). The leaders' perception of the value of education in influencing the organization's objectives and goals are often critical to the sponsorship of learning activities (Andrews, 1961). The organization's objectives through the learning processes may be influenced by factors related to competition in the marketplace, profits, the work setting, the perceived appropriateness of prior training programs, the sophistication of the organization, the products and processes, the rate of technological change, distance to learning opportunities, and the corporate culture. The leaders perceptions of education may be the major influence upon the organization's participation in education or willingness to provide incentives for employees to engage in learning activities.

Concerns of Society

The effective utilization of new technologies, processes and systems, depends upon a learning society. The ability to adopt new processes, products, and technologies requires an informed society. The business executive, as a societal leader with the ability to influence others, can be a major factor in the educational efforts of a society (Black, 1979, p. 5). This study attempts to identify some of those

factors that influence the business leaders' attitude toward continuing education and affect participation in learning activities.

Statement of the Problem

This study addresses factors that may influence the executives' decisions whether to participate in adult learning activities. The study identifies relationships between the manufacturing executives' perceptions of education and experiential factors that may influence those perceptions. It seeks conclusions about the significance of the relationships of perceptions and attitudes upon participation in learning activities. Insights are also provided on the sources of those attitudes and the influences of the product, technology, growth rate of the firm, and the corporate environment in forming those attitudes.

The selection of the chief executive in manufacturing, as the subject for study, was guided by a body of knowledge that identifies the strong position of influence of the chief executive in a business organization. The influence of the executive is readily apparent in policies, products, and rewards that exist in the hierarchial business organization. The leadership position has a multiplier, or ripple effect, upon employees of the organization. Yet, little is known about the manufacturing executives' attitudes toward education, what factors influence those attitudes, or whether those attitudes directly affect the rate of participation in learning activities. One may conclude that executives will continuously seek knowledge and information that will

benefit themselves and the organization; that they are self-directed in their learning; that learning will benefit the organization; and that education is directly related to success, but in fact, little is known about the extent to which those factors influence executives' attitudes or participation in education (Dill et al., 1965). The manufacturing sector was selected for this study due to its large multiplier effect in the economy and the availability of data for differentiating between companies.

Study design

This study is designed to analyze data obtained from a questionnaire sent to a random sample of manufacturing executives located in the state of Iowa. The study will measure the executives' attitudes toward learning, measure the executives' participation rate in educational activities, measure selected internal and external factors which may influence those attitudes, determine meaningful relationships between those factors, and recommend actions which educators may take to benefit from this newly acquired knowledge.

Significance of the Study

The results of this study will be useful to adult educators, associations offering education and courses, publishers, institutions of higher education, and other adult educational providers. It will provide insights for executives in business organizations, those engaged in technology and information transfer, management consultants, media,

educators, and conference leaders. Particularly interesting to educators will be:

1. The identification of factors and attitudes that influence participation in adult continuing education.
2. The acquisition of knowledge and data on selected influences that develop attitudes and perceptions about continuing adult education.
3. The added knowledge on the method of delivery, source, and effectiveness of a variety of continuing educational efforts offered manufacturing organizations.
4. The acquisition of additional information to the knowledge base in adult education.

Limitations of the Study

Data collected in this study and the conclusions have limitations in their applicability. The data and relationships are limited to the questions and responses provided in a questionnaire mailed to a random sample of manufacturing executives located in the state of Iowa. The specific limitations of the conclusions reached in this study are listed below.

The results obtained in this study should not be generalized beyond Iowa, the manufacturing and processing sector, or to other groups within manufacturing.

The study is limited to:

1. The geographic region of the state of Iowa.
2. The use of a sample for extrapolating results.
3. The selection of the sample from manufacturing operations employing 51-250 employees.
4. The reliance upon the accuracy of individual recall and response.
5. The use of a data collection instrument that has received only limited tests for reliability, bias, and validity.
6. The use of a survey rather than an experimental research design.

Assumptions

Several assumptions have been made in this study. These assumptions are:

1. The instrument developed by the researcher is valid, suitable, and reliable data collection instrument that will measure executive attitudes and preferences toward continuing adult education and learning.
2. The executives will accurately identify and report their perceptions.
3. The sample selected accurately reflects the population.
4. The statistical procedures for the analysis of data are appropriate.

5. The factors selected for inclusion in the data collection are appropriate for the study.
6. The chief executive has significant influence upon the continuing education programs of the organization.
7. The learning process is valuable to the future needs and profitability of the manufacturing organization.
8. Attitudes significantly impact participation in continuing education.
9. The information collected in this study will contribute to the knowledge base in adult education.

Organization of the Study

This dissertation is organized into six chapters. Chapter I presents the introduction, statement of the problem, definition of terms, significance of the study, limitations of the study, and assumptions.

Chapter II provides a review of current and relevant literature related to the study of the problem. It contains an introduction, the theoretical framework for the study, findings of studies pertaining to the continuing education of adults, study findings pertaining to continuing adult education in business and industry, the methods processes of learning, a summary at the end of each major division within the chapter, and an overall summary.

Chapter III describes the methodology used in the study. The chapter contains an introduction, the nature of the study, the

population and the sample, the data collection procedures, research questions, data analyses, and a summary.

Chapter IV contains an introduction, presentation of the data, discussion of the findings, analysis of the individual research questions, and a summary.

Chapter V contains the introduction, purpose of the study and methodology used, major findings, conclusions, implications, recommendations for further study, and a summary.

Chapter VI is a summary of the study.

Definition of Terms

Executive: The individual responsible for the direction and management of a business, corporation, and institution (Funk and Wagnall, 1973, p. 464).

Management: The art and science of working with people in order to achieve organizational goals and objectives. The fundamental functions of management are often designated as planning, organizing, implementing, controlling, and evaluation (Langerman and Smith, 1979, p.5).

Manufacturing: Business establishments classified 20-39 in the Standard Industrial Classification Code, Statistical Policy Division, Office of Management and Budget, 1982.

Attitude: A predisposition to act in a certain way. A state of readiness that influences a person to act in a given manner (Bernard, 1972, p. 444).

Perception: One of the primary psychological processes--the selection and organization of environmental stimuli to provide meaningful experiences for the individual. Dependent upon preferences, expectations, and numerous experiences (Hellriegel and Slocum, 1979, pp. 142-143).

Continuing Education: A process, more structured than unstructured, which provides learning opportunities for adults (Langerman and Smith, 1979, p. 7).

Learning: The acquisition of knowledge, attitudes, or skills, and the master of behavior in which facts, ideas, or concepts are made available for individual use (Werner, 1964, p. 32). The act of acquiring knowledge or skill (Funk and Wagnall, 1973, p. 770).

Education: The act of educating: Systematic development or training of the mind, capabilities or character through instruction or study (Funk and Wagnall, 1973, p. 240).

Technology: The application of science and technical advance in industry, manufacturing, commerce, and the arts (Funk and Wagnall, 1973, p. 1374).

Technical: Having, dealing with, or pertaining to a specialized knowledge or skill, especially to a mechanical or scientific knowledge or skill (Funk and Wagnall, 1973, p. 1375).

Knowledge: A result or product of knowing; information or understanding acquired through experience, practical ability, or skill (Funk and Wagnall, 1973, p. 749).

Association: A body of persons associated for some common purpose, society, or league (Funk and Wagnall, 1973, p. 88).

Adult Learner: Any adult who engages in some type of activity, formal or informal, in the acquisition of knowledge or skill, in an examination of personal attitudes, or in the mastery of behavior (Hiemstra, 1976, p. 39).

Leadership: The ability of a person to influence the activities of followers in an organizational setting (Donnelly, Gibson, and Ivancevich, 1983, p. 631).

Leader: The person who is in charge of the planning, organizing, and controlling in a group (Hellriegel and Slocum, 1979, p. 698).

Adult Educator: One who has some responsibility for helping adults to learn (Knowles, 1970, p. 21).

Adult Education: The education of men and women who have assumed mature responsibilities as citizens, workers, faculty or group members, and social beings, and who are learning purposefully to achieve their individual and societal goals (Chartiers and Associates, 1981, p. 1).

CHAPTER II. REVIEW OF THE LITERATURE

Introduction

Recognition that education and learning play a significant role in the development of individuals, societies, economies, technologies, and the efficient use of scarce resources have resulted in greater interest within the public and scientific communities in discovering more about the learning process and its resulting impacts. These interests in the learning processes affect not only traditional education in its formal setting, but the expanded environment of adults and nontraditional education. Inquiries in educational research have increasingly concentrated upon the processes, efficiencies, and, during the past thirty years, the continuing education of the adult population.

The purpose of this chapter is to present a review of the literature in adult education, particularly where its relevance pertains to the research question of how the attitudes and perceptions affect a specific adult population's participation in the continuing education. The chapter is segmented into five sections: (1) the theoretical framework for adult education, (2) studies related to the participation of adults in learning activities, (3) the chain of response model for understanding adult participation in learning activities, (4) adult education in business and industry settings, and (5) a brief summary.

Adult education is the study and practice of how mature individuals acquire knowledge and skills. It is a relatively new area

for intensive study within the broad field of education, and thus far, has been unable to develop a unified conceptual framework. This absence of a unified theoretical foundation is perceived by many scholars as a severe handicap to the profession. The profession of adult education cannot advance beyond its present stage of development if one generation of adult educators simply passes on what it has learned through experience to the next generation (Cross, 1981b, p. 110). Yet, despite this lack of a unified theory, the number of studies describing adult learning have expanded rapidly in recent years.

The causes for the lack of an adult learning theory appear ingrained in the complexities surrounding the study of learning. No comprehensive theory of learning seems to exist that suffices for the divergent episodes that the adult experiences throughout a lifetime. Moreover, adult educators have been unable to articulate an adequate theory of adult learning (Nie et al., 1975, p. 45). Multidisciplinary, or eclectic theories that describes adult learning have emerged and are evident in the literature of adult education. Whether one accepts only one or a composite of the myriad of models or theories of adult learning, it is clear that adult learning does take place and that all learning is associated with change (Thorndike, 1933; LeFrancois, 1972; Verner and Davidson, 1971; Hilgard and Bower, 1966; and Gagne, 1970). "Learning is clearly the process by which an activity originates or is changed through reacting to an encountered situation, provided the

characteristic of the change cannot be explained on the basis of routine response, maturation, or temporary status of the organism" (Hilgard and Bower, p. 2, 1966).

It is clear that studies of adult learning will proceed and that these studies will have theoretical foundations whether they are clearly identified, assumed, or ignored. This study builds upon prior multidisciplinary studies of cognitivism, the individual motivations for learning with particular emphasis placed upon the chain of response model developed by Patricia Cross (Cross, 1981b, p. 124).

The work of Boshier (1973, pp. 255-282), along with Rubenson and Miller, influence this work as they pursued the concept that the motivation for learning is the result of interactions between psychological factors and the perceptions of the environment. Boshier's work stated that "Both adult education and dropout can be understood to occur as a function of the magnitude of the discrepancy between participants self-concept and key aspects of the educational environment. Nonparticipants manifest self-institution incongruence and do not enroll" (Boshier, 1973, p. 260).

Behaviorism and cognitivism

The basic foundations for the study of adult education and learning are found within theoretical psychology. There are two basic psychological theories of the learning processes that guide most models, studies, examinations, and help explain the general directions in adult

education (Lasker, Moore, and Simpson, 1980, p. 47). These fundamental theories and their many derivations are behaviorism and cognitivism. Both of these general theories assume the moral neutrality of the individual, but differ significantly in other areas. Behaviorism encompasses all stimulus-response theories that explain a learner's behavior in terms of responses to external stimuli. The cognitive theories include the stimulus response connectionism and neobehaviorism. Cognitive theorists of the Gestalt era school concentrated upon the learner's perceptions or field of reference. The various cognitive theories appear under titles such as organismic, field, phenomenological, and cognitive field psychology. The combination of various parts of behaviorism and cognitive theories are frequently termed eclectic by attempting to bring together the best aspects of the various theories in explaining particular learning phenomena. The function of any theory, however, is to provide the foundation that guides approaches to understanding an area of knowledge and explain its actions.

Edward Thorndike et al. (1928) is considered the father of the behavior school. He was followed by a host of other behavioristic theorists who stressed the stimulus response phenomena (Watson, 1928; Hall and Lindsey, 1970; and Guthrie, 1952). The cognitive perspective originated in Gestalt psychology (Wertheimer, 1938, pp. 71-88) followed by studies by Lewin (1935) and Tolman (1932). Cognitivism, as differentiated from behaviorism, recognizes insight and perception as

alternatives to trial and error. "According to cognitive theorists, the way in which the learning is perceived, the way in which the learner perceived the learning environment, affected how learning took place" (Nie et al., 1975, p. 48).

The integration of behaviorism and cognitive theories was postulated by Miller (1967) and Kidd (1973). Modern cognitive theory was further divided into several contemporary viewpoints, such as inquiry learning (Bruner, 1961, pp. 21-32), receptive learning (Ausubel, 1967), and humanism (Combs, 1962). Bruner suggested that the learner's cognitive structure organizes information into meaningful categories with recall dependent upon the organization structure. Ausubel stressed that learning occurred when an organization structure is used to access acquired information. Combs' humanistic theory suggests that learning occurs when one is self-actualizing or becoming one's self. The humanistic theory postulates that the individual cannot be taught, but rather all learning is self-directed through the purposeful development of individual human needs. The individual requires a balanced state, and when not in balance, the individual will find a way to satisfy this need or tension, thus the ego, or self, is seen of the primary instrument of learning (Lasker et al., 1980, p. 50).

The humanistic alternatives within the cognitive theory base contribute strongly to studies of motivation, learning ability, interests through the life span and learning style. The view that learning is interactive, purposeful, continuing, and learner initiated,

rather than biological, are the major thrusts of the humanistic approaches.

Perception

The writings of Dewey (1916) and Bruner (1961), are of particular interest in determining the effect of perceptions on participation in adult learning. Gestalt theorists regard experience as rooted insightful behavior based upon the interactions between the individual and a perceived environment. "To learn from experience is to make a backward and forward connection between what we do to things and what we enjoy or suffer from things in the consequence" (Dewey, 1916, p. 164).

The cognitive realm is one of purposeful and insightful action. This purposeful action is designed to reduce complexities in the individual's environment and life, and connotes a goal directed (Bruner, 1960, p. 72) active processes wherein the individual constructs (Bigge, 1976, pp. 288-289) his knowledge through relating information to a previously acquired psychological frame of reference. These complex and interaction processes involve three simultaneous actions--the acquisition of new information, the transfer of knowledge, and a checking of the adequacy of that knowledge (Bruner, 1966, pp. 421-422). "A person's perception of an event, then is essentially a constructive process within which the person infers a hypothesis by relating his

sense data to his model of the world to then check his hypothesis against additional properties of the event" (Bigge, 1976, p. 251)--an inferential step. Human development and learning for the cognitivists are a matter of the individual organizing perceptions around his/her person, then imposing other less egocentric axes on the field. This process is also termed apperception, or relating new ideas or mental states to an existing store of experiences, where "memories stored in the subconscious and brought into the conscious enable one to interpret experiences for the moment" (Bigge, 1976, p. 26).

Recent research

Recent work in developing theories and models of adult learning have concentrated upon three principal areas: (1) learning orientation, predisposition, and motivation for learning, (2) learning abilities and subsequent changes throughout the life span that stimulate or discourage learning, and (3) learning style or the way individuals may approach and process learning content (Nie et al., 1975, p. 51).

Studies Related to the Participation of Adults in Learning Activities

Landmark systematic studies of adult learners were undertaken and reported by Houle (1963); Tough (1978); Boshier (1973); Miller (1967). Houle (1981) and Rubenson (1977) separated learners into distinct classifications and paved the way for numerous other studies of motivation and orientation. Houle's categories were: (1) goal oriented

individuals desirous to obtain clear-cut objectives, (2) activity oriented individuals who desire participation more than content, and (3) learning oriented desiring to acquire knowledge for knowledge sake (Houle, 1963, pp. 103-110). Inquiries into participation by Johnstone and Rivera (1965, pp. 231, 263) concluded that people participated more frequently in organizationally sponsored programs and that participation was directly correlated with the level of formal education and certain other factors. Tough (1968) and Hiemstra (1972) concerned with the individual orientation to learning and participation, concluded that most people engage in one or two major learning projects a year (median 8) and that 70 percent of the learning projects were planned by the individual. Tough concluded that the most common motivation for learning was the anticipated application of what was learned (Tough, 1979, p. 1).

Biological factors

Biological limitations on learning have been studied by numerous scientists (Bosco, 1977; Knox and Sjogren, 1965; Okun, 1977). The researchers concluded that the adult is capable of learning throughout the life span, although some studies (Cattell, 1968, pp. 56-62) place a biological limitation on learning abilities. Cattell suggested that fluid intelligence--the ability to perceive abstract relationships, form concepts, reason abstractly, and recall from short term memory, actually declined with age. Whereas, crystallized intelligence, with formal

reasoning and the ability to determine relationships resulting from experience and education, increased throughout the life span.

Self-direction

Gibb (1960, pp. 54-64) suggested that a functional theory of adult education must include the acceptance of the following: (1) learning relates to problems, (2) learning relates expressions, (3) experience must be meaningful, (4) the learner must be free to act and select experience, (5) goals must be learner set, and (6) feedback on performance is essential.

Malcolm Knowles (1970, p. 39) contended that the adult is unique, and therefore, previous theories of learning had little application when applied to adults. Knowles androgogy states that: (1) development of the self-concept moves from dependence upon others for learning to a self-directed learning wherein the individual assumes control over learning, (2) the use of experiences as a valuable resource for learning, (3) a readiness for learning based upon expanding social roles, and (4) the immediate application of what is learned rather than the delayed application that is found in most childhood learning experiences.

One important relationship of learning that has interested researchers in adult learning is the interaction between the learners style of learning, orientation, the method employed, and the intended outcomes of learning (Lowman, 1984; Morgan, 1976; and Smith, 1982). The

way the learner perceives the method and the intended result of learning appears unique to each individual learner, particularly adult learners (Wingo, 1974). Torbert (1972, pp. 7-8) suggests that "experiential learning involved becoming aware of the qualities, patterns, and consequences of our own experience as one experience." Cross (1976) and Knox (1977), in their studies of cognitive style, concluded that certain situations are essential for the successful implementation of adult learning.

Phasic and stage models

Researchers in adult education have developed models that help explain adult learning and development. These models attempt to bring order and consensus to explain the patterns by which adults appear to learn. Two general approaches of particular interests are the phasic and stage models. These approaches assume that distinct qualitative changes appear throughout the life span and affect learning interests. The phasic model concludes that development occurs at relatively fixed periods in the adult's life, whereas the stage model focuses on levels of development that are not directly correlated with chronological age, rather when each new level depends upon successful completion of the prior level.

The phasic approach has an extensive history (Havighurst, 1973; Erikson, 1950; Levinson, 1978) with Levinson's work, particularly interesting due to its emphasis upon life structures, or the way the

individual organizes an understanding of the world (see Table 1). The individual intentionally develops structures by making conscious choices that are governed by a personal philosophy and self-understanding which has been developed through interacting with internal and external influences.

Table 1. Levinson Eras in the Male Life Cycle (Levinson, 1978)

Age	Era	
65	late adulthood	attainment of wisdom
60-65	late adult transition	
45-60	middle adulthood	dominant generation work, career, family
40-45	mid life transition	
22-40	early adulthood	development of life structure; option, choices in work career
17-22	early adult transition	
3-17	childhood and adolescence	social skills and knowledge
0-3	early childhood transition	

The transitional phases of Levinson are particularly interesting to the adult educator due to the direct correlation between the transitional phases and periods of where there is greater interest in learning. Weathersby (1977) suggested that adult educators also had the ability to initiate and accelerate the change in adult life structures through intervention. Weatherby's suggestion has not, however, been examined thoroughly and at present very little is understood about the role that education plays in life structures.

While the phasic approach is directly related to chronological age, the stage approach involves the development of discrete levels of maturity.

Loevinger (1976) described how individuals understand themselves, their growth, and relationsips by explaining that learning becomes intensely personal with active interpretations of one's self-control in all activities (see Table 2). The development of the ego, or self, provides the foundation for making sense of life--and the frame of reference for understanding events. He further identified ten milestones, or levels, from presocial to integrated, that are progressive and require adaption to each milestone, or stage, before entering the next stage. Adults, therefore, are able to construct their experiences in different ways and at different stages. Adults differ in the relationships they develop with peers and teachers, and the role they expect knowledge and education and their stresses to play in their lives, depending upon the stage of their ego development. Educational achievement could, therefore, be correlated with the level of ego development (Hauser, 1976; Levinson, 1978).

Lasker (1974) approached adult education through a stage model noting differences in how knowledge and learning are received and that roles, motives, and functions change at each stage. The self-protective conformist, conscientious, and autonomous, each have different motivations, knowledge requirements, institutional functions, teacher roles, and learner roles. The higher stages of the Lasker model have less structure and more student activity. Subsequent studies have shown that development to higher stages are an outcome of education. It may be, therefore, assumed that difficulties in the learning process

Table 2. Milestones of Ego Development (Source: Loevinger, 1976, pp. 24-25)

Stage	Impulse Control, Character Development	Interpersonal Style	Conscious Preoccupations	Cognitive Style
Presocial		Autistic		
Symbiotic		Symbiotic	Self vs. nonself	
Impulsive	Impulsive, fear of retaliation	Receiving, dependent, expliotative	Bodily feelings, especially sexual and aggressive	Stereotyping, conceptual confusion
Self-protective	Fear of being caught, externalizing blame, opportunistic	Wary, manipulative, exploitative	Self-protection, trouble, wishes, things, advantage, control	
Conformist	Conformity to external rules, shame, guilt for breaking rules	Belonging, superficial niceness	Appearance, social acceptability, banal feelings, behavior	Conceptual simplicity, sterotypes, cliches
Conscientious-conformist	Differentiation of norms, goals	Aware of self in relation to group, helping	Adjustment, problems, reasons, opportunities (vague)	Multiplicity
Conscientious	Self-evaluated standards, self-criticism, guilt for consequences, long-term goals and ideas	Intensive, responsible, mutual, concern for communication	Differentiated feelings, motives for behavior, self-respect, achievements, traits, expression	Conceptual complexity, idea of patterning

Table 2. Continued

Stage	Impulse Control, Character Development	Interpersonal Style	Conscious Preoccupations	Cognitive Style
Individualistic	Add:[a] Respect for individuality	Add:[a] Dependence as an emotional problem	Add:[a] Development, social problems, differentiation of inner life from outer	Add:[a] Distinction of process and outcome
Autonomous	Add:[a] Coping with conflicting inner needs, toleration	Add:[a] Respect for autonomy, interdependence	Vividly conveyed feelings, integration of physiological & psychological, psychological causation of behavior, role conception, self-fulfillment, self-in social context	Increased conceptual complexity, complex patterns, toleration for ambiguity, broad scope, objectivity
Integrated	Add:[a] Reconciling inner conflicts, renunciation of unattainable	Add:[a] Cherishing of individuality	Add:[a] Identity	

[a]Note: "Add" means in addition to the description applying to the previous level.

restrict the attainment of the higher stages of learning in the stage model.

Prior learning experiences

"There never was a time when it was not understood that emotions play an important part in learning. Feelings are not just aids or inhibitors to learning; the goals of learning and emotional development are parallel and sometimes identical, and can probably be most conveniently stated as self-realization and self-mastery" (Kidd, 1973, p. 93). Kidd further states that "Adult may bear an additional burden, that of failure or unpleasantness associated with learning during childhood" (Kidd, 1973, p. 96).

There are a growing number of studies that show the relationship between anxiety, tension, and impaired learning (Kidd, 1973). The consensus is that the reduction of anxiety in the learning processes is axiomatic to successful adult education programs. Thus, the reduction of anxieties, besides satisfying the individual, is needed to foster adult education.

The individual needs in learning are strong determinants of apparent individual interests in education. "Vocation is much more likely to affect man's interests than will his chronological age" (Kidd, 1973, p. 113). Learning also relies upon the relevance of the learning. "Adults expect to find relevance in both objectives and methods employed. Continued learning also depends upon the achievement of

satisfaction" (Kidd, 1973, p. 114). Interest and attitudes are examples of learned motives, and therefore, if experiences in a particular activity did not occur with satisfaction, in the first two or three decades of life, the development of that interest in an older person will be far from automatic. It has been well documented that expectation of success plays an important role in learning (Smith and Haverkamp, 1977, p. 69). London (1963) reported that having liked school in one's youth and having had a desire to continue schooling are positively associated with continued participation as contrast with scholastic performance. The study also revealed that attitudes have a positive correlation with the level of education, but apparently no direct relationship to continuing education. The full extent of the effect of attitudes on continuing education have not been well resolved. Thibodeau (1980) postulated, however, that one's attitude toward education remained quite stable throughout life.

Education results in change in the individual and often society. The characteristic features of social action and change are that they are the results of individual motivation. Motivation assigns meanings to situations and the individual reacts to his definition of the situation (frame of reference), not what he observes (Silverman, 1974, p. 33). Hence, experience often rules the situation (Botkin et al., 1979, p. 10; Furth, 1969, p. 232). People will manage knowledge to promote the selective availability of information in order to confirm judgements already arrived at (Greenwald, 1980, pp. 603-606).

The Expectancy-Valence Model (Boshier, 1973) suggests that past behavior has less impact on learning than the current environment. This is based on the proposition that participation in adult education is associated with the actual life situation of the individual. Therefore, if an adult sees education as solving a need, a positive value will be placed upon participation (Boshier, 1973, p. 131). Boshier also noted the relationship between work satisfaction and adult education.

Cross (1981b, pp. 124-131) Chain of Response (COR) Model suggests a strong interrelationship between attitudes and participation in adult education. The premise is that participation in education is the net result of several responses and attitudes, negative and positive, toward education and a direct consequence of ones past and the expected results.

Cross proposes a consistent reinforcing interaction between self-evaluation and attitudes about education. Cross supported Havighurst's (1973) teachable moment and the goals/expectations of Lewin (1935, pp. 250-251). Cross also observed the importance of barriers to learning and the overcoming of those barriers by even stronger desires for knowledge.

The significance of barriers to learning has been noted by numerous other studies, but Marieneau and Klinger (1977) note that external barriers are easier to change than internal ones. These observations are supported by Knox (1977, p. 466) statement that older adults tend to experience more interference and conflicts from prior

learning than do young people. He further states that "Adults tend to underestimate their learning ability by over emphasizing their early childhood experience and under emphasizing their recent informal learning experiences" (Knox, 1977, p. 464).

Factors related to participation

Virtually all studies of adult learning agree that adult participation in education programs are directly correlated with factors such as social economic status--years of education, work, changes anticipated, age, technology, aspirations, goals, income level, and availability (Hiemstra, 1972; Long et al., 1980).

A national study of education completed by the Commission on Nontraditional Education and reported by Camp et al. (1974) found that 77 percent of adults had an interest in continuing education, but only 12 percent of these were interested in college credit programs. The interest in education, 50 percent, was directly related to work situation changes in technology, competition, and upward mobility (Payne and Cooper, 1981). The study also noted that interest in continuing education was also highly correlated with the level of education, social status, and income levels. As Cross (1981b, p. 53) pointed out, there is a substantial research base describing the demographics of individuals interested in organized continuing education. The fact that prior education experiences influences participation is also known--but much less well understood. Darkenwald (1983, p. 233) reported that only

4.1 percent of persons with two years or less of high school participated in organized continuing education and concluded that "the high school dropouts having experienced education failure are not eager to try again. Therefore, "If the poorly educated are to be attracted into learning activities as adults, the major problem may be to overcome their childhood experiences with school and their doubt about their ability to succeed there. If the reward is great enough (a better job or more money, but rarely the enjoyment of having), they may enter into education as adults" (Cross, 1981b, p. 56). According to Armstrong (1971), adults entering organized continuing education activities are apparently highly motivated and achievers, while those not participating are considered resigned or conformists. Cross subsequently pointed out that the "Armstrong study is unique and important in that it attempts to answer who participates in adult education by looking at personality traits and attitudes. Few studies of either self-directed learning or surveys of participation in organized instruction have done that. The opportunities are wide open, and the need is great for further research in learning proven personalities" (Cross, 1981b, p. 66).

Cross proposes "We might advance the hypothesis that unpleasant school experiences are a major deterrent in learning activity. An experimental design to test the hypothesis would involve doing a measure of unpleasant school experiences and a measure of adult participation, and determining the relationship between the two" (Cross, 1981b, p. 97). Most adult education researchers agree that disposition barriers are

understated in studies. Rubenson goes further by stating that if the individual does not perceive himself as able to participate successfully, or if there is no reward in doing so, there is then no motivation to participate.

The value of prior educational experiences is also recognized by Boshier (Cross, 1981b, p. 118). Both participation and drop out in adult education activities can be understood to occur as a function of the magnitude of the discrepancy between the participant's self-concept and key aspects of the education environment.

Malcolm Knowles (1970, p. 40) stated the issues clearly. "Often there is another ingredient in the self-concept of an adult that affects his role as a learner. He may carry over from his previous experience with schooling the perception that he isn't very smart, at least in regard to academic work. This fact has several consequences for adult education. In the case of some adults, the remembrance of the classroom as a place where one is treated with disrespect is so strong that it serves as a serious barrier to them becoming involved in adult-education activities at all. If those adults are to be enticed back to systematic learning, the rewards of learning must be made so great they outweigh the anticipated pain of learning" (Knowles, 1970, p. 40).

Chain of Response Model

The Chain of Response Model of Cross provides a means for understanding the participation in adult learning activities by

recognizing the importance of educational experiences, perceptions, reference, rewards, and prior information. Cross hypothesizes that participation in continuing education is not a single act, but a chain of responses based on an evaluation the individual makes of his or her position of their environment (Cross, 1981b, p. 125). Participation in adult education relates to self-perception or attitude about education. Cross states "Attitudes toward education arise directly from the learners own past experiences and indirectly from friends and significant others" (Cross, 1981b, p. 9). Concludes Cross, adults who hate school as children are unlikely to voluntarily return to the scene of their former embarrassment.

Cross is supported by other research and cognitive model builders. Miller (1967), Bloom (1976), Glaser (1977), Holt (1970), who concluded that constant failure in school leads to lower self-esteem and those with poor records in school are unlikely to be educated as adults, and if these adults later attend educational programs, it would be in nonthreatening situations, such as noncredit, technical or self-directed programs.

Although prior experiences are important to participation in education, little research has been conducted related to the question of self-confidence and participation. Cross proposes the questions: Do adults with unsuccessful school learning experiences have low evaluations of their learning abilities? Does participation raise self-

esteem, improve attitudes toward education, and increase participation (Cross, 1981b, pp. 123-131)?

The Chain of Response Model, with its recognition of the effect that experiences, attitudes, and opinions have upon participation in adult learning actions is of particular importance to this study because the issue of why people participate, or do not participate in adult education programs, has not been addressed by most researchers except in a peripheral sense. Tough, Abbey, and Orton (1979) and others attempted to identify the motivation for learning in terms of the conscious anticipation of rewards through a staged process: (1) engaging in a learning activity, (2) retaining the knowledge, (3) applying the knowledge, (4) gaining material rewards, and (5) gaining a symbolic reward. They also emphasized the importance of rewards in countering negative influences that could inhibit participation. Boshier's (1973) Congruence Model addressed these interactions between internal psychological factors and external factors where the self-concept was pitted against the environmental factors to determine actual participation in education. Incongruencies were measured to determine whether a person would participate, drop out, or avoid the educational setting. The degree of negativism in the perception of the self versus ideal self and prior experiences formed the incongruencies (Boshier, 1973, p. 255).

The motivational studies of Tough (1979) and Boshier (1973) are outgrowths of the force field analysis of Miller (1967), Maslow (1954),

Lewin (1935), and supported by Rubenson (1977), Cross (1981a), and other researchers of motivation. Miller postulated that Maslow's social class explained the socioeconomic factors affecting particpation in adult education. Miller's force field analysis, which used Lewin's concept of negative and positive forces, provided a way to calculate the motivational power of job related learning. The sociological factors of need were countered by negative personal factors. Vroom's (1964) Expectency-Valence Model, using psychological and sociological factors, continued this work of examining the influences of motivation and barriers--and the resulting interactions. Rubenson (1977) continued this work and provided a value to measure expectancy. The personal success expectations in the activity and positive expectation consequences of the final results were weighed against the valences or consequences of the activity. This concentration or perception of the individual's environment and expectations from participation are critical to further examination of the motivational aspects of adult learning (Rubenson, 1977).

Cross, in the development of her Chain of Response Model, utilized the motivational theories or models. Cross (1981b, pp. 123-131) outlined the factors of prior studies that are most important to her model: (1) interaction between the individual and the environment, (2) the force field concepts of the strength of the motivation determined by the perception of results, (3) individual control over the results, (4) social and personal esteem, (5) reference groups, (6) incongruence and

disonance, (7) a hierarchy need, and (8) the expectancy of reward. The Cross Model uses the concept of a multidirectional continuum beginning with the individual and moving toward external factors. The reinforcing element of the COR helps explain the effect of prior experiences, self-concepts, and the influence of peers.

Adult education in business and industry

Douglas and Maddox (1974) declared that participation in adult education is related to positional and psychological factors. The positional factors being employment status, income, and level of occupation. The psychological factors were identified as self-reliance, social skills, withdrawal tendencies, and occupational relations. The work place, particularly the level of identifiable achievement in the hierarchy, would positively influence participation in learning activities. The transitions in life (Long, 1983, p. 99) and certain other barriers influence that rate of participation (Marieneau and Klinger, 1977) but studies have not yet produced definitive answers. These and other studies indicate that frequent participants are younger, better educated, employed, have higher incomes, and have professional or technical skills--and that educational attainment is one of the best predictors of participation in sponsored education.

Employee training and education needs have resulted in employers spending $30 billion a year to improve employee skills, providing evidence that industry, government, and other employers see the need for

continual learning (Morse, 1984, p. 1). Employee's interest in education are generally agreed to be the result of technological changes, the demands for a more skilled work force, and the need for the continual upgrading of skills. The shift in training from traditional educational settings to the workplace occurs despite the fact that traditional education offers faculty, data, facilities, research, and an administrative structure. Large businesses have been able to institute sizeable and well organized training programs, but evidence shows the small and medium sized companies are hampered in their training or education needs by their size and income. The smaller firms respond to immediate demands, rather than develop a planned scheduled training--and they appear to offer an excellent opportunity for collaboration with educational institutions (Morse, 1984, p. 2).

The problems in achieving suitable collaborations between employers and educational institutions are three fold: (1) awareness of the educational needs of industry, (2) timing, and (3) institutional and psychological barriers. Where such industrial and institutional collaborations have occurred, they are generally related to the needs of the larger employers. A survey of employees (Kelley, 1984, p. 9) found that 63 percent of the employers reported that workers received less than 20 hours of training annually--and that managers, not the workers, have the responsibility for setting priorities and selecting the training. The phenomena of large firm domination in adult education is not unique to the United States, but also occurs in Europe (Titmus,

1981, p. 2). Titmus concluded that "Some adults want to study. Some want others to study. An adult is free to refuse the opportunity to do so. He is not free to study unless the opportunities are created, by himself, or others. To do so, these opportunities must compete with all demands upon his time and interest" (Titmus, 1981, p. 15). Titmus further stated, "It had long been accepted that an industrial society required a literate work force" (Titmus, 1981, p. 19).

Approached from the perspective of literacy, numerous authors have noted the need to expand adult educational programs as economies develop and expand. But countries have not yet fully accepted adult education as an integral of their overall education system (Chartiers and Associates, 1981, p. 5), even though their populations are largely adult.

According to Houle (1981, p. 4), the need for continuing education became evident in the latter part of the nineteenth century as a way of attaining competence and maintaining knowledge. Diverse processes were developed to achieve these educational tasks--journals, reports, societies, books, magazines, conventions, manufacturer's brochures and sales people. The growth of formal adult education programs coincided with the industrial revolution when more and complex systems replaced the apprenticeship systems. The rise of professionalism increased the demand for continuing education (Houle, 1981, p. 56). Houle contended that "Every member of a profession or a person who follows a sequence of study has a special style of life long learning influenced by an

individual background, a unique combination of character traits, and the special circumstances of his or her immediate environment, including stimuli provided by people and institutions who seek to advance continued education. As personality and circumstances change, so does this pattern of learning" (Houle, 1981, p. 77).

The reason that employers encourage and invest in education relates to their competitive tasks and as Houle declared, "The central task of employing institutions is to improve the quality of the services or products they provide" (Houle, 1981, p. 185). The most common method of providing instruction in business is to conduct a session at the place of work with the goal of improved performance (Houle, 1981, p. 193).

The modern manufacturing setting is one of significant change due to a variety of factors, with most recent changes closely related to new technologies, global communications, intensified competition, and the rising education level of entry workers. The modern business world places increased emphasis upon human resource development. Management increasingly views people as the key factor in ensuring productivity and profitability (Harris, 1985, pp. 99-100). Tomorrow's management will have multi-faceted competencies in communication, human resource, development, and technology, according to Harris (1985, pp. 100-101). Numerous other studies concur with the idea that human resources are the source of productivity and new products. A national study of companies identified as leaders in productivity, however, found that 81 percent of

their less successful competitors did not perceive strong educational programs or human development systems (Harris, 1985, p. 105). The conclusion being that education improves productivity or at least indicates the striving for increased productivity.

As change demands new skills, the worker needs management support to adapt. Management tends to concentrate on performance related learning, problem finding, and real world problems (Harris, 1985, p. 111). The thrust of business education is upon performance improvement and the quantification improved results (Darkenwald, 1983, p. 241). "The information society, with its new technologies is promoting and facilitating more synergistic approaches to human resources development" (Harris, 1985, p. 116). The result is a rapid growth in industrial educational programs and incentives, especially among the new growth companies--the high technology firms--and the subsequent growth of a training industry. The estimated sales of the training industry was $1.7 billion with 55 percent materials and packaged programs, 27 percent seminars, and 18 percent for custom designed programs (Hope Reports (Harris, 1985, pp. 128, 129)). Another study places that business education market size at $2.2 billion (Black, 1979, p. 67). The conclusion is that "Managing for greater productivity requires partial reinforcement and constructive feedback. A creative corporate environment stimulates people to energize themselves; allows for self-development and career advancement; and offers recognition and rewards" (Harris, 1985, p. 203). Innovative employers have subsequently created

a variety of financial incentives to stimulate employee performance and productivity, including time off for education.

Effect of change

The focus of change is central to all education, and particularly adult education. Education seeks and causes changes in individuals, hence organizations, culture, and nations. But change is not always desired, and while it is not true that everyone resists change, neither is it true that everyone accepts change. Receptivity to change depends on how people perceive the change (Kilpatrick, 1985, p. 97).

The obvious conclusion is that change is inevitable and those who lead the change, accept it and accommodate it, are generally successful in their adaptions. It stands to reason that if education denotes change, then industry accepting change in their products and operations, will accept education. The champions of change are probably led in most corporations by those who have profited most from programs designed to relate the corporation to the environment in which it operated (Black, 1979, p. 135). Adult education should enhance growth by developing skills, disabling fears, supporting creative capacities, supporting achievements toward positive goals, enlarging capacity of the individuals, and providing access to opportunities (Krietlow, 1981, p. 10). These educational goals are also obvious goals of a growing and successful manufacturing enterprise as well. Individual development, as sponsored by the company, is thus directly connected to performance if it is to be accepted (Foster and Rippey, 1985, p. 116).

Obstacles to business participation in continuing education

Educational attainment may be the best indice of interest, motivation, and participation in learning (Peterson and Associates, 1980, p. 93). It is true that the people with more education have the greater interest in further education--and education correlates with income and age (Peterson and Associates, 1980, p. 82). The obstacles that deter adults from participating in learning activities are situational, dispositonal, and institutional (Cross, 1981a and Peterson and Associates, 1980, p. 106). Situational factors such as proximity, cost, and families aid institution barriers, such as scheduling, courses available, information, and dispositional-interest. Evidence suggests that the institutional and situational barriers, such as lack of information, are not as important as reported, but are used as socially accepted responses. The dispositional barriers are thought to be understated (Peterson and Associates, 1980, p. 109) in this desire to give socially acceptable responses to surveys. It is surprising, however, that work places rated low as places to learn (Gibb, 1960, pp. 54-64).

Adults are pragmatic learners. As pragmatic learners, young adults concentrate their learning oriented toward their work and people over 55 years of age show less interest in job related learning activities. Attitudinal barriers toward accepting the change and continuing education also occur within companies and individuals. Much

of this resistance has been outlined in studies, however, the attitudinal issue relating to prior experiences in education, has not been explored extensively.

Several studies have indicated the problems encountered and sources of information that are desired by manufacturers. The studies of particular interest in this study were conducted by the Center for Industrial Research and Service at Iowa State University (Swanson, 1979, 1982, 1984) in which the problems identified by manufacturers differed considerably from than the type of information they sought to acquire. The problems were often beyond the control of the individual, i.e., inflation and energy. Therefore, information desired was more directly in the areas that could be controlled by the executive, i.e., motivation, productivity. The studies also revealed that educational institutions were not the primary source of information (Swanson, 1979) and that manufacturing executives had a variety of problems and sought a variety of sources for information. Smaller firms, under 250 employees, differed from larger firms in that they preferred publications/-workshops, and did not want workshops to be held in their plants. Neither group sought formal credit classes (Swanson, 1979).

Influence of chief executive

The chief executive's "own interest in education, his interest in the education of his associates, and his estimate of the skills required for effective management, are likely to determine the frequency and

number of men to send to outside programs" (Andrews, 1966, pp. 214-215). The educational effort is considered to be a vital component in executive continuity, but it is not dominant. Most large firms expect increases in expenditures for continuing education (Mahler, 1973, p. 107). Management is also becoming more realistic on what can be accomplished in the classroom, thus, there is a lessening interest in long executive training programs and a rising interest in shorter directed programs (Stoltz, 1966, pp. 139, 140). But the business perspective of management shows some confusion on how useful education programs are to the company. "How effective a manager will perform on the job cannot be predicted by the number of degrees he holds, the grades he receives in school, or the formal management education programs he attends--unless they acquire their own experience, knowledge, and skills that are vital to this effectiveness, they are not likely to advance up the organizational ladder" (Livingston, 1977).

The CIRAS survey on Technology and Research Needs of Manufacturers (Swanson, 1984) indicated that Iowa manufacturers changed where they would acquire information, depending on the subject to be addressed (Swanson, 1984). Traditional education ranked significantly higher in technology and research areas, but in all cases, management preferred to obtain information from private sources.

Studies of management executive programs indicate that size of firm and source of information are definitely factors in adult education--and that the company executive determines where education

will occur. In a study of 10,000 business executives from 2,718 companies represented at the Wharton School of Business, 38 percent of those attending were senior level and 41 percent were department heads--and 47 percent of the firms were engaged in manufacturing. Ninety-four percent of the attendees were also selected for attendance by their companies. The company use or non-use of executive programs turned principally upon the chief executive's attitude toward education (Andrews, 1966, p. 192). Andrews stated "The rapid advance in technology, the internationalization of markets and competition, and the progress of research on information processing and human behavior make hopeless the proposition that a man may learn what he will need to know from what he is currently doing. To admit the need for continuous development of management skills is a necessary prelude to deciding what should be done about it" (Andrews, 1966, pp. 232-235).

There is also the supposition that smaller and newer companies are the ones that provide innovations (McIntyre, 1982, p. 23), but that the smaller company has difficulties engaging in the continuing education processes. McIntyre noted that obstacles to change are inherent in the structure and products of a large company--yet larger companies appear to be more active in the continuing education of their employees (McIntyre, 1982, pp. 24-26).

Education, training, and change

The philosophical issue of "training" versus "education" remains. The goal of education is to teach concepts and critical inquiry, while

the corporate goal is perceived as more specific and narrow (Eurich, 1985, pp. 14-15). But as Patricia Cross points out, the lines between training vs education are blurring as education institutions move into training and corporations into education (Cross, 1981a, pp. 1-7). Eurich points out that advanced education programs are now found in industries, especially those with the highest investment in research and development--evidence of advanced technology and change, hence training and education (Eurich, 1985, p. 10).

Training managers within industry see the benefits of continuing education from outside sources as access to facilities, equipment, materials, and expertise, with the outcome being increased productivity and employee satisfaction (Darkenwald, 1983, pp. 233-241); the barriers being incompatibility, poor understanding of training needs, poor relevance to business, and limited returns. Black (1979) concludes that a company growing rapidly can be expected to be more interested in continuing education than a stable mature dominant company in an industry with existing technology. Large firms tend to use executive training to stimulate the creative abilities of executives and to cultivate innovation (Darkenwald, 1983, p. 37). Industrial nations think of change as a result of scientific and technological change--and make life long learning necessary (Cross, 1981b, p. 31). The people required to learn are also more likely to have up-to-date information and motivated people learn most effectively (Cross, 1981b, p. 43).

Executive influence on participation of employees

A critical issue to this study relates to prior experiences in education affecting participation. This is supported by numerous research, Cross (1976); Bruner (1960, 1966); London et al. (1963), but Auice Saint (1974) stated it bluntly "Choices of approach tended to rest on a man's ability, personal experiences with different methods in the past--self-education is hard even for well motivated executives--to make self-education a mainstream activity, top management can accomplish more by example than exhortation" (Dill et al., 1965).

Most individuals will stay in the same job for most of their working life (Morse, 1984, pp. 2-10) and their employers face the challenge of finding ways to increase their skills. Sponsored employee education programs are encouraged by industry for three reasons: (1) to keep valued employees, (2) obtain new information, and (3) keep existing workers competent. The willingness to invest in training indicates a longer term view of the company and the fact that 75 percent of the nations growth in products is attributable to the human factor (Carnevale, 1983).

Education results in change and change can create problems for companies. Investments in technology, structure, and skills are costly to alter, thus organizations with the greatest power often opt for the status quo (Miles, 1982, p.8). But organizations with strong leadership often make changes before being forced to comply. "The fundamental qualities of leadership are those that enable an organization to

maneuver their organizations through and around environmental obstacles and into domains more abundant in resources and opportunities" (Miles, 1982, pp. 11-12). Executives not only steer organizations, they create administrative frameworks, reinforce coalition, change the purposes, and restructure systems. They are, therefore, instrumental to any improvement in particpating in a continuing education program.

Summary

Adult learning and adult education do not have a comprehensive theory that explains all the learning interactions that occur in the life span of the individual. This apparent lack of a theory base does not mean that there is no theoretical framework or theoretical model from which to conduct research or develop learning programs. Adult education, in fact, has numerous theories and models that help guide programs and inquiries. It does, however, provide a caution to the researcher and educator to continually engage in critical examination of theories, assumptions, and institutions. The continuing reflection on philosophical issues in adult education should serve to develop methods of critical thinking, aid individuals to ask better questions, and expand the visions of educators beyond their present limits (Elias and Merriam, 1980, p. 206).

Adult education has its theoretical foundations in the cognitive theories first established in Gestalt psychology that established the the principles of insight, perception, and reasoning to explain

learning. Gestalt and subsequent researchers invested learning away from the behaviorist school that predicated its theories on the various interpretation of stimulus response learning. The development of learning theories in the cognitive school and espoused by Bruner (1961), Ausubel (1967), Combs (1962) provided adult education with a humanistic framework. The humanistic obviously brought forward the concepts of the adult learner internally organizing information into meaningful structures that could be recalled or used to make judgements. The central theme is of insight and self-actualizing to purposeful ends that satisfied the individual's needs or tensions.

The humanistic theories, with the emphasis on interaction, useful needs, change, and perceived environments provided adult education with the framework under which it currently operates. The self-directed learner of Knowles, the experience base of Dewey, and a growing awareness of the biological constraints and advantages of aging, combined into models that helped explain adult learning. The adult was definitely a learning animal. Further work by Tough (1979); Houle (1981); Cross (1981a); Knowles (1970) confirmed the self-directed and androgogy model. The pattern of learning through life was thoroughly studied or explained by Levingson, Erickson, and Havighurst. The influence of experience in adult learning has been recognized by virtually all cognitive theories. Experience influences one's interpretation of the environment, indeed provides the environment, and

it greatly influences receptivity to participation in further learning--particularly organized learning.

Patricia K. Cross's model and the work of other researchers beginning with Dewey appears to confirm the influence of prior experiences, particularly experiences in school, or participation in organized learning. The extent of that influence has not, however, been well researched even though it is frequently mentioned in the work of theorists and practitioners.

Industry has become a major force in the educational processes and learning of adults. Industry provides training and education for adults for a variety of reasons, but heavily weighted on handling: (1) changes in technology and competition, (2) improving products and services, (3) increasing productivity, (4) providing leadership to the organization, and (5) retraining employees. The organization is guided by the chief executive and this individual, to a large extent, determines the learning opportunities offered to employees. The heavy influence of the work environment upon the individual and the dominating influence of the chief executive upon learning opportunities for employees suggests that research concentrate on the chief executive--the perceptions, attendees, changes, and prior educational experiences.

CHAPTER III. METHODOLOGY

Introduction

This chapter addresses the methodology, factors, and parameters that guided the collection of data and the subsequent analyses. The chapter provides information considered in the selection of the population and sample; the research questions to be addressed; the design and use of the data collection instrument; the procedures for handling and validating data; the procedures used in the analyses of the data; and the handling of other information provided in the completed research instruments.

Research Methodology

Survey research methodology and techniques were selected for collecting the data in this study. The selection of survey methodology was based upon the need to: (1) collect information on opinions, attitudes, and perceptions; (2) reduce data collection costs; (3) shorten the time devoted to data collection; (4) effectively contact a large population; and (5) address the need to measure statistical relationships between predetermined elements. Other research methodologies such as observational, historical, casual--comparative, experimental, evaluative, or correlation research were not deemed appropriate due to the time, cost, and control constraints. The selection of survey research methodology for this study of perceptions was guided strongly by the Borg and Gall (1979, p. 27) statement that,

"Survey research typically employs questionnaires in order to determine the opinions, attitudes, preferences, and perceptions of persons of interest to the researcher." Borg and Gall (1979, p. 28) further state that "Questionnaire surveys are one of the few types of educational research in which it is feasible for the investigator to select random samples from some national population."

Survey research does have distinct advantages for the researcher, and therefore, survey research has a history of use by educators (Borg and Gall, 1979, p. 283) to describe and explore relationships, collect standardized information in a sample drawn from a predetermined population at a single point in time, allow cross sectional applications, and improve the efficiency of data collection. Survey research does, however, have many shortcomings compared to experimental research methods. Particularly noteworthy is the inability to determine cause and affect relationships. But the benefits of achieving accurate descriptions of objectives, the population, and relationships override most of these objections of the survey methods. Borg and Gall (1979, p. 28) do caution, however, that, "both questionnaires and interviews are subject to bias because of the fact that the way a question is asked can influence the response. Therefore, in planning either a questionnaire or interview, the researcher must be very careful to frame questions in such a way to avoid this type of bias."

The use of the survey method to measure attitudes, preferences, perceptions, and relationships was deemed appropriate for this study.

Future researchers examining this topic, however, may wish to consider the use of experimental and longitudinal designs so that in-depth studies of the causal relationships and interactions can be determined.

Population and Sample

Population

The population for this study in adult education was restricted to the principal operating officer in manufacturing operations located in the state of Iowa. The principal operating officer was selected due to the importance of hierarchical structures in the business community. The hierarchical structure theoretically places the final responsibility for all functions, i.e., expenditures, plans, products, services, and the organization's economic viability--upon the chief executive. The executive also frequently assumes strong social leadership responsibilities within and outside the organization due to the skills and accomplishments inferred by the hierarchical structure, reward systems, and the nature of the business culture. The principal operating officer's actions are frequently multiplied in their affect and influence upon other individuals in most business organizations. The assumption was that the principle operating officer would be the eventual decision maker on continuing education programs offered and encouraged by the company.

This study also was limited to the manufacturing sector due to the similarities of function, purpose, structure, and market orientation

that exist among manufacturing organizations. The purposes of all manufacturing operations are to combine materials, labor, capital, technology, and knowledge into a physical product that will be sold. The manufacturing function provides strong commonality, although the final product and markets for these products may be markedly differentiated geographically, and institutionally.

Prior studies indicated that the individuals selected to lead manufacturing organizations have quite similar educational backgrounds, philosophies, motivations, codes of ethics, and responsibilities. They frequently have educational backgrounds founded in business or engineering curricula and are competitive, directive, organized, and structural in their orientations.

The population selected was comprised of manufacturing executives in the state of Iowa that were identified from a computerized listing of Iowa manufacturing companies maintained at the Center for Industrial Research and Service (CIRAS) at Iowa State University of Science and Technology. This listing of manufacturers is updated on a continuous basis through the personal contacts with manufacturers that are made by university field staff; continuous updating is also made through bimonthly mailings of newsletters to the Iowa manufacturing companies; and surveys that are periodically mailed to the principal executive. The computerized record of CIRAS contains the company name, an employment code, product code, address, history of prior center contacts with the company, type of problems the company has asked the university

to answer, the name of the individual receiving information, and the individual's business title. The center's computerized record is also checked periodically by comparing the information with a manufacturing directory compiled by the Iowa Department of Economic Development (IDED). The Department publishes an annually updated directory of Iowa manufacturers and a computerized record of the listed companies. The IDED directory and computerized listing contains information similar to that found at CIRAS, except it offers an additional listing of the names of the top corporate management, purchasing agents, and more detailed information on the company's products. The two sources of information on Iowa manufacturing companies, and the likelihood of the information being accurate, provided the promise of improving the response rate and reducing the costs incurred in this study. The distinct advantages of having the names of the firms, correct addresses and exact name of the executives resulted in restricting the study to manufacturers located only in the state of Iowa.

There were 3,780 manufacturers in the state of Iowa on the February 1, 1984 date that the listing was acquired. The manufacturers ranged in size from one employee to several thousand employees and from one location to many branch plants. The products manufacturerd by the companies ranged from heavy construction equipment to electronics and apparel. The decision was made to restrict this research effort to companies with fewer than 250 employees but having more than 20 employees.

Prior surveys of manufacturers and studies conducted in Iowa indicated that the smaller manufacturer, under 20 employees, although more numerous, were less responsive to surveys. This group also appeared to have interests that were similar to those represented in the next two employment categories that were available in the manufacturing listings (21-50 and 51-250 employees). The largest employers, those with over 500 employees, were few in number, thus, their response rates would not be sufficient for statistical analyses or add significantly to the study. The larger manufacturers are also able to utilize internal training programs and easily access other training programs. Firms with 250-500 employees were also found to be largely branch plants of larger companies and with responses similar to the parent firm or independently owned similar to the smaller firm. The decision was made to exclude the larger firms, therefore, those companies with over 250 employees or branches of larger companies were excluded from this study. The population selected was restricted to chief executive officers in Iowa manufacturing organizations with over 20 employees, but fewer than 250. The selection process reduced the number of firms in the population from 3,780 to 1,204 companies.

The consideration of the time and expense factors of making personal contacts with the 1,204 manufacturing executives was deemed as impractical for this study; therefore, the decision was made to select a random sample from the population of the 1,204 companies. The decision was also made that 100 useable data instruments would be necessary for

proper analyses of the data. Prior experience in using mailed survey instruments with Iowa manufacturers indicated that approximately one half of the executives would return the survey. A lower response rate could be expected if the data collection instrument was deemed inappropriate or too complex by the respondents. The complex surveys that were conducted by CIRAS in 1979, 1982, and 1984 had returns of 25.7 percent, 25.3 percent, and 24.7 percent respectively. It was decided to mail a data collection instrument to 200 randomly selected companies.

Sample

A random sample generator selected 200 manufacturing companies with 51-250 employees for inclusion in the study from the total population of 1,204. An additional listing of 25 companies was also selected in the event that any of the preselected firms in the sample would be unavailable to the survey due to a plant closing, shutdown, extended holidays, identification as a branch plant, or some other factor that would exclude it using the parameters selected for this study. The computer generated sample, therefore, created a listing of 225 firms, names of the principal officer, type of product manufactured, the employment code, and the mailing address. Three mailing labels were generated for each company, plus a listing of all the firms. The labels would be used for a preliminary letter, the initial mailing of the data instrument, and a reminder or follow-up mailing. The list of all the selected companies was for use in checking returns of the data

instrument. The computer generated list was checked for accuracy using two methods: (1) a cross-check for accuracy with the Iowa Directory of Manufacturers and (2) contact with CIRAS field representatives seeking their help in checking the accuracy of the information about the company, its address, and chief executive. Corrections in name, address, product, or employment were made on 21 companies. Fifteen firms were eliminated because of duplications, the firm not being a manufacturing company, identification as a branch plant, or the firm having gone out of business. Additional manufacturing companies were added to the mailing list from the list of 25 companies generated as part of the random sample. A final list of 200 manufacturing companies and executives was obtained (see Tables 3 and 4).

Table 3. Employment Size of Sample

Size	Frequency	Percentage
1- 20	2	1.0%
21- 50	2	1.0
51-100	101	51.8
101-250	89	45.6
251-500	1	0.5

Table 4. Standard Industrial Classification (SIC) of Sample

SIC	Frequency	Percentage
Chemical	6	3.1%
Concrete	14	7.2
Food Processing	36	18.6
Machine	50	25.8
Metal	31	16.0
Printing	22	11.3
Rubber	8	4.1
Textile	11	5.7
Wood	16	8.2

Instruments

One instrument was used to collect the data necessary for this study. The data collection instrument was developed by the investigator with significant inputs from Mr. Bud Meador and Ms. Kathy Shelley from the Iowa State University Statistical Laboratory, Dr. Vern Ryan from the College of Agriculture, and Dr. Roger Lawrence from the College of Education. Instruments used in the three prior CIRAS surveys of Iowa manufacturers were also examined to determine the availability of data and the suitability of the questions. The CIRAS surveys had examined manufacturers' perceptions on the topics of business climate, information needs, research and technology needs, and sources of assistance sought by the principal executive. Several books provided valuable inputs for the instrument design. Particularly valuable for the survey design was a text by Borg and Gall (1979).

Design criteria

The data collection instrument was designed to be mailed using the following guidelines: (1) facilitate an accurate response without the need for the respondent to seek supplementary sources of information; (2) require less than ten minutes to complete; (3) gain the respondents personal interest in the topic in order to assure completion of the instrument and obtain supplementary information; (4) provide uniformity of data; (5) permit statistical analyses of the data; (6) adequately test the research questions and hypotheses; (7) obtain information that could be the source for further study; (8) obtain reliable and valid information; (9) reduce redundancy; (10) avoid collecting information already available to the investigator, and (11) avoid obtaining information that was unnecessary for this study.

The instrument was designed to be mailed to a specific individual, require very few instructions to understand or complete, list the items in order of priority to the study, and provide useable information even when all the questions were not answered by the respondent. The assumptions used in the design of the instrument were: (1) the chief executive was busy and the instrument was competing with other needs; (2) the completion of the instrument was a lower priority for the chief executive than most other demands upon his or her time; (3) the topic of continuing education was not a high priority for the individual; (4) the instrument would need to be completed quickly and easily or it would not be completed; (5) the reason the executive would complete the instrument

was related to a social obligation rather than for a business purpose; and (6) the individual's perceptions could not always be measured with precision.

The data collection instrument

The first section of the instrument was arranged to collect personal information about the individual with emphasis on education, attitude toward change, age, and title. This information could be easily answered by the respondent and would, therefore, encourage the respondent to answer the more specific perception questions that followed. The second section of the questionnaire was devoted to the company's comparative position relative to technology, skills, educational offerings, and incentives for continuing education. The third section was devoted to the individual attendance in organized continuing education, factors important in deciding whether to attend education programs, and the availability of educational programs. The fourth section measured attitudes toward education.

The instrument contained 34 major questions, each of which was related to specific hypotheses. Most of the questions in the instrument were designed to elicit perceptions or attitude responses on a rating scale, were written in context of language familiar to the business executive, had space for additional comments, and were pretested for clarity, accuracy, and relevance by submission to a group of business executives. The matching of the questions to a specific hypothesis, the

using of a rating scale, and the preliminary check for clarity and relevance, insured that the questions could be answered and that useable data would be collected for statistical tests of relationship.

The eight page 8 1/2" x 11" instrument was designed (see Appendix A) to be folded and mailed to the executive in an 8 1/2" x 3" envelope. The instrument was professionally printed on an buff colored paper, and had a stapled binding on the left side. General directions for the completion of the survey were printed at the beginning of the survey as were assurances of confidentiality--including a statement that the individual instrument would be destroyed when the study was completed. A copy of the completed study was also offered, and if the executive desired a copy his/her business card would need to be included with the completed instrument. The introduction also explained that the number code written in the front upper right hand corner was only for follow up purposes only.

A separate introductory letter (see Appendix B) was prepared and placed on the front of the questionnaire. The letter was printed on white paper that contained the university letterhead. The three paragraph letter urged completion of the instrument, early return in the attached postage paid envelope, and confidentiality. The letter was signed by the author in the capacity of director of the Center for Industrial Research and Service. Specific identification of the researcher was not provided.

The data collection instrument, cover, and a self-addressed postage paid return envelope were placed in an 8 1/2" x 11" envelope and a mailing label affixed to the face of the envelope.

Pretesting

The instrument was pretested through several independent actions: (1) November 1985, the instrument was distributed to the professional staff of the Center for Industrial Research and Service at Iowa State University. The staff provided comments and suggestions for change. The staff examiners were selected due to their experience in providing management and technical assistance to Iowa industry and the fact that most of them had prior management experience in manufacturing or processing industries. The suggestions offered by the staff were incorporated in the data instrument; (2) November 1985, 10 members of the CIRAS Advisory Council, executives of manufacturing companies, were provided a copy of the instrument and asked to complete it. They were also asked to provide input on how to improve the instrument. The 10 executives completed the instrument with little difficulty; and (3) the third check of the instrument was made when instrument with recommended changes was then sent to five local manufacturers. Each recipient in the test was asked to indicate areas where he/she was reluctant to provide information, thought questions were unclear, where additional instructions would be needed, whether questions should be deleted, whether questions should be added, or whether a relevance of the study

was in question. The chief executives in the manufacturing companies recommended no major changes in the instrument, nor had problems in completing individual questions.

The conclusion was that the instrument was clear, concise, and meaningful. The instrument appeared to measure what it purported to measure and was relatively easy to complete.

Each question of the final version of the data collection instrument was then precoded for ease of entry into the university computer, matrices were designed, and some of the statistical tests to be used were determined. The instrument was then printed (400 copies), three sets of mailing labels prepared, a listing of executives and companies printed, and the cover letter printed (225 copies).

Data Collection Procedures

The data were obtained from one instrument containing 34 major questions, including questions with up to 14 subsets. The questions required single value responses; i.e., age, rankings; and general response statements. The completed data instrument would provide an array of data on participation, attitudes, and facts. The only specialized training required for collection of data from the instrument related to computer coding, matrices design, statistical tests, follow up, and data entry. These services were provided by the Iowa State University Statistical Laboratory.

The Process

A letter of introduction (see Appendix C) was mailed on February 17, 1986 to the 200 chief executives. This letter stated that a questionnaire would be mailed to them the next week and it was hoped they would complete and return it. It also assured them of confidentiality and offered a copy of the study. The printed questionnaire (see Appendix A) and cover letter (see Appendix B), and a postage paid return envelope were then mailed to the 200 manufacturing executives on February 25, 1986 in an 8 1/2" x 3" envelope with a preprinted mailing label affixed to the face of the envelope. The envelope was stamped "Personal--please respond."

When the instrument was returned, the date was written on the face. The return was noted on the mailing list and the instrument was checked for completeness. If one or two items were not completed, a telephone call was made to the respondent asking for additional data. The few qestionnaires (3) that were returned unanswered were also noted and when possible, contact was made to the nonrespondents to get some indication of why the date instrument was not completed. On March 13, 1986, a letter (see Appendix D) was sent to all nonrespondents asking them to complete the questionnaire. The CIRAS field staff was then asked to contact nonrespondents by telephone requesting completion and return of the questionnaire. The field staff telephone follow up was not considered productive as only three questionnaires were completed by this method. A cursory check was made of all late responses to see if

they differed significantly from the responses that were received without the follow up call--there was no obvious differences in the responses. A total of 113 data instruments returned--a 56.5 percent response rate. There were 109 data instruments deemed useable for the study. Four instruments were rejected because of a lack of data.

The information on the completed instruments was then coded, tabulated, and entered into the computer. All questionnaires were retained in the event of data file loss, but these questionnaires were to be destroyed at the completion of the study.

Research Questions

The basic research question is: Do individual's attitudes and perceptions toward education affect their participation in continuing education learning activities? This study is, however, more restrictive in that it is an examination of the influence that attitudes have upon participation in continuing education by the principal executive in manufacturing enterprises located in the state of Iowa. It is also restrictive in that a specific and predetermined set of attitude factors were examined in this inquiry.

The selection of the manufacturing executive was predicated on assumptions that: (1) principal executives are leaders and role models for their organizations and are major influences of incentives and reward systems for their employee's learning experiences; (2) learning is essential for the continued viability of an organization in a

competitive environment; (3) technology, competition, and markets require active participation in learning and those requirements will be readily evidenced in the acquisition of new skills, products, and processes in manufacturing enterprises; (4) education, although important to the success and adaption of the enterprise, is not a mainstream high priority for the enterprise or executive; (5) education, information, and learning can be required through a wide variety of sources and methods; (6) attitudes and perceptions about formal learning greatly influence participation rates in continuing education activities; (7) the executive is willing to share those perceptions and attitudes about education and prior learning experiences; and (8) information about those attitudes and prior participation in learning activities are important to the field of adult education.

One major research question (hypothesis) and 10 subsidiary research questions were developed and examined in this study. The central hypotheses, the subsidiary questions, and the premises listed previously were used to develop the collection instrument and statistical tests used in this study. The major research question in this study is: "Do manufacturing executives' attitudes toward education significantly affect their particpation in learning activitiies?"

Major research question

Are manufacturing executives' attitudes toward education significantly and directly related to their participation in learning activities?

Subsidiary research questions

1. Are manufacturing executives' attitudes toward continuing education directly related prior to educational experiences?
2. Are the manufacturing executives' levels of participation in continuing education and learning activities directly related to the level of education attainment?
3. Is the level of manufacturing executives' participation in continuing education directly related to the perceived relevance of education?
4. Is the level of the manufacturing executives' participation in continuing education directly related to the rate of change in their industry?
5. Is the level of participation in continuing education of the manufacturing executives directly related to the skills required by the organization?
6. Are executives' attitudes toward education directly related to their perception of the relevance of education?
7. Are manufacturing executives' participation rates in continuing educational activities related to cost/distance factors of the programs?
8. Are manufacturing executives' interests in continuing education related to short term goals?

9. Are manufacturing executives' attitudes toward learning directly related to the incentives offered by the company?
10. How do manufacturing executives learn of educational opportunities?

Data analysis

Analyses of the data was completed using the central computer facilities of Iowa State University and the Statistical Package for the Social Sciences (SPSS). The statistical tests planned for this study, included frequency, mean and standard deviation, Pearson correlation coefficients, and chi-square.

Frequency counts, mean, and standard deviation were created on all questions and subquestions in the data collection instruments. The frequency means and standard deviations provide general information on manufacturing executives, their perceptions on education, and particpation rates. The data would be placed in computer that would provide general information that could be analyzed at a later date--and more importantly, provide a basis for hypotheses not anticipated at the beginning of this study.

Pearson correlation coefficients would be calculated on each question. These correlations would provide indicators of the variables that were significant and should be examined with stronger statistical procedures

Chi-square would be calculated for each question based upon attitudes toward education and participation rates. The attitude and

participation rate would be made into dichotomous variables using a division of approximately fifty percent of the respondents into each grouping. Pearson correlation coefficients would also be calculated using the dichotomous approach.

Summary

Survey methodology was selected for this study of the relationship between attitudes and participation in continuing education activities. A data collection instrument was mailed to a computer generated sample of the chief executives in manufacturing companies located in Iowa. The executives were from companies having 51-250 employees and they were randomly selected from a population of 1,204 firms. A sample of 200 executives were mailed the survey instrument and 113 returned the completed instrument.

The data collection instrument was developed by the researcher and tested with three different groups: (1) industrial specialists at Iowa State University of Science and Technology; (2) manufacturing executives in the CIRAS Advisory Council; and (3) executives from selected manufacturing companies.

The completed data collection instruments were returned over a period of three weeks, coded and placed in a computer file for future statistical analyses. The analyses planned were frequency counts, mean, standard deviation, correlation, and chi-square. The major research question was: "Do manufacturing executives' attitudes toward education

affect their participation in continuing education?" Ten subsidiary and related research questions test propositions on change, school experiences, relevance, attendance factor, and incentives.

Frequency counts would be made of all questions and responses tested in the data collection instrument. Pearson correlation coefficient would also be needed for each question and chi-square. Dichotomous variables of participation rates and attitudes toward education would be generated in order to facilitate statistical analyses and examinations for statistical significance of different groups.

CHAPTER IV. PRESENTATION OF DATA AND FINDINGS

Introduction

This chapter provides the presentation of data collected in the study and the interpretations of that data. The first section presents information on the response rate from the sample; the second section presents the frequencies of data from each question in the data collection instrument; in the third section, the tests of the data for statistical significance is made on each research question, and the fourth section presents some information that is important, but not directly related to a specific research question. A summary is also added to provide an overview of the statistical analyses and findings that were made in this study.

Response rate and validity checks

The data collection instrument was mailed to 200 executives in 200 Iowa manufacturing companies on February 25, 1986. This mailing of the data collection instrument was preceded by a letter to the executive informing them that they would receive the data collection instrument or questionnaire in one week. A follow-up letter was mailed to executives who had not responded by March 13, 1986, and telephone calls were then made to a small number of nonrespondents by CIRAS field staff. The initial mailing proved to be far more effective than the two follow-up procedures. Instruments received after April 15, 1986 (2) were not included in this study (see Table 5).

Table 5. Response rate

Date	Instruments	Frequency	Percentage	Response[a]
March 4	13	13	11.5%	6.5%
March 5	17	30	26.5	15.0
March 6	6	36	31.8	18.0
March 7	10	46	40.7	23.0
March 11	7	53	46.9	26.5
March 12	8	61	53.9	30.5
March 13	2	63	55.7	31.5
March 17	2	65	57.5	32.5
March 18	8	73	64.6	36.5
March 19	11	84	74.3	42.0
March 20	2	86	76.1	43.0
March 21	5	91	80.5	45.5
March 24	2	93	82.3	46.5
March 26	2	95	84.0	47.5
March 27	1	96	84.9	48.0
March 31	2	98	86.7	49.0
April 1	2	100	88.4	50.0
April 2	3	103	91.1	51.5
April 3	3	106	93.8	53.0
April 4	1	107	94.6	53.5
April 7	3	110	97.3	55.0
April 8	1	111	98.2	55.5
April 15	2	113	100.0	56.5
TOTAL	113	113	100.0%	56.5%

[a] $\frac{\text{Returns}}{200}$.

Four of the returned questionnaires were rejected due to incomplete data or a stated refusal to complete the form. The number of useable data instruments coded and entered for analysis of data was, therefore, 109 or 54.5 percent of the instruments that were mailed to manufacturing executives.

The returns, based on the type of manufactured products, adequately represented the population (see Table 6). This check also assured that all respondents were employed in manufacturing operations.

Table 6. Industry categories of respondents

Major product	Respondents Percent	Valid percent
Food	13.8%	13.9%
Feed	2.8	2.8
Textile	3.7	3.7
Apparel	3.7	3.7
Wood	4.6	4.6
Paper	2.8	2.8
Printing	11.0	11.1
Chemicals	1.8	1.9
Plastics	4.6	4.6
Leather	0.9	0.9
Stone, Clay, Glass	2.8	2.8
Precision Metal	1.8	1.9
Fabricated Metal	22.0	22.2
Machinery-Nonelectric	3.7	3.7
Machinery-Electric	1.8	1.9
Transportation Equipment	3.7	3.7
Instruments	0.9	0.9
Other/Missing	12.8	13.0
TOTAL	100.0%	100.0%

A check of the responses by employment size revealed that 15 of the plants were actually larger than previously indicated by accuracy checks. Only four of the companies, however, had more than 500 employees, so the issue of potential bias was considered insignificant. A check of the individual questionnaires from the larger firms was also made and appreciable differences in responses from the firms with 250 employees were not noticed.

Accuracy checks were also made on the titles of the respondents. Only 18 respondents declared titles other than plant manager, vice president, president, or chief executive. This indicated that the individual to whom the data instrument was mailed actually completed the instrument in at least 83.0 percent of the cases.

Frequency Counts

This section of the study provides information on the frequency counts. The executives responding to the survey provided a large amount of information on their personal education backgrounds, work experience, attitudes toward education, companies, and participation in continuing education. In some instances the data is presented in a summarized form, but all the frequency counts are available.

Section I. Personnel information

Section I of the data instrument related to personal data regarding the executive. Question I-A confirmed the executive's position in the company (see Table 7). Interestingly, only 16.5 percent of the respondents declared their title other than chief executive, vice president, manager, or plant manager. The titles offered in these exceptions indicated authoritative positions, i.e., owner, chairman, and president. Some of the respondents also indicated they had more than one title and, therefore, they provided each title. These dual titles were merged into the highest order title for statistical analyses.

Table 7. Title of respondent

	Frequency	Percent
Chief Executive	56	48.6%
Vice President	15	13.8
Manager	19	17.4
Plant Manager	21	19.3
Other	18	16.5
TOTAL	127	100.0%

Questions I-B,C,D,E indicate that the average executive has 18 years of experience in the company and has been in an executive position for approximately half of that time (9.9 years). The executives (59.9%) also have educational backgrounds concentrated in business-economics and engineering, although a significant number have training outside these areas of concentration. Presumably, most were high school related, and therefore, without a concentrated study program. Notable was the fact that only 1.9 percent of the executives received their degrees in the education disciplines (see Tables 8 and 9).

I-B. Number of years in this position.

Mean--9.9 years
Standard Deviation--8.34 years
Maximum--40 years
Minimum--1 year

I-C. Number of years in the company.

Mean--18 years
Standard Deviation 11.9 years
Maximum--54 years
Minimum--1 year

Table 8. The highest degree received

	Frequency	Percent
High School	24	22.0%
Technical Associate	10	9.2
Bachelor	64	58.7
Master	66	5.5
Doctor of Philosophy	0	0.0
No degree	5	4.6
TOTAL	109	100.0%

Table 9. Major field of study

	Frequency	Percent
Business-Economics	41	38.0%
Education	2	1.9
Engineering	23	21.3
Agriculture	6	5.6
Law	13	12.0
Other	23	21.3
TOTAL	108	100.0%

The next two questions on the data collection instrument sought information on satisfaction with their major fields of study while attending school (see Table 10). Eighty-two percent (82.9%) of the respondents were satisfied with their major field of study and 55.2 percent with their degree level. Forty percent of the respondents thought another degree, generally an advanced degree, would benefit them.

Table 10. Satisfaction with present education

	Frequency	Percentage
Education Level		
No	47	44.8%
Yes	58	55.2
TOTAL	105	100.0%
Prefer other degree.		
No	63	60.0%
Yes	42	40.0
TOTAL	105	100.0%
Prefer other major.		
No	87	82.9%
Yes	18	17.1
TOTAL	105	100.0%

Question I-G sought the age of the executive. The age of the executives ranged from 29 years to 71 years of age--the mean being 47.552 and the standard deviation 10.508.

Question I-H sought information that would provide an indication of whether the individual sought new knowledge and information. The executives identified themselves as being quite early in the adoption process, as only 7.3 percent were identified as waiting for proof before adopting new ideas and processes (see Table 11).

Table 11. Executives' identification self in adoption process

	Frequency	Percent
Late adopters	1	0.9%
Wait for proof	7	6.4
Accept ideas in growth stage	38	34.9
Early adopters	28	25.7
Developer of ideas/products	35	32.1
TOTAL	109	100.0%

Mean--3.894; Standard Deviation--0.954

Section II. Company information

Section II of the data instrument sought information on the company. Question II-A classified the company by product and Question II-B by the number of employees. The frequency counts for these questions were used for validation and were described previously in this study. Question II-C sought information on the companies geographic market dimension. The companies' market areas were extensive, including foreign markets (see Table 12). Interestingly, only 35.8 percent relied upon state and local markets, while 64.2 percent exported outside the state.

Table 12. Market of company

Market	Frequency	Percent
Local	21	19.3%
State	18	16.5
Regional	39	35.8
United States	60	55.0
North America	30	27.5
Overseas	30	27.5

Question II-D was an attempt to identify a proclivity toward change. The question sought information on the percent of sales/profits that came from products introduced in the past 10 years. The responses ranged from no products being introduced in the past 10 years to 99 percent of the sales and profits coming from recent products.

II-D. Percent of Profits/Sales from Products Introduced in the last 10 years.

Mean--43.6

Standard Deviation--31.8

Minimum--0

Maximum--99

Question II-E required a rating of the company in comparison to its competition. Fourteen factors were ranked by the respondent. Those factors were level of technology, products, processes, research and development, distributor system, skill levels, educational programs, and the future. The respondents had four choices in the ranking--poor (value 1); fair (value 2); good (value 3); very good (value 4). The companies' processes, products, skills, and fringe benefits were ranked well against competitors, while the educational programs offered to employees and management were rated lower than their competitors (see Table 13).

Question II-F sought information on how the executive compared the executive's industry to other industries. The executives rated their industry lower in all categories than in the previous question. The

Table 13. Company in comparison to competitors--N=109

Topic	Mean	Standard deviation
Level of Technology	3.296	0.656
Products	3.500	0.585
Manufacturing Processes	3.198	0.725
Research and Development	2.698	0.884
Management System	3.056	0.650
Distribution System	3.121	0.676
Competitive Ability	3.262	0.671
Skill of Manufacturing Employees	3.095	0.660
Skill of Other Employees	3.043	0.501
Skill Level of Management	3.185	0.595
Fringe Benefits	3.028	0.897
Education for Employees	2.292	0.892
Education for Management	2.343	0.850
Positioning for Future	3.019	0.793

Poor=1; Fair=2; Good=3; Very Good=4

executives clearly felt that other industries were better in the offered categories than their own industry. Although educational programs did not have the sizeable decline of other categories, it did rank the 12th and 14th of the 14 categories offered in the question (see Table 14).

Question II-G. The issue of technology was addressed again with the executive asked to describe the company's technology on a five point scale based upon age of the technology. The company's technology ranked average or above average, with 12.8 percent considering their technology advanced. Only 11.0 percent of the executives thought their company's technology was below average (see Table 15).

Table 14. Rating of your industry compared to other industries--N=109

Topic	Mean	Standard deviation
Level of Technology	2.594	0.858
Products	3.038	0.637
Manufacturing Processes	2.724	0.726
Research and Development	2.390	0.866
Management System	2.577	0.676
Distribution System	2.830	0.673
Competitive Ability	2.876	0.754
Skill of Manufacturing Employees	2.721	0.673
Skill of Other Employees	2.774	0.582
Skill of Management	2.891	0.590
Fringe Benefits	2.695	0.748
Education for Employees	2.163	0.783
Education for Management	2.202	0.712
Positioning for Future	2.587	0.789

Poor=1; Fair=2; Good=3; Very Good=4

Table 15. General level of technology

Technology	Frequency	Percentage
Older than 10 years	8	7.3%
Below average	4	3.7
Average	48	44.0
Above average	34	31.2
Advanced	14	12.8
TOTAL	109	100.0%

Mean--3.389; Standard Deviation--1.008; Maximum--5; Minimum--1

The issue of company efforts in education was addressed in Questions II-H,I,J. Question II-H sought information on the importance of upgrading skills. Twenty-six percent (26.6%) of the executives indicated that upgrading employee skills was not important to the company and only 2.8 percent of the executives stated upgrading skills was very important (see Table 16).

Table 16. Importance of upgrading employees skills

Importance level	Frequency	Percentage
Not Important	29	26.6%
Somewhat Important	27	24.8
Important	29	26.6
Quite Important	19	17.4
Very Important	3	2.8
TOTAL	89	98.2%

Mean--3.561; Standard Deviation--1.140; Maximum--5; Minimum--1

The question on the importance of education make it relatively clear that education and upgrading employee skills were not a high priority for the executives. Company incentives for education, Question II-I, confirmed this fact as 14.7 percent of the companies had no incentives and only 60.0 percent, the highest frequency, had tuition reimbursement (see Table 17).

Table 17. Company incentives for education

Incentive	Frequency	Percentage
None	16	14.7%
Books	38	34.9
Tuition	66	60.6
Travel	36	33.0
Time Off	28	25.7
Classes in Plant	40	36.7
Other	12	11.0

The apparent lack of incentives and the impression that upgrading skills was of relatively small importance was clearly the responsibility of the chief executive. Sixty-four percent of the executives indicated they were responsible for the education programs in their companies (see Table 18).

Table 18. Decision maker for educational programs in company

	Frequency	Percentage
Executive	70	64.0%
Personnel Manager	16	14.7
Other	21	19.3
TOTAL	107	98.0%

There is a general assumption that the rate of change experienced in the company should influence interest in education. The prevailing educational thought is that technology and change demand greater interest in education and training.

It was apparent from the responses to Question II-K and II-L that Iowa executives feel the rate of change in their company is quite high

compared to competitors. Forty-four percent of the executives responded that the rate of change in their industry was quite high or high as compared to their competitors. The rates of change for their industry were considered lower than other industries. Twenty-nine percent (29.4%) of the executives thought their industry had a lower rate of change than other industries (see Table 19).

Table 19. Rate of change

	Compared to competitors		Compared to other industries	
Rate[a]	Frequency	Percentage	Frequency	Percentage
Low	3	2.8%	6	5.5%
Below Average	5	4.6	26	23.9
Average	50	45.9	55	50.5
Quite High	42	38.5	16	14.7
High	6	5.5	3	2.8
TOTAL	109	100.0%	109	100.0%
Mean	3.406		2.849	
Standard Deviation	0.779		0.837	
Maximum	5		5	
Minimum	1		1	

[a]Low=1; Below Average=2; Average=3; Quite High=4; High=5.

Section III. Education programs

Section III of the data collection instrument concentrated upon participation in educational programs, seminars, workshops, and conferences. It also provided a ranking of the factors the respondent

considered important in making a decision to attend a conference or educational program.

Questions III-A,B,C,D sought information on the number of conferences and workshops that were attended last year and the number they expected to attend next year (see Tables 20, 21, 22, 23, and 24).

Table 20. Participation in educational activities--Conferences

Number attended	Frequency	Percentage
0	33	30.3%
1	22	20.2
2	30	27.5
3	11	10.1
4	8	7.3
5	2	1.8
6	1	0.9
7	1	0.9
10	1	0.9
TOTAL	109	100.0%

Mean--1,651; Standard Deviation--1.685; Maximum--10; Minimum--0

Table 21. Participation in educational activities--Workshops

Number attended	Frequency	Percentage
0	64	58.7%
1	18	16.5
2	18	16.5
3	7	6.4
4	1	0.9
16	1	0.9
TOTAL	109	100.0%

Mean--0.872; Standard Deviation--1.780; Maximum--16; Minimum--0

Table 22. Participation in educational activities--Courses (credit)

Number attended	Frequency	Percentage
0	100	91.7%
1	5	4.6
2	3	2.8
9	1	0.9
TOTAL	109	100.0%

Mean--0.183; Standard Deviation--0.935; Maximum--9; Minimum--8

Table 23. Participation in educational activities--Courses (noncredit)

Number attended	Frequency	Percentage
0	95	87.2%
1	10	9.2
2	3	2.8
3	1	0.9
TOTAL	109	100.0%

Mean--0.114; Standard Deviation--0.506; Maximum--3; Minimum--0

Table 24. Participation in educational activities--Seminars

Number attended	Frequency	Percentage
0	41	37.6%
1	32	29.4
2	24	22.0
3	6	5.5
4	5	4.6
5	1	0.9
TOTAL	109	100.0%

Mean--1.128; Standard Deviation--1.171; Maximum--5; Minimum--0

The participation rates for last year clearly indicate that large numbers of manufacturers do not participate in organized educational activities. They do attend more conferences, followed in rank order by seminars, workshops, and courses. During the year, 91.7 percent had not taken credit courses, 81.7 percent took no courses at all, 58.7 percent did not attend workshops, 30.3 percent did not attend conferences, and 37.6 percent did not attend seminars.

Question III-D. Executives' plans for attending future educational activities revealed a pattern similar to their prior attendance pattern (see Table 25). While conferences were more popular, 39.4 percent did not plan to attend a conference, 57.4 percent did not plan to attend a workshop, and 93.6 percent did not plan to take courses.

Executives were asked in Question III-F what factors they considered important in making a decision to attend a conference or educational programs (see Table 26). The factors offered were the cost of program, travel time, time away from business, relevance of the topic, personal interest, immediacy of using the information, academic credit for attending, sponsorship, and the speakers. Clearly the relevance of the topic, use of the material, the speaker, and amount of time away from the business were important factors. The sponsor and credit for attendance were considered unimportant to most executives.

Table 25. Plans to participate in educational activities--N=109

	Number of events									
	0	1	2	3	4	5	6	10+	Mean	Standard deviation
Conferences										
Frequency	43.0	19.0	30.0	6.0	7.0	2.0	1.0	1.0	1.385	1.615
Percent	39.4	17.4	27.5	5.5	6.4	1.8	0.9	0.9	0	0
Workshops										
Frequency	63.0	19.0	17.0	7.0	2.0	0	0	1.0	0.899	1.800
Percent	57.8	17.4	15.6	6.4	1.8	0	0	0.9	0	0
Courses (Credit)										
Frequency	102.0	7.0	0	0	0	0	0	0	0.64	0.246
Percent	93.6	6.4	0	0	0	0	0	0	0	0
Courses (Other)										
Frequency	102.0	2.0	5.0	0	0	0	0	0	0.110	0.438
Percent	93.6	1.8	4.6	0	0	0	0	0	0	0

Table 26. Factors important to attending educational program--N=109

	Percent of respondents				
	Not important	Somewhat important	Important	Mean	Standard deviation
Cost of Program	11.9%	63.3%	18.4%	2.069	0.549
Travel Time & Cost	9.2	47.7	39.4	2.314	0.628
Time Away	7.3	32.1	56.9	2.514	0.625
Relevance of Topic	0.9	4.6	91.7	2.934	0.281
Personal Interest	27.5	45.0	27.5	2.000	0.745
Immediate Use	6.4	46.8	44.0	2.387	0.602
Long Term Use	1.8	40.4	55.0	2.547	0.529
Academic Credit	83.5	10.1	1.8	1.144	0.395
Program Sponsor	62.4	26.6	6.4	1.413	0.603
Speakers	16.5	33.9	46.8	2.311	0.737

Not Important=1; Somewhat Important=2; Very Important=3

The executives were also asked to rate the suppliers of educational activities and the methods that they preferred to use in gaining new skills in knowledge.

The ratings indicate that the conventional providers of education opportunities were not highly rated, but neither were they considered poor providers--only the government had a strong negative rating (see Table 27). Associations appear to be the highest regarded providers of continuing education programs, although the universities rated a close second, followed by community colleges, suppliers, and consultants.

Table 27. Rating of education providers--N=109

Providers	Rating and percentage of respondents: Poor	Fair	Good	Very good	Mean	Standard deviation
Associations	7.3%	27.5%	44.0%	18.3%	2.755	0.837
Suppliers	17.4	36.7	35.8	5.5	2.308	0.817
Universities	8.3	23.9	49.5	12.8	2.709	0.789
Community Colleges	18.3	32.1	36.7	6.4	2.333	0.843
Consultants	27.5	33.9	29.4	1.8	2.059	0.803
Government	59.6	28.4	6.4	0	1.437	0.604
Other	0.9	0	2.8	0	0	0

Poor=1; Fair=2; Good=3; Very Good=4

Question III-H sought information on the executive's preference in methods to obtain information, skill, and knowledge. The executives rated conferences, workshops, classes, reading, independent study, and television for the acceptability in providing skills and knowledge (see Table 28).

Table 28. Preferred method to gain skills and knowledge

Method	Rating scale--Percentage: Not acceptable	Acceptable	Preferred	Mean
Conferences	1.8%	60.6%	31.2%	2.314
Workshops	4.6	55.0	33.9	2.314
Classes-Credit	18.3	61.5	6.4	1.862
Classes-Noncredit	15.6	67.0	2.8	1.849
Personal Contacts	2.8	38.5	53.2	2.534
Reading	5.5	51.4	37.6	2.304
Television	34.9	50.5	3.7	1.649
Independent	17.4	57.8	19.3	2.019
Other				

Not Acceptable=1; Acceptable=2; Preferred=3

The executives again indicated preferences for conferences and workshops, but most preferred was personal contact followed by personal reading. Personal contact was the highest rated method of obtaining information and knowledge by 53.2 percent of the executives. Television (3.7%) and classes, both credit (6.4%) and noncredit (2.8%), rated the lowest. Television was not only least preferred as a medium, but was considered not acceptable by 34.9 percent of the executives.

Section IV. Attitude

Section IV of the data collection instrument sought to gain information on the executive's attitude toward education, particularly the individual's attitude about personal experience while attending school. The executives rated their educational experiences, today's educational systems, the frequency of using media to gain knowledge, how they rated organized education for gaining knowledge, and finally, how they found out where and when educational offerings were available.

Conferences, workshops, and continuing education were rated lower than formal educational experiences (see Table 29). College experiences were rated the highest with 62.7 percent rating those experiences as very good and 28.9 percent rated college as good. Continuing education was rated very good by 16.2 percent, workshops by 19.1 percent, and conferences by 22.3 percent. High school and elementary educational experiences were considered good or very good by approximately 84.0 percent of executives.

Table 29. Rating of executives' educational experiences

Area of experience	Rating--percentage of responses Poor	Fair	Good	Very good	Mean
Elementary School--N=106	0.9%	11.0%	37.6%	47.7%	3.358
High School--N=104	0	11.5	36.5	47.1	3.374
College--N=87	2.4	6.0	28.9	62.7	3.518
Conferences--N=100	4.3	27.7	45.7	22.3	2.869
Workshops--N=98	8.5	23.4	48.9	19.1	2.787
Other Continuing Education--N=72	10.3	26.5	47.1	16.2	2.691

Poor=1; Fair=2; Good=3; Very Good=4

Executive ratings of today's educational systems were positive with college, particularly in four-year colleges rating the highest (see Table 30). Continuing education systems again received lower ratings than more formal providers of educational experiences. Notable, however, was the overall lowering of the very good ratings for all providers.

Table 30. Ratings of today's educational system

Provider	Rating--percentage of response Poor	Fair	Good	Very good	Mean
Elementary School	2.9%	23.3%	50.5%	19.5%	2.899
High School	6.8	27.2	44.7	17.5	2.758
Community College	7.4	22.3	43.6	26.6	2.894
College	2.1	7.4	56.8	33.7	3.221
Conferences	1.1	28.0	59.1	11.8	2.817
Workshops	3.4	32.6	49.4	14.6	2.753

Poor=1; Fair=2; Good=3; Very Good=4

When nontraditional methods of obtaining information were added to the options available for ranking, the executives' strong use of publications became apparent. The business executive frequently used business and technical magazines to obtain information. Meetings with suppliers were also major sources of frequent use in obtaining information, while meetings with educators, television, conferences, and classes were not frequently used to gain new knowledge--approximately one-fourth of the executives never used these sources (see Table 31).

Table 31. Use of materials for gaining knowledge

System	Percentage of executives using Never	Seldom	Occasionally	Often	Mean
Newspaper	11.9%	24.8%	30.3%	31.2%	2.822
Business Magazine	2.8	7.3	32.1	55.0	3.434
Technical Magazine	1.8	10.1	34.9	51.4	3.383
Journals	4.6	27.5	36.7	26.6	2.890
Television	28.4	43.1	20.2	3.7	1.990
Meeting with Educators	27.5	48.6	18.3	0.9	1.923
Meeting with Industries	4.6	16.5	56.0	19.3	2.933
Meeting with Suppliers	3.7	17.4	42.2	33.0	3.086
Workshops	9.2	33.9	45.9	6.4	2.519
Conferences	6.4	30.3	52.3	7.3	2.629
Classes	25.7	45.0	17.4	3.7	1.990

Never=1; Seldom=2; Occasionally=3; Often=4

The infrequent use of educators was not the result of a perception that academic institutions were not valuable for learning new skills and knowledge. Executives rated educational institutions and conferences-workshops as good in such development (see Table 32).

Table 32. Rating for learning skills and knowledge

	Poor	Fair	Good	Very good	Mean
Elementary School	8.5	36.2	39.4	16.0	2.628
High School	6.4	37.2	42.6	13.8	2.638
College	1.0	12.2	62.6	24.5	3.102
Conferences	2.1	25.0	50.0	22.9	2.993
Workshops	4.1	29.6	46.9	19.4	2.816
Other Continuing Education	6.4	30.8	51.3	11.5	2.679

Poor=1; Fair=2; Good=3; Very Good=4

There is often a presumption that problems exist in obtaining information about continuing education opportunities. A question regarding how executives obtain information in educational programs did provide some valuable insights for educators (see Table 33). It is evident that direct mail was the most commonly used method to obtain information on opportunities in education, as 76.0 percent of the executives responded that they frequently received educational materials in the mail.

Table 33. Obtaining information on continuing education

	Never	Seldom	Occasionally	Often	Mean
Mail	0	6.7	17.1	76.0	3.695
Meetings	5.8	32.0	48.5	13.6	2.699
Friends	14.6	40.8	41.7	2.9	2.330
Request Programs	13.1	49.5	36.4	1.0	2.253

Never=1; Seldom=2; Occasionally=3; Often=4

Research Questions

Question 1. Are manufacturing executives' attitudes toward continuing education related to their prior experiences in education?

The hypothesis for this research question is that there is no statistical relationship between manufacturing executives' attitudinal ratings of their prior experiences in education and their current attitudes toward continuing education.

Pearson Correlation Coefficients were calculated and the hypothesis could not be rejected at 0.05 level of significance based upon the measures of relationships between the prior educational experiences and measures of the ratios of continuing educational opportunities provided by associations, suppliers, consultants, and government (see Table 34). The hypothesis was, however, rejected in the individual correlation of prior educational experiences while attending universities and community colleges to ratings of continuing education by the institutions. Executives rated their experiences at universities and community colleges significantly higher than their experiences in the continuing education programs that were provided by those institutions. The statistical relationship, however, was not practically significant due to the small correlation coefficient.

The scores were placed into two equal sized dichotomous groups based upon scores in order to determine whether the two groups were independent on their ratings of the value of continuing education by

Table 34. Pearson Correlation Coefficients between executives' ratings of continuing education and ratings of prior experiences in education

Prior experiences in education	Associations	Suppliers	Universities	Community colleges	Government	Consultants
Correlation	0.1414	0.1073	0.1768	0.3319	0.1284	-0.446
Cases	109.0	109.0	109.0	109.0	109.0	109.0
Significance	P=0.071	P=0.133	P=0.033	P=0.000	P=0.092	P=0.323

Poor=1; Fair=2; Good=3; Very Good=4

individual education providers (see Table 35). The hypothesis could not be rejected, although one of the educational providers, consultants, had a significant chi-square.

Executives rated consultants slightly higher as providers of continuing education than they did prior experiences in school. Once again, however, the results explained only a small percentage of the variation and, therefore, had little practical significance.

Additional Pearson Correlation Coefficient tests for relationships were made between prior experiences in education and executives' attitudes toward the current educational systems (see Table 36). The hypothesis that prior experiences had no relationship to current attitudes toward education was retained. The rating of current educational systems were, however, significantly different for two of the six measures. Executives rated their own educational experiences in elementary school and college higher than they rated these systems today (see Tables 35 and 36).

Question 2. Are manufacturing executives' levels of participation in continuing education activities directly related to their level of educational achievement?

The hypothesis that there was no relationship between the executives level of educational accomplishment as measured in years of school and of the level of participation in continuing education could not be rejected at the 0.05 level of significance (see Table 37).

Table 35. Chi-square test of independence between ratings of continuing education with ratings of prior experiences in school

Prior experiences of group	Associations	Suppliers	Universities	Community colleges	Government	Consultants
Significance	0.0732	0.1855	0.4024	0.1211	0.0807	0.0099
Chi-square	8.55825	6.18811	4.02671	7.29438	6.74033	13.29574

Poor=1; Fair=2; Good=3; Very Good=4

Table 36. Pearson Correlation Coefficients between ratings of current school systems and prior experiences in school

Prior experiences	Elementary	High School	Community colleges	Colleges	Conferences	Workshops
Correlation	0.2495	0.1532	0.3296	0.1709	0.1162	0.1472
Cases	103.0	103.0	94.0	95.0	93.0	89.0
Significance	P=0.006	P=0.061	P=0.001	P=0.49	P=0.134	P=0.084

Poor=1; Fair=2; Good=3; Very Good=4

Pearson Correlation Coefficients were calculated for relationships between educational attainment and the level of participation in continuing education activities. There was no relationship between the education level attained by the executive and the number of continuing education activities attended in the prior year (see Table 37).

Table 37. Pearson Correlation Coefficients between measures of the level participation and the level of education attained

	Education Degree				
Participation level	High school	Technology associate	Bachelor	Masters	No degree
Correlation	0.364	0.0468	0.0362	0.0414	-0.0348
Cases	109.0	109.0	109.0	109.0	109.0
Significance	P=0.354	P=0.314	P=0.354	P=0.335	P=0.360

Participation = number of continuing education events attended in prior year

Efforts to utilize chi-square by dividing the executives into the two groups, based upon level of participation in continuing education programs, resulted in the rejection of the hypothesis, but the small number of observations in the cells negated these findings. Individuals with a masters degree appeared to attend more continuing education activities, but the number of observations were considered too small for inference to the population. Only six executives had masters degrees and five of them attended more than three continuing education activities during the prior year.

Question 3. Are manufacturing executives' levels of participation in continuing education directly related to the perceived relevance of education?

The basic hypothesis is that there is no relationship between the level of participation in continuing education and the executives' perceptions of the relevance of the education. The hypothesis could not be rejected using Pearson Correlation Coefficients (see Table 38) or the chi-square test of independence when total scores of participation levels were used or when the participation was divided into two equal groups based on those attending three or fewer activities and those attending more than three continuing education activities. The small frequencies occurring in several cells negated any meaningful interpretation of the chi-square test (see Table 39).

Table 38. Pearson Correlation Coefficients between measures of the relevance of continuing education and the level of participation in continuing education

Participation level		Participation level between groups	
Correlation	0.0671	Correlation	0.0328
Cases	109.0	Cases	109.0
Significance	P=0.244	Significance	P=0.036

Not Important=1; Somewhat Important=2; Very Important=3

Table 39. Frequency distribution of measures of the relevance of education with participation level in continuing education events

	Relevance to education		
Participation	Not important	Somewhat important	Very important
< 3 events	1.0	2.0	50.0
> 3 events		3.0	50.0

Question 4. Is the level of the manufacturing executives' participation in continuing education directly related to the rate of change in their industry?

The hypothesis is that there is no relationship between the level of participation in continuing education and the rate of change in the industry.

Statistical tests were conducted to determine whether the hypothesis could be rejected on the factors measuring the companies' level of technology, rate of change experienced in the company as compared to its competitors, rate of change in the industry compared to other industries, the executives' willingness to accept change, and the percent of sales coming from products developed in the past 10 years.

The hypothesis was statistically rejected using the Pearson Correlation Coefficients at the 0.05 level when three measures of the companies' level of technology were related to the level of participation in continuing education based upon attending more than three events. The small correlation coefficients, however, indicated

that the correlations had very little practical significance of the companies technology and participation in continuing education events (see Table 40). Where the technology level was above average, executives appeared to attend more continuing education activities.

The hypothesis could not be rejected based upon the executives' willingness to accept change or the percentage of sales coming from products developed in the past 10 years.

Table 40. Pearson Correlation Coefficients between measures of willingness to accept ideas, percentage of sales from new products, levels of technology in company and industry and the level of participation in continuing education

Participation	Accept[a] ideas	New products	Company[b] technology	Industry technology	Overall technology
Participation < 3 events					
Correlation	0.0016	-0.2161	0.1567	0.1815	0.0049
Cases	109.0	101.0	109.0	109.0	109.0
Significance	P=0.493	P=0.015	P=0.052	P=0.029	P=0.480
Participation > 3 events					
Correlation	0.0453	-0.1581	0.1769	0.2041	0.1718
Cases	109.0	101.0	109.0	109.0	109.0
Significance	P=0.320	P=0.057	P=0.033	P=0.017	P=0.037

[a]Accept ideas; Late=1; Wait for Proof=2; Growth Stage=3; Early Adopter=4; Developer=5.

[b]Technology; Poor=1; Fair=2; Good=3; Very Good=4.

Executives generally perceive themselves as adopters of new ideas, but this perception bares no relationship to their attendance in continuing education programs. Developers of new products appeared to

attend fewer continuing education activities than other executives. However, corporate executives who rated their companies' technology as good, very good, or advanced attended more continuing education activities.

Question 5. Is the continuing education participation level of the manufacturing executive directly related to the skills required in the organization?

The hypothesis that there is no relationship between skill levels required by the organization and participation rates was rejected at the 0.05 percent level of significance (see Table 41). Pearson Correlation Coefficients were calculated to determine the degree of relationship between several factors and the level of participation in continuing education of the executive during the prior year. The factors examined were the importance of upgrading employee skills, ratings of the companies' management systems, skill levels of manufacturing employees, skill levels of management skills, and skill levels of other employees. Those factors were ranked by company executives in comparison to competitors and other industries.

The frequencies obtained on the factor of the importance of upgrading employee skills provided some insight into the research question. Executives surprisingly indicated that upgrading employee skills was not very important to the organization. Only 2.8 percent of

Table 41. Frequency counts of the importance of continually upgrading employee skills

Importance	N	Percent
Very important	3	2.8%
Quite important	19	17.4
Important	29	26.6
Somewhat important	27	24.8
Not important	29	26.6
	89	98.2%

the executives considered upgrading employee skills as very important, while 26.6 percent stated upgrading employee skills was not important. The hypothesis that there was no relationship between the necessity of upgrading skills and participation in continuing education was rejected at the 0.01 level (See Table 42).

Table 42. Pearson Correlation Coefficients between the measures of the importance of upgrading skills with the level of participation in continuing education

Participation < 3 events	
Correlation	0.3475
Cases	109.0
Significance	P=0.000
Participation > 3 events	
Correlation	0.3119
Cases	109.0
Significance	P=0.009

Very Important=1; Quite Important=2; Important=3; Somewhat Important=4; Not Important=5

The hypothesis was also rejected at the 0.01 level based upon Pearson Correlation Coefficients calculated between the participation in more than three continuing education events and the skill levels of the manufacturing employees, skill levels of management and the management system (see Table 43). The small correlation coefficient, however, indicated that these factors explained a very small percentage of the variations.

Table 43. Pearson Correlation Coefficients between the measures of the skill levels of company and level of participation in continuing education

	Management system	Skill manufacturing employment	Other employment	Skill management
Total participation	0.1543 109.0 P=0.055	0.0198 109.0 P=0.409	0.0270 109.0 P=0.390	0.2027 109.0 P=0.017
Participation > 3 events	0.2568 109.0 P=0.004	0.2834 109.0 P=0.001	0.1507 109.0 P=0.059	0.2535 109.0 P=0.004

Poor=1; Fair=2; Good=3; Very Good=4

Executives attending more than three continuing education activities in the past year appeared to rate the skill levels of manufacturing management employees, and others in their company higher than do the executives attending fewer than three educational events--factors of management system, other employee skills, and management skills reveal no significant relationship to participation. Chi-square

computations for the relationships between the measure of the level of participation in continuing education and the level of skill in the company were significant, but the large number of empty cells or cells with fewer than 5 observations negated the significance of these findings.

The executives' perceptions of skills were measured comparing the firm's industry with other industries. A similar pattern of significant relationships to management systems and the skills of management, other employees, and manufacturing employees were calculated by using Pearson Correlation Coefficients (see Table 44). Executives attending more than three continuing education events rated the skills of their industry higher than those attending three or fewer events.

Chi-square tests on the level of independence between the measures of the skill levels in the industry and participation rates resulted in numerous cells with less than five observations. The chi-square was, therefore, unusable for statistical analysis purposes. The display of data did, however, reveal a tendency for management giving highest ratings to the manufacturing and management skills of their companies to attend more continuing education events (see Tables 45 and 46).

Question 6. Are manufacturing executives' attitudes toward education directly related to their perceptions of the relevance of education?

The hypothesis that no significant differences in relationship exist between the relevance of continuing education and attitudes toward

Table 44. Pearson Correlation Coefficients between measures of the industry compared to other industries and participation in continuing education

Continuing education	Industry rating of skill level: Management system	Manufacturing employees	Other employees	Management skill
Participation				
Correlation	0.2336	0.1042	0.1928	0.1136
Cases	109.0	109.0	109.0	109.0
Significance	P=0.007	P=0.41	P=0.027	P=0.120
Participation in > 3 events				
Correlation	0.109	0.1781	0.2218	0.1748
Cases	109.0	109.0	109.0	109.0
Significance	P=0.129	P=0.032	P=0.010	P=0.035

Poor=1; Fair=2; Good=3; Very Good=4

Table 45. Frequency distribution of the skill level of the industry compared to other industries and the level of participation in continuing education

Continuing education participation	Rating of skills of employees in industry: Poor	Fair	Good	Very good
< 3 events	1.0	20.0	29.0	3.0
> 3 events	1.0	7.0	41.0	4.0

Poor=1; Fair=2; Good=3; Very good=4

Table 46. Industry/skill of management with participation in continuing education

Continuing education participation	Poor	Fair	Good	Very good
< 3 events		18.0	31.0	3.0
> 3 events	1.0	9.0	36.0	7.0

Poor=1; Fair=2; Good=3; Very Good=4

education could not be rejected. There were no significant difference based upon rating of today's education and rating of education for learning new skills or knowledge with the importance of relevance to business (see Tables 47 and 48).

While there was not an overall significant difference in the executives' attitudes toward today's educational systems and their attitudes toward education as a means for learning new skills and knowledge, the examination of relationships between the ratings of today's educational systems and the rating of education for learning new skills and knowledge revealed several significant findings. Pearson Correlation Coefficients for the ratings are listed in Table 49.

Pearson Correlation Coefficients revealed significant chi-square relationships at the 0.05 and 0.01 levels. High schools, conferences, and workshops were rated somewhat lower than were the other components of today's educational system, i.e., elementary schools, community colleges, and colleges. It is also important to note, however, that

Table 47. Pearson Correlation Coefficients of measures rating today's education and the relevance of the topic to business needs

Relevance to business	Rating of education systems					
	Elementary	High School	Colleges	Community colleges	Conferences	Workshops
Correlation	0.0237	-0.0950	-0.1090	0.0684	-0.0464	-0.0593
Cases	103.0	103.0	0.94	0.95	0.93	0.89
Significance	P=0.406	P=0.170	P=0.148	P=0.255	P=0.330	P=0.290

Poor=1; Fair=2; Good=3; Very Good=4

Table 48. Pearson Correlation Coefficients of the ratings of today's education systems and the value of the educational system for learning of skills

Learning of skills	Rating of education systems					
	Elementary	High School	Colleges	Conferences	Workshops	Continuing education
Correlation	-0.0037	-0.0040	0.0401	0.0898	0.0498	0.1740
Cases	0.94	0.94	0.98	0.96	0.98	0.78
Significance	P=0.486	P=0.485	P=0.347	P=0.192	P=0.313	P=0.064

Poor=1; Fair=2; Good=3; Very Good=4

Table 49. Pearson Correlation Coefficients of measure of attitudes toward education and the ability to acquire skills in the education setting

Ratings for skills and knowledge		Ratings of today's education systems					
		Elementary	High School	Community colleges	Colleges	Conferences	Workshops
Elementary	Correlation	0.2136	0.2316	0.1528	0.0502	0.1213	0.2150
	Cases	90.0	91.0	85.0	86.0	85.0	81.0
	Significance	P=0.022	P=0.014	P=0.81	P=0.323	P=0.134	P=0.027
High school	Correlation	0.3284	0.3839	0.3125	0.1414	0.2265	0.1837
	Cases	90.0	90.0	84.0	86.0	85.0	81.0
	Significance	P=0.001	P=0.001	P=0.002	P=0.097	P=0.019	P=0.050
Colleges	Correlation	0.2515	0.2768	0.1787	0.3619	0.0478	0.0714
	Cases	94.0	94.0	87.0	89.0	88.0	84.0
	Significance	P=0.007	P=0.003	P=0.049	P=0.000	P=0.329	P=0.259
Conferences	Correlation	0.1623	0.1769	0.2342	0.2897	0.6232	0.4130
	Cases	91.0	91.0	85.0	86.0	87.0	84.0
	Significance	P=0.067	P=0.047	P=0.015	P=0.003	P=0.000	P=0.000
Workshops	Correlation	0.1431	0.1775	0.2502	0.2737	0.5052	0.6943
	Cases	93.0	93.0	87.0	88.0	89.0	86.0
	Significance	P=0.086	P=0.044	P=0.010	P=0.005	P=0.000	P=0.000

Poor=1; Fair=2; Good=3; Very Good=4

little emphasis can be given to these statistical findings due to the small correlation scores.

Workshops, colleges, and conferences were the most consistent in obtaining significant scores in the tests for relationships between the rating of today's educational systems and those systems in acquiring new skills and knowledge. Colleges rated higher among more executives for acquiring skills and knowledge than would have been expected based upon the ratings of today's college systems. Workshops were generally rated lower for acquiring skills and knowledge than would have been expected except for those rating today's college systems. Executives rated conferences and workshops better for acquiring new skills and knowledge than their overall rating of conferences and workshops in today's educational system.

Tests of the independence between scores of attitudes toward education and the importance of relevance in continuing education revealed no significant difference between those with favorable or less favorable attitudes toward their educational experiences. Ninety-one (91.7%) of the executives felt that relevance of the topic to business was a very important factor and only 5.4 percent believed it was unimportant or somewhat important. The relevance of the topic did not explain the level of attendance as 89.3 percent of the executives attending three or fewer events reported relevance as very important and 94.3 percent of the executives attending more than three continuing education events reported relevance as very important (see Table 50).

Table 50. Frequency and percentages of executives reporting the importance of relevance to participation in continuing education events

Participation in continuing education	Relevance of topic		
	Not important	Somewhat important	Very important
< 3 events	1.0	4.0	50.0
	1.8	7.1	89.3
> 3 events		1.0	50.0
		1.9	94.3
	1.0	5.5	91.7

Question 7. Are manufacturing executives' participation levels in continuing education activities related to cost and distance factors?

The hypothesis is that no relationship exists between the registration cost and the level of participation in continuing education. This hypothesis cannot be rejected based upon Pearson Correlation Coefficients or in tests of independence (see Tables 51 and 52).

A test of independence could not reject the hypothesis when travel time and its related costs were compared with the attendance at continuing education events. The travel costs and time away from business were not significant determinants of the level of participation in continuing education activities (see Tables 53 and 54).

Table 51. Pearson Correlation Cofficients between the measures of the relationship of participation levels with the costs and time of attending the event

Preparation		Cost of Program	Travel Time and Cost
< 3 events	Correlation	0.1183	-0.0794
	Cases	109.0	109.0
	Significance	P=0.110	P=0.206
> 3 events	Correlation	0.0191	-0.0101
	Cases	109.0	109.0
	Significance	P=0.422	P=0.459

Not Important=1; Somewhat Important=2; Very Important=3

Table 52. Frequencies of response on the measures of the cost of continuing education program and the level of participation

	Cost of program		
Continuing education participation	Not important	Somewhat important	Very important
< 3 events	7.0	35.0	10.0
> 3 events	6.0	34.0	10.0

Not Important=1; Somewhat Important=2; Very Important=3

Table 53. Frequency counts based upon executives response to the importance of travel time, cost, and participation in continuing education

Participation	Not important	Somewhat important	Very important
< 3 events	6.0	24.0	23.0
> 3 events	4.0	28.0	20.0

Not Important=1; Somewhat Important=2; Very Important=3

Table 54. Frequency counts of executives response to the importance of time away from business and participation in continuing education

Continuing education participation	Not important	Somewhat important	Very important
< 3 events	4.0	13.0	36.0
> 3 events	4.0	22.0	26.0

Not Important=1; Somewhat Important=2; Very Important=3

Question 8. Are manufacturing executives' interests in education related to short term goals?

The hypothesis is that no relationship exists between executives' interests in education and short term goals. The executives attendance at continuing education events was compared to the importance of immediate use of the information gained in continuing education. The hypothesis was not rejected based upon the calculation of Pearson Correlation Coefficients (see Table 55). The level of attendance in continuing education is not related to the immediate use of the

information. The importance of long term use of the information was significant at 0.05, but the small correlation coefficient indicated that this factor is not of practical value.

Table 55. Pearson Correlation Coefficients based upon the measures of the immediacy of the use of information and participation in continuing education

Participation		Immediate use	Long term use
Total N	Correlation	-0.0281	0.2218
	Cases	109.0	109.0
	Significance	P=0.386	P=0.010
> 3 events	Correlation	-0.0766	0.1714
	Cases	109.0	109.0
	Significance	P=0.214	P=0.035

Not Important=1; Somewhat Important=2; Very Important=3

A chi-square test of independence, calculated using the measures of the level of participation in continuing education activities, indicated that significant differences did not occur nor could they explain the level of attendance in continuing education using the measure of the immediacy of use of the information. The examination of the data did reveal, however, that executives favored the information gained in continuing education for its long term impacts (see Tables 56 and 57). Executives reported that long term use of information was important. The number of missing cells or those with fewer than 5 observations negated any statistical analyses. While long term and immediate use of the information were important to attendance in

continuing education, they did not determine the number of programs attended.

Table 56. Frequency counts of executives responses to the importance of immediate use of information and participation in continuing education

Continuing education participation	Not important	Somewhat important	Very important
< 3 events	3.0	24.0	26.0
> 3 events	4.0	27.0	22.0

Table 57. Frequency counts of the executives response to the importance of the long term use information and participation in continuing education

Continuing education participation	Not important	Somewhat important	Very important
< 3 events	2.0	25.0	26.0
> 3 events		19.0	34.0

Question 9. Are manufacturing executives' attitudes toward education directly related to incentives offered by the company?

The hypothesis is that there is no relationship between executives' attitudes toward education and the incentives offered by the company to participate in continuing education. There were no significant relationships between the number and type of incentives offered by the company and the executives' attitudes toward education. The individual incentives offered by the company, such as tuition, books, travel, time off, and classes in the plant were not significantly

related to the attitudes. The only significant relationships, using Pearson Correlation Coeffients, were related to participation in education and the time allowed off and classes in the plant using both total ratings and the executives divided into two equal sized groups based upon rating levels (see Table 58). Although only 25.7 percent of the companies provided time off, it was interesting that none of the executive group that had lower ratings for their education experiences were in companies that offered the incentive of providing time off for participating in education.

Measures of participation in continuing education did, however, have interesting relationships to the incentives offered by the company and the executives' rating of their companies' educational programs. When the executives were divided into two equal groups based upon their ratings of their company incentives the executives that rated their companies' educational programs as poor attended fewer continuing education programs, but these results were not statistically significant using the chi-square test of independents (see Tables 59, 60, 61, 62, and 63).

Where incentives were offered, executives were likely to attend at least one continuing education event. Travel and tuition were the most significant incentives offered by the company (see Table 64).

Table 58. Pearson Correlation Coefficients based on measures of the importance of incentives and executives attitudes toward their education experiences

Rating of education		Incentives					
		No incentives	Books	Tuition	Travel	Time off	Classes in plant
Total rating	Correlation	-0.0005	0.0032	0.0274	0.0600	-0.1567	0.1842
	Cases	109.0	109.0	109.0	109.0	109.0	109.0
	Significance	P=0.498	P=0.487	P=0.389	P=0.268	P=0.052	P=0.028
Group Differences	Correlation	0.0633	-0.0954	-0.0410	-0.0978	-0.1939	0.0971
	Cases	109.0	109.0	109.0	109.0	109.0	109.0
	Significance	P=0.257	P=0.162	P=0.336	P=0.156	P=0.022	P=0.158

Poor=1; Fair=2; Good=3; Very Good=4

Table 59. Frequency counts of executives responses to the importance of incentive time off and the ratings of prior education experiences

Rating of prior education	No	Yes
Low rating group	37.0	19.0
High rating group	44.0	9.0

Table 60. Frequency counts of executives ratings of their company's employee education programs compared to competitors and participation in continuing education

	Rating of company programs			
Participation	Poor	Fair	Good	Very good
< 3 events	15.0	26.0	9.0	3.0
> 3 events	4.0	24.0	15.0	10.0

Table 61. Frequency counts of executives ratings of their industry's management education programs compared to other industries and participation in continuing education

	Rating of industry educational programs			
Continuing education participation	Poor	Fair	Good	Very good
< 3 events	13.0	27.0	11.0	
> 3 events	4.0	24.0	23.0	2.0

Table 62. Frequency counts of executives ratings of their company's management education programs compared to competitors and participation in continuing education

Participation	Poor	Fair	Good	Very good
< 3 events	12.0	27.0	13.0	1.0
> 3 events	5.0	18.0	21.0	9.0

Table 63. Frequency counts of executives ratings of their industry's employee education programs compared to other industries and participation in continuing education

Participation	Poor	Fair	Good	Very good
< 3 events	16.0	25.0	7.0	3.0
> 3 events	4.0	28.0	18.0	3.0

Classes in the plant were significant in their impact on participation levels in continuing education. Travel and time off are significant incentives for participation in at least one event, but were not determinants to higher levels of participation in continuing education.

Question 10. How do manufacturing executives learn of educational offerings?

Executives rely heavily upon the mail for notification of courses and continuing education events. Frequency counts indicated that 76.2 percent of the executives frequently obtained information on continuing education via the mail. Friends attending other meetings were rated important, but executives do not often seek programs in continuing education (see Tables 65, 66, 67, 68, and 69).

Table 64. Pearson Correlation Coefficients based on the level of participation in continuing education and the individual incentives offered by company

Participation		Incentives				
		Books	Tuition	Travel	Time off	Classes
≥ 3 events	Correlation	0.1437	0.1438	0.1102	0.0861	0.1619
	Cases	109.0	109.0	109.0	109.0	109.0
	Significance	P=0.068	P=0.068	P=0.127	P=0.189	P=0.046
< 3 events	Correlation	0.1357	0.2592	0.1364	-0.0258	0.1733
	Cases	109.0	109.0	109.0	109.0	109.0
	Significance	P=0.080	P=0.003	P=0.079	P=0.395	P=0.036
≥ 1 event	Correlation	0.1478	0.3448	0.3329	0.1702	0.2626
	Cases	109.0	109.0	109.0	109.0	109.0
	Significance	P=0.062	P=0.000	P=0.000	P=0.038	P=0.003

Seldom=1; Occasionally=2; Often=3

Table 65. Percentages--methods by which executives became aware of continuing education events

Method	Percent			
	Never	Seldom	Occasionally	Other
Mail		6.7%	17.5%	76.2%
Meetings	5.8%	32.0	48.5	13.6
Friends	14.6	40.8	41.7	2.9
Actively	13.1	49.5	36.4	1.0

Table 66. Method of notification with participation level in continuing education

Participation		Mail	Meetings	Friends	Seek programs
> 3 events	Correlation	0.1572	0.2021	0.1156	0.1142
	Number	105.0	103.0	103.0	99.0
	Significance	P=0.050	P=0.020	P=0.122	P=0.130

Table 67. Frequency counts of executives receiving notification by mail and the levels of participation in continuing education

Participation	Seldom	Occasionally	Often
< 3 events	4.0	13.0	36.0
> 3 events	3.0	5.0	44.0

Table 68. Frequency counts of executives receiving information on continuing education at meetings and the level of participation in continuing education

Participation	Never	Seldom	Occasionally	Often
< 3 events	5.0	20.0	22.0	6.0
> 3 events	1.0	13.0	28.0	8.0

Table 69. Frequency counts of executives receiving information on continuing education from friends and the level of participation in continuing education

Participation	Never	Seldom	Occasionally	Often
< 3 events	9.0	24.0	18.0	2.0
> 3 events	6.0	18.0	25.0	1.0

Pearson Correlation Coefficients tests of the data indicated significant relationships between participation and the methods by which executives become aware of continuing education events. The use of friends and individual efforts for finding information on continuing education programs had no significant relationships with participation, but receiving information at meetings and by mail, were significant.

Major Research Question

Are manufacturing executives' attitudes toward education signficantly and directly related to their participation in learning activities?

The use of Pearson Correlation Coefficients indicated several significant relationships when utilizing the factors of participation in continuing education activities and attitudes--attitudes toward prior education, attitudes toward the providers of continuing education attitudes toward existing educational systems, and attitudes toward educational systems in acquiring new skills and knowledge (see Table 70).

Table 70. Pearson Correlation Coefficients between level of participation in continuing education based on attitudes and ratings of the providers of education

		Attitudes toward providers of education					
		Elementary	High school	Colleges	Conferences	Workshops	Continuing education
Prior education							
≤ 3 events	Correlation	-0.1228	-0.0289	0.0607	0.1965	0.2093	0.1604
	Significance	P=0.102	P=0.385	P=0.278	P=0.022	P=0.016	P=0.056
> 3 events	Correlation	-0.1113	-0.0839	0.2099	0.2395	0.2895	0.1994
	Significance	P=0.125	P=0.198	P=0.020	P=0.007	P=0.001	P=0.024
Today's education							
≤ 3 events	Correlation	-0.0214	-0.0101	0.0735	0.0291	0.1434	0.1742
	Significance	P=0.415	P=0.460	P=0.241	P=0.390	P=0.085	P=0.051
> 3 events	Correlation	0.1023	0.1107	0.0674	0.1384	0.1399	0.2095
	Significance	P=0.152	P=0.133	P=0.259	P=0.091	P=0.091	P=0.024
Knowledge and Skill							
≤ 3 events	Correlation	0.0420	0.0342	0.0025	0.2728	0.2127	0.2018
	Significance	P=0.344	P=0.0372	P=0.440	P=0.004	P=0.018	P=0.038
> 3 events	Correlation	0.1441	0.1677	0.0357	0.3886	0.3631	0.2641
	Significance	P=0.083	P=0.053	P=0.364	P=0.000	P=0.000	P=0.010

Poor=1; Fair=2; Good=3; Very Good=4

Attitudes toward prior education, the acquisition of skills, and today's educational system differed significantly from participation in workshops, conferences, and other continuing education activities (see Table 71).

The examination of the data using chi-square tests of independents indicated, however, that only two significant relationships existed--those between attendance at workshops and continuing education and attitudes toward prior educational experiences. The number of empty cells, or cells with fewer than 5 observations, negated any tests for significance, but individuals with higher ratings of workshops and continuing education tended to participate in more events (see Tables 72 and 73).

In chi-square tests of independence based upon the levels of participation in continuing education with their ratings of workshops and conferences for acquiring knowledge and skills revealed interesting results. Individuals attending more than three continuing education activities per year appeared to rate workshops and conferences better for acquiring new skills and knowledge than those attending 3 or fewer continuing education events. The low number of observations in some cells prevented accurate tests for statistical significance and, therefore, those results could not be inferred to the population (see Tables 74 and 75).

Table 71. Pearson Correlation Coefficients between the measures of attitudes toward providers of continuing education and the level of participation in continuing education

Participation		Associations	Suppliers	Universities	Community colleges	Consultants	Government
≤ 3 events	Correlation	-0.0209	-0.1515	-0.1472	-0.1102	0.0980	0.1495
	Significance	P=0.415	P=0.058	P=0.063	P=0.127	P=0.155	P=0.060
> 3 events	Correlation	0.1268	-0.0833	-0.0034	0.1167	-0.0209	0.1270
	Significance	P=0.094	P=0.195	P=0.486	P=0.113	P=0.415	P=0.094

Poor=1; Fair=2; Good=3; Very Good=4

Other tests of relationships and independents of ratings of attitudes with participation levels were not significant.

Table 72. Frequency counts of executives ratings of conferences with participation in continuing education

	Rating of Conferences			
Participation	Poor	Fair	Good	Very good
< 3 events	3.0	17.0	19.0	7.0
> 3 events	1.0	9.0	24.0	14.0

Table 73. Frequency counts of executives ratings of workshops with participation in continuing education

Participation	Poor	Fair	Good	Very good
< 3 events	6.0	15.0	20.0	5.0
> 3 events	2.0	7.0	26.0	13.0

Table 74. Frequency counts of executives ratings of conferences for acquiring new skills and knowledge and participation in continuing education

Participation	Poor	Fair	Good	Very Good
< 3 events	2.0	18.0	24.0	5.0
> 3 events		6.0	24.0	17.0

Table 75. Frequency counts of executives ratings of workshops for acquiring new skills and knowledge with participation in continuing education

Participation	Poor	Fair	Good	Very good
< 3 events	4.0	22.0	16.0	7.0
> 3 events		7.0	30.0	12.0

The chi-square tests of the indpendence for measures of participation level and attitudes toward today's educational systems were not significant. Executives generally rated educational systems rather well. The examinations of relationships between the providers of continuing education and the level of participation in continuing education did provide one interesting sidelight. Individuals attending three or more programs tended to rate government higher as a provider of continuing education than those attending fewer than three programs (see Table 76). Government, however, was rated very poor as an overall provider of education by the manufacturing executives.

Table 76. Frequency counts of executives ratings of government as a provider of continuing education with the level of participation in continuing education

Participation	Poor	Fair	Good
< 3 events	39.0	9.0	5.0
> 3 events	26.0	22.0	2.0

There were no significant findings based upon the frequency of the use of newspapers, business magazines, technical magazines, journals,

television, meetings with educators, meetings with suppliers, or meetings with industry as factors in determining the level of participating in continuing education.

Subsidiary findings

Pearson Correlation Coefficients indicated that several other factors were significantly correlated to the level of participation. Chi-square tests of independence were completed on these factors and several continued to be significantly related to the level of participation in continuing education activity, but the numerous empty, or low observation cells, negated use of those findings.

The division of manufacturing executives into two groups, those not attending any continuing educational programs, and those who attended one or more conferences, workshops, classes, or other programs, unfolded several interesting relationships. The number of individuals not attending continuing education activities did, however, present problems as many cells had fewer representations than necessary for adequate interpretation. The Pearson Correlation Coefficients of significance are listed in Table 77. The executives not attending any continuing education activities appeared to have fewer incentives for attending and smaller markets.

Table 77. Pearson Correlation Coefficients between executives not participating in continuing education and those participating based on selected factors for the company

Factor	Significance	Correlation coefficient
Geographic Market - Local	0.008	0.2316
Geographic Market - State	0.014	0.2108
Geographic Market - Regional	0.016	0.2055
Company Products	0.045	0.1627
Fringe Benefits for Employees	0.019	0.1999
Educational Programs for Employees	0.005	0.2473
Educational Programs for Management	0.017	0.2040
Importance of Upgrading Skills	0.014	0.2104
No Educational Incentives	0.000	0.4062
Tuition Reimbursement	0.000	0.3448
Travel Pay for Education	0.000	0.3329
Time Off for Education	0.038	0.1709
Classes in Plant	0.003	0.2626
Course Relevance to Business	0.005	0.2437

Poor=1; Fair=2; Good=3; Very Good=4

Finding: Executives are responsible for education programs

Sixty-four percent of the chief executives indicated that they made the decision on what educational programs would be available in their company. The personnel manager was involved only 14.7 percent of the time and other individuals made the decisions in 21.0 percent of the firms. Incentives for education were offered to employees by all of the firms, but were largely limited to tuition reimbursement (60.6%).

Finding: The manufacturing executives' interests in academic topics in continuing education are of low priority Approximately ninety percent of the executives did not participate in credit (91.7%),

or noncredit classes (87.2%) during the past year--nor did they intend to attend classes during the next year. They did attend conferences (69.7%), seminars (62.4%), and workshops (41.3%)--and this pattern was likely to continue. Educational programs offered to employees and management consistantly ranked lower in priority than other factors such as technology and products.

Finding: Upgrading skill levels of employees was a low priority The executives generally rated the importance of upgrading employee skill levels quite low--26.6 percent considering the upgrading of skills unimportant, 24.8 percent somewhat important, 26.6 percent important, 17.4 percent quite important, and only 2.8 percent as very important.

Finding: Personal contacts are the preferred methods to acquire new knowledge and skills Manufacturing executives suggested that while most delivery methods, such as conferences, workshops, personal reading, classes, and independent study as acceptable, the preferred delivery method was by personal contacts (53.8%), followed in order by reading (37.6%), workshops (33.9%) and conferences (31.2%). Television was the lowest rated delivery method.

Finding: Associations and higher education institutions are the highest rated providers of continuing education Associations and universities have the highest rating among the providers of continuing education programs while government agencies rated the lowest by a wide margin. Government agencies were rated poor by 59.6 percent of the executives, while universities and associations were rated good or very

good as providers by 62.3 percent of the executives. Importantly, however, none of the listed providers received a "very good" rating by more than 18.0 percent of the executives.

Finding: Reading is the most used method of acquiring information, knowledge, and skills Executives utilized a variety of methods to acquire knowledge, but business magazines and technical magazines were the most often used. Meetings with suppliers and the reading of newspapers rated high as methods of acquiring information. Meetings with educators, television, classes, workshops, and conferences, were used infrequently, if ever.

Finding: Formal education ranks high as a method to acquire knowledge and skills Although infrequently used as a source of information after graduation, schools and conferences rated well as means of acquiring new knowledge. Colleges were rated good or very good for acquiring knowledge and skills by 87.1 percent of the executives, while conferences were rated good or very good by 72.9 percent of the executives.

Finding: Executives rate their company's technology, processes, management system, and competitive ability very well in relationship to their industry, although they rated them lower when compared to other industries Their company's educational programs for employees and management were consistently ranked lower than their competitors or other industries. Their educational programs ranked only fair compared to their competitors.

Finding: Direct mail is the primary method by which executives learn of offerings in educational programs Seventy-six percent of the executives obtained information on educational offerings by the means of direct mail.

Summary

This chapter provided analyses of data that was obtained by mailing a data collection instrument to 200 manufacturing executives in Iowa operations with 51-250 employees. The information from 109 completed instruments was placed in a computer file and analyzed by SPSSX programs. The data presented in this chapter were analyzed using the descriptive statistics of frequency, mean, percentage, and standard deviation. The inferential statistical tests used were Pearson Correlation Coefficient and chi-square. These analyses were addressed to each ten research questions and the major research question.

The findings in this study are drawn from the analyses of data taken from the data collection instruments that were completed by executives in Iowa. The findings are applicable only to the population represented in this study. This population is comprised of manufacturing executives directing operations in independent Iowa companies with employment size of 51-250 employees. Some of the information, insights, and findings may be applicable and interesting to other sectors and users, but that extension of this data should be determined by additional study, analysis, and scrutiny. While the

information and findings represented in this study represent the opinions of manufacturing executives in certain sized firms in Iowa, it should not be inferred to any other group.

This study examined certain aspects of the model formulated by K. Patricia Cross. The Chain of Response Model (COR) indicated that participation in continuing education was dependent upon a variety of factors, constraints, and needs. Among these constraints and incentives were experiences in education and relevance.

This study examined the above factors. The major research question was: Did prior experiences and resulting attitudes toward education influence the level of participation in continuing education. The answer is largely no when the population is manufacturing executives; but there are implications and influences that suggest some equivocation in that response.

Descriptive statistics developed in this study indicate that relevance is critical to attendance or participation in continuing education, even though it does not determine the level of participation in continuing education. It is also interesting that while skills levels and technology are important to companies, but they have little influence upon the level of participation in continuing education.

It is apparent that executives have positive attitudes toward: their experiences in education, the providers of education, and the education systems that deliver knowledge and skills. The executives as successful individuals, have had few unpleasant experiences in education

and they share most attitudes whether or nor they particpate actively in education. They do not differ significantly in their opinions or education, but rather share common goals and ideals.

This study revealed these commonalities, but had difficulty showing differences based on attitudes toward education as related to participation levels in education.

There were no significant differences between executive groups based on: (1) attitudes toward education; (2) the influences of prior experiences in education; (3) participation in continuing education; (4) the importance of the relevance issue in continuing education; (5) the influence of change; (6) the influence of costs; (7) the need for useful information; and (8) the influence of incentives. The differences existed in the influence of upgrading skills within the company, and the method of obtaining information on education programs.

CHAPTER V. CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Introduction

The objectives of this chapter are to present the conclusions that were drawn from the study, discuss the implications of those conclusions, and recommend avenues for future research on the topic. The chapter contains a concise summary of the study's purposes, the methodology employed, the major findings, subsidiary findings, the conclusions, the implication of findings, and the recommendations for further study.

Purposes

The primary purpose of this study was to provide new information and insight on the influence of attitudes upon particpation in continuing education. The major research question examined was whether manufacturing executives' attitudes toward education significantly and directly related to their participation in learning activities. The subsidiary research questions examined the influence of prior experiences with education, level of educational attainment, relevance of education, rate of industrial change, skills required for employment, cost of continuing education, goals, and incentives for learning. The study sought to give the educational provider and theorist with information that would allow for improved continuing education programs for manufacturing executives.

Relevant literature and research findings related to barriers to education, learning theory, adult education, and particpation in continuing education were reviewed. Several significant theories and models were examined and offered guidance to this study. The model that was of particular interest was the Chain of Response (COR) model presented by Patricia Cross (Cross, 1981b, pp. 124-131). This model, using prior work from field force analysis, cognitivism, reference group theory, incongruence, disonance, hierarchical needs, and expectancy was particularly useful in examining attitudinal influences and barriers.

Methodology

The breath of the research questions, plus time and cost limitations required that this study be restricted to a small population. The executive population of Iowa manufacturing companies was selected for study due to executives' influence upon educational incentives that were offered to a larger population, plus the researcher's ability to readily access this group. The population was further limited to executives located in small independent companies in order to provide assurance that the respondent was in control of the operation and made the decisions on education programs. A computer listing of the 3,904 manufacturing companies in Iowa was the source of the executives' names and companies.

A random sample of 200 executives was drawn from the population of 1,204 companies with employments of 51-250 people through the use of a

computerized random sample generator. The sample was examined for accuracy by comparing it with the state manufacturing directory and the knowledge of field staff who were acquainted with the companies and the executives. Errors in the sample were corrected and new companies were added when the company did not meet the established criteria for the study. The final sample contained the 200 names of manufacturing executives.

The decision was made to use a mailed questionnaire to collect data. This decision was made due to time and cost constraints, although it was understood that certain inaccuracies and biases could occur. A data collection instrument was designed by the researcher and this instrument was subsequently examined and moderately altered based upon the recommendations of university experts in statistics and survey methods. The revised draft instrument was then tested through mailings to university experts in industrial assistance programs, members of a university industrial advisory council, and a select mailing to five manufacturers. Minor revisions were made to the data collection instrument as a result of these further examinations.

The mailing of the instruments was preceded with a letter to the 200 executives. The final data collection instrument, with a cover letter, was mailed to 200 executives on February 25, 1986, with follow-up letters and telephone calls made after three weeks. One hundred-thirteen instruments were returned, of which 109 were useable.

The completed instruments were then computer coded, entered, and analyzed using the Statistical Package for the Social Services (SPSS).

Major Findings of the Study

Are manufacturing executives' attitudes toward education significantly and directly related to their participation and learning activities?

There are no significant differences in the relationships between executives attitudes toward experiences in their academic education and their level of participation in continuing education.

There is a significant relationship between participation levels in continuing education and prior experiences in workshop and other continuing education programs.

There are no significant relationships between executive's general attitudes toward education and participation in continuing education.

Are manufacturing executives' attitudes toward continuing education related to their prior experiences in education?

The attitudinal measure indicating significance of prior educational experiences to attitudes toward continuing education was directed at prior experiences in continuing education such as workshops, conferences, classes, seminars and government sponsorship. Experiences in elementary, high school, and college revealed no significant differences in relationship when compared to education sponsorship of programs. Government was the only provider of education that was not

desired as a sponsor by executives. This fact was particularly strong with executives attending fewer than three continuing educatien programs.

Are the manufacturing executives level of participation in continuing education activities directly related to their level of educational attainment?

There is no significant difference in relationships between the level of educational attainment of manufacturing executives and the level of participation in continuing education.

Are the manufacturing executives' levels of participation in continuing education directly related to the perceived relevance of educators?

While executives agree that relevance to business is a major factor in deciding whether to attend a conference, workshop, seminar, or class, there is no significant difference in relationships between the level of participation and the factor of relevance. Relevance is critical to any attendance, but individuals who attend fewer than three activities were not differentiated from those high levels of attendance on this factor.

Is the level of manufacturing executives' participation in continuing education directly related to the rate of change in their industry?

The rate of change of the company was compared to their competitors and to other industries, but there were no significant

differences in relationships between the change and level of participation in continuing educational activities. There is, however, a significant relationship between the level of participation and the level of technology in the company (0.0155). Executives in companies with higher levels of technology attend more continuing education events.

Is the continuing education participation level of manufacturing executives directly related to the skills required in the organization?

There are significant differences in relationships between the participation rate of executives and the skill level of employees, importance of upgrading worker skills, and educational programs offered by the company.

The importance of upgrading the skills of workers among the executives participating in education opportunities, was however, significantly different depending upon the level of participation. Executives attending programs rated educational programs higher for their companies. The executives attending more programs rated the level of technology in their companies higher. Executives attending continuing education programs surprisingly were less likely to perceive it important that employees upgrade their skills.

Are manufacturing executives attitudes toward education directly related to their perception of the relevance of education?

There is no significant difference between executives attitudes toward education and the relevance of education.

Are manufacturing executives participation levels in continuing education related to cost and distance factors?

Cost of the program, travel time and cost, and time away from business were not differentiated significantly between those attending continuing education activities and those not attending or attending fewer than three events.

Are manufacturing executives' interests related to short term goals?

Executives rate immediate and long term use of materials as vital to their attendance at continuing education programs. However, participation levels were not significantly different based upon long term use of the material or the immediate use of the information.

Are manufacturing executives' attitudes toward learning directly related to the incentives offered by the company?

There were no significant differences in relationships between attitudes toward education and the incentives offered by the companies. The level of participation in continuing education was, however, significantly related to the incentives offered by the company. Incentives were important to attendance in continuing education programs.

How do executives learn of educational offerings?

Executives obtain information on educational opportunities largely by the mail. There were no significant differences between participation levels and the means by which the information was acquired.

Subsidiary Findings

The principal executive in smaller manufacturing operations is responsible for the firm's educational programs. Sixty-four percent of the chief executives indicated that they made the decision on what educational programs would be available in their company. A personnel manager was involved only 14.7 percent of the time while other individuals made the decision in 21.0 percent of the firms. Incentives for education were offered by many of the firms, but were largely limited to tuition reimbursement (60.6%).

The manufacturing executives' interests in academic topics in continuing education were of very low priority. Approximately ninety percent of the executives did not participate in credit (91.7%), or noncredit classes (87.2%) during the prior year, nor did they intend to attend classes during the forthcoming year. They did attend conferences (69.7%), seminars (62.4%), and workshops (41.3%), during the prior year--and this attendance pattern was forecast to continue. Academic credit was considered not important by a surprisingly 83.5 percent of the executives.

In ratings to compare the strength of the company to competitors and the other industries, educational programs offered by companies to their employees and management rank lower in importance than other factors such as technology, products, and processes.

The executives rated the importance of upgrading employee skill levels quite low--26.6 percent considering the upgrading of skills

unimportant, 24.8 percent somewhat important, 26.6 percent important, 17.4 percent quite important, and only 2.8 percent as very important to the company.

Personal contacts were the preferred method to acquire new knowledge and skills. Manufacturing executives consider most delivery methods, such as conferences, workshops, personal reading, classes, and independent study as acceptable, but personal contacts (53.8%) were the most preferred method, followed by reading (37.6%), workshops (33.9%), and conferences (31.2%). Television was rated the lowest as a delivery method.

Associations and institutions of higher education are the highest rated as providers of continuing education. Universities and associations were rated good or very good as providers by 62.3 percent of the executives. Government agencies were rated as poor sponsors of continuing education by 59.6 percent of the executives. None of the providers received "very good" ratings by more than 18.0 percent of the executives.

Reading is the most frequently used method of acquiring information, knowledge, and skills. The executives utilized a variety of methods to acquire knowledge, but business magazines and technical magazines were most common. Meetings with suppliers and newspapers were the next highest rated methods in the frequency of use in acquiring information. Meetings with educators, television, classes, workshops, and conferences were used infrequently.

Formal education ranks high as a method to acquire knowledge and skills. Although infrequently used, educational institutions and conferences were highly rated in acquiring new knowledge. Colleges were rated good or very good by 87.1 percent of the executives and conferences by 72.9 percent of the executives.

Executives rate the educational programs offered by their company lower than competitors or other industries. However, executives rated their companies' technology, processes, management systems, skill levels, and competitive abilities very well in relationship to competitors, but all factors rated lower when compared to other industries. The companies' educational programs for employees and management were consistently ranked lower than their competitors or other industries. Their educational programs ranked fair compared to their competitors.

Direct mail was the primary method by which executives learn of offerings in educational programs. Seventy-six percent of the executives obtained information on educational offerings by the means of direct mail.

Recommendations for Further Research

The following areas of investigation and research should be considered based upon the findings of this study.

1. Research is needed that will compare the findings of this study to the general population.

2. Research is needed toward identifying the specific factors that contribute to favorable or unfavorable experiences in continuing education programs.
3. Research is needed, particularly experimental research, that will show the influences that affect the participation in continuing education for different groups.
4. Research, particularly observation and interviews, is needed to determine what effect that internal culture of the organization has upon individual decisions related to participation in continuing education.
5. Research is needed to further discriminate and identify the factors that affect individual participation in continuing education.
6. Research is needed to determine why executive's ranked education programs lower than the other factors affecting the success of the firm.
7. Conduct analyses of the data obtained in this study using different hypotheses.
8. Research using the data collection instrument should be made to all sizes of manufacturing operations and different geographic regions in order to determine if differences occur based on firm size and geographic area.

CHAPTER VI. SUMMARY

This study sought to examine aspects of the Chain of Response Model presented by Dr. Patricia Cross related to: (1) the effect that attitudes derived from prior experiences in education have upon participation in continuing education; and (2) the importance of relevance and change to participation in continuing education. Subsidiary purposes were related to executives' means of acquiring additional information and other insights that might be used to improve the knowledge base of adult education.

The study was restricted to Iowa, manufacturing, executives, and independently owned firms with fewer than 250 but more than 50 employees. The cost, availability of information, and time, were the reasons for the selection of this population and decision to conduct a descriptive study.

A data collection instrument was designed utilizing expertise from Iowa State University and inputs from manufacturing executives. The instrument was then mailed to 200 manufacturing executives who were randomly selected. A total of 113 instruments (56.5%) were returned, of which 109 (54.5%) were deemed useable for statistical analyses.

The data were transferred to a computer file and analyses conducted using SPSS. One major and ten subsidiary research questions were the basis for the statistical analyses. The statistical analyses included the descriptive statistics of frequency counts, percentage,

mean, standard deviation, maximum, and minimum, plus inferential statistics using Pearson Correlation Coefficients and the chi-square tests.

Descriptive statistics provided valuable information for this and future studies. The executive average age was 48 (47.9) years and they averaged eight years in their current position. Sixty-four percent (64.3%) of the executives had college degrees and only 4.6 percent had not graduated from either high school or college. The executives education majors were largely business and engineering (59.3%) with only 1.9 percent having degrees in education. The executives were also generally satisfied with their level of education and major courses of study. They also identified themselves as growth oriented and early adopters of ideas, with only 7.3 percent identifying themselves as having late adoption tendencies.

The companies appeared well oriented toward the future with 43.6 percent of the average firm's sales coming from products developed during the last ten years. The companies also rated themselves good in level of technology, products, processes, management systems, and skills. Education programs for employees and management were the lowest rated company attributes of the companies. Associated with the low rating of company educational programs was the executive's rating of the importance of upgrading employees skills. The executives did not rate upgrading skills as very important to the company, and that was borne out by relatively frugal incentives for continuing education that were offered by the company.

A large percentage of executives did attend continuing education activities and only 20.0 percent attended no continuing education programs. Credit courses were not attended by 91.7 percent of the executives, nor did they expect to attend credit classes in the next year.

The factors deemed important to attending continuing education networks were long term use, immediate use, time away from work, the speaker, and costs of travel. These factors were emphasized by both those attending and those not attending education programs. The ratings of nearly all the providers of continuing education programs were favorable with one exception. None of the executives gave government a very good rating in continuing education, while universities and associations ranked the highest among the providers of continuing education. Executives also declared that personal contacts were the preferred way (53.2%) to gain skills and knowledge, but most commonly used delivery methods were acceptable except for television.

The executives' attitudes toward their prior educational experiences were also very good except for experiences in continuing education. Today's school systems were also rated fair to good, with community colleges and universities having the highest ratings by the executives. Colleges and universities also rated well as places to acquire new skills and knowledge. The method by which executives learn about the offerings in continuing education were largely relegated to the mail contacts, as 93.0 percent of the executives received information by mail.

Statistical analyses provided realistic appraisals of the differences in executives participation and attitudes. The manufacturing executives responses were amazingly similar when divided on the basis of participation and attitude toward education. The research questions that sought differentiated relationships and their impact upon attendance were largely without merit.

There were no significant differences on the research relationships on question of: (1) manufacturing executives attitudes toward continuing education as related to prior experiences in education; (2) participation in continuing education based upon educational attainment; (3) participation and the relevance of education; (4) participation in relation to the rate of change in the company or industry; (5) attitudes toward education in relation to opinions on the relevance of education; (6) participation relative to certain cost factors; (7) participation as related to the need for the immediate use of acquired information; and (8) the executives attitudes toward education and their relationship to the incentives offered by the company.

Significant differences were focused on the research questions of: (1) the level of participation in continuing education as related to the importance of skills upgrading by the company; and (2) the level of participation as related to the method of obtaining information on continuing education.

The major research question of attitudes as related to the participation in continuing education indicated significant differences

where: (1) prior experiences in continuing education were related to participation in continuing education; (2) the sponsorship of the programs by government and attitude toward government; and (3) the attitude toward upgrading skill levels.

The importance of this study to adult educators is that differences in executives' attitudes toward education do not adequately explain their level of participation in continuing education. The executives' positive attitudes toward education and their attendance in continuing education could not be accounted for by the differences in attitudes toward education. The implications are that: (1) executives' participation in continuing education was not differentiated by age, education, attitude toward education, or prior experiences; (2) the Chain of Response Model and its concern with barriers and relevance are important, but not determinant of the number of continuing education activities attended by executives; (3) education is not a high priority item of executives or their companies; (4) the current methods of reaching executives is by mail, (5) electronic media, especially television, must be carefully monitored and promoted if it is to be accepted by executives; (6) the executives' educational majors are largely business and engineering; and (7) the long term use of the information is of more importance than the immediate use.

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APPENDIX A: QUESTIONNAIRE

EXECUTIVE SURVEY # _____

Directions: Please complete all the questions and return the completed questionnaire in the prepaid envelope to CIRAS.

The information you supply will be combined with information from other companies. There will be no identification of individuals or companies made in the final report. The number in the upper right hand corner is for follow-up and statistical validity checks only. All completed questionnaires will be destroyed at the completition of the study. If you prefer having your questionaire returned to you, please indicate this desire.

Add comments and extra information to make your answers more complete or to clarify your opinions. The purpose is to discover your views about continuing education programs for executives--and how to make them better.

If you want to receive a copy of the study, please attach your business card to the completed questionnaire.

Section I: Personal Data

Please tell us a little about yourself.

A. What is your position in the company? (Circle all that apply)

1. Chief Executive
2. Vice President
3. Manager
4. Plant Manager
5. Other _____

B. How many years have you been in this position? ____ Years

C. How many years have you been with this company? ____ Years

D. What degrees in formal education have you received? (Check all that apply)

Degrees:
1. High School
2. Technical Associate
3. Bachelor
4. Master
5. Doctor of Philosophy
6. None

E. What was your major field of study?

1. Business-Economics
2. Education
3. Engineering
4. Agriculture
5. Law
6. Other _____

F. What level and type of education do you wish you would have attained? (Circle one only)

1. Satisfied with present education
2. Prefer _____ Degree

   Prefer _____ Major

G. What is your age? ____ Years

H. How would you classify yourself? (Circle one only)

1. Late to adopt new ideas
2. Prefer to wait for new ideas to prove value elsewhere
3. Accept new ideas in growth stage
4. Early adopter of new ideas/products
5. Developer of new ideas/products

Section II: Company Data

We need some information about your company and its products for comparative purposes.

A. How would you classify your company's major product? (Circle one only)

1. Food
2. Feed
3. Textile
4. Apparel
5. Lumber and Wood
6. Paper
7. Printing and Publishing
8. Chemicals
9. Rubber and Plastics
10. Leather
11. Stone, Clay, Glass
12. Precision Metal
13. Fabricated Metal
14. Machinery-Nonelectric
15. Machinery-Electric
16. Transportation Equipment
17. Instruments
18. Other _____

B. How many employees do you have? ____

C. What is the geographic market area for your company? (Circle all that apply)

1. Local
2. State
3. Regional (multi state-midwest)
4. United States
5. North America
6. Overseas

D. Approximately what percent of your sales/profits come from products which have been introduced in the past ten years? ____%

E. How do you rate your company in comparison to your competition based on the following factors?

	POOR	FAIR	GOOD	VERY GOOD
1. General Level of Technology.....	1	2	3	4
2. Products.....	1	2	3	4
3. Manufacturing Processes.....	1	2	3	4
4. R & D Efforts.....	1	2	3	4
5. Management System.....	1	2	3	4
6. Distribution System.....	1	2	3	4
7. Ability to Compete.....	1	2	3	4
8. Skill Levels of Manufacturing Employees.....	1	2	3	4
9. Skill Levels of other Employees.....	1	2	3	4
10. Skill Levels of Management.....	1	2	3	4
11. Fringe Benefits for Employees.....	1	2	3	4
12. Educational Program for Employees.....	1	2	3	4
13. Educational Program for Management.....	1	2	3	4
14. Positioning for Future.....	1	2	3	4

F. How do you rate your industry compared to other industries based on the following factors?

	POOR	FAIR	GOOD	VERY GOOD
1. General Level of Technology.....	1	2	3	4
2. Products.....	1	2	3	4
3. Manufacturing Processes.....	1	2	3	4
4. R & D Efforts.....	1	2	3	4
5. Management Systems.....	1	2	3	4
6. Distribution System.....	1	2	3	4
7. Ability to Compete.....	1	2	3	4
8. Skill Levels of Manufacturing Employees.....	1	2	3	4
9. Skill Levels of other Employees.....	1	2	3	4
10. Skill Levels of Management.....	1	2	3	4
11. Fringe Benefits for Employees.....	1	2	3	4
12. Educational Program for Employees.....	1	2	3	4
13. Educational Program for Management.....	1	2	3	4
14. Positioning for Future.....	1	2	3	4

G. How would you describe your company's general level of technology? (Circle one only)

1. Older--Technology older than 10 years
2. Below Average--Technology available during last 10 years
3. Average--Standard technology found in industry
4. Above Average--Newer technologies available to industry
5. Very Advanced--Edge of scientific knowledge, one of leading companies

H. How important is it to your company that employees continually upgrade their skills? (Circle one only)

1. Very Important
2. Quite important
3. Important
4. Somewhat important
5. Not important

I. What incentives are provided to encourage employees to upgrade their skills or education levels? (Circle all that apply)

1. No incentive
2. Books
3. Tuition
4. Travel
5. Time Off
6. Classes in Plant
7. Other _____

Comments: _____

_____

J. Who in your company makes the decisions in educational incentives and programs?

1. Me
2. Personnel Manager
3. Other _____

K. In general, how would you classify the rate of change in your company compared to your competitors? (Circle one only)

1. Low
2. Below Average
3. Average
4. Quite High
5. High

L. In general, how would you classify the rate of change in your industry compared to other industries? (Circle one only)

1. Low
2. Below Average
3. Average
4. Quite High
5. High

Section III: Participation in Education

A. How many conferences or workshops did you attend last year?

Conferences ____ Workshops ____

B. How many courses were you enrolled in last year?

Courses (credit) ____ Courses (other) ____

C. How many seminars did you attend last year? Seminars ____

D. How many conferences and workshops do you plan to attend this year?

Conferences ____ Workshops ____

Courses (credit) ____ Courses (other) ____

E. What topics would you like to have addressed at those conferences and workshops? (Please be as specific as possible in your suggestions)

Conferences _____

Workshops _____

Courses (credit) _____

Courses (other) _____

F. How important do you consider the following factors in your decision to attend a conference or educational program?

	NOT IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
Cost of the Program.....	1	2	3
Travel Time and Cost.....	1	2	3
Time away from Business.....	1	2	3
Relevance of Topic to Business.....	1	2	3
Personal Interests.....	1	2	3
Immediate use of Information.....	1	2	3
Long Term use of Information.....	1	2	3
Academic Credit.....	1	2	3
Program Sponsorship.....	1	2	3
Speakers.....	1	2	3

G. How do you rate each of the following for supplying you with continuing educational opportunities?

	POOR	FAIR	GOOD	VERY GOOD
Associations	1	2	3	4
Suppliers	1	2	3	4
Universities	1	2	3	4
Community Colleges	1	2	3	4
Consultants	1	2	3	4
Government	1	2	3	4
Other _____	1	2	3	4

H. What methods of learning do you prefer for gaining new skills and knowledge?

	NOT ACCEPTABLE	ACCEPTABLE	PREFERRED
Conferences	1	2	3
Workshops	1	2	3
Classes (Credit)	1	2	3
Classes (Noncredit)	1	2	3
Personal Contact	1	2	3
Reading	1	2	3
Television	1	2	3
Independent Study	1	2	3
Other _____	1	2	3

Section IV: Education Experience

A. How would you rate your own education in the following areas?

	POOR	FAIR	GOOD	VERY GOOD	HAVE NOT RECEIVED
Elementary	1	2	3	4	5
High School	1	2	3	4	5
College	1	2	3	4	5
Conferences	1	2	3	4	5
Workshops	1	2	3	4	5
Other Continuing Education	1	2	3	4	5

B. How would you rate today's educational systems?

	POOR	FAIR	GOOD	VERY GOOD	DON'T KNOW
Elementary	1	2	3	4	5
High School	1	2	3	4	5
Community College	1	2	3	4	5
College	1	2	3	4	5
Conferences	1	2	3	4	5
Workshops	1	2	3	4	5

____C. How frequently do you use the following for learning new skills and knowledge related to your job?

	NEVER	SELDOM	OCCASIONALLY	OFTEN
Newspapers	1	2	3	4
Business Magazines	1	2	3	4
Technical Magazines	1	2	3	4
Journals	1	2	3	4
Television	1	2	3	4
Meetings with Educators	1	2	3	4
Meetings with Industries	1	2	3	4
Meetings with Suppliers	1	2	3	4
Workshops	1	2	3	4
Conferences	1	2	3	4
Attend Classes	1	2	3	4

D. How do you rate the following for learning new skills or knowledge?

	POOR	FAIR	GOOD	VERY GOOD
Elementary	1	2	3	4
High School	1	2	3	4
College	1	2	3	4
Conferences	1	2	3	4
Workshops	1	2	3	4
Other Continuing Education	1	2	3	4

E. How do you obtain knowledge about new continuing education opportunities?

	NEVER	SELDOM	OCCASIONALLY	OFTEN
Mail.....	1	2	3	4
Meetings.....	1	2	3	4
Friends.....	1	2	3	4
Ask for Program.....	1	2	3	4

F. Please add any personal comments on educational programs to help your company.

_____

_____

_____

Please send a copy of this study.

NAME_____

ORGANIZATION_____

ADDRESS_____

_____

APPENDIX B: COVER LETTER

Iowa State University of Science and Technology Ames, Iowa 50011

University Extension

Address reply to:

Center for Industrial Research and Service
205 Engineering Annex
Telephone 515-294-3420

February 25, 1986

RE: Executive Survey

We need your input in order to complete a study of the continuing education interests of manufacturing executives. This study will ultimately attempt to identify ways to improve the training and educational offerings that are made available to you. The consolidated information will be also used in a doctoral dissertation.

I hope you will take the time to complete the attached questionnaire and return it to CIRAS in the postage paid envelope. The questionnaire will take just a few minutes and should not require you to look up any information.

All the information will be treated confidentially and at the end of the study the individual questionnaire will be destroyed or returned if you so request.

Thank you for your cooperation.

Sincerely,

David H. Swanson, Director

Enclosures

APPENDIX C: LETTER OF INTRODUCTION

Iowa State University of Science and Technology Ames, Iowa 50011

University Extension

Address reply to:

Center for Industrial Research and Service
205 Engineering Annex
Telephone 515-294-3420

February 17, 1986

RE: Executive Survey

In a few days you will receive a brief questionnaire from us. The questionnaire will be relatively short, straight forward, and easy to complete. Its main thrust is to determine your interests related to continuing education. The data will be used in a dissertation and in designing educational programs for Iowa manufacturers.

The questionnaire will be numbered for follow up purposes, but all information will be treated confidentially. The individual questionnaire will be destroyed, or if you prefer, returned to you after the study is completed. No individual identification will be noted in the study.

I hope you will complete the questionnaire and return it to us. Incidentally, if you would like a copy of the study, we will be glad to send you one.

Thank you.

Sincerely,

David H. Swanson, Director

pb

APPENDIX D: FOLLOW-UP LETTER

Iowa State University of Science and Technology Ames, Iowa 50011

University Extension

Address reply to:

Center for Industrial Research and Service
205 Engineering Annex
Telephone 515-294-3420

March 13, 1986

RE: Executive Survey

A few weeks ago we mailed you a questionnaire asking for information on your continuing education interests. As of today, we have not received your completed questionnaire. Perhaps the questionnaire is enroute to us, but in the event that you have not completed it, will you take a few minutes to do so? We know your schedule is terribly crowded with important decisions and issues, but I can assure you that your response is very important to us.

I hope you will give us an assist and complete the questionnaire.

Thank you for your cooperation.

Sincerely,

David H. Swanson, Director

APPENDIX E. HUMAN SUBJECTS APPROVAL FORM

INFORMATION ON THE USE OF HUMAN SUBJECTS IN RESEARCH
IOWA STATE UNIVERSITY
(Please follow the accompanying instructions for completing this form.)

1. Title of project (please type): A study of the relationships between manufacturing executives' attitudes and participation in adult continuing education

2. I agree to provide the proper surveillance of this project to insure that the rights and welfare of the human subjects are properly protected. Additions to or changes in procedures affecting the subjects after the project has been approved will be submitted to the committee for review.

David Henry Swanson — Typed Named of Principal Investigator
11-21-86 — Date
[signature] — Signature of Principal Investigator

205 Engineering Annex — Campus Address
294-0932 — Campus Telephone

3. Signatures of others (if any) | Date | Relationship to Principal Investigator

[signature] | 11-21-86 | Major Prof.

4. ATTACH an additional page(s) (A) describing your proposed research and (B) the subjects to be used, (C) indicating any risks or discomforts to the subjects, and (D) covering any topics checked below. CHECK all boxes applicable.

- ☐ Medical clearance necessary before subjects can participate
- ☐ Samples (blood, tissue, etc.) from subjects
- ☐ Administration of substances (foods, drugs, etc.) to subjects
- ☐ Physical exercise or conditioning for subjects
- ☐ Deception of subjects
- ☐ Subjects under 14 years of age and(or) ☐ Subjects 14-17 years of age
- ☐ Subjects in Institutions
- ☐ Research must be approved by another institution or agency

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5. ATTACH an example of the material to be used to obtain informed consent and CHECK which type will be used.

- ☐ Signed informed consent will be obtained.
- ☐ Modified informed consent will be obtained.

6. Anticipated date on which subjects will be first contacted: Month 2 Day 17 Year 86

Anticipated date for last contact with subjects: 2 25 86

7. If Applicable: Anticipated date on which audio or visual tapes will be erased and(or) identifiers will be removed from completed survey instruments: 1 Month 1 Day 87 Year

8. Signature of Head or Chairperson | Date | Department or Administrative Unit

[signature] | 11-21-86 | CIRAS

9. Decision of the University Committee on the Use of Human Subjects in Research:

- ☒ Project Approved
- ☐ Project not approved
- ☐ No action required

George G. Karas — Name of Committee Chairperson
12/4/86 — Date
[signature] — Signature of Committee Chairperson