EFFECTIVENESS OF IN-BASKET SIMULATION AS AN INSTRUCTIONAL TOOL FOR INDUSTRIAL MANAGEMENT

by

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CHAPTER 1

INTRODUCTION

Management development and training is an important research area in organizational behavior and engineering management as well as educational psychology and curriculum design. Since training and development are aimed at improving management's performance, it is closely dependent on the basic understanding of "management". Eight major schools of thought are described by Mintzberg (1980) as an extract of the available literature. But none of these are the definitive answer to "good" or "effective" management. Burgoyne et al. (1978) identified four inter-related features of managerial work as follows:

(1) Managerial work is complex and variable;

(2) Managers exist in order to deal with unprogrammed as opposed to programmed problems;

(3) Managerial work involves ordering and coordinating the work of others, but to do this, the manager must first be able to create similar order and coordination in himself.

(4) Managers need to be able to move and work across technical, cultural and functional boundaries. This demands an ability to adapt quickly and to have "learned how to learn".

Training establishments and educational institutions should develop the procedures to identify specific training needs. This would make the training and development efforts more effective and relevant. The delineation of the boundaries between management development, management education and management training has, in the past, been an area without fruitful debate (Huczynski, 1983).

The traditional educational paradigm considers education to be primarily concerned with the transmission of knowledge. Over the centuries, the educational approach has, in the main, not changed in terms of its objective (the transmission of knowledge) nor in terms of the tools employed (readings and lectures). But many of the action-oriented disciplines such as medicine, law, business, aviation and production and manufacturing management retain an essential part of the learning process in performing tasks in a real environment. The traditional educational approach is an important early phase of the learning process. But when taken alone, it provides an incomplete coverage of the learning process for action-oriented disciplines. As a result, only a small fraction of the knowledge acquired has an effective impact on performance. Most of the remaining knowledge is not translated into action and is progressively forgotten (Larreche, 1987).

The gaming approach has been adopted to train people as they use and develop their decision-making skills in a fictitious competitive environment (Horn, 1977). Business schools were using some forms of games in their teaching programs by 1968 (Graham et al., 1969). Two methods have been increasingly used in action-oriented disciplines: case studies and simulations. Divergence of opinion among educators vis-a-vis the effectiveness of simulations as learning tools in business is basically due to the diversity of the objectives for the simulations (Fripp, 1984; Sims et al., 1976). Yet the primary objective of a simulation is to develop skills to apply concepts effectively through making decisions and taking appropriate courses of action. Several research projects investigated specific issues such as the acquisition of international business knowledge (Klein, 1984), the effect of game complexity on learning (Wolfe, 1978) or the motivation of business simulation participants (Schriesheim, 1975). A number of studies have attempted to measure effectiveness of simulations in business policy courses (see Wolfe, 1985 for a review).

The research reported herein describes an approach to evaluate the relative effectiveness of an in-basket simulation compared to a case study in a fictitious manufacturing environment. An in-basket simulation and a

case study were developed for this purpose based on the identical problems under an identical scenario of manufacturing environment. Perceptions and task-decisions were considered as outcome variables using a questionnaire format.

1.1. STATEMENT OF THE PROBLEM

In recent years many researchers and training and personnel selection specialists have expressed renewed interest in using job simulations and games. Games may include computer simulations, role-playing, problem-solving exercises, and other similar methods. The elements of a game comprise a more or less accurate representation or model of some external reality with which players interact in much the same way they would interact with the actual reality (Birnbaum, 1982). The higher level of management sophistication and the greater intensity of competition have also placed pressure on individuals and corporations to identify more effective training and educational techniques. Simulation provides an attractive experimental setting for research. In the late 1950s, researchers started investigating the relationships between game performance and psychodemographic characteristics of the participants (Hoggatt, 1959; Purdy, 1959). Simulations also provide a natural setting to analyze human decision

making and information handling processes. Situations that are particularly appropriate for the study of the group decision activities, leadership and other personality traits can also be created and examined with the help of simulations. But, even in the broad span of the above mentioned applications, a more frequent objective remains to be "learning".

Almost simultaneously with the introduction and development of business simulations, researchers began to discuss what students learn from this form of instruction. A variety of aspects of learning such as organizational learning (Cangelosi and Dill, 1965); the effect of information (Philippatos and Moscato, 1969; Greenlaw and Biggs, 1974; Biggs, 1975) and the effect of game complexity (Raia, 1966; Butler et al., 1979) etc. have been investigated in business simulations. Comparative studies based on perceptions of students in courses such as marketing (Faria and Nulsen, 1975; Chisholm et al., 1978, 1979); general management (Catalanello and Brenenstuhl, 1977; Blythe and Gosenpud, 1981; Stokes and Stoner, 1981) and finance (Chisholm et al., 1978, 1979) have been reported in the business schools.

Education discipline, at both the high school and the university levels, has taken several approaches to

incorporate and examine job simulation as a viable tool for instruction. Stopp (1976) noted the extent of the use of simulation techniques in high school education. Bilick (1974) and Matefy et al. (1976) compared various instruction methods on the basis of attitude changes in the participants. A very few papers (Johnstone and Reid, 1978; Nasr, 1976; Steele, 1979) have drawn attention to actual measurements and indicated the power of simulation techniques for science education.

As can be seen from the above discussion (see literature review in Chapter 2 for more details), prior research has not considered the applicability of the in-basket simulation technique for educational purposes, even though it is a widely accepted method for training and personnel assessment purposes. Engineering schools have a good potential to introduce simulation techniques as an instruction method. This is especially true for the industrial engineering discipline with its emphasis on action-oriented courses in the field of production and manufacturing management.

The purpose of this research is two-fold: (1) to devise a model of in-basket simulation and (2) to conduct a controlled research study to examine the relative effectiveness of this in-basket type simulation technique

as compared to a case-study for a manufacturing management model-environment. Perception and task-decision measures are used as the indicators of the effectiveness.
The problem studied herein may be stated as-

What are the differential effects of two instructional techniques -- in-basket simulation and case-study -- as measured by participants' perception of potential for the performance, learning, realism, satisfaction, ease of time management, understanding of delegation and functional responsibility and participants' task-decisions in a manufacturing management environment?

1.2. NEED FOR THIS RESEARCH

This brief review of the literature in this field (see Chapter 2 for more detail) indicates potential of the job-simulation techniques in management training, personnel selection and business/management education and high school education. No prior research has been found which studied the applicability of simulation techniques in engineering schools. Manufacturing management and related subjects readily lend themselves to a variety of instructional methodologies. The need for more research on applicability and evaluation aspect of the action-oriented approach in the engineering discipline is, therefore, apparent.

The present study aims at providing a model of in-basket job simulation for manufacturing management education. The important guidelines for the construction of the in-basket are followed from various past references (Frederiksen et al., 1957, 1972; Jaffee, 1968; Zoll, 1969; McCright, 1987; etc.)

Further, this study also attempts to establish the indicators of relative effectiveness using perception and task-decision based outcome variables. Measuring perception based outcome variables other than satisfaction would extend the evaluation to include some other important outcome characteristics. Task-decision based evaluation would provide useful information relevant to the perception measures.

In summary, this study is a step toward development of a model job-simulation for manufacturing management and also toward establishment of a methodology to evaluate the relative effectiveness of the job-simulation as compared to a case study.

1.3. ORGANIZATION OF THE THESIS

With the main research problem now established, this study will proceed to discuss the findings from the relevant literature in Chapter 2. Chapter 3 will

thoroughly describe theoretical models and the experimental model of the experiment. It will also include the description of scenario and the tasks contained in the simulation and case. The development of the measurement instrument and experiment protocol will be explained. This will include identification of meaningful outcome variables. The methods of data analysis will be presented in Chapter 4. The means of two groups for each outcome variable will be examined for the statistical significance. Finally, Chapter 5 will discuss the implications of these results, pursuant to answering the research question presented in this chapter. Possible application of the findings and contribution of this study will be discussed.

CHAPTER 2

LITERATURE REVIEW

There is a wealth of literature on the comparative evaluation of one type of training or instruction method with that of another. Management development workshops, professional training programs and assessment centers have established the meaningfulness of job simulations as a reliable tool to predict on-the-job performance. The purpose of this chapter is to report those research experiments and findings from the vast amount of existing literature which appear to be closely linked to the present study.

2.1. SIMULATION TECHNIQUES - AN OVERVIEW

The early business games were developed in the 1950's as one of the contributions of operations research. The American Management Association produced the Top Management Simulation in 1957. It was in the 1960s that some business games, such as the Carnegie Tech Management Game and INTOP (International Operations Management Simulation) became widely available (Cohen et al., 1964; Thorelli et al., 1962).

Frederiksen (1962a) proposed a classification of methods for measuring the outcomes of training.

Situational tests or "simulations" are designed to "elicit life-like behavior" that approach the realism of life but can still be standardized so that all subjects are presented with identical problems under identical conditions. The term "simulation" has been applied to those instances in which one attempts to build a laboratory model of a natural or real life phenomenon of considerable complexity (Guetzkow, 1962).

More recently, Kesselman et al. (1983) defined a management game as "a decision making exercise in which the participant is placed in a more or less controlled or standardized task situation structured around some aspect of a position for which he is being assessed." It can be said that management games are essentially situational tests. Lopez (1966) identified three main classes of the management games: "solitaire" games, small group games, and complex team games. The participant is required to enact a role in an imaginary environment by committing himself in writing to a specific course of action. The in-basket simulation or exercise is an example of a solitaire game.

Jaffee (1968) stated that the first known use of an in-basket simulation was by the German War Boards during World War I and by the O.S.S. during World War II. The first in-basket tests developed in the U.S. were for use in

training and curriculum evaluation. The Officer Education Research Laboratory of the Air Force Personnel and Training Research Center contracted Educational Testing Service to study and evaluate the training at the Command and Staff School at the Air University (Frederiksen, Saunders and Wand, 1957). Frederiksen et al. developed this test as a situational test which allowed the individuals a wide range of responses.

Schachter (1980) defined the primary purpose of this type of job simulation as "to develop or assess behavior in a problem centered context where the participants not only make decisions but also generate the alternatives from which a given decision must be made." The test was to be administered by first providing the appropriate background information concerning the fictitious situation and then presenting written materials in the form of letters, memoranda, phone-message notes, etc. which have supposedly collected in the in-basket of an administrative officer. Participants were expected to identify the problems in the in-basket materials and devise strategies and decisions to solve them.

The potential of this technique was suggested for comparison of group performances, assessment of general capabilities of the incoming students, and evaluation of

the instruction (Frederiksen et al., 1957). Application as a selection tool, however, was not recommended by the developers until it could become more reliable and scoring techniques could be improved.

The Bureau of Business In-Basket Test was developed by Frederiksen (1962b) using a standard set of administrative problems embedded in the in-basket of an executive in an attempt to simulate some major aspects of an executive's job. The main purpose of this study was to identify some of the major dimensions of administrative performance.

Review of the literature indicates that the technique gained popularity in management training, human resources programs and business and science education.

The application of the in-basket simulation can be categorized according to: selection test, research instrument, training method and instructional method.

2.2. APPLICATION AS SELECTION TEST

Since Frederiksen's early work, the in-basket test has grown steadily in popularity and has been used frequently in assessment centers and other human resource programs. The in-basket exercise is an individual exercise, where a participant's performance is not contingent upon another

participant's response. This may be an important consideration while validating a selection test in order to meet the standards set by American Psychological Association (1974) and federal regulations on equal employment opportunity (E.E.O.C., 1978) (Kesselman et al., 1983). Organizations such as IBM, the Bell System, the Port Authority of New York, etc. have used simulation as an assessment tool for selecting future managers (Lopez, 1966).

Research has supported the belief that in-basket simulations provide a good basis for evaluating the potential of a candidate to perform effectively in a specific job. Meyer (1970) studied the job performance of the unit managers of General Electric Company by using the in-basket simulation as a measure of particular abilities or aptitudes. Results of this study indicated that this type of job-simulation might serve as a valuable aid in the selection process of the managers. Further, the performance of the participants in job-simulation was found to be correlated with demonstrated on-the-job performance; especially the ability to handle the planning and administrative aspects of the job.

Brass and Oldham (1976) examined the relationships between the test scores and ratings of the on-the-job

performance of foremen. The results of the study indicated a positive and significant relationship between most of the scoring dimensions of simulation and a composite measure of foreman effectiveness.

Friedman and Mann (1981) demonstrated the high job-relatedness of in-basket simulations due to use of realistic materials from a specific job. They found that the results from such techniques were more valid than traditional aptitude and intelligence tests.

Marshall and Hollenbeck (1981) reported the simulation exercise designed and used by Merrill Lynch to improve its selection process for account executives. They explained that evaluating an applicant's potential with an actual job-trial typically "samples" only a few aspects of the job. A single integrated simulation exercise was developed to overcome these difficulties.

Kesselman, Lopez and Lopez (1983) indicated that the in-basket performance can be scored in a systematic and objective manner to yield reliable and meaningful information about a prospective manager's ability to function properly in an administrative situation. The results of this study also confirmed the conclusions of other studies that the performance of the supervisors and foremen who rate higher in on-the-job performance score

significantly higher on the most relevant dimensions of the in-basket performance.

Cohen and Gump (1984) suggested combining a well structured interview with a specially developed simulation for a better selection process. They reviewed the literature of the last 25 years to conclude that validity-scores were in the range of 0.40 to 0.60 for the job-simulations and the correlation coefficients were higher than those for almost all other types of selection procedures. They stated that the realistic job-preview helps in matching the expectations between candidate and organizational need; thereby increasing the potential for greater productivity early in employment and longer job tenure.

Kemerer and Wahlstrom (1984) studied the development of such a job-simulation for bank managers through a pilot study and field administration. They concluded that in-basket job-simulations are good predictors of managerial success, and can be developed for a specific job in a particular field.

2.3. APPLICATION AS RESEARCH INSTRUMENT

Some researchers have worked on the development and improvement of the in-basket simulation since the first

effort of Frederiksen et al. (1957). Hemphill et al. (1962) completed an elaborate study using school principals as subjects in order to identify the major dimensions of administrative performance. Frederiksen (1962b) reported a similar study using his Bureau of Business In-Basket Test. Major dimensions of the administrative behavior in the simulated job were identified. Further, the measures of the dimensions of administrative behavior could be considered as intermediate criteria. This approach could help in using the tests of ability and personality more effectively in selection for managerial work.

Research applications of the in-basket simulation are found in various fields. Shulman (1965) and Shulman, Loupe and Piper (1968) studied the approaches taken by teachers in determining problem resolution alternatives using an in-basket simulation. Brass and Oldham (1976) examined the relationship between a foreman's in-basket scores on six leadership dimensions and the ratings of his on-the-job performance. This study provided the behavioral dimensions that have been shown to predict the managerial and subordinate work performance reliably. The results were substantially stronger than those obtained in previous research on the validity aspect (e.g. Meyer, 1970; Frederiksen et al., 1972). This study contributed to the

development of scoring categories for job simulations based on the environmental control approach suggested by Oldham (1976).

More recently, Shapira and Dunbar (1980) constructed an in-basket simulation to test Mintzberg's classification system (1980) for managerial work. They indicated that Mintzberg's ten roles can be regrouped into two categories: information generation and processing roles and decision making roles. In-basket simulation was found to be a better instrument than other experiential methods for providing further insight into the more specific nature of managerial work.

Thompson and Keon (1981) used a management simulation to study how the environment impacts the decision making process of the manager. They reported that it is difficult to provide a framework for managers to see the different problems resulting from operating in an uncertain versus certain environment in a management education setting. The results of this study demonstrated the efficacy of the use of simulation in the perceptions and the resultant behavior of the manager in changing his/her management strategies in order to achieve success in differing external environments. The second finding replicated the results of a fieldwork project conducted with 103 Canadian firms by

Khandwalla (1977), indicating that high performance was associated with a less hostilely perceived environment. The authors strongly suggested the use of management simulations as a research tool in the demonstration of theoretical constructs outlined in the organization theory and management development literature.

Job design is another important research area in organizational behavior which can be seen as related to performance and efficiency improvement ideas of scientific management. Most of the laboratory studies of job design have tended to be trivial jobs such as puzzles, proof-reading and model-building exercises. McCright (1987) devised an executive in-basket exercise to study the effects of the differing levels of job control and job demand on employee perception (satisfaction and job-related strain) and on employee performance (productivity, quality and creativity). An in-basket simulation was used to control job-demand and job-control as manipulating variables for the laboratory study. This study provided the evidence that such a simulation can be used to study important aspects of executive work in laboratory settings. Methodology of the study demonstrated the strong applicability of the in-basket simulation as a research tool in design and study of executive jobs.

2.4. APPLICATION AS TRAINING METHOD

The understanding of a manager and being able to effectively manage in his/her immediate surroundings have always been a critical concern in management training (Thompson and Keon, 1981). In the past, management training was focused on the skills in managing a myriad of behavioral problems within an organization. The area of management training has increasingly become more eclectic in its areas of emphasis. It has evolved into a relatively comprehensive area of topical coverage in the past decade.

The process view of managerial work has been traditionally utilized for management development and training and has been reflected in the structure of the majority of our basic management literature (Koontz, 1980). Recently, however, increased attention has been devoted to the action approach for studying the nature of managerial work. The focus of the action view of management is on examining the roles and skills that are necessary for the effective performance of the manager's job. In-basket simulations are related to other action-oriented approaches like case studies and other management games in that all these techniques attempt to model the real world and provide a learning experience which is readily transferable to a work situation (McCright, 1987).

A review of the literature disclosed that in-basket simulations are frequently used in training business and industrial managers and administrators of different organizations. Commercially available in-basket simulations have been developed for training school officials (Musella and Joyce, 1973), supervisors (Jaffee, 1968) and employees in management cadres (Zoll, 1969).

In-basket simulations have also been used to generate possible alternatives for effective policy decisions. Duke (1982) discussed the problem of developing a comprehensive self-image to guide policy-decisions in institutional management. He proposed simulation as a solution and demonstrated its application as a predecisional tool. Similarly, the application of simulation principles in management development were illustrated based on experiences of the management of a public agency in a midwestern city (Center for Creative Leadership, 1983). Nolan and Green (1983) reported that Developing a Curriculum (DACUM) process at Cincinnati Technical College generated three possible methods for training technical writers and editors: case study, internship and simulation.

The potential of the simulation for planning and forecasting in university manpower development was illustrated in a study (Klabbers,1985). He presented a

taxonomy of planning and forecasting methods which could be combined with policy-making and interactive simulation as an inquiry method for planning.

Wehrenberg (1986) reviewed the use of various forms of simulations in training the employees. He discussed hands-on tools such as flight simulators and a nuclear power plant control-room simulator, role-playing, and in-baskets. He also suggested that trainers be careful to use simulations only when on-the-job training in the real situation is impractical or prohibitively expensive.

2.5. APPLICATION IN BUSINESS/MANAGEMENT EDUCATION

A considerable body of research on simulation as an instructional technique in various educational disciplines has accumulated since the 1960's. The review of the literature indicates two distinguishable strands of research. First there is the educational and socio-psychological approach regarding cognitive and affective learning effects of simulation techniques. Second, there is the effectiveness of simulation compared to other instructional approaches. Researchers have investigated a variety of aspects of learning in business simulation such as organizational learning (Cangelosi and Dill, 1965) and influences on learning in business games (McKenney and Dill, 1966). The socio-psychological approach (Bilick,

1974; Hegarty, 1975; Cascio and Bass, 1976; Clore and Jeffrey, 1977) has concluded that simulated experience can often bring about significant attitude changes. A large number of field studies and reports indicate that job-simulations create considerably more motivation than other techniques of instruction (Burch, 1969; Fletcher, 1970; Twelker, 1971; Boseman and Schellenberger, 1974).

Researchers have also found that participants of simulation report a variety of self-integrating outcomes. Lee and O'Leary (1971) found that students reported more confidence in their decision-making abilities and tolerance for ambiguity after a simulation experience. Rhyne (1975) summarized that the advantage of the simulation approach lies in its ability to present various concepts as "visible, holistic entities". Simulation also provides immediate and dynamic referents for a concept. This study also demonstrated that the participants could understand a concept in interaction with other aspects of sociology coursework.

Boydell (1976) concluded that "the experiential learning that occurs in simulation enables participants to generate ideas, to see, feel and interact with meaningful problems. These experiences may provide a motivational link between past, present and future cognitions and

effect." Kozma et al.(1978) also observed similar effects of simulation on the participants. They concluded that "the strongest case for the use of simulations in instruction is that they teach higher order skills and influence student attitudes and values." They mentioned that changes in attitude may even include those concerning the learning situation. Simulations may foster positive feeling toward the discipline and the educational process.

Reid (1980) reported the development and thorough evaluation of teaching packages which were based on simulation techniques in Scottish schools over a 15 month period. He concluded that the importance of noncognitive outcomes from simulations are important mainly because other teaching strategies do not seem to be successful in achieving them. Therefore a total educational strategy should incorporate simulation to complement the development of noncognitive aspects related to the coursework.

Learning under the simulated environment has been studied by different researchers. Szafran and Mandolini (1980) analyzed the effect of participation in a simulation on two kinds of cognitive learning: (1) improvement in test scores on a test concerning factual information, and (2) ability to recognize sociological concepts embedded in nonsociological written accounts. They suggested that

simulation as a teaching technique should not be adopted or rejected solely based on its effect on cognitive knowledge. Its effect on student motivation and interest, affective learning, and other areas must be considered.

Bredemeier and Greenblat (1981) identified three major categories of dependent variables to express the learning effect of a simulation. One is substantive learning, which may be either cognitive or affective learning and may entail learning about the self or about some external subject or phenomenon. The second concerns motivation to learn something and the third concerns the "atmosphere" of learning. They also reported that students frequently mention the simulation experience as outstanding and perceive it as a stimulant for their motivation and interest.

Birnbaum (1982) indicated that the curricular problems of many degree programs in the field of higher education are unrelated to those of other programs for training professionals. The major purpose of the degree program is the preparation of persons for advanced professional practice. Teaching of processes in which a successful practitioner must engage is much more difficult. He referred to an ASHE (Association for the Study of Higher Education) survey to determine availability of simulation

material for the field of higher education and application of this approach in instructional programs.

Smith et al. (1983) used a complex in-basket simulation and a scenario-study to examine relationship between organizational leadership and gender. It was concluded that simulation may tap a deeper level of psychological process and may elicit more involvement of participants than many typical experiential methods. Thus, more complex structures of simulations are justified as compared to a typical method of scenario-study for the course of organizational behavior.

The simulation approach was also used to introduce students of economics to the world of banking at the University of North Dakota (Markovich, 1983). The Stanford Bank Management Simulation (SBMS) was used to help students understand the practical aspects of banking and the factors affecting decisions and operations.

Many of the research studies also aimed at evaluating the relative effectiveness of simulation compared to other instructional methods. Steinmetz and Patten (1967) examined the learning achievement and attitudinal effect of a simulation in an introductory accounting course. This simulation was based on a hypothetical business firm and

the students were required to make decisions on finance and distribution of finished inventories. The students with simulated experience appeared to learn more and seemed to be influenced toward selecting a business career.

Overall understanding, principle or concept mastery and fact mastery were used as criteria for evaluation of case-only and simulation-only approaches in a Business Policy course by Wolfe (1973). A nine item questionnaire was administered to give scores for the analysis. No statistically significant differences were found on the scores relative to fact mastery. But the simulation group scored significantly higher on principle and concept mastery and overall understanding compared to the case-study group. Greenblat (1975) suggested after a review of many studies that simulation may be more effective in teaching facts (providing information) about specific processes.

Ashmun (1974) investigated the relative effectiveness of a business simulation and lecture-discussion method in a lower division general business course. Positive correlations were found to exist between the subjects' composite and mathematics test scores, unit achievement tests and final grades in the course. Further analysis of the data indicated significantly higher performance of the

subjects with high ability in both the groups.

Evered and Pearce (1974) compared the case study method to a simulation for developing the ability to write a corporate strategy statement with certain desirable attributes. Six senior level Business Policy classes were divided into three groups: control, simulation and case study. Participants developed a strategy statement from a written description of a complex strategic dilemma upon completion of eight training sessions. Independent judges evaluated the statements based on nine different criteria. The case study group scored significantly higher on three of these criteria.

Use of a computerized business simulation was reported by Brenenstuhl (1975) for a basic management course. Results on examination at the end of the 11th week indicated significant differences in mean scores favoring the simulation compared to lecture approach. A Mann-Whitney U-test revealed significant differences on scores at the 0.01 level on a Needs-Satisfaction Questionnaire. The simulation group was found to exhibit less dissatisfaction of needs than those in the lecture class. Keys (1975) concluded from his research study on business simulation that "learning in simulation is so flexible and attitude involving that previous knowledge is awakened in

the simulated job."

Hearn (1980) made an important remark that efficacy of simulation lies in removing learning blocks and providing links among various courses. Many studies have supported these claims by testimonial and impressionistic evidence (Bredemeier, 1978, 1981; Rosen, 1981; Tiene, 1981). Simulations are widely believed to have great potential in the area of affective learning. It seems plausible that experience would be more effective than conventional instruction for increasing empathy and might lead to changed perspectives and orientations.

2.6. SUMMARY OF THE LITERATURE

Various research studies were examined in this chapter to discuss the development and application aspect of the in-basket simulations. It can be observed from the literature that the in-basket simulations are widely accepted in personnel assessment and employee training. The academic application of case studies and simulations has been found in management schools. Production management is certainly a valid area for future research to examine the applicability of in-basket simulation. The next chapter describes theoretical and experimental models, the measurement instrument, and the experimental design of this study.

CHAPTER 3

RESEARCH MODEL AND EXPERIMENTAL DESIGN

The purpose of this chapter is to describe the relevant theoretical models for this research and the design of the experiment to examine the research question (problem statement) stated in Chapter 1. The research model for this experiment is explained and the independent and dependent variables are defined. Further, selected outcome variables, tasks, subjects, measurement instrument, and the experiment protocol are also described.

3.1. THEORETICAL MODELS

3.1.1 Domains of Learning

The attempt to produce a comprehensive list of educational objectives has a long tradition in educational psychology. The taxonomy developed by Bloom and his co-workers (Bloom et al., 1956; Krathwohl et al., 1964) identified three domains of learning. These are the cognitive (concerned with knowledge, facts and their manipulation), the affective (dealing with feelings, emotions and values), and the psychomotor (concerned with movement). Pedler's classification (1978) was found useful for discussing the objectives in management educational training. He added two more domains of "inter-personal"

and "self-knowledge" to the three domains of Bloom's classification (see Figure 3.1). "Interpersonal" refers to skills associated with face to face interactions. These skills are a combination of cognitive, affective and even the psychomotor skills. "Self-Knowledge" is based on the awareness of a person about his/her own strengths and weaknesses.

Different learning methods influence a number of domains of learning. Generally, an action-oriented approach is believed to span "application" and "understanding" level of cognitive learning in addition to the affective learning. The "application" level of cognitive learning requires a learner to apply personal ideas and standard concepts in a specific environment, while the "understanding" level requires that the learner has primary knowledge of general concepts of the environment. In addition, the learner integrates the bits of knowledge in order to understand the situation and to make decisions accordingly.

3.1.2 Educational Technology Concepts

The purpose of education is to screen a collection of beliefs. This helps in sorting the relevant knowledge, skills and attitudes to be emphasized in the time allotted to instruction (Henak et al., 1986). Growing knowledge of

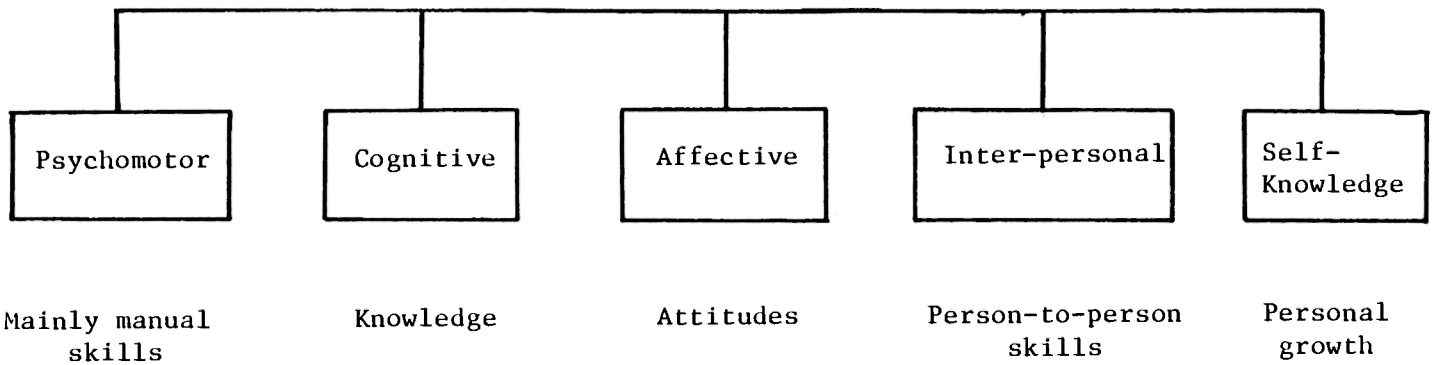


Fig. 3.1. Domains of Learning Behavior. (Pedler, 1978)

what motivates people and how people learn is the fabric of the psychology screen. The quality of the psychology screen determines the efficiency of the learning experiences. It serves as a guide in selecting training/ learning activities. The better we understand how people learn, the better we can design learning experiences.

The system of educational technology consists of learner, strategy, outcomes and evaluation as major elements (see Figure 3.2). The human adaptive systems and their relationships to the needs and purposes of learners and society should be understood in technical education and training. Technical education must be able to identify, select and appropriate intended outcomes that have relevance and that will result in growth by the learner. The intended outcomes must surpass the cognitive knowledge and psychomotor skills. Outcomes from technical education should help in developing rational thinking and problem solving skills.

The task of training or educating is difficult when selection of intended outcomes for instruction is involved. According to Henak et al. (1986), an effort needs to be made to:

(1) ensure that a comprehensive coverage of technology is achieved;

(2) make the content personally relevant to the learner;

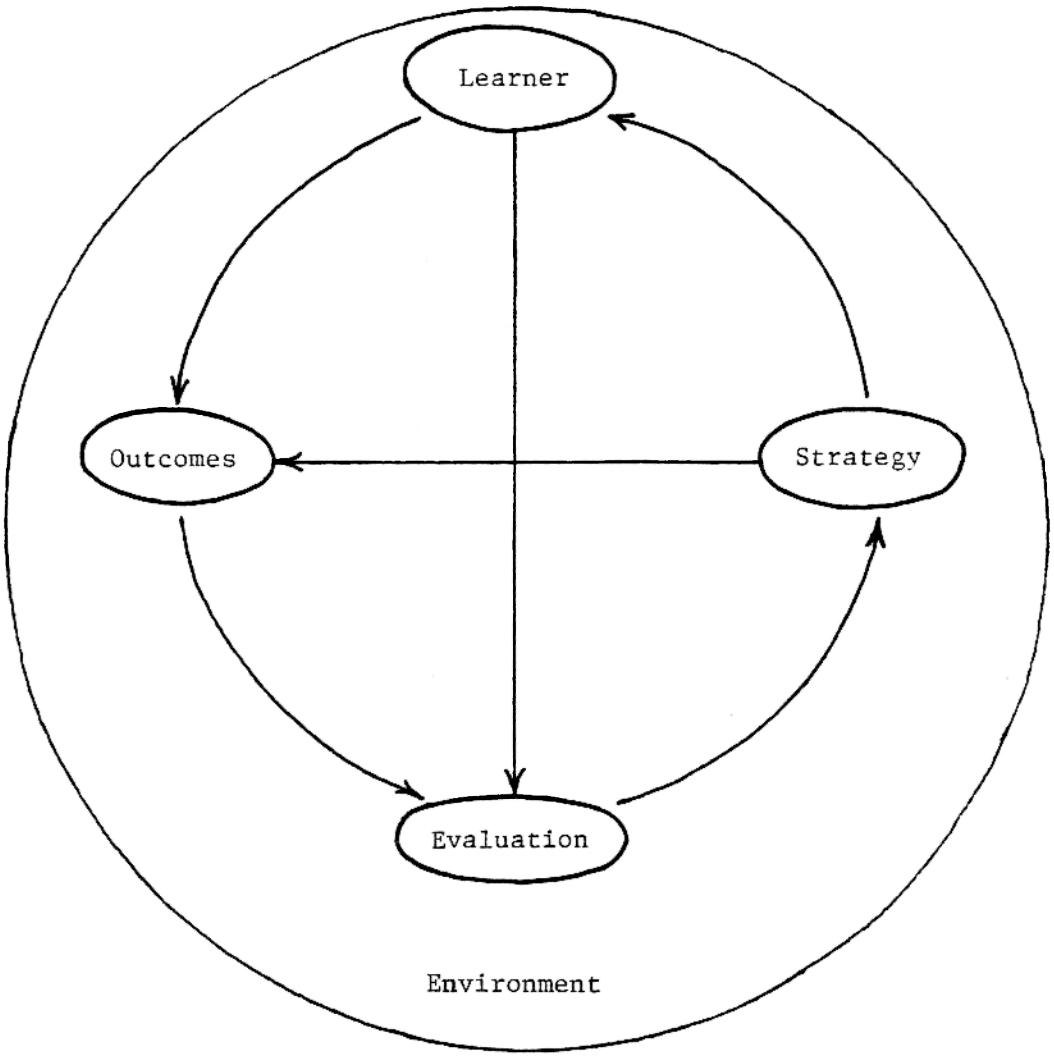


Fig. 3.2. Educational Technology and its Components. (Henak et al., 1986)

(3) include the content that results in clarifying the values relevant to the important issues, problems and opportunities;

(4) select the content that is useful in the future;

(5) contribute to the purposes of education;

(6) enhance the learnability of the concepts.

An overall instructional strategy is the integration of all the teaching and learning techniques (Henak et al., 1986). The basic premise of educational technology suggests that knowledge of different technical systems begins with the study of materials, tools and techniques at varying depths and breadths within each individual sub-system. Eventually, at a higher level, this study would culminate in an understanding of inter-relationships between the sub-systems to demonstrate human adaptation through technology. An action-oriented approach through simulations and case studies is followed in business schools and employee training centers in pursuance to the above instructional or training philosophy.

3.1.3 Experiential Learning Model

The success of any scientific project/research depends on both the researcher's command of the subject matter and his/her competence in applying it in the best possible way. Academicians understand this fact, but seldom try to put it into action for the training of the future generation of

managers (Charalambides, 1984). Students are usually well exposed to technical/scientific knowledge that they are likely to encounter in their careers. However, experience in the systematic use of scientific tools in solving real world problems is limited. The experiential learning approach seems to demonstrate the value of formalizing the learning process from experience. This kind of approach can be used in connection with various types of experiential methods like simulation, case study, role-playing exercise and other methods.

Lang et al.(1978) concluded from a review of various models of the problem-solving process that they all incorporate features from learning theory. Kolb (1974) mentioned that "learning and problem-solving are essentially not different processes but the same basic process of adaptation viewed from different perspectives." Kolb's model demonstrates the relevance of the scientific approach to the experiential learning process (see Figure 3.3).

3.1.4 Job Characteristics Model

The research model of this study also draws from several other models from the job design field. The Job Characteristics Model of Hackman and Oldham (1975, 1980) demonstrated that jobs can be defined in terms of certain

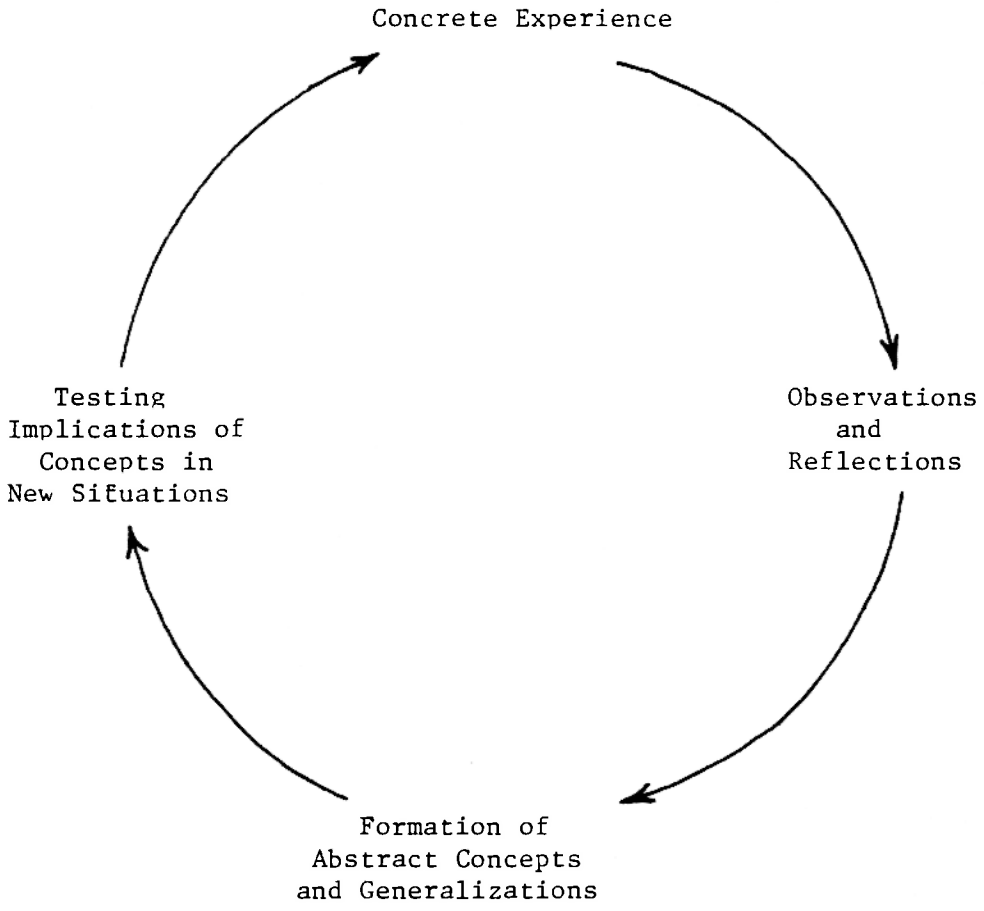


Fig. 3.3. The Experiential Learning Model. (Kolb, 1974)

common characteristics (see Figure 3.4). It further stated that these objective job characteristics may be measured by perceived outcomes. The five core job dimensions- skill variety, task identity, task significance, autonomy and feedback- are considered to affect some critical psychological states of an individual. This in turn, influences personal and work outcomes of an individual. Hackman and Oldham hypothesized that higher levels of these job dimensions (characteristics) positively affect the critical psychological states. This in turn, leads to more positive outcome variables such as internal work motivation, quality of work performance, satisfaction with the work, etc. The Job Diagnostic Survey (JDS) was developed to determine a composite score - "motivating potential score"- based on five job characteristics. A review of 20 studies by McCright (1987) revealed that most of the studies used perception based questionnaires as measurement devices. The concept of the Job Characteristics Model is utilized in this experiment in a way that the perceived measures of outcome variables reflect the differences in the independent variables of simulation and case study.

Some of the researchers suggested extensions to this basic model of job characteristics. Sims, Szilagyi and Keller (1976) developed a method of measuring perceived job

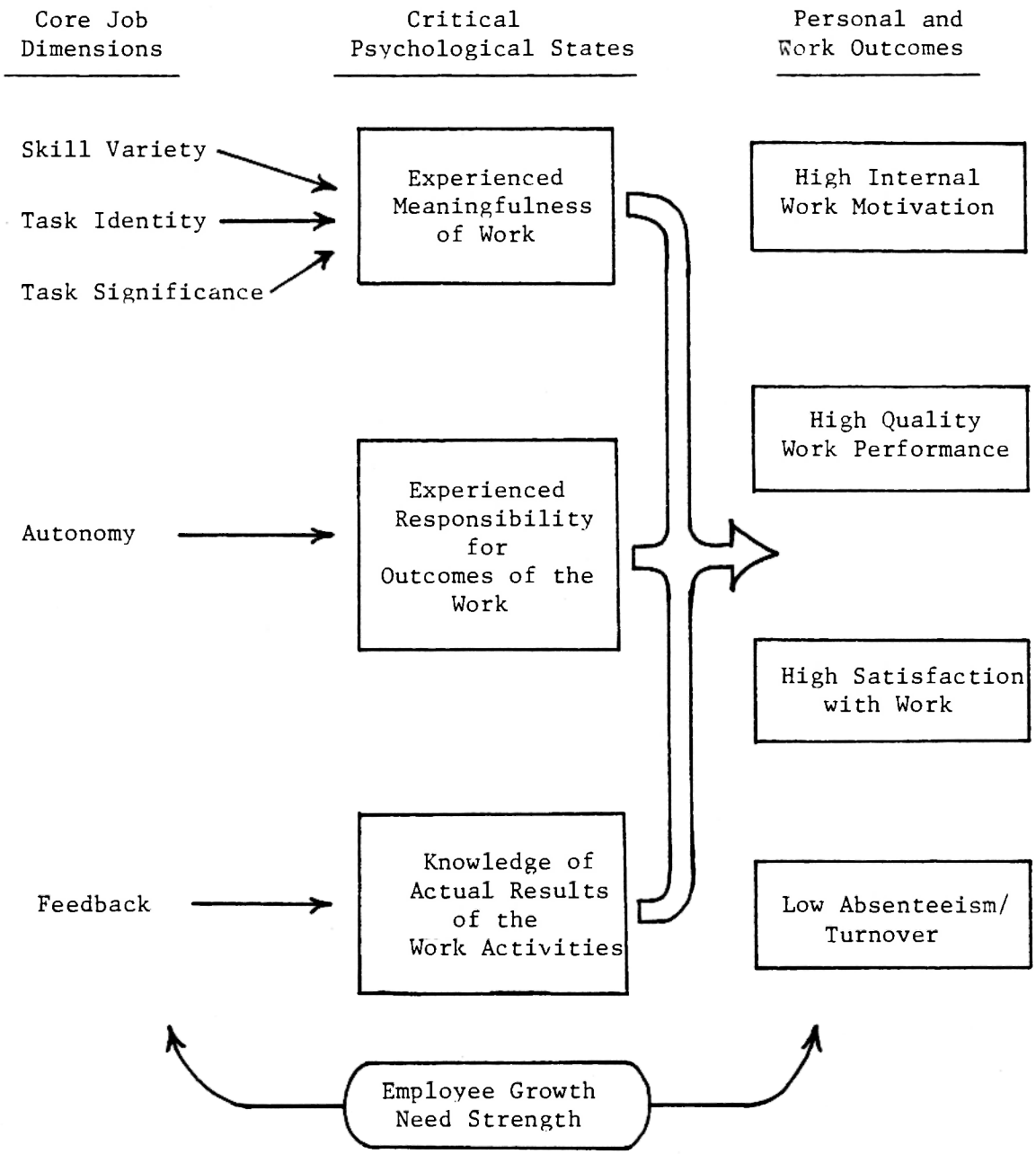


Fig. 3.4. Basic Job Characteristic Model. (Hackman and Oldham, 1975)

characteristics -- the Job Characteristics Inventory (JCI). They suggested that task responsibility, task challenge etc. should also be included in the basic model.

A review of several field studies revealed that the outcomes (dependent variables) related to satisfaction were found to be better predictors of job characteristics (Pierce and Dunham, 1976). Kemery et al.(1985) found that role ambiguity directly affects satisfaction and performance. Hence it should also be included as an important measure.

3.2. THE EXPERIMENTAL MODEL

The experimental model used in this study is shown in Figure 3.5. The experience of job simulation and the case study are two independent variables. The effect of these independent variables on dependent variables like perception-based measures of potential for performance, general satisfaction, learning, realistic experience, functional responsibility, time management and delegation of work is investigated. This causality model follows Hackman and Oldham's Job Characteristics Model discussed earlier. Two different approaches through simulation and case study are predicted to influence some particular psychological states of the subjects. This in turn causes the subjects to develop certain internal responses toward

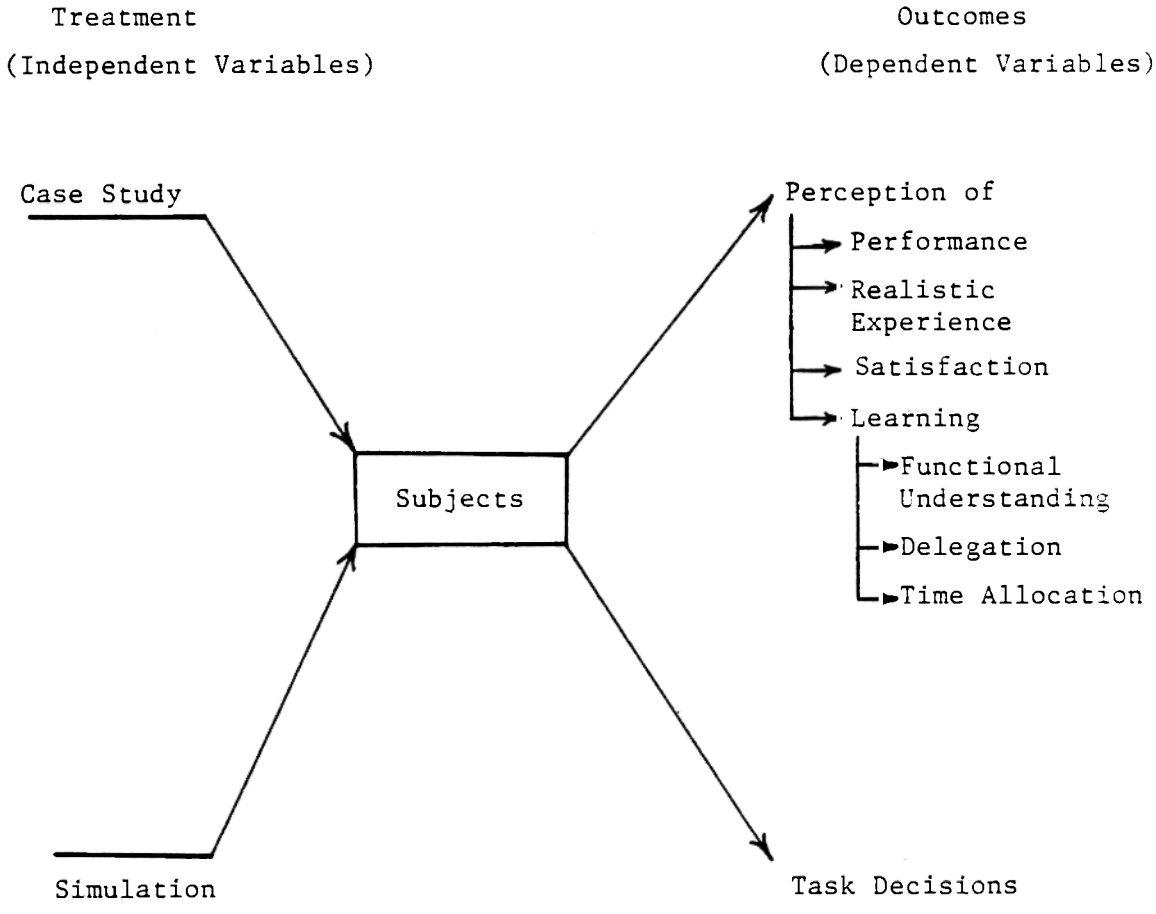


Fig. 3.5. The Experimental Model.

the experience. An appropriate measurement instrument can be developed to measure these responses.

It can be summarized that this research model is aimed at comparing the influence of two different action-oriented approaches of training and instruction. It differs from the earlier studies in that it is aimed at a potential application of in-basket job simulation in the instruction of production management. Identical information on a hypothetical industrial business environment and identical managerial tasks were provided to both experimental groups.

3.3. HYPOTHESIS ON EXPERIMENTAL MODEL

As can be seen from the literature review in Chapter 2, comparative studies of various training/instructional methods have indicated contradictory results. The application of in-basket job simulation has not been found in engineering education or training. This study is an initial attempt to evaluate relative effectiveness of in-basket simulation compared to a case study. Therefore, a null hypothesis was established as the main research hypothesis. This hypothesis is developed to evaluate the research question posed earlier in Chapter 1. Thus, the major hypothesis was established as follows:

There will be no significant differences in perception measures of learning, performance, realistic experience,

satisfaction, and understanding of time management, delegation and functional responsibility between the two experimental groups given a case study or an in-basket simulation. Further, there will be no significant differences in the decisions for various tasks.

3.4. OUTCOME VARIABLES

One of the first avenues of research offered by the advent of management simulations was naturally to test the relative effectiveness of simulations in instruction. The concept of effectiveness of simulations leads to two separate notions of internal validity and external validity. Internal validity denotes the achievement of short-term teaching/training objectives while the external validity represents the transfer of academic insights to effective real world orientations and perceptions (Larreche, 1987). Identification of valid measures of experimental effects is difficult for empirical research. An effectiveness study requires meaningful outcome variables and an appropriate measurement instrument for those variables.

An action-oriented approach is widely believed to have great potential for affective learning and attitude change. However, the claim for increased cognitive learning has

rarely been supported by empirical research (Szafran and Mandolini, 1980). Easterby-Smith (1986) suggested that two basic potential outcomes of any training or instruction effort can be categorized into "learning" or "development". These two global terms have been measured through different dependent variables in previous studies. Perception has been considered a valid way to collect comparative data on personal outcome variables (Miles, 1984). Learning, realistic experience, general satisfaction and potential for performance were selected as outcome variables to tap the global outcome variables of "learning" and "development". Additional variables specific to managerial tasks and industrial environment were also considered in developing the measurement instrument. These variables were perception measures for understanding of delegation, time management and functional responsibility. All the seven variables have been explained in section 3.8, Measurement Instrument.

3.5. SCENARIO

A scenario was prepared to provide adequate background information about the simulated environment to the subjects. This scenario was instrumental in making the subjects accustomed to the simulated environment. It also provided a frame to tie in the administrative tasks for

both the simulation and case study (see Appendix A for full description of the scenario). The scenario provides a description of a manufacturing company engaged in the manufacture and sales of wooden souvenir boats and toys. The company's performance in the market and competitive environment are described. The job of production manager of this production facility is simulated in the in-basket. The scenario also explains the circumstances under which the participant is required to assume the office of the production manager. The time constraint and pressure of the work is realized by the fact that the production manager must leave in a short time to attend a meeting with the executive vice-president of the company. The participant must work alone, since the simulation occurs on a Sunday morning. Identical information is included in the case-description for the case study group (see Appendix B).

3.6. TASKS

Various tasks embedded in the in-basket simulation and the case study are representative of administrative and managerial responsibilities of a production manager (see Appendix A and B for the contents of the in-basket simulation and the case study respectively). Some useful suggestions were followed in preparing the material for the in-basket as well as the case study. Realistic dates,

company forms and letterheads, different writing styles, and different signatures were used in the in-basket (Jafee, 1968; Zoll, 1969; McCright, 1987). The items contained in the in-basket were of varied importance. Some of the items required immediate attention while others were long term planning tasks. Inter-related items were scattered over the set of items. These factors enhanced the face validity of the experimental material. "Face validity" is a nonstatistical concept which defines the degree to which a measure appears to measure the attribute it is supposed to measure.

The simulation allowed the subjects to assume responsibility of the simulated position. It also allowed them to develop appropriate policy decisions to solve certain problems. The case study also required the subjects to work on identical tasks. The key difference between the two groups was the way of presenting the tasks and the relevant information. The tasks as contained in the in-basket are explained below. These tasks were also contained in the case description for the case study group (see Appendix B for the contents of case study).

1. **Industries Association's Meeting**

A note from Lisa (secretary) informs Pat (simulated position of new production manager) about a telephone call from Gary Johnson (marketing manager) inquiring whether Pat

would be attending Springfield Industries Association's meeting. Gary wants Pat to meet one of their suppliers at this meeting.

A memo from Mike Smith (plant manager) tells that he wants to know whether Pat would be going to the meeting. He wants to inform the association within the next few days about the company's decision concerning attendance of a representative from the company.

2. **Quality of Raw Materials**

Past correspondence from a vendor reveals some information about the quality of raw materials. The president of this supplier company is visiting Springfield the next day. He has asked for an appointment in order to discuss arrangements for the future orders.

3. **Labor Management**

(a) A memo from plant manager Mike Smith indicates early clocking out by second shift people as a probable reason for lower production performance in the second shift. He wants to discuss this matter with Pat. A routine report from the foremen provides information about the production figures of the two shifts for the first quarter of the year.

(b) A note from Lisa (secretary) informs Pat about a memo drafted by Bob Rogers (previous production manager). She wants to know Pat's decision about this draft. Bob had

explained the problem of "moonlighting" by some employees as the reason for higher absenteeism. He was to request Mike to introduce a new policy in order to solve this problem.

4. Quality of Supplies and Vendor Rating Scheme

A new scheme for vendor rating is suggested by Gary Johnson (marketing manager) in his memo. He also points out quality problems with some purchased parts. Mike wants to know Pat's view on this scheme and wants to discuss this sometime during the next week.

5. Product Quality and Delivery Schedules

Another memo from Gary Johnson (marketing manager) conveys the complaints of a customer about the quality of finished products. William Spencer, vice president of a leading distributor company, is visiting Springfield Wheelers. Gary requests the production manager to discuss with him the quality of their products and reliability of meeting delivery schedules.

6. Policy about Overtime

Another memo drafted by Bob (previous production manager) is addressed to all foremen and shift supervisors. It requires them to restrict the overtime approval and also requires that they get the authorization from the manager for this purpose. Lisa (secretary) asks about Pat's decision on this memo.

7. In-house Inspection and Quality Control

(a) Mike (plant manager) discusses the new inspection duties assigned to assembly line people. He feels that the problem is due to the removal of quality control inspectors from the assembly line. Mike asks Pat to evaluate the drawbacks of the present arrangement and decide how to solve this problem.

(b) Another memo from Greg Stevens (chief engineer) informs Pat about a reconsideration of the inspection process. He wants to increase the number of inspection stages in the production process. Greg is interested in discussing this matter with Pat.

8. Agenda for Meeting with Vice President

Robert Wilson, Executive Vice President of the company, expresses his view on the company's performance and competitive environment in his letter to Pat. This letter requires Pat to be prepared for the discussion on quality problems of the products, production performance of the facility and other related factors.

9. Labor Scheduling

(a) A memo from second shift foreman Bill Crane details the problems due to poor quality of the raw material. The production schedule is likely to be hampered as they have to wait for the replacements to arrive.

(b) Bill also requests authorization for overtime in order

to meet the production schedule. This memo actually expresses the effect of different inter-related circumstances. Pat should look into all the possible causes such as quality of raw material, quality control process, maintenance and labor performance.

10. **Machine Maintenance and Replacement**

Frequent maintenance problems are reported for many machines by Greg Stevens (chief engineer). He tells that Harry (industrial engineer) is collecting data about these machines. He also inquires about the policy for machine replacement and periodic maintenance schedules.

The contents of the in-basket reflected the fact that most issues and problems were interdependent. Therefore, a decision on a particular item could possibly influence some other decisions, too. The case study also contained identical tasks (see Appendix B for the description of the case), but did not require the participant to work on this simulated position. Instead, it described the tasks for Pat under the circumstances and provided the relevant information to the reader. The reader was then required to generate his/her own strategy to find solutions to different problems.

3.7. SUBJECTS

The subjects in this study were 22 engineering students of an undergraduate level engineering course in Industrial Management. All subjects were given extra course credit for participation. The subjects read and signed Informed Consent Forms voluntarily (see Appendix D for a copy of this form). The ages of the subjects were in the range of 20 to 26 years. 10 subjects were female and 12 subjects were male. Their grade point averages ranged from 2.9 to 4.0 on a 4.0 scale.

The 22 subjects were divided equally in each of the experimental groups. Both groups were balanced on the basis of gender, GPA, and work-experience. This was done in order to control the bias effect of these subject-dependent variables on overall group measures. Except for these restrictions, the subjects were randomly allocated.

3.8. MEASUREMENT INSTRUMENT

Attitude scales represent a very extensive area of study and application in the field of evaluation of training and development programs (Hogarth, 1979). A questionnaire format with attitude scales is seldom used to provide a good measure of perception variables. Questionnaires with Likert scales (Likert, 1932) provide an adequate instrument for attitude measurement. The main

feature of such a scale is a pair of contrasting phrases (such as, strongly agree - strongly disagree) anchored at either extremes of the rating scale. A scale with 5- or 7-point anchored categories is preferred; anything above 7 points or with fractional values is considered to exhibit a spurious impression of accuracy. Hence a questionnaire format with a 7-point Likert scale was selected for reliable measures of affective and attitude related outcome variables in this study.

There are no specific standards about the ideal number of questions to be used in measuring a perception variable. More than one question is preferred so as to provide a better perspective of each variable. On the other hand, long questionnaires may become tedious to complete and may influence the evaluation itself. At least two questions were developed for each dependent variable of this study. A 21-item questionnaire was prepared for 7 dependent variables. The 21 items were identical for both experimental groups except for minor word changes to make them appropriate for a particular experimental condition.

Three measurement techniques were developed to measure various outcomes. These techniques were: a 21-item questionnaire with a 7-point Likert rating scale, internal consistency measure of reliability (Cronbach's Alpha) for

hypothesized groups of questions, and a scoring method for a questionnaire with multiple alternatives, based on actions on 13 items. These items contained information for 10 tasks described earlier. Two sets of comparable questionnaires were developed as post-experiment questionnaires for both experimental groups.

3.8.1 Post-Experiment Questionnaires

A two-part questionnaire was given to the subjects at the completion of the experiment (see Appendix F and G for the simulation and case study questionnaires respectively). The first part of the questionnaire was composed of 21 items (questions), each with a 7-point Likert rating scale. This part was designed to measure subjects' perceptions about the following outcome variables: learning, potential for performance, general satisfaction, realism of the experience, understanding of functional responsibility, time management, and task delegation. Each hypothesized grouping of items (questions) was intended to measure a particular outcome variable. Every attempt was made to use or refer to an item developed and used in other job-design and evaluative research studies. In some instances, the original wordings were modified to make the item appropriate for this experiment (see Appendix H for original items from various references). Some of the items

were specifically developed by the experimenter to provide a desired perspective on any dependent variable in this study. The following section discusses the hypothesized groups of items for perception measures of variables on part 1 of the questionnaire. The groupings are discussed in the context of the in-basket simulation, but the same explanation can be extended for the case study questionnaire.

(A) Learning

"Affective learning" explains the improvement in one's attitudes and beliefs about a certain object or experience due to changes in feeling, emotion and motivation toward it. The "application" and "understanding" levels of cognitive learning and "affective learning" often merge in typical managerial behavior. Therefore, this variable attempts to explain the combined learning effect due to a specific experimental effect.

Two items included in this group attempt to measure the perception of each subject about the potential of learning from the experimental effect. One item was obtained from Hackman and Oldham (1980). This item is one of the standard questions used in many of the past studies of job-design. Another item was developed by the experimenter to measure specifically the potential of

improvement due to the experimental effect. These two items were:

1. The job gave me opportunities to use personal initiative or judgment in carrying out the work.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Hackman and Oldham, 1980; Questionnaire item # 2).

2. I can do a similar job <u>even</u> <u>better</u> next time.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 11).

(B) General Satisfaction

As discussed in the literature review in Chapter 2, many studies have examined general satisfaction with different conceptual approaches. The main purpose of studying "general satisfaction" was to tap the effect of stimulating experimental treatment on subjects' attitudes toward the experience. One of the 3 items in this group was modified from Hackman and Oldham (1980). The experimenter prepared two other items to strengthen the measurement of this variable. The items were:

1. I found the work period interesting.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 5).

2. Generally speaking, I was satisfied with the experience of "working" on this simulated job.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Hackman and Oldham, 1980; Questionnaire item # 7).

3. I liked this simulated job.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 8).

(C) Realistic Experience

External validity of the action-oriented approach using simulation, case study etc. is believed to be the most important factor in the application of this approach. External validity explains the degree to which such an experiment is able to simulate a realistic environment. The main purpose of simulation is to provide an appropriate context to create the experience of various facets of a job. Perceived measure of this factor can also indicate the effect of experience on other variables. Three items were designed for this variable. The following two items were derived from similar items from Miles et al. (1986):

1. This simulation gave me realistic job experience.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 9)

2. I felt as if this simulation was based on a real situation.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 13)

The most important aspect of realism in the experience is to indicate "learning" about a certain environment/ situation. The third item for this group was developed to evaluate this dimension of the variable. Thus, this general variable became more meaningful in the context of evaluating academic/training value of simulation and case study. This item was:

3. I feel that I learned methods which could be used for similar tasks.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 20).

(D) Potential for Performance

Researchers often find that the action-oriented approach generates a variety of self-integrating outcomes including increased awareness, and a greater sense of self-confidence (Bredemeier, 1978, 1981; Rosen, 1981). Mintzberg (1980) observed that a manager's activities are characterized by brevity, variety and fragmentation. He also noted that the open-ended nature of the job compels

the manager to perform a great quantity of work. This indicates the importance of strong preparation of an individual to develop the potential for performance. Three items were used to measure this variable. The following two items were obtained from McCright (1987):

1. I felt nervous about my performance level on this job.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(McCright, 1987; Questionnaire item #1- Reverse scored)

2. It seemed like I had too much work for one person to do.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(McCright, 1987; Beehr, Walsh, and Taber, 1976; Questionnaire item # 18- Reverse scored).

The reverse scores on the above two items were retained to measure the potential of performance through perceived job-related strain and job-demand respectively. A third item was developed to provide a direct measure of this variable. Inclusion of this item provided a reliability check among direct and indirect measures of this variable. The third item was:

3. I think I performed well on this job.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 10).

(E) Understanding of Delegation

The contemporary view of managerial work based on an extensive study of empirical literature in management and research by Mintzberg (1980) support the contention that managerial activities can be categorized into 10 major roles. Furthermore, three major groups can be defined which contain these 10 roles: (1) Interpersonal roles, (2) Informational roles, and (3) Decision-making roles. One of the important decision-making roles of a manager is to discharge his/her duties as an "entrepreneur". Delegation of responsibility and identifying the appropriateness of this decision are crucial factors in an executive job. Different tasks should be evaluated for this alternative of delegating the responsibility. This leads to an understanding of "delegation of responsibility". The following four items were developed for this variable:

1. This experience showed me the value of delegating work to others.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 14).

2. I understood the functions of other people in Springfield Wheelers.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 21).

3. This simulation helped me to see how difficult it is to find the real cause of any problem.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 16).

4. As the simulation progressed, I understood more clearly how the information was interrelated.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 15).

The last two items were designed to bring in the importance of information channels in the organization. It also helped in observing the relevance of delegation to complexity in information processing.

(F) Ease of Time Management

The most crucial part of the manager's work, the part that justifies his/her authority and powerful access to information, is that performed in decision-making roles. Resource allocation is an important management function in the organization. The manager is also faced with myriad decisions involving time allocation. In a broad context, scheduling of time can also be considered as a resource allocation decision. The effect of these decisions can extend beyond the schedule of the manager. It also determines the priorities for action and interests of the organization. The following are the three items used in

the measurement of this variable:

1. I knew the importance of proper allotment of my time during the exercise.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 3).

2. It was easy to prioritize the different tasks.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 12).

Some items from Rizzo, House, and Lirtzman (1970) were referred to while developing the above items. The third item was specifically included in this group to explain the variable with a cause-effect relationship. The reason is that the application of knowledge could explain the ease of time allocation. This also helped in a reliability check of the group to establish the interrelationship of potential of application of knowledge with time management.

3. I tried to apply the knowledge I acquired from different courses.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 17).

(G) Understanding of Functional Responsibility

Mintzberg (1980) made propositions about basic managerial duties. Frederiksen et al.(1972) used "understanding of administrative responsibility" as a

dependent variable for their Bureau of Business In-Basket Test. A review based on empirical data revealed some implications for engineering and management schools. The skill development associated with the job of managing production activities can be greatly influenced by these schools. It is presumably the role of an instructor to inform the students about the essentials of managerial work. The skill of introspection is needed by the students to learn by themselves on the job. "Understanding of functional responsibility" was a relevant variable to this fact about self-learning. The following three items were prepared for this variable:

1. I knew what my responsibilities were in this simulated job.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Rizzo et al., 1970; Questionnaire item # 4).

2. I knew exactly what was expected of me in the simulated job.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Rizzo et al., 1970; Questionnaire item # 6).

3. I understood the functional responsibility of this simulated position.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 19).

Some of the related items were referred from Miles et al.

(1986) while developing these items (see Appendix H for the original items of this reference).

(H) Task Decisions

Part 2 of the questionnaire (see Appendix F and G) was developed to collect the information about the decisions taken by the subjects on a set of tasks. This information was collected through a set of questions with multiple alternatives. Each subject was asked to select the alternative most closely related to his/her action on a specific task in the experiment.

Evaluation of these decisions was accomplished by using a rating scheme suggested by Amabile (1983) for creativity assessment. McCright (1987) used a similar scheme to score productivity, quality and creativity of the participants on various tasks contained in an in-basket simulation. Three raters assigned a rating score to each alternative for a particular task in questionnaire - part 2. They were graduate students in the Industrial Engineering program. All had a significant amount of work experience in an industrial environment. They were also acquainted with the manufacturing environment being simulated in the experiment. They used a Likert scale with anchor points: 1 (Least appropriate) - 4 (Neither appropriate nor inappropriate), and 7 (Most appropriate).

The raters were not given any predetermined standard for evaluating the alternatives. They reviewed the questionnaire independently and assigned the score to each alternative using the above scale.

The independent rating scores were checked for inter-rater reliability using Cronbach's Alpha coefficient. Once the reliability was accepted, all three rating scores were averaged to calculate the final score for an alternative. The output of each subject was then examined by the experimenter. Each subject received a score based on the alternative he/she selected on a particular task. This score was the final rating score assigned to the selected alternative by the raters. The sum of the scores on the entire questionnaire was defined as a composite score of a subject on "task-decisions" (see Chapter 4 for the details of analysis).

3.9. EXPERIMENT PROTOCOL

A standard procedure was followed in conducting the experiment with two groups. Pre-experiment data about gender, academic performance (GPA), age and work experience was collected during subject sign-up sessions. This data was used to assign each subject to a specific group so as to balance the groups on the basis of this data. Upon

arrival each subject was informed to go to the experiment room depending on the assignment.

The experimenter and his colleague followed similar briefing scripts for the two experimental groups. The minor word differences in the scripts were allowed in order to make them applicable to different experimental treatments (see Appendix E for the script).

Thereafter, the subjects in the simulation group were given the copies of the scenario description (see Appendix A) and the reference manual (see Appendix C). The subjects in the case study group received these materials in a different format but containing identical information (see Appendix C). Questions about any of these materials were answered by the experimenter and his colleague. The in-basket material was then distributed to the simulation group. This material was composed of various memos, letters, reports and messages (see Appendix A). On the other hand, subjects in the case study group were given copies of a case description (see Appendix B). Subjects in both the groups were told to feel free to write any remark or decision on the material given to them. All the subjects were reminded of the scenario setup. The time constraint for both the groups was exactly one hour. The subjects were asked to make decisions on different tasks

included in the in-basket simulation or the case study. The amount of information available to both the groups was identical, but the method of presentation was different.

After exactly one hour, the subjects were informed that the work-period was over. The first part of the questionnaire was then distributed to the subjects in both groups. This questionnaire had identical questions with minor word changes to make it group specific. The subjects were then asked to complete this part of the questionnaire based on their reactions to the experience of either the simulation or the case study. They were allowed to refer back to the experiment material for this purpose.

Upon completion of this part of the questionnaire in the allotted time of 15 minutes, the second part of the questionnaire was distributed to the subjects. This part of the questionnaire was designed to collect data on the actual decisions of the subjects on different tasks in the experiment. The subjects were asked to mark their actual decision for each task from the list of alternatives provided for each task (see Appendix F and G for part 2 of the questionnaire for the simulation and case study groups respectively). The experiment material was collected from every subject after completion of this part of the questionnaire. The material and the accompanying

questionnaire was given a unique number to identify a particular subject in an experimental group. The subjects were then allowed to leave the experiment room.

3.10. SUMMARY

The outcome variables of interest were explained in this chapter. The experimental hypothesis considered here will be evaluated in the next chapter using those outcome variables. The data collected from this experiment will be analyzed to identify statistically significant differences between two groups. The next chapter will also describe the methods of analysis. The reliability of the measures will be established for each outcome variable and the results of the statistical analysis will be reported.

CHAPTER 4

ANALYSIS OF DATA

The statistical analysis of the data gathered from the experiment described in Chapter 3 is reported in this chapter. The measurement instrument in Chapter 3 described the hypothesized groups of items on part 1 of the questionnaire. These groups of items purport to measure the set of outcome variables of interest for this study. The reliability of this instrument was tested using Cronbach's Coefficient Alpha. This coefficient is the internal consistency measure of reliability within a group of items. Once an acceptable value of this measure was established, a test of variances was run for each dependent variable. This test was the F-test with a null hypothesis that the group variances were equal. The means of the responses of the two experimental groups were then compared for each dependent variable by Student's t-tests. The weighted average of sample variances (pooled estimate) was used in the condition of equal variances. Otherwise, separate estimates of the variances were used for the t-tests.

Part 2 of the questionnaire provided the information about the task decisions of the subjects. As discussed in Chapter 3, three judges evaluated the alternative decisions

for each task and assigned the scores independently. Inter-rater reliability of this scheme was checked by Cronbach's Alpha coefficient for each item in questionnaire- part 2. An average rating score was used to assign a score to each subject depending on his/her decision. Finally, a composite score for each subject was calculated by addition of the scores gained on all items in questionnaire- part 2. This variable of "task decisions" was then analyzed using a similar approach described above for part 1 of the questionnaire.

4.1. HYPOTHESIS TESTING

The choice of the significance level for the t-tests should be a result of both the practical considerations and the power of the test considerations. The case study approach has been used for a long time in management and engineering schools. The preparation for in-basket simulation could cost almost the same amount as the case study (Boyd, 1976). As a result, costs of incorporating the simulation approach along the lines of case study would not justify a very critical alpha level. Furthermore, the study was based on the evaluation of some outcome variables of human behavior. Many of the research studies in behavioral sciences and job design have considered significance at 0.05 level. Hence it was unwise to employ

a very rigid alpha level that would unduly decrease the power of the test. This could, in turn, fail to detect a false null hypothesis (type II error).

Hypothesis testing with a preset value of alpha has been rejected in recent years by many researchers. Another approach followed frequently is to specify the null and alternative hypotheses and determine the weight of evidence for rejecting the null hypothesis (Ott, 1988). This weight is given in terms of probability and is called the "level of significance" (p-value) of the statistical test. The purpose of this study was also to encourage the instruction efforts in management oriented courses in engineering schools toward the simulation approach. This would depend on any statistically significant finding from this study. Hence this approach is followed in reporting the results of t-tests with significance level p-value and also the preset alpha of 0.10 and 0.05.

4.2. METHODS OF ANALYSIS

4.2.1. Reliability Coefficient

The responses of the subjects in both the experimental groups were collected from the items (questions) in part 1 of the questionnaire. These perceived measures of various outcome variables were dependent on the hypothesized groups

of items on the questionnaire. Therefore, the reliability of this measurement instrument was very important for the analysis. Cronbach's Alpha coefficient (Crocker and Algina, 1986) was used to establish the reliability of each individual group of items that attempt to measure subjects' responses to a particular outcome variable. This coefficient is defined as an internal consistency measure of reliability. The following formula defines the coefficient mathematically:

$$\alpha = \frac{K}{K-1}\left[1 - \frac{\sum_{i=1}^{K} \sigma_i^2}{\sigma_t^2}\right]$$

where K = Total number of items in the group,

σ_i = Standard deviation of responses for an item.

σ_t = Standard deviation of total score (sum of responses of all items in a group)

4.2.2. Test of Variances (F-test)

Student's t-test was used to compare the mean of the responses of the simulation group to the mean of the responses of the case study group for each variable. The t-test assumes that the variances of the two independent groups are equal. The F-test was run for each variable in order to test the null hypothesis of equality of group variances. The results of F-tests determined whether the weighted average of group variances (pooled estimate) or the separate estimate of variances was used in t-tests. An

alpha level of 5% was considered in defining the statistically significant difference of variances.

4.2.3. Test of Mean Comparisons (Two sample t-test)

The inferences about the difference in mean responses of two experimental groups can be drawn from Student's t-test. The two experimental groups were independent samples for this study. Therefore, a two sample t-test was run after an equal variance check by the test of variances (F-test) mentioned earlier. The weighted average of sample (group) variances was considered as an estimate of the variance for the two populations when the F-test failed to reject the null hypothesis. In the reverse case of unequal sample variances, the separate variance t-test was used for mean comparisons between the two groups. The null hypothesis of equality of group means was tested for each variable. The level of significance (p-value) was mentioned for the significance of the mean differences for each variable. The Wilcoxon Rank Sum test provided a non-parametric evaluation for the comparison of two groups. All the responses of both groups were put into a single array for each item on part 1 of questionnaire. The ranks were assigned to the combined array. Finally, the smaller sum of ranks was examined to determine the significance between the two groups.

4.3. ANALYSIS OF THE OUTCOME VARIABLES

The above methods of analysis were applied to the outcome variables discussed in Chapter 3. The following sections describe the results of these analyses for each variable. The hypothesized group of items (questions) used for each outcome variable is reproduced here for convenient reference. The inter-item correlation matrix and the relevant Cronbach's Alpha coefficients are mentioned for each variable. This is followed by the F-test to test the equality of variances. The means of the responses are compared by the two sample t-test using appropriate estimate of population variance. The level of significance (p-value) for the t-tests is included in the discussion. The Wilcoxon Rank Sum test (Mann-Whitney U-test), the non-parametric alternative for the mean comparisons of independent groups, is also run for each variable. This provides a further check on the results obtained from t-tests.

4.3.1. Learning

The following group of items was hypothesized to measure this dependent variable:

1. The job gave me opportunities to use personal initiative or judgment in carrying out the work.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Hackman and Oldham, 1980; Questionnaire item # 2).

2. I can do a similar job even better next time.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 11).

The inter-item correlations for this variable are shown in Table 4.1.

Table 4.1. Inter-Item Correlation Matrix for the Variable "Learning".

	Item 2	Item 11
Item 2	1.00	
Item 11	0.53	1.00

The standardized item alpha of this group is 0.68. This is an acceptable level of Cronbach's Alpha for human data to represent good convergent validity of this instrument. Thus, the perceived measure of "learning" was calculated by average of the responses on these two items (questionnaire item #2 and #11) for each subject of both groups. The F-test was run to test the null hypothesis of equal variance for the two groups. Table 4.2 contains the result of this test.

Table 4.2. Test of Variances (F-test) for the Variable "Learning".

Group *	Number of subjects	Mean	Standard deviation	Standard error	F statistic	p > F
C	11	4.136	0.8969	0.2704	1.26	0.7261
S	11	5.590	0.8005	0.2414		

* C = Case study group; S = Simulation group.

The probability value of 0.7261 failed to reject the null hypothesis of equal variances. So the estimate of population variance was calculated by the pooled average of the sample (group) variances. The null hypothesis tested was that the means of responses for "learning" are equal for the two groups. The alternative hypothesis was that the mean of either of the two groups was higher than the mean of the other group. This conservative approach was followed with a two-tailed test. Table 4.3 shows the results of the t-test for equal variances.

Table 4.3. Test of Means (t-test) for the Variable "Learning".

T Statistic	Degrees of freedom	2-tailed probability of significance
-4.026	20	0.0007

The null hypothesis of equal group means was rejected at a significance level of $p < 0.001$. Referring to the means of the groups from Table 4.2, it can be concluded that the response mean of the simulation group was significantly higher than the response mean of the case study group for "learning" at the 0.1% level. The Wilcoxon Rank Sum test also indicated that the mean of responses for the simulation group was significantly higher than that of case study group at $p < 0.005$.

4.3.2. Potential for Performance

As discussed earlier in Chapter 3, three items (#1, #10 and #18) in the measurement instrument attempt to measure this variable. Items 1 and 18 are reverse-scored to get the responses of the subjects to this variable. The three items are as follows:

1. I felt nervous about my performance level on this job.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(McCright, 1987; Questionnaire item #1- Reverse scored)

2. It seemed as if I had too much work for one person to do.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(McCright, 1987; Beehr, Walsh, and Taber, 1976; Questionnaire item # 18- Reverse scored).

3. I think I performed well on this job.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 10).

The inter-item correlation matrix for the above group of items is shown in Table 4.4.

Table 4.4. Inter-Item Correlation Matrix for the Variable "Potential for Performance".

	Item 1	Item 10	Item 18
Item 1	1.00		
Item 10	0.68	1.00	
Item 18	0.65	0.26	1.00

The reliability of the composite score on the three items as a measure of this variable was checked by Cronbach's Alpha. The value of 0.75 for this coefficient demonstrated internal consistency for this group of items. The average of the responses for these three items was considered as a score on this variable. The F-test result for test of equality of variances is summarized in Table 4.5.

Table 4.5. Test of Variances (F-test) for the Variable "Potential for Performance".

Group *	Number of subjects	Mean	Standard deviation	Standard error	F statistic	p > F
C	11	3.242	0.8851	0.2662	2.40	0.1827
S	11	4.515	1.3692	0.4128		

* C = Case study group; S = Simulation group.

The probability level of 0.1827 for p (greater F) failed to reject the null hypothesis of equal variances at 5% significance level. So, a pooled average of the sample variances was considered in an independent sample t-test. The result of this t-test is shown in Table 4.6.

Table 4.6. Test of Means (t-test) for the Variable "Potential for Performance".

T Statistic	Degrees of freedom	2-tailed probability of significance
-2.59	20	0.0175

The t-statistic and associated probability value provided enough evidence to reject the null hypothesis of equal means of the two groups. Referring to the response means of the two groups in Table 4.5, it can be explained that the response mean of the simulation group on "potential for performance" was significantly higher than that of the

case study group at $p < 0.02$ (i.e. 2% level). This significance level was $p < 0.03$ for the Wilcoxon Rank Sum test.

4.3.3. General Satisfaction

The perceived measure of "general satisfaction" about the experimental condition was obtained by subject responses to the following group of items:

1. I found the work period interesting.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 5).

2. Generally speaking, I was satisfied with the experience of "working" on this simulated job.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Hackman and Oldham, 1980; Questionnaire item # 7).

3. I liked this simulated job.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 8).

Table 4.7 shows the inter-item correlation matrix for the above group of items.

Table 4.7. Inter-Item Correlation Matrix for the Variable "General Satisfaction".

	Item 5	Item 7	Item 8
Item 5	1.00		
Item 7	0.50	1.00	
Item 8	0.83	0.62	1.00

The reliability of this instrument was tested by Cronbach's Alpha. This coefficient was found to be 0.85 for the responses on these three items. This value verified that the group of these items provided the measure of the same characteristic. The F-test was run on the average of responses on these items (the composite score). The result of this test is summarized in Table 4.8.

Table 4.8. Test of Variances (F-test) for the Variable "General Satisfaction".

Group	Number of subjects	Mean	Standard deviation	Standard error	F statistic	p > F
C *	11	4.515	1.3280	0.4004	2.45	0.1733
S *	11	5.515	0.8480	0.2557		

* C = Case study group; S = Simulation group.

The F-statistic and p (greater F) level of 0.1733 revealed that the null hypothesis about the equality of variances

could not be rejected at a significance level of 5%. Hence, a pooled estimate of variance was used for the t-test of mean comparisons. The following Table 4.9 contains the result of the t-test:

Table 4.9. Test of Means (t-test) for the Variable "General Satisfaction".

T Statistic	Degrees of freedom	2-tailed probability of significance
-2.10	20	0.0481

The t-statistic and associated 2-tailed probability value provided enough evidence to reject the null hypothesis of equality of response means for "general satisfaction". The mean values of responses in Table 4.8 indicated that the response mean of the simulation group was higher than that of the case study group at a level of significance $p < 0.05$ (i.e. 5% level). The Wilcoxon Rank Sum test revealed the significance at $p < 0.07$ for this variable.

4.3.4. Realistic Experience

Perceived measure of this factor was obtained through the following group consisting of three items:

1. This simulation gave me realistic job experience.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 9)

2. I felt as if this simulation was based on a real situation.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 13)

3. I feel that I learned methods which could be used for similar tasks.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 20).

The inter-item correlations are shown in Table 4.10. The Cronbach's Alpha was calculated to indicate the reliability of these items as a measure of perception about "realistic experience".

Table 4.10. Inter-Item Correlation Matrix for the Variable "Realistic Experience".

	Item 9	Item 13	Item 20
Item 9	1.00		
Item 13	0.50	1.00	
Item 20	0.58	0.52	1.00

The alpha coefficient of 0.77 was a sufficiently high value to accept the group of items in the measurement instrument. Therefore, the average of the scores on the three items was

considered as the score representing the perception of "realistic experience". Table 4.11 shows the result from the F-test on the group variances of this score.

Table 4.11. Test of Variances (F-test) for the Variable "Realistic Experience".

Group *	Number of subjects	Mean	Standard deviation	Standard error	F statistic	p > F
C	11	4.394	0.9980	0.3009	1.46	0.5632
S	11	5.212	1.2044	0.3631		

* C = Case study group; S = Simulation group.

Here, the null hypothesis of the equality of variances could not be rejected at a significance level of 5%. Hence, a pooled estimate of variance was used in the t-test for the mean comparisons. The following Table 4.12 contains the result of the t-test:

Table 4.12. Test of Means (t-test) for the Variable "Realistic Experience".

T Statistic	Degrees of freedom	2-tailed probability of significance
-1.73	20	0.0981

The null hypothesis about the equality of response means for perceived "realistic experience" was rejected at the

significance level of $p < 0.1$. The means of responses in Table 4.11 indicated that the response mean for "realistic experience" in the simulation group was higher than that in the case study group at a significance level of $p < 0.1$ (i.e. 10% level). The Wilcoxon Rank Sum test also indicated the significance at $p < 0.1$.

4.3.5. Ease of Time Management

The following three items were designed to measure perception of this outcome variable:

1. I knew the importance of proper allotment of my time during the exercise.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 3).

2. It was easy to prioritize the different tasks.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 12).

3. I tried to apply the knowledge I acquired from different courses.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 17).

The inter-item correlations are shown in Table 4.13. The Cronbach's Alpha is calculated for this group of items before considering a composite score for this variable.

Table 4.13. Inter-Item Correlation Matrix for the Variable "Ease of Time Management".

	Item 3	Item 12	Item 17
Item 3	1.00		
Item 12	0.34	1.00	
Item 17	0.45	0.41	1.00

The alpha coefficient of 0.65 established the reliability of the group of items for measurement of this variable. Then the average of the scores on the three items was considered as the score representing the perception of "ease of time management". Table 4.14 shows the result of the F-test for the group variances on this score.

Table 4.14. Test of Variances (F-test) for the Variable "Ease of Time Management".

Group	Number of subjects	Mean	Standard deviation	Standard error	F statistic	p > F
C *	11	4.667	1.1155	0.3363	2.07	0.2656
S *	11	5.333	0.7746	0.2335		

* C = Case study group; S = Simulation group.

The F-statistic and the corresponding probability level of 0.2656 for p (greater F) failed to reject equality of

variances at a significance level of 5%. Hence, a pooled estimate of variance was used in the t-test for the mean comparisons. The following Table 4.15 contains the result of the t-test:

Table 4.15. Test of Means (t-test) for the Variable "Ease of Time Management".

T Statistic	Degrees of freedom	2-tailed probability of significance
-1.63	20	0.1192

The above two-tailed t-test compared the means of perceived "ease of time management" of the two groups. The mean difference was not significant at a level of $p < 0.1$ (i.e. 10% level). Therefore, the null hypothesis about equality of response means of the two groups could not be rejected at 10%. Although the difference between the means was not significant at this level, the mean of simulation group was higher than that of case study group (see Table 4.14 for means of the groups). The level of significance was found to be $p < 0.2$ from the Wilcoxon Rank Sum test. Thus the difference between the group means for "ease of time management" was not significant at $p < 0.1$.

4.3.6. Understanding of Delegation of Responsibility

Four items were developed to obtain the perceived measure of this variable in both experimental groups.

1. This experience showed me the value of delegating work to others.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 14).

2. I understood the functions of other people in Springfield Wheelers.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 21).

3. This simulation helped me to see how difficult it is to find the real cause of any problem.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 16).

4. As the simulation progressed, I understood more clearly how the information is interrelated.

1	2	3	4	5	6	7
Disagree strongly			Neither agree nor disagree			Agree strongly

(Questionnaire item # 15).

The reliability coefficient for the above group of items was 0.52. This was not adequate to support the contention that these items measure the same attribute or characteristic. Hence item #15 was dropped from this group and the remaining items were tested again. The correlations among these items are shown in Table 4.16.

Table 4.16. Inter-Item Correlation Matrix for the Variable "Understanding of Delegation of Responsibility".

	Item 14	Item 16	Item 21
Item 14	1.00		
Item 16	0.53	1.00	
Item 21	0.35	0.58	1.00

The Cronbach Alpha coefficient 0.72 was deemed adequate to accept the group of items as a representative of a single variable - "understanding of delegation of responsibility". A perception-based score for this variable was obtained by averaging the scores on the above items. The result of the F-test is presented in Table 4.17. This test verified the equality assumption of the variances for the t-test.

Table 4.17. Test of Variances (F-test) for the Variable "Understanding of Delegation of Responsibility".

Group	Number of subjects	Mean	Standard deviation	Standard error	F statistic	p > F
C *	11	5.060	0.7275	0.2194		
S *	11	4.756	1.3173	0.3972	3.28	0.0747

* C = Case study group; S = Simulation group.

The difference between the group variances was not significant at a level of 5% but was significant at 10%. Hence, an approximation of the t-statistic (t') was used for the mean comparisons. The degrees of freedom were calculated by Satterthwaite's approximation formula. The result from this separate variance t-test is summarized in Table 4.18.

Table 4.18. Test of Means (t-test) for the Variable "Understanding of Delegation of Responsibility".

T' Statistic	Degrees of freedom	2-tailed probability of significance
0.67	15.6	0.5140

The t'-statistic and the probability level of 0.5140 for p (greater t') indicated that the difference between the two group means for "understanding of delegation of responsibility" was not significant at alpha of 0.1 (i.e. 10% level). The Wilcoxon Rank Sum test verified the result that the means were not significantly different at $p < 0.1$ for the "understanding of delegation of responsibility".

4.3.7. Understanding of Functional responsibility

The perceived measure of this variable was tapped by the following three items on the questionnaire. The validity of combining the scores (responses) on these items

was established by testing Cronbach's Alpha coefficient.

1. I knew what my responsibilities were in this simulated job.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Rizzo et al., 1970; Questionnaire item # 4).

2. I knew exactly what was expected of me in the simulated job.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Rizzo et al., 1970; Questionnaire item # 6).

3. I understood the functional responsibility of this simulated position.

1	2	3	4	5	6	7
Very false			Neutral			Very true

(Questionnaire item # 19).

The correlations among these items are shown in Table 4.19.

Table 4.19. Inter-Item Correlation Matrix for the Variable "Understanding of Functional Responsibility".

	Item 4	Item 6	Item 19
Item 4	1.00		
Item 6	0.70	1.00	
Item 19	0.75	0.62	1.00

The Cronbach Alpha coefficient of 0.87 was adequate to accept this group of items for the measurement of the variable - "understanding of functional responsibility".

Hence the average score on these three items was calculated to obtain a perception-based score of this variable. The equality assumption of the group variances was tested by the F-test. Table 4.20 contains the result of this test.

Table 4.20. Test of Variances (F-test) for the Variable "Understanding of Functional Responsibility".

Group *	Number of subjects	Mean	Standard deviation	Standard error	F statistic	p > F
C	11	4.030	1.2863	0.3878	1.32	0.6682
S	11	3.818	1.1192	0.3374		

* C = Case study group; S = Simulation group.

The F-statistic and the probability level for p (greater F) of 0.6682 failed to reject the null hypothesis of equal variances at 5% significance level. The pooled estimate of variance was used in the t-test. The result from this t-test is summarized in Table 4.21.

Table 4.21. Test of Means (t-test) for the Variable "Understanding of Functional Responsibility".

T Statistic	Degrees of freedom	2-tailed probability of significance
0.41	20	0.6843

The t-statistic and the probability level of 0.6843 for p (greater t) indicated that the difference between the two group means for "understanding of functional responsibility" was not significant at a level of $p < 0.1$ (i.e. 10% level). The Wilcoxon Rank Sum test confirmed that the mean difference was not significant at $p < 0.1$.

4.3.8. Decisions on Tasks

The decision on each task was evaluated using the ratings of three judges assigned to the alternatives for each item. Part 2 of the questionnaire provided a list of possible courses of action for each item contained in the simulation and case study. The set of alternative actions was rated by three judges independently using a Likert scale (Least Appropriate (1) to Most Appropriate (7)). A composite score based on all the items in the simulation or case study was calculated for every participant. The inter-judge correlation matrix was developed for the rating of each item. The reliability coefficient (Cronbach's Alpha) was calculated to provide the internal consistency measure of reliability for this instrument. Table 4.22 contains the values of Cronbach's Alpha for the ratings of all items. This method of evaluation for the in-basket tasks was more appropriate than a subjective evaluation of responses to open-ended questions about the decision on a particular item (McCright, 1987). The values of

Cronbach's Alpha ranged from 0.75 to 0.94. These values were adequate to accept the rating scheme. The average rating scores were assigned to each alternative action for an item.

Table 4.22. Values of Reliability Coefficient (Cronbach's Alpha) for ratings of items by three judges.

Item Number on Questionnaire: Part 2	Reliability Coefficient (Cronbach's Alpha)
1	0.85
2	0.88
3	0.86
4	0.87
5	0.75
6	0.94
7	0.83
8	0.87
9	0.78
10	0.92
11	0.91
12	0.89
13	0.92

The equality assumption of the group variances was tested by the F-test. Table 4.23 contains the result of this test for "task-decisions".

Table 4.23. Test of Variances (F-test) for the Variable "Task Decisions".

Group *	Number of subjects	Mean	Standard deviation	Standard error	F statistic	p > F
C	11	51.727	5.6761	1.7114	1.01	0.9937
S	11	55.636	5.6617	1.7070		

* C = Case study group; S = Simulation group.

The F-statistic and the probability value 0.9937 for p (greater F) failed to reject the null hypothesis of equal variances at 5% significance level. The pooled estimate of variance was used in the t-test. The result from this t-test is summarized in Table 4.24.

Table 4.24. Test of Means (t-test) for the Variable "Task Decisions".

T Statistic	Degrees of freedom	2-tailed probability of significance
-1.61	20	0.1215

The t-statistic and the probability level of 0.1215 indicated that the difference between the two group means for "task decisions" was not significant at a level of p < 0.1 (i.e. 10% level). But it should be noted that the mean of simulation group was higher than the case study group. The Wilcoxon Rank Sum test confirmed that the mean

difference was not significant at $p < 0.1$.

4.4. SUMMARY OF ANALYSIS

A null hypothesis of equal means for two groups was considered in this study. Both parametric (t-test) and non-parametric (Wilcoxon Rank Sum test) methods were used to evaluate this hypothesis. Table 4.25 summarizes the analysis of all outcome variables.

Table 4.25. Summary of Analysis.

Outcome variables	Level of Significance	Group with higher Mean
Learning	$p < 0.001$	Simulation
Potential for Performance	$p < 0.02$	Simulation
General Satisfaction	$p < 0.05$	Simulation
Realism of Experience	$p < 0.10$	Simulation
Ease of Time Management	NS*	-
Understanding of Delegation	NS	-
Understanding of Functional Responsibility	NS	-
Task Decisions	NS	-

* NS = Not significant at $p < 0.1$.

Statistically significant positive effects of the in-basket simulation were found for learning, potential for

performance, realistic experience and satisfaction. The group means were not significantly different for ease of time management, understanding of delegation and functional responsibility, and task decisions. However, the later was still a useful result in that the in-basket simulation was able to exhibit an equivalent level of applicability of a case study. Further discussion of the results and the implications of this study will be provided in Chapter 5.

CHAPTER 5

RESULTS AND CONCLUSIONS

Chapter 4 described the methods of data analysis for this experiment. This chapter will explain the results from these statistical analyses. Further, it will also draw important conclusions from the results of this study. The scope of future research will be identified and some constructive recommendations will be made for more controlled and detailed studies in the future. The contribution of this study will be explained consistent with the research question and experimental hypothesis established in Chapters 1 and 3 respectively.

5.1. THE DISCUSSION OF RESULTS

The methods of data analysis were explained in the previous chapter. The test of differences was run for each dependent variable to evaluate the null hypothesis of equality of means of responses of two groups.

The perception-based variables and task decisions were measured for both the groups. The following conclusions can be drawn about the effect of independent variables from the analysis:

(1) In-basket job simulation has a statistically significant positive effect compared to a case study on

perceived potential for performance on a similar job of managerial work, experience of realism of the environment, learning and general satisfaction toward the experience.

The above conclusion can be extended to the following statement due to the specific application in this experiment:

(2) Job simulation can provide a more realistic experience of the production management environment. The potential for learning and performance are higher than that in a case study. The participants can derive a greater degree of satisfaction from simulation than from a case study.

The in-basket simulation differs from a case study in that it requires the participant to identify the problems embedded in the in-basket material. Various items in the in-basket provide important bits of information to the participant about a particular problem. The participant is required to bring these bits of information together. This additional step in the entire problem solving process develops a higher degree of involvement in the simulated environment. In addition to this, the material of the in-basket enhances the realness of the simulated environment to a higher extent than a case study. On the other hand, discussion of problems in the case does not require the participant to identify tasks from the case description as

they are already furnished in an organized pattern. It can be speculated that the higher degree of realistic experience from the in-basket simulation might bring in more involvement with the experience. This may lead to more satisfaction from the experience which may, in turn, exhibit a higher potential of learning and performance from the experience.

The results of this study lead to a generalized conclusion about a potential application of in-basket simulation:

(3) The in-basket simulation technique can be incorporated into management oriented education/training in a production environment by the engineering schools.

5.2. RECOMMENDATIONS FROM THE STUDY

Larger sample size is strongly recommended in future studies of this nature. This might bring out a stronger association between independent and dependent variables. Adequate sample size with respect to the number of variables in the study would make factor analysis feasible. This study could consider only the psychometric factor analysis using Cronbach's Alpha. The stability of factor loading in principal component factor analysis requires a ratio of sample size to a variable to be at least 5:1 for

each variable (Thorndike, 1978).

The generalized nature of the contents of the simulation and case study is also a limiting factor in this study. Future studies of this nature should sample the subjects from a student population in specific areas where they already have some knowledge, such as Computer Integrated Manufacturing Concepts, Statistical Quality Control, or Work Design and Facility Layout. This would help tremendously in developing precisely job-specific simulations and case studies. The generalized results from these studies with such course-specific contents would be able to explore the applicability of in-basket simulations. It will also contribute to the development of an effective instructional tool to teach the management aspects in the engineering curriculum.

Some of the sources of variability such as academic ability (GPA) and gender were controlled in the study. It is recommended that some additional person-dependent variables such as personality and creative ability should be included in the investigation. A set of psychological variables may affect the performance and attitude of an individual in the action-oriented approach to education and training.

5.3. AREAS FOR FUTURE RESEARCH

The effect of two different action-oriented techniques of management training, namely in-basket simulation and case study, were evaluated on a set of dependent outcome variables. This study also examined the application of an in-basket job simulation as a viable option to the case study in the education and training for the production management activities. The findings of this study imply that further investigation in this direction is needed.

Future studies should develop simulations more specific to a topic than of a general nature, in order to evaluate the effectiveness pertaining to a specific topic. The contents of the simulation and case study can be modified to make the experiment specific to a particular topic of interest. For example, a simulation or a case study can be devised which deals with the managerial tasks involved in production and inventory control function for the class of Production Planning and Inventory Control.

More performance measures should be developed for this purpose. This improvement in the measurement instrument would make it a better predictor of educational and training capabilities of techniques such as in-basket job simulation and case-studies.

5.4. CONTRIBUTION OF THE STUDY

The design of the study is strong due to the comparative evaluation of the in-basket simulation with another action-oriented technique, the case study, which is widely accepted and utilized in management education. The use of case studies is also found in engineering schools in management courses but the in-basket simulation has not been used for this purpose. A majority of the studies in the past have evaluated the applicability of in-basket type management simulation in training and selection of personnel, and management development research. This study evaluated the relative effectiveness of in-basket simulation compared to a case study to find its potential application in industrial management instruction.

The results of the analyses of outcome variables demonstrate significant differential effects between two experimental groups. The conclusions about the effects of in-basket simulation compared to a case study on dependent variables may be valuable for academic application in the Industrial Engineering curriculum. This study provided enough evidence to incorporate management simulations in class-rooms. The study also contributed to the development of in-basket simulation as an educational tool applicable to the instruction of production management topics.

REFERENCES

Amabile, T. M. The Social Psychology of Creativity. New York: Springer-Verlag, 1983.

American Psychological Association, Inc. Standards for Educational and Psychological Tests. Washington, D.C., 1974.

Ashmun, R. D. "The effectiveness of a non-computer business game in teaching post-high school business problem classes", Ph.D. Dissertation, University of Minnesota, 1966.

Biggs, W. D. "Some impacts of varying amounts of information on frustration and attitudes in a finance game" in R. H. Buskirk (ed.) Proceedings of the Second Annual Conference of the Association for Business Simulation and Experiential Learning. 1975.

Bilick, H. A. "The effects of a simulation game on intergroup attitudes as a function of conceptual level", Ph.D. Dissertation, University of Cincinnati, 1974.

Birnbaum, R. "Games and simulations in higher education", Simulation and Games. March, 1982, vol.13, no.1, p.3-11.

Bloom, B. S., Engelhart, M. B., Furst, E. J., Hill, W. H., and Krathwohl, D. R. Taxonomy of Educational Objectives - The Classification of Educational Goals - Handbook 1: Cognitive Domain. New York: Longmans Green, 1956.

Blythe, S. E., and Gosenpud, J. J. "A relative evaluation of experiential and simulation learning in terms of perceptions of effected changes in students", in W. D. Biggs and D. J. Fritzche (eds.), Proceedings of the Eighth Annual Conference of the Association for Business Simulation and Experiential Learning. 1981.

Boseman, F. G., and Schellenberger, R. E. "Business gaming: An Empirical Appraisal", Simulation and Games. 1974, vol.5, p.383-402.

Boyd, C. W. "A comparison of the effects of three teaching methods on learning achievement and attitudes in a Principles of Management course", Ph. D. Dissertation, Kansas State University, 1976.

Boydell, T. Experimental Learning. Monograph No. 5, University of Manchester, 1976.

Brass, D. J., and Oldham, G. R. "Validating an in-basket test using an alternative set of leadership scoring dimensions", Journal of Applied Psychology. 1976, vol.61, no.5, p.652-657.

Bredemeier, M. E. "Providing referents for sociological concepts: Simulation gaming", Teaching Sociology. July, 1978, vol.5, p.409-421.

Bredemeier, M. E. "Simulation games in counselor training", SIMAGES. Spring, 1981, vol.3.

Bredemeier, M. E., and Greenblat, C. S. "The educational effectiveness of simulation games- A synthesis of findings", Simulation and Games. September, 1981, vol.12, no.3, p.307-332.

Brenenstuhl, D. C. "An experimental study of performance in a basic management course", Proceedings of the Association for Business Simulation and Experiential Learning, April 9-11, 1975, p.83-91.

Burch, J. G. "Business games and simulation techniques", Managerial Accounting. 1969, no.51, p.49-52.

Burgoyne, J. G., Boydell, T. H., and Pedler, M. J. Self-Development: Theory and Applications for Practitioners. London: ATM, 1978.

Butler, R. J., Pray, T. F., and Strang, D. R. "An extension of Wolfe's study of simulation game complexity", Decision Sciences. 1979, vol.10, p.480-486.

Cangalosi, V. E., and Dill, W. R. "Organizational learning: observations toward a theory", Administrative Science Quarterly. 1965, vol.10, p.175-203.

Cascio, W. F., and Bass, B. M. "The effects of role play in a program to modify attitudes toward black employees", Journal of Psychology. 1976, no.92, p.261-266.

Catalanello, R. F., and Brenenstuhl, D. C. "An assessment of the effect of experimental simulation and discussion pedagogies used in laboratory sections of an introductory management course", in C. C. Nielsen (ed.) Proceedings of the Fourth Annual Conference of the Association for Business Simulation and Experiential Learning. 1977.

Center for Creative Leadership. "A mirror for managers: using simulation to develop management teams", Technical Report 23. Greeensboro, NC, 1983.

Charalambides, L. C. "Experiential learning and the scientific approach - An application to managerial problem-solving", Simulation and Games, Sept., 1984, vol.15, no.3, p.275-295.

Chisholm, T. A., Krishnakumar, P., and Clay, J. P. "An examination of the perceived effectiveness of computer simulation in a classroom setting as affected by game, environmental and respondent characteristics", in D. C. Brenenstuhl and S. C. Certo (eds.) Proceedings of the Sixth Annual Conference of the Association for Business Simulation and Experiential Learning. 1979.

Chisholm, T. A., Krishnakumar, P., and Clay, J. P. "An exploratory investigation of student perceptions of computer simulation as an educational tool", in D. C. Brenenstuhl and S. C. Certo (eds.) Proceedings of the Fifth Annual Conference of the Association for Business Simulation and Experiential Learning. 1978.

Clore, G. L., and Jeffrey, K. M. "Emotional role playing, attitude change and attraction toward a disabled person", Journal of Personality and Social Psychology, 1977, no.23, p.105-111.

Cohen, K. J., Dill, W. R., Kuehn, A. A., and Winters, P. R. The Carnegie Tech Management Game. Homewood, Illinois: Richard D. Irwin, 1964.

Cohen, S. L., and Gump, H. F. "Using simulations to improve selection decisions", Training and Development Journal, Dec. 1984, p.85-88.

Crocker, L., and Algina, J. Introduction to Classical and Modern Test Theory. New York: Holt, Rinehart and Winston, Inc., 1986, p.138.

Duke, R. D. "Management under complexity: gaming/simulation as a predecisional tool", Simulation and Games. September 1982, vol.13, no.3, p.365-373.

Easterby-Smith, M. Evaluation of Management Education, Training and Development. Aldershot, Hants, England: Gower Publishing Company Limited, 1986.

Equal Employment Opportunity Commission. "Uniform guidelines on employee selection procedures", Federal Register. August 25, 1978, 38290-3815.

Evered, R. D., and Pearce, J. A. "Business simulation as an alternative to case analysis for teaching corporate strategy formulation skills", Proceedings of the 13th Annual Symposium of the National Gaming Council. Pittsburgh, PA, October 8-10, 1974, p. 409-414.

Faria, A. J., and Nulsen, R. O., Jr. "Student evaluation of and reaction to a marketing simulation game under varying circumstances" in R. H. Buskirk (ed.) Proceedings of the Second Conference of the Association for Business Simulation and Experiential Learning. 1975.

Fletcher, J. H. "The use of simulation games in instruction", Presented at the National Gaming Council Symposium. Washington, D. C., 1970.

Frederiksen, N. "Proficiency tests for training evaluation" in R. Graser (ed.) Training Research and Education. Pittsburgh: University of Pittsburgh Press, 1962a, p.323-346.

Frederiksen, N. "Factors in in-basket performance", Psychological Monographs: General and Applied. 1962b, vol.76, no.22, p.1-25.

Frederiksen, N., Jensen, O., and Beaton, A. E. Prediction of Organizational Behavior. New York: Pergamon Press, Inc., 1972.

Frederiksen, N., Saunders, D. R., and Wand, B. "The in-basket test", Psychological Monographs: General and Applied. 1957, vol.71, no.9, p.1-28.

Friedman, B. A., and Mann, R. W. "Employee assessment methods assessed", Personnel. 1981, vol.58, no.6, p.69-74.

Fripp, J. "Business games can be educational too!", Journal of European Industrial Training, June, 1984, vol.8, p. 27-32.

Graham, R. G., and Gary, C. F. Business Games Handbook. New York: American Management Association, 1969.

Greenblat, C. S. "Teaching with Simulation Games: A review of Claims and Evidence" in C. S. Greenblat and R. D. Duke (eds.) Gaming-Simulation: Rationale, Design and Applications. New York: John Wiley, 1975, p.270-284.

Greenlaw, P. S., and Biggs, W. D. "Financim: From genesis to revelations" in J. Belkin and H. Hazi (eds.) Proceedings of the Thirteenth Annual Symposium of the National Gaming Council, 1974.

Guetzkow, H. (ed.) Simulation in Social Science: Readings. Englewood Cliffs, N.J.: Prentice-Hall, 1962.

Hackman, J. R., and Oldham, G. R. "Development of the job diagnostic survey", Journal of Applied Psychology, 1975, vol.60, p.159-170.

Hackman, J. R., and Oldham, G. R. Work Redesign. Reading, MA: Addison-Wesley, 1980.

Hearn, J. "The potential of gaming and simulation in revision", Simulation/Games for Learning, Spring, 1980, no.10, p.21-25.

Hegarty, W. H. "Changes in students' attitudes as a result of participation in a simulated game", Journal of Educational Psychology, 1975, no.67, p.136-140.

Hemphill, J., Griffiths, D., and Frederiksen, N. Administrative Performance and Personality. New York: Teachers College, Columbia University Bureau of Publications, 1962.

Henak, R. M., and Barella, R. "Undergraduate technology education: The professional sequence" in R. E. Jones and J. R. Wright (eds.) Implementing Technology Education. American Council on Industrial Arts Teacher Education: 35th Yearbook, 1986, p.138-170.

Hogarth, R. M. Evaluating Management Education. Chichester, Great Britain: John Wiley and Sons, 1979.

Hoggatt, A. C. "An experimental business game", Behavioral Science. October, 1959, vol.4, p.192-203.

Horn, R. E. The Guide to Simulations/Games for Education and Training (3rd ed.). Cranford, NJ: Didactic Systems, 1977.

Huczynski, A. Encyclopedia of Management Development Methods. Aldershot, Hants, England: Gower Publishing Company Limited, 1983.

Jaffee, C. L. Problems in Supervision: An In-basket Training Exercise. Menlo Park, CA: Addison Wesley Publishing Company, Inc., 1968.

Jhonstone, A. H., and Reid, N. "New science teaching materials", Research Bulletin, 1978, vol.15, p. 2-29, Dundee, Scotland: Scottish Curriculum Development Service.

Kemerer, R., and Wahlstrom, M. "How to develop and use in-basket simulations: a case study in the selection of bank managers", Performance and Instruction. 1984, vol.23, no.4, p.6-8.

Kemery, E. R., Bedeian, A. G., Mossholder, K. W., and Touliatos, J. "Outcomes of role stress: A multisample constructive replication", Academy of Management Journal. 1985, vol.28, p.363-375.

Kesselman, G. A., Lopez, F. M., and Lopez, F. E. "The development and validation of a self-report scored in-basket test in an assessment center setting", Public Personnel Management Journal. 1983, p. 228-238.

Keys, B. "An epistemological approach to the evaluation of learning in simulation games and experiential learning exercises", A paper presented to the South-West Division, Academy of Management, March, 1975, p. 4.

Khandwalla, P. N. The Design of Organizations. New York: Harcourt Brace Jovanovich, Inc., 1977.

Klabbers, J. H. G. "Instruments for planning and policy formation: some methodological considerations", Simulation and Games. June, 1975, vol.16, no.2, p.135-160.

Klein, R. D. "Adding international business to the core program via the simulation game", Journal of International Business Studies. Spring/Summer, 1984, vol.15, p.151-159.

Kolb, D. A. "On management and the learning process" in Kolb, Rubin and McIntyre (eds.) Organizational Psychology: A Book of Readings. Englewood Cliffs, N.J.: Prentice-Hall, 1974.

Koontz, H. "The management theory jungle revisited", Academy of Management Review. 1980, vol.5, p.175-187.

Kozma, R. B., Belle, L. W., and Williams, G. W. Instructional Techniques in Higher Education. Englewood Cliffs, N.J.: Educational Technology Publications, 1978.

Krathwohl, D. R., Bloom, B. S., and Masia, B. B. Taxonomy of Educational Objectives- Handbook 2: Affective Domain. New York: David McKay Company, Inc., 1964.

Lang, J. R., Dittrich, J. E., and White, S. E. "Managerial problem solving models: A review and a proposal", Academy of Management Review. October, 1978, no.3, p.854-866.

Larreche, Jean-Claude. "On simulations in business education and research", Journal of Business Research. 1987, vol.15, p.559-571.

Lee, R. S., and O'Leary, M. A. "Attitude and personality effects of a three day simulation", Simulation and Games. September, 1971, no.2, p.309-347.

Likert, R. "A technique for the measurement of attitudes", Archives of Psychology. 1932, no.140, p.5-55.

Lopez, F. M. Jr. Evaluating Executive Decision-making: The In-basket Technique. American Management Association, Inc., AMA Research Study 75, 1966.

Markovitch, D. "To simulate or not to simulate? - Bridging the gap from classroom to profession", College Teaching Monograph. Grand Forks, ND: Office of Instructional Development, University of North Dakota, 1983.

Marshall, S., and Hollenbeck, G. "Using simulation in selecting a sales force", Training and Development Journal. November, 1981, p. 43-46.

Matefy, R., and Acksen, B. A. "The effect of role-playing discrepant positions on change in moral judgments and attitudes", Journal of General Psychology, 1976, vol.128, p.189-200.

McCright, P. R. "The effects of differing levels of job control and job demands on performance and perceptions: An executive simulation exercise", Ph.D. Dissertation, Stanford University, 1987.

McKenney, J. L., and Dill, W. R. "Influences on learning in simulation games", American Behavioral Scientist, 1966, no.10, p.28-32.

Meyer, H. H. "The validity of the in-basket test as a measure of managerial performance", Personnel Psychology, 1970, vol.23, p.297-307.

Miles, W. G. Jr., Biggs, W. D., and Schubert, J. N. "Student perceptions of skill acquisition through cases and a general management simulation", Simulation and Games, March, 1986, vol.17, no.1, p.7-24.

Mintzberg, H. The Nature of Managerial Work. Englewood Cliffs, NJ: Prentice Hall, Inc., 1980.

Musella, D. F., and Joyce, H. D. Conducting in-basket simulation: a handbook for workshop leaders. Toronto: The Ontario Institute for Studies in Education, 1973.

Nasr, M. A. "A study of the affective domain in school science", Ph.D. Dissertation, University of Glasgow, Scotland, 1976.

Nolan, T., and Green, M. "Analysis of the technical writing profession through the DACUM process", Paper presented at the Annual Meeting of the Ohio Valley Business and Technical Writing Teacher's Roundtable, Oxford, OH, October 9-10, 1983.

Oldham, G. R. "The motivational strategies used by supervisors: Relationships to effectiveness indicators", Organizational Behavior and Human Performance, 1976, vol.15, p.66-86.

Ott, L. An Introduction to Statistical Methods and Data Analysis (3rd ed.). Boston, MA: PWS-Kent Publishing Company, 1988.

Pedler, M. "Negotiating skills training part 4: Learning to negotiate", Journal of European Industrial Training, 1978, vol.2, no.1, p.20-25.

Phillipatos, G. C., and Moscato, D. R. "An empirical study of the learning aspects of experimental business game playing", AIIE Transections, 1969, vol.1, p.343-348.

Pierce, J. L., and Dunham, R. B. "Task redesign: A literature review", Academy of Management Review, 1976, p.83-97.

Purdy, M. M. "Management decision-making simulation: A study of psychological relationships", Ph.D. Dissertation, Purdue University, 1959.

Raia, A. P. "A study of the educational value of management games", Journal of Business, 1966, vol.113, p.339-352.

Rhyne, R. F. "Communicating holistic insights" in C. S. greenblat and R. D. Duke, Gaming-Simulation: Rationale, Design and Applications. New York: John Wiley, 1975.

Rizzo, J., House, R. J., and Lirtzman, S. J. "Role conflict and ambiguity in complex organization", Administrative Science Quarterly, 1970, vol.15, p.150-163.

Rosen, D. J. "METRO-APEX as a course", Simulation and Games, 1981, vol.12, p.15-27.

Schachter, H. L. "Simulations for training and assessment: The problem of relevance to the real world", Public Personnel Management Journal, 1980, vol.9, no.3, p.225-227.

Schriesheim, C. A., and Yaney, J. P. "The motivation of business game participants", Training and Development Journal, August, 1975, p.11-15.

Shapira, Z., and Dunbar, R. L. M. "Testing Mintzberg's managerial roles' classification using an in-basket simulation", Journal of Applied Psychology, 1980, vol.65, no.1, p.87-95.

Shulman, L. S. "Seeking styles and individual differences in patterns of inquiry", School Review, 1965, vol.73, p.258-266.

Shulman, L. S., Loupe, M. J., and Piper, R. M. Studies of the inquiry process: Inquiry patterns of students in teacher training programs. East Lansing, MI: Educational Publication Services, Michigan State University, 1968.

Sims H. P., Szilagyi, A. D., and Keller, R. T. "The measurement of job characteristics", Academy of Management Journal. 1976, vol.19, p.195-212.

Smith, H. W., Winer, J. L., and George, C. E. "The relative efficacy of simulation experiments", Journal of Vocational Behavior. February, 1983, vol.22, no.1, p.96-104.

Steele, D. "Materials for less able science pupils", M.S. Thesis, University of Glasgow, England, 1979.

Steinmetz, L. L., and Patten, R. J. "Enthusiasm, interest and learning- the results of game training: A study of simulation training at the University of Colorado", Training and Development Journal. April, 1967.

Stokes, R. L., and Stoner, C. R. "Students' perceptions of the use of a computerized simulation in teaching management information systems", in W. D. Biggs and D. J. Fritzche (eds.), Proceedings of the Eighth Annual Conference of the Association for Business Simulation and Experiential Learning. 1981.

Stopp, P. "Understanding and evaluating the use of simulations and games in schools", Progressive Learning and Educational Techniques. 1976, vol.13, p.29-36.

Szafran, R. F., and Mandolini, A. F. "Test performance and concept recognition", Simulation and Games. September, 1980, vol.11, no.3, p.326-335.

Thompson, K. R., and Keon, T. L. "Manipulating environments of a management simulation: A pedagogy and test" in K. H. Chung (ed.) Proceedings of Academy of Management. 41st Annual Meeting, San Diego, CA, August 2-5, 1981.

Thorelli, H. B., Graves, R. L., and Howells, L. T. "The International Operations Simulation at the University of Chicago", Journal of Business. July, 1962, no.35.

Thorndike, R. M. Correlational Procedures for Research. New York: Gardner Press, Inc., 1978.

Tiene, D. "BAFA and after: Exposing teacher trainees to the world of simulation games", SIMAGES. Spring, 1981, no.3.

Twelker, P. A. "Simulation and media", in P. J. Tansey (ed.) Educational Aspects of Simulation. New York: McGraw-Hill, 1971.

Wehrenberg, S. B. "Simulations: Capturing the experience of the real thing", Personnel Journal. April, 1986, p.101-104.

Wolfe, J. "The comparative learning effects of a management game vs. casework in the business policy", Proceedings of the 33rd Annual Meeting of the Academy of Management. Boston, MA, August 19-21, 1973, p.291-298.

Wolfe, J. "The effects of game complexity on the acquisition of business policy knowledge", Decision Sciences. 1978, vol.9, p.143-155.

Wolfe, J. "The teaching effectiveness of games in collegiate business courses", Simulations and Games. 1985, vol.16, p.251-288.

Zoll, A. A. Dynamic Management Education. Menlo Park: Addison-Wesley Publishing Company, Inc., 1969.

APPENDIX - A

CONTENTS OF THE IN-BASKET

SCENARIO DESCRIPTION

The following is the description of a fictitious organization and the simulated job you will be working in. Please read the information provided herein and ask the experimenter any questions you have before we go on.

ABOUT THE ORGANIZATION:

Springfield Wheelers, Inc. is a fast growing subsidiary company of General Furniture Corporation (G.F.C.). G.F.C.'s head office is located at St. Louis, Missouri. Springfield Wheelers, Inc. is involved in the manufacture of small "Mississippi Sternwheeler" souvenir boats. In the recent past these boats have also been marketed as toy boats. Manufacturing facilities of Springfield Wheelers are located at Springfield (Missouri), about 130 miles southwest of the state capital--Jefferson City, Missouri. The 1987 annual sales was $ 7,056,000 for Springfield Wheelers, Inc. The company came into being 10 years ago when tourism was flourishing in the state. Springfield Wheelers has the advantage of being the first manufacturer of souvenir boats.

This region of Missouri -- the Ozark Mountains -- is famous for its folklore and lyrical beauty. Segments of the Jacks Fork and Current rivers are set aside as Ozark

National Scenic Riverways. Table Rock Reservoir- Lake Taneycomo near the southern border and Lake of the Ozarks are the state's most popular resort areas. The Tourism Development Authority has finalized some exciting plans to attract more tourists. Tourism is increasing every year and thus Springfield Wheelers expects a bigger potential market in the coming years. In spite of the growth and good potential for a bigger market, the executives at Springfield Wheelers are concerned.

Sales have increased by 30% in the last 2 years but net profits are shrinking. At present profits are about half of what they were 2 years ago.

Spencer Brothers, Kansas City has been the leading buyer and distributor for Springfield Wheelers' products since the company's inception. Last week, a large shipment of "Supreme Mississippi"-the deluxe brand of sternwheeler boats- was returned as defective from Spencer Brothers. An assembly line problem was blamed for the rejection.

Competition in the area has now become routine. Although the competitors are few and have smaller sales, they are well established. Springfield Wheelers' edge over rivals was due to earlier establishment in the business and sound market reputation. Dynamic Corporation, an

industrial giant with diverse business activities, is planning to enter into the manufacture of a similar kind of boats. So far, their sole selling agency -- Dynamic Distributors -- has been a leading distributor for toy boats of Springfield Wheelers, Inc. Dynamic's plant is in the finishing stage of setup at Jefferson City, Missouri and is equipped with new sophisticated machines and an automated assembly line.

YOUR JOB:

The previous production manager of Springfield Wheelers, Inc., Mr. Bob Rogers, had a car accident on April 20, 1988 and died. He was on his way to meet the vice-president of General Furniture Corporation regarding a defective shipment, increasing complaints about delays and Spencer's decision to finalize an order with the rival Dynamics Corporation for supplies for the forthcoming "Fair on the Lake" festival being organized by the Tourism Development Authority.

You are **Pat Fisher**, the new production manager of Springfield Wheelers, Inc. You have previously worked for eight years as a shop superintendent at the Wooden Furniture Plant of General Furniture Corporation, located at Wichita, Kansas.

Today is Sunday, April 24, 1988 and the time is 9:00

a.m. You are in your office at Springfield for the first time and have only the in-basket to look in for all the information you may need. You have to leave your office in one hour to catch a flight to St. Louis to attend an urgently scheduled meeting with your executive vice-president, Mr. Robert Wilson. You have a pre-scheduled meeting with Mr. William Spencer, vice president of Spencer Brothers, at 9:00 a.m. tomorrow.

*****

PLANT MANAGER OF SPRINGFIELD WHEELERS, INC.
(BIOGRAPHICAL SKETCH)

Plant manager is the chief position at Springfield, Missouri, the location of the manufacturing facilities of Springfield Wheelers, Inc. This position is currently being held by **Mike Smith**. All the managers, production manager, finance manager and marketing manager, and the chief engineer report to him.

You have met him once when he visited the Wichita Plant of G.F.C. He was very cordial and had appreciated your efforts and abilities in development of that plant. In fact, your previous manager had remarked that it was Mr. Smith, who played an important role in getting you for this position.

You also have some more information about him from the usual informal talks with your colleagues and superiors. Mike is a 46-year-old Kansan. He graduated from Kansas State University with a M.S.(I.E.) degree in 1966. He has been with Springfield Wheelers since its inception in 1976. Previously, he served in many different positions in G.F.C. He was Asst. Manager(Production) at the Omaha (Nebraska) Plant of G.F.C. before he moved to Springfield Wheelers.

Smith is considered to be a highly participative manager. He likes innovative ideas and suggestions from his employees. He also tries to apply these ideas if he finds them suitable and appropriate to the company's goals.

EXECUTIVE VICE-PRESIDENT OF SPRINGFIELD WHEELERS, INC. (BIOGRAPHICAL SKETCH)

Executive vice-president of Springfield Wheelers, Inc. is the topmost position in the hierarchy of the company. Currently it is occupied by **Mr. Robert Wilson**. Plant manager Mike Smith directly reports to him.

Mr. Wilson is 50 years old and has been associated with G.F.C. for the last 20 years. You never had a chance to meet him personally, but you have some information about him from informal talks with different persons in your company.

Mr. Wilson is a graduate of the Business School of Yale University with an M.B.A. He is on the Board of Directors of many companies and so has a very busy job schedule.

He is considered to be a self-reliant person. This has created an impression that he is aggressive and sometimes uncompromising in his demands for performance. He usually does not like to get involved in the decisions to be taken by managers. But he expects the managers to report important decisions and performance figures to him regularly. Occasionally, he gets so involved in the matter that his subordinates have to follow his word.

SPRINGFIELD WHEELERS, INC.
Springfield, MO 65803

Date 4/22/88 Time 4:45 pm

To Pat Fishes

While you were unavailable:

Caller Gary Johnson

From Marketing Dept.

Phone –

☒ Telephoned
☐ Returned your call
☐ Was in to see you
☐ Please call
☐ Will call again
☐ Urgent

Message Wanted to know if you are going to the SIA meeting. If you are - please try to meet Ron from Anderson & Anderson.

by -lisa

4/22/'88

NOTE

Pat

I am unable to attend this... It does not seem to be worthwhile. Please let me know if you can make it convenient to attend.

Mike

(Mike Smith)

P.S.- I need to inform John Newell by April 25, if we can not attend.

STATES ASSOCIATION

ington Avenue
Missouri.

April 8, 1988

Re : Executive committee meeting scheduled on April 27, 1988.

Dear Mike,

Our next executive committee meeting is scheduled for April 27, 1988. Since you were not able to attend the last meeting, I thought I should inform you that the next meeting is important to all the industries located in and around Springfield. We will decide our strategy for state support for the development of this area.

I hope you will be able to make it this time. In case you are not able to attend this meeting, please make a suitable arrangement to send a representative of your firm.

Please feel free to call me if I can be of any assistance to you.

Regards,

J Newell

(John Newell)

Executive Secretary,
S.I.A.

JN/ra

SPRINGFIELD WHEELERS, INC.

1500 Broadway
St. Louis, MO 63105

April 22, 1988

To : Pat Fisher
Production Manager-Springfield.

From: Robert Wilson
Executive Vice President

Re : Meeting on April 24, 1988.

You must have received my message on April 21 about this meeting before leaving Wichita. This is to inform you of the agenda for this meeting scheduled on Sunday, April 24. We will meet in my office at 6:30 p.m.

I would like to give you some first hand information. You must be aware of the recent developments in this business. Dynamic is expected to be in the model boat-market within two months. Obviously we have a battle on our hands for a major part of our production. At the same time, we are facing problems with our valuable customers like Spencer Brothers due to quality of our product.

Since this is your first position as a production manager, I feel that we should discuss your views on the Springfield facility.

You may want to look at the ways to improve our existing performance and try to work on your plans for the future. You will realize that the success of most of our improvement efforts depends on how well can you deal with your personnel.

You may want to know that Mike had suggested to me and John Dyer (V.P.-G.F.C.) to get you moved into this position. Your position has a lot of challenges built into it. I am looking forward to seeing your approach to the production problems in the plant. I am confident that you will be a big help to Mike in managing the critical functions at Springfield.

CC: Mike Smith, Plant Manager, Springfield

SPRINGFIELD WHEELERS, INC.
Springfield, MO 65803

Inter–Office Memo

April 22, 1988

To : Pat Fisher
Production Manager

From: Greg Stevens
Chief Engineer GS

Let me congratulate you on your promotion. I am happy to welcome you to Springfield.

I would like to talk to you about our inspection requirements at your convenience. Our industrial engineer Harry Davis has been studying our processes. He told me that we should install more inspection checks in the stages before subassemblying. I had met Bob Rogers regarding this before.

If I can be of any assistance, do not hesitate to call me.

MEMO

April 22, 1988

To : Pat Fisher
Production Manager

We are running behind schedule for Spencer's order because of frequent machine breakdowns and some other problems. May I request you to authorize overtime for the full crew for one shift on this Saturday?

I am concerned over what is to be done with all the operators for Monday and probably Tuesday also, because no work could be scheduled. Once again the batch of wood received yesterday was found of rejectable quality upon cutting and routing operations.

We will be unable to begin until the new shipment arrives next week. The running stock is enough for this week's production only. What are your instructions?

Bill Crane
II shift Foreman

SPRINGFIELD WHEELERS, INC.
Springfield, MO 65803

Inter–Office Memo

April 19, 1988

To : Mike Smith
Plant Manager

From: Gary Johnson
Marketing Manager

Re: Quality of purchased parts

I hope you recall our conversation, a few weeks ago regarding increased quality problems with "Sternwheeler" and "Sidewheeler" axles, supplied by Anderson & Anderson. We have also found that Spencer returned a high number of boats due to defective axles ir our last shipment.

I feel that we should install an intensive rating system for our vendors. We have tried to evaluate each vendor on the basis of price, quality of goods and efficient deliveries. I have enclosed one such vendor rating report. This plan is based on Weighted Point Rating Plan by the National Association of Purchasing Agents. Please let me know your views on this.

4/22

CC: Bob Rogers
Production Manager

Pat is this what we need for this next week?
Mike

Encl: Vendor Report

GJ/sp

SPRINGFIELD WHEELERS, INC.
Springfield, Missouri.

VENDOR RATING REPORT

Part Name: Sternwheel axle Used on model: Sternwheeler

Part Number: 2323

	Vendor #1 National Suppliers	Vendor #2 Rolla Wooden Works	Vendor#3 Anderson & Anderson
PRICE			
A. Unit price	$0.50	$0.55	$0.60
B. Lowest price ----------*100 / Net price	100.0	91.0	83.3
C. Price Rating	40.0	36.4	33.3
QUALITY			
A. Lots received	80	80	60
B. Lots accepted	72	77	53
C. % accepted	90.0	96.3	88.3
D. Quality Rating	31.5	33.7	30.9
DELIVERY			
A. Delivery met(%)	95	90	85
B. Delivery rating	23.8	22.5	21.3
TOTAL RATING			
Add: Price -line C	40.0	36.4	33.3
Quality -line D	31.5	33.7	30.9
Delivery-line B	23.8	22.5	21.3
TOTAL RATING	95.3	92.6	85.5

SPRINGFIELD WHEELERS, INC.

1500 Broadway
St. Louis, MO 63105

April 14, 1988

Mike Smith
Plant Manager-Springfield.

Dear Mike,

Recently I met Mr. Henson of Arthur Andersen at the dinner of American Management Association (AMA)'s Spring Meeting. We had the chance to talk about effective uses and experiences of Japanese management techniques for some of the US industries. Some of the achievements he talked about sound impressive. I believe that those are not mere "buzzwords"!

Why don't we look into the possibility of "manufacturing cells" when we study our facility expansion? I am interested in getting some preliminary information on this. I would like to discuss this with Mr. John Dyer (VP/G.F.C.) during my next meeting on April 28,1988.

4/22

R. Wilson

(Robert Wilson)

Exe. Vice President

Pat,
I would appreciate if you can talk about this also on 4/24
Mike

CC: Mr. J. Dyer,
V.P.-G.F.C.

RW/dp

DRAFT

4/22

Sir,
Would you like this draft as it is?
Mr. Rogers was upset about this ---
lisa

To: Mike Smith
Plant Manager

From: Bob Rogers
Production Manager

One problem that we are facing is increasing absenteeism. I suspect that it is more of a problem than we know.

I checked with the personnel officer here and he told me that a corporate policy is in the mill but it only states that "Employees may engage in other employment which is not on company time and does not adversely affect their performance for the company."

This has hardly any meaning because a man with two jobs often feels too sick to go to one of the jobs. How can we tell how much of our absenteeism is due to the employees working on two jobs without making them tell us when they take another job?

I feel that we should control it more closely. Could I go over this with you as soon as possible?

BR/lm

QUALITY SUPPLIES COMPANY
1400 Independence Road
Rolla, MO 65401

(314) 341–2611

April 18, 1988

Production Manager
Springfield Wheelers, Inc.
2625 N Glenstone
Springfield, MO 65803

Dear Sir,

We sincerely regret the quality of material supplied to you last week. We could not get the quantity from our regular supplier to meet your requirement on time. Unfortunately, the quality of this shipment was not up to our standard. Please bear with us on this.

We have now received a sufficient quota for your requirement. We will be happy to replace the unused quantity of the last supply. Please let us know at your convenience about your decision. I want to discuss future orders with you when I am in Springfield on April 25, 1988. I will call you to set a time.

Once again, inconvenience caused to you is highly regretted.

Sincerely,

For Quality Supplies,

E. Mason

(E. Mason)
President

EM/cd

DRAFT

April 20, 1988

To : ALL FOREMEN AND SUPERVISORS

You are requested to submit written requests for overtime requirements for your persons atleast two days in advance. Please make sure that these assignments are absolutely necessary before handing in a request. I need your performance evaluations on all of your people by next friday.

(Bob Rogers)
Production Manager

4/22
Sir,
Should I prepare this under your name?
- Lisa

SPRINGFIELD WHEELERS, INC.
Springfield, MO 65803

Inter–Office Memo

April 20, 1988

To : Bob Rogers
Production Manager

From: Mike Smith
Plant Manager Mike

Re : Production Performance.

I went through last month's production-reports. I found that second shift's production figures are lower than the first shift's. I believe that there are probably many reasons for this, but I've noticed that some of your people are clocking out early. Please look into it.

I believe we should meet to discuss this sometime during the next week.

MS/ne

SPRINGFIELD WHEELERS, INC.
Springfield, MO 65803

Inter–Office Memo

April 20, 1988

To : Bob Rogers
Production Manager

From : Fred Jackson
Personnel Officer

Re : Proposed Wage Incentive Plan: GFC-PD-88/WP from Corporate Personnel Division.

The attached report on the proposed wage incentive plan is for your information and necessary action. I would appreciate your detailed response with suggestions, if any, so that I can forward it to the corporate office before April 28, 1988.

(Fred Jackson)

Attachment: Report GFC-PD-88/WP

GENERAL FURNITURE CORPORATION

Proposed Wage Incentive Plan for all G.F.C. Group of Companies

Report No.: GFC–PD–88–WP

Prepared by:

Corporate Personnel Division
General Furniture Corporation
St.Louis, Missouri.

March 30, 1988

CONTENTS

INTRODUCTION

Our company is in a highly competitive business. Therefore, the production of high quality products at a competitive cost is very important. The Company must have capable and efficient employees to meet this need.

Everyone should be able to realize the benefits of the proper use of our wage incentive plan. This report contains the base rules for the proposed plan. Do not hesitate to ask questions or make suggestions through your supervisor.

GENERAL RULES

1. The company guarantees that each employee will be paid for the hours reported per day at a personal rate plus any adjustment for overtime, shift differentials etc. The employee is eligible for incentive bonus if the work is covered by the plan.

2. Incentive opportunity will be provided when the wage incentives can be based on work performance measurement.

3. The employee will be paid incentive bonus in direct proportion to the extra amount of production of acceptable quality.

4. Reasonable time standards will be set according to the operations and technology in use and shall be guaranteed as long as no change has taken place which affects the time standard. A new standard will be established whenever deemed necessary due to the circumstances that make the existing standard obsolete.

5. Time standards are expressed in units per hour and standard hours per 100 units of production. Time standards are to be established by competent personnel who have thorough knowledge of time study techniques and production processes. Direct time measurements and predetermined time standards both will be used to decide the time standards.

6. Employees will be paid on their personal rates for the lost time due to major delays beyond their control. Delays must be reported immediately to the supervisor in order to get credit for that time. Such claims do not include minor delays inherent to any operation. The proper allowances for minor delays have been included in the time standards.

7. All incentive earnings will be calculated on the occupational rate, except when the personal rate is higher than the occupational rate. Incentive calculations will be based on the day's production.

8. Periodic reviews will be performed by the engineering staff to determine whether the plan is followed appropriately.

TIME STUDY PROCEDURES

1. **Time Study** The time study team will study the time and record each element of an operation. Performance of the operator will be rated by an experienced rater.

2. **Rating** Variations in the difficulty of the operation must be kept in mind while rating any performance. If the machine is operating at an optimum speed, then the incentive wage opportunity is allowed above 125% of the normal pace.

3. **Normal Performance (100%)** This is the experienced worker's pace, which is continuous, consistent and maintainable throughout the day.

4. **Personal and Fatigue Allowances** All employees will be allowed time for personal and fatigue needs. This factor will be considered in deciding the time standard for an operation.

5. **Quality** Adequate time will be provided for maintaining the quality of the production.

6. **Job Codes** This is for the work performed off standard (cleanup, waiting etc.). This will protect the bonus on training time and reduce the same for workers' errors.

7. **Group Incentives** Such incentives may be necessary to keep a standard on assembly line operations for the group of operators. The following steps are to be considered:

    1. All elements are studied.

    2. Finished units per day on the line are established from production schedules.

    3. Number of workstations required is decided.

    4. Equal distribution of work amongst the workstations.

EMPLOYEE TIME RECORDING

Employees will be required to fill in a time sheet every day. Time should be reported as accurately on non-standard jobs as on a standard job.

Job codes should be used with the supervisor's permission to properly account for the time on off-standard work. Normally, this should be considered beyond a delay of 10 minutes.

A performance report will be submitted by each department every week. This should include the actual hours on the standard, the standard hours produced, the performance percentage, hours worked and the percent of hours on the standard. For example-

Operator	Actual Hrs./ Standard	Std. Hrs. Produced	% Rating	Total Hrs.	% of Hrs.
# 26	32	40	125	40	80

NOTE:

Occupational Rate is the hourly rate for the employees of a classified category of labor.

Personal Rate is the hourly rate for an employee.

Hours on Standard is the hours worked on incentive jobs.

Standard Hours Produced is the number of units produced of acceptable quality multiplied by standard hours per unit.

Performance is the standard hours earned divided by hours on standard.

SPRINGFIELD WHEELERS, INC.
Springfield, MO 65803

Inter–Office Memo

April 19,1988

To : Bob Rogers
Production Manager

From: Greg Stevens
Chief Engineer

Subject: Maintenance of Routers

Maintenance says that we are having frequent problems with two of the 4 HP Rockwell routers located in "Area 2".

We need to develop a long term plan for machine replacement and maintenance. I do not know whether overhauling by the company's service technician would be worthwhile. Harry is collecting the relevant data on this. Let me know what you think. I think we need to get new machines.

SPRINGFIELD WHEELERS, INC.
Springfield, MO 65803

Inter–Office Memo

April 19, 1988

To : Bob Rogers
Production Manager

From: Gary Johnson
Marketing Manager

Re : Quality of Production.

Bob:

As a direct result of high breakage of our products supplied to Spencer Brothers, we are now facing a tough time securing our next prospective order from them. Inspite of our discussions with them, we were unable to succeed. We had no other option but to call Mr. William Spencer, VP of Spencer Bros., for further negotiations. At this time, we intend to convince him of our earnest efforts to improve delivery promises and quality.

Mr. Spencer will be visiting us on April 25, 1988. I believe that you should meet him in order to convince him about our product quality and delivery schedules.

cc: Mike Smith,
Plant Manager

GJ/sp

SPRINGFIELD WHEELERS, INC.
Springfield, MO 65803

Inter–Office Memo

April 18, 1988

To : Bob Rogers
Production Manager

From : Mike Smith
Plant Manager Mike

Subject : Quality control requirement

A few month's back, we eliminated the separate positions of Q.C. inspectors and allocated the major part of the routine inspection job to the assembly line personnel. Due to this additional responsibility, all the assembly line personnel are not able to perform assembly operations with enough care and attention.

Our exe. vice-president Mr. Wilson is very concerned with the quality of our products. I feel that this requires immediate attention. Please look into this and then we can decide about any changes needed in our present arrangement to enhance our performance.

CC : Greg Stevens
Chief Engineer

MK/ne

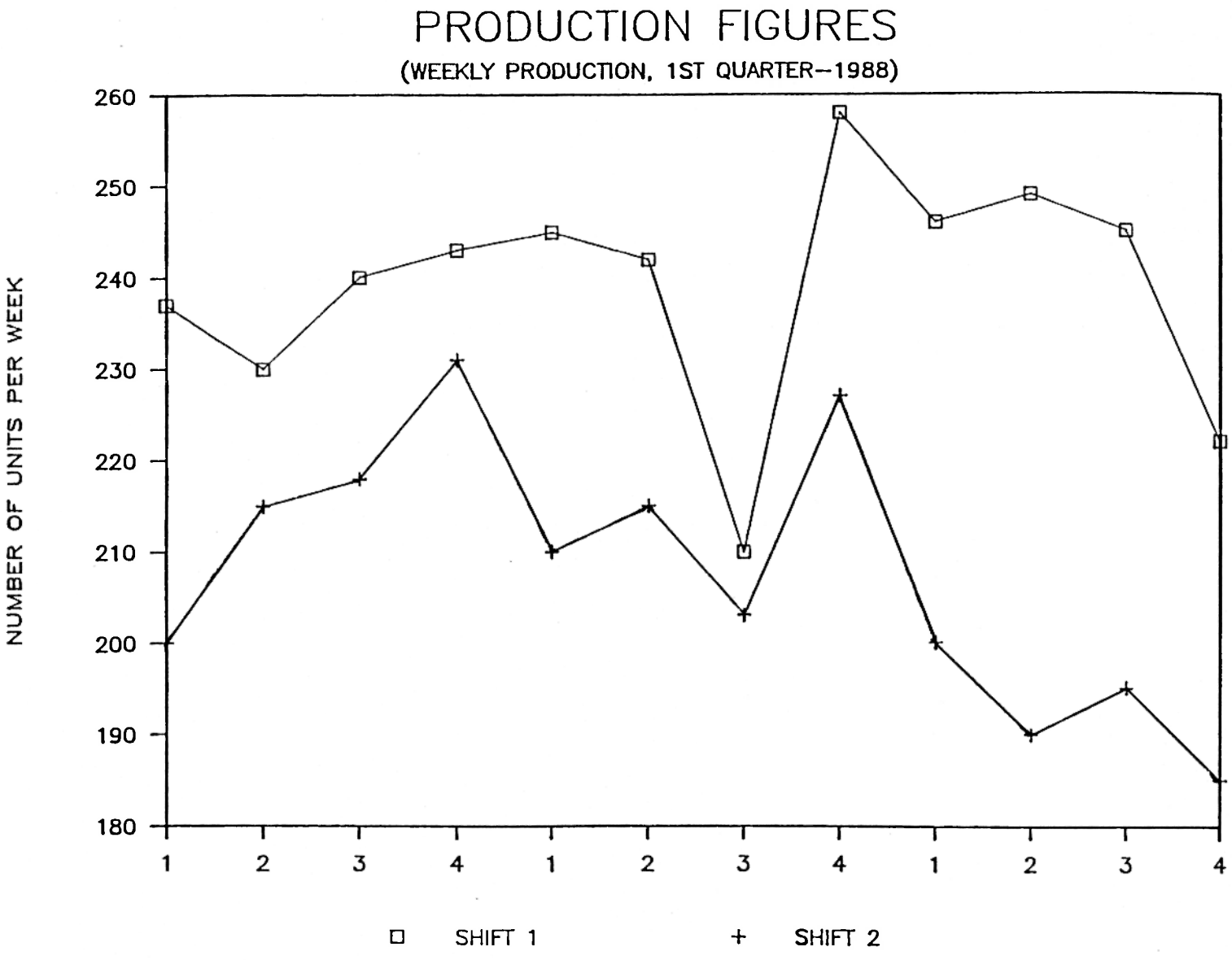
PRODUCTION REPORT

For Period : 1st Quarter Year : 1988

Prepared By: J. Martin

B. Crane

Month	Shift I (Units)	Shift II (Units)
January		
Week 1	237	200
Week 2	230	215
Week 3	240	218
Week 4	243	231
February		
Week 1	245	210
Week 2	242	215
Week 3	210	203
Week 4	258	227
March		
Week 1	246	200
Week 2	249	190
Week 3	245	195
Week 4	222	185


PRODUCTION FIGURES
(WEEKLY PRODUCTION, 1ST QUARTER–1988)
NUMBER OF UNITS PER WEEK
260
250
240
230
220
210
200
190
180
1 2 3 4 1 2 3 4 1 2 3 4
SHIFT 1
SHIFT 2

APPENDIX - B

CONTENTS OF CASE STUDY

Springfield Wheelers, Inc. is a fast growing subsidiary company of General Furniture Corporation (G.F.C.). G.F.C.'s head office is located at St. Louis, Missouri. Springfield Wheelers, Inc. is involved in the manufacture of small "Mississippi Sternwheeler" souvenir boats. In the recent past these boats have also been marketed as toy boats. Manufacturing facilities of Springfield Wheelers are located at Springfield (Missouri), about 130 miles south west of the state capital-Jefferson City, Missouri. The 1987 annual sales was $ 7,056,000 for Springfield Wheelers, Inc. The company came into being 10 years ago when tourism was flourishing in the state. Springfield Wheelers has the advantage of being the first manufacturer of souvenir boats.

This region of Missouri, the Ozark Mountains, is famous for its folklore and lyrical beauty. Segments of the Jacks Fork and Current rivers are set aside as Ozark National Scenic Riverways. Table Rock Reservoir, Lake Taneycomo near the southern border and Lake of the Ozarks are the state's most popular resort areas. The Tourism Development Authority has finalized some exciting plans to attract more tourists. Tourism is increasing every year

and thus Springfield Wheelers expects a bigger potential market in the coming years.

In spite of the growth and good potential for a market, the executives at Springfield Wheelers are concerned. Sales have increased by 30% in the last 2 years but net profits are shrinking. At present profits are about half of what they were 2 years ago.

Spencer Brothers, Kansas City has been the leading buyer and distributor for Springfield Wheelers' products since the company's inception. Last week, a large shipment of "Supreme Mississippi", the deluxe brand of sternwheeler boats, was returned as defective from Spencer Brothers. An assembly line problem was blamed for the rejection.

Competition in the area has now become routine. Although the competitors are few and have smaller sales, they are well established. Springfield Wheelers' edge over rivals was due to earlier establishment in the business and sound market reputation. Dynamic Corporation, an industrial giant with diverse business activities, has decided to enter into the manufacture of a similar kind of boats. So far, their sole selling agency, Dynamic Distributors, has been a leading distributor for toy boats of Springfield Wheelers, Inc. Dynamic's plant is in the

finishing stage of setup at Jefferson City, Missouri and is equipped with new sophisticated machines and an automated assembly line.

The previous production manager of Springfield Wheelers, Inc., Mr. Bob Rogers, had a car accident on April 20, 1988 and died. He was on his way to meet the president of General Furniture Corporation regarding a defective shipment, increasing complaints about delays and Spencer's decision to finalize an order with the rival Dynamics Corporation for supplies for the forthcoming "Fair on the Lake" festival being organized by the Tourism Development Authority.

Pat Fisher has been appointed as the new production manager of Springfield Wheelers, Inc. He has previously worked for 8 years as a shop superintendent at the Wooden Furniture Plant of General Furniture Corporation, located at Wichita, Kansas.

Pat arrived at Springfield on the night of April 23. The next morning (on April 24, 1988) he is in his office at Springfield for the first time for one hour before leaving Springfield to catch a flight to St. Louis. He has been informed earlier that an urgent meeting is scheduled in the evening with the executive vice-president of Springfield Wheelers, Mr. Robert Wilson. Pat also has to attend Bob's

pre-scheduled meeting with Mr. William Spencer, vice president of Spencer Brothers, on April 25, 1988. Let us see what kind of job is waiting for Pat.

Chief engineer of the company, Greg Stevens, is concerned with the inspection and quality control function of the company. His subordinate, Harry Davis (industrial engineer) has been studying the operation sequence for the products. He has suggested that the company can reduce the rework and scrap cost by introducing more inspection work before the final assembly stage. A few months back, the management had assigned the inspection work to assembly workers in order to save on inspection costs. Plant manager Mike Smith is still in doubt about the success of this maneuver. His opinion is that the assembly line personnel are not able to perform their work with enough care and attention due to this change.

In spite of encouraging market demand for this type of boat, Springfield Wheelers' marketing manager Gary Johnson is upset about the quality of their products. The major reason for his concern is the loss of the future order from their biggest customer, Spencer Brothers. Spencer Brothers are not yet ready to place the next order. Gary wants Pat to convince the vice president of Spencer Brothers of the company's product quality and promise of on-time

deliveries. Gary had written to Bob about the poor quality of the purchased parts supplied by their vendor Anderson & Anderson. They are supplying the sternwheeler axles to Springfield Wheelers. Gary had, therefore, suggested introduction of a vendor rating plan. (Vendor Report, Exhibit 1)

On the other hand, plant manager Mike Smith also wants Pat to take care of several items. Robert Wilson, vice president of Springfield Wheelers had asked Mike about a possible cellular manufacturing arrangement in their facility. Mike wants Pat to decide on this. On going through one of the memos, Pat finds that Mike is concerned about the last few months' production performance (Production report, Exhibit 2). Mike also wants him to decide whether or not to attend the upcoming Springfield Industries Association's (SIA) quarterly meeting on April 27. Pat had received a telephone message from Gary Johnson (Marketing Manager), asking him whether he would be attending this meeting. Probably what Gary has in mind is the possibility that Pat could meet Ron Hays of Anderson & Anderson at the meeting.

Apart from all this, Pat has to take care of the other tasks awaiting him on his desk. His secretary Lisa has left two notes to him regarding the memos drafted by Bob.

The first draft is for a memo to the foremen and supervisors, asking them to get permission for overtime well in advance. In the second draft, Bob wanted to write to Mike about the labor absenteeism and its probable connection with the moonlighting by some of their workers. A report on proposed wage incentive plan is also on Pat's desk (see Exhibit 3*). Personnel Officer, Fred Jackson, wanted Bob's response and suggestions to this report. Now Pat has to decide on these issues.

Looking at a recent letter from Eric Mason, president of Quality Supplies Company, Pat could see that Mason had already written to Bob about replacement for the defective material when it happened last time. A memo from the second shift's foreman, Bill Crane, tells him that Spencer's pending order is likely to be delayed due to defective raw material from Quality Supplies Company. Bill is worried about the work to be assigned to workers on Monday and Tuesday, when they run out of material. He has asked Pat to allow overtime for his crew on next Saturday (April 30, 1988) to work on Spencer's order.

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* Exhibit 3 has the same content as item # 15 in the In-basket (page 133).

EXHIBIT 1. VENDOR RATING REPORT

Part Name: Sternwheel axle Used on model: Sternwheeler

Part Number: 2323

	Vendor #1 National Suppliers	Vendor #2 Rolla Wooden Works	Vendor#3 Anderson & Anderson
PRICE			
A. Unit price	$0.50	$0.55	$0.60
B. Lowest price ----------*100 Net price	100.0	91.0	83.3
C. Price Rating	40.0	36.4	33.3
QUALITY			
A. Lots received	80	80	60
B. Lots accepted	72	77	53
C. % accepted	90.0	96.3	88.3
D. Quality Rating	31.5	33.7	30.9
DELIVERY			
A. Delivery met(%)	95	90	85
B. Delivery rating	23.8	22.5	21.3
TOTAL RATING			
Add: Price -line C	40.0	36.4	33.3
Quality -line D	31.5	33.7	30.9
Delivery-line B	23.8	22.5	21.3
TOTAL RATING	95.3	92.6	85.5

EXHIBIT 2. PRODUCTION REPORT

For Period : _____ Year : _____

Prepared By: _____

Month	Shift I (Units)	Shift II (Units)
January		
Week 1	237	200
Week 2	230	215
Week 3	240	218
Week 4	243	231
February		
Week 1	245	210
Week 2	242	215
Week 3	210	203
Week 4	258	227
March		
Week 1	246	200
Week 2	249	190
Week 3	245	195
Week 4	222	185

Note: The figure on page 144 was also provided alongwith the above table to the case study group.

APPENDIX - C

REFERENCE MATERIAL FOR THE EXPERIMENT

1. Organization chart of the company
2. Income statement for the year 1987
3. Comparative statement for the last 3 years
4. Sales data of the distributors
5. Market share data for the last 3 years
6. Operations process chart
7. Machinery data
8. Product drawings

PRODUCTION MANAGER'S REFERENCE MANUAL*

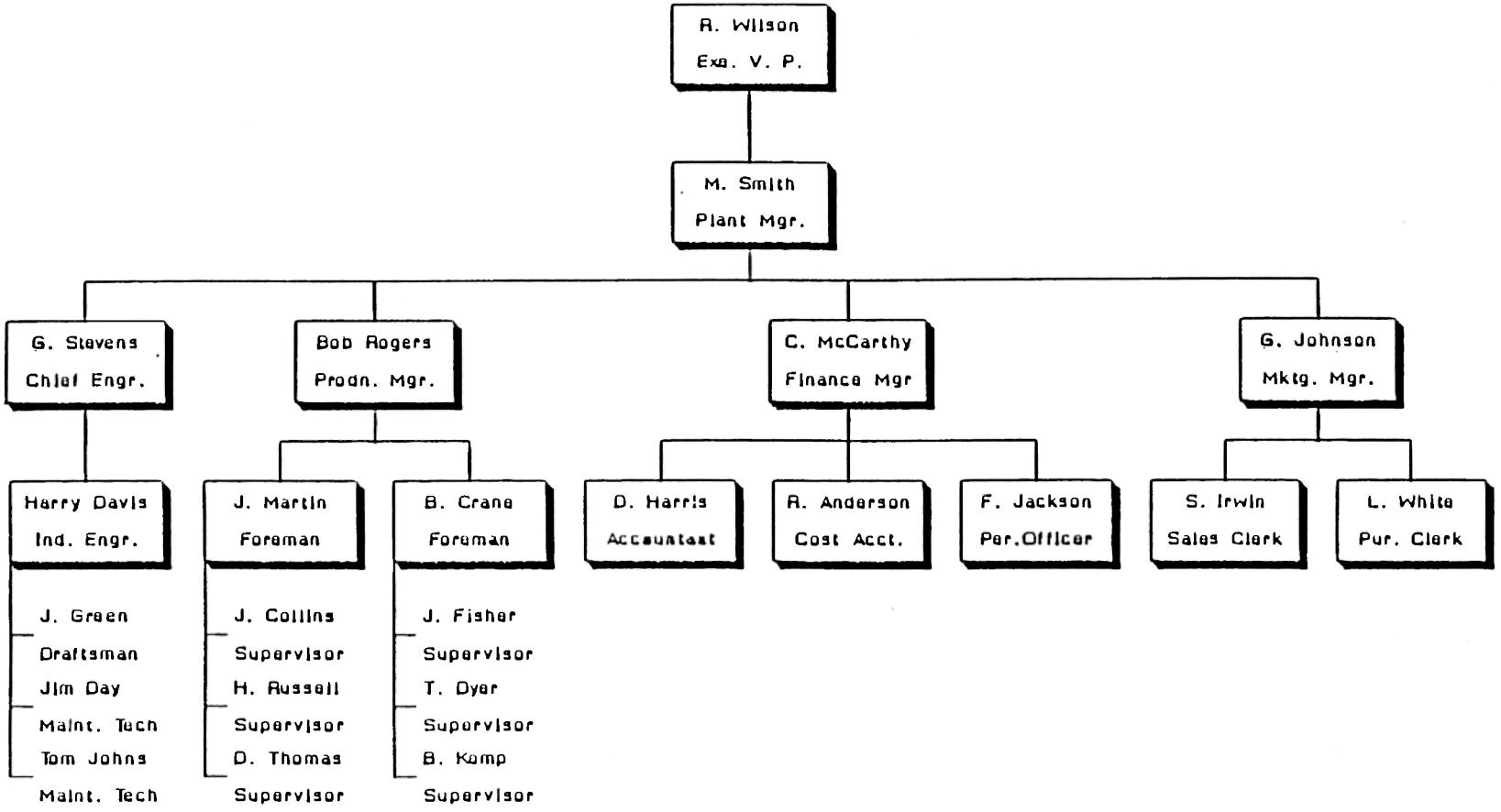
SPRINGFIELD WHEELERS, INC.

AT SPRINGFIELD, MISSOURI.

CONTENTS

* Note: This page was not included in reference material for the case-study group.

SPRINGFIELD WHEELERS, INC.
(Organization Chart)



SPRINGFIELD WHEELERS, INC.

STATEMENT OF INCOME FOR YEAR ENDING DEC., 1987.
(IN DOLLARS)

Sales			7,056,000
Less Sales returns & allowances		32,000	
Net Sales			7,024,000
Less: Manufacturing Cost of Goods Sold			
Direct material	2,352,000		
Direct labor	978,400		
Indirect manufacturing cost (Schedule 1-3 total)	1,270,370		
Total Cost of Goods Sold		4,600,770	
Gross Profit			2,423,230
Less Operating Expenses:			
Selling expenses:			
Sales personnel salaries	162,000		
Advertising, commission etc.	705,000		
		867,600	
General Administrative Expenses:			
Managers' salaries	182,000		
Office staff salaries	279,000		
Miscellaneous	66,500		
		527,500	
Total Operating Expenses		1,395,100	
Net income from operations			1,028,130
Less Income-tax expenses		359,850	
Net Income			668,280

SPRINGFIELD WHEELERS, INC.

INDIRECT MANUFACTURING COSTS

Schedule 1: Variable Costs

Supplies	117,600	
Indirect Labor	122,300	
Repair	35,000	
Power	45,000	
Total 1:		319,900

Schedule 2: Discretionary costs

Foremen's salaries	58,800	
Employee Training	50,000	
Total 2:		108,800

Schedule 3: Committed costs

Supervisory salaries	141,120	
Depreciation, plant & equipment	600,000	
Property taxes	70,550	
Insurance	30,000	
Total 3:		841,670
Total Indirect Manufacturing Costs		1,270,370

SPRINGFIELD WHEELERS, INC.

FINANCE & ACCOUNTS DEPARTMENT

COMPARATIVE STATEMENT OF LAST 3 YEARS

**	1985 (in $)	1986 (in $)	1987 (in $)
Sales	5,091,840	5,991,450	7,056,000
Returns & Allowances	17,340	21,050	32,000
Net Sales	5,074,500	5,970,400	7,024,000
Cost of Goods sold	2,775,000	3,450,500	4,600,770
Gross Margin	2,299,500	2,519,900	2,423,230
Selling Expense	583,000	694,000	867,600
Administrative Expenses	400,500	470,500	527,500
Total Operating Expenses	983,500	1,164,500	1,395,100
Net Income before Taxes	1,316,000	1,355,400	1,028,130
% of net Sales	26%	22%	14%

**** Note:**

	1985	1986	1987
Based on # of Units	353,600	406,200	470,400
Cost of Goods per Unit	$ 7.85	$ 8.50	$ 9.85
Operating Cost per Unit	$ 2.80	$ 2.86	$ 2.96

SPRINGFIELD WHEELERS, INC.
SALES & PURCHASE DEPARTMENT

DISTRIBUTOR SALES DATA
(in dollars per year)

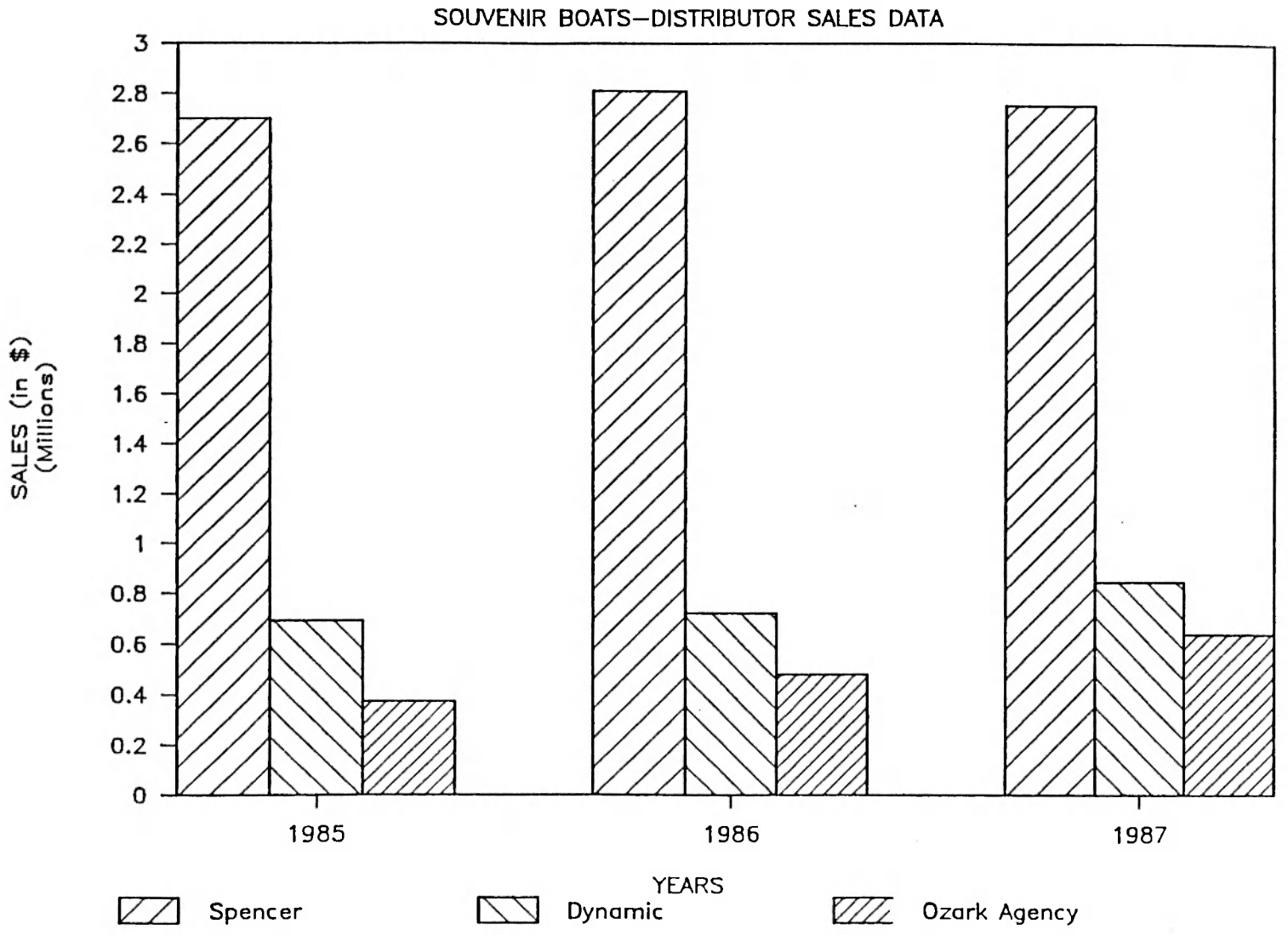
SOUVENIR BOATS:

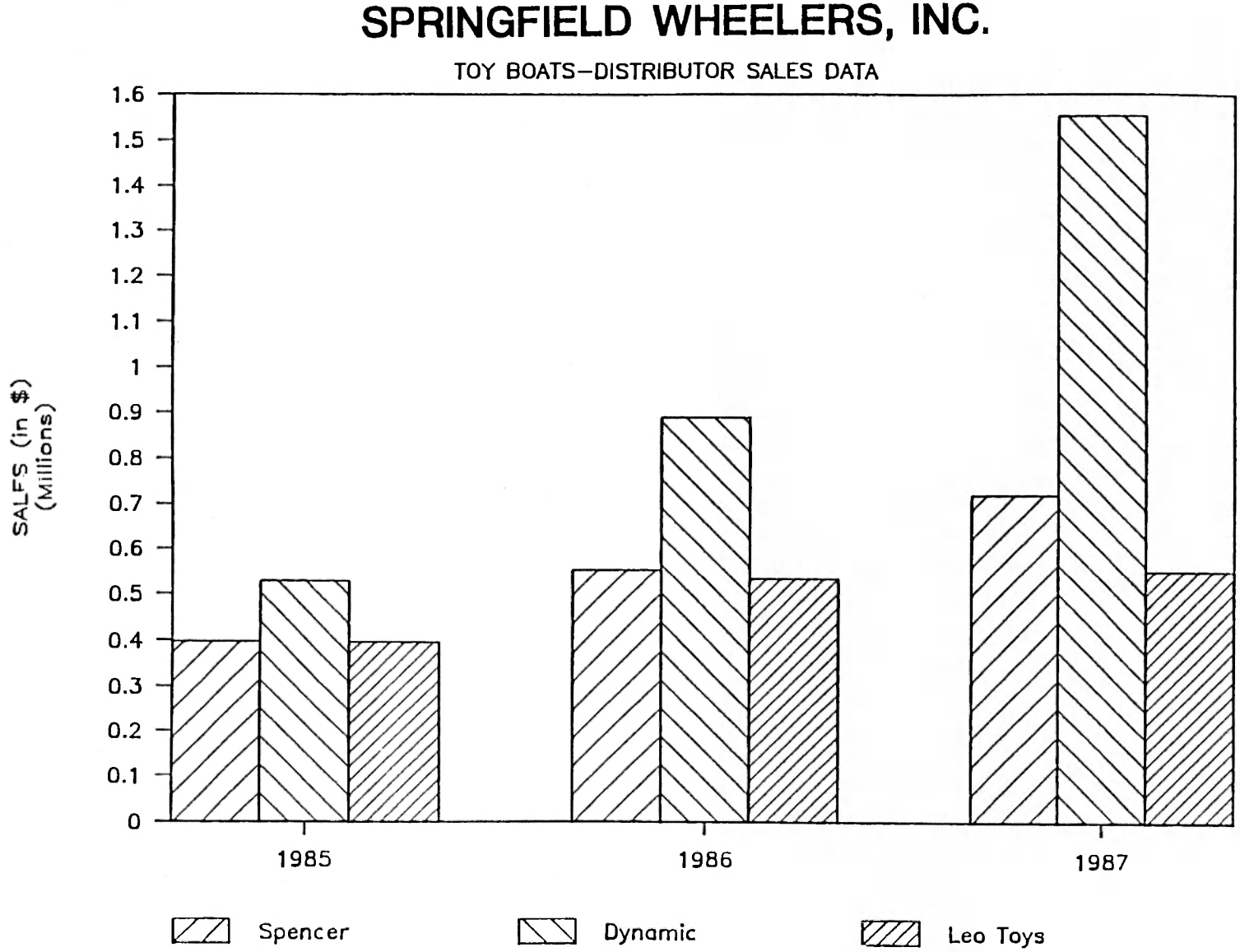
DISTRIBUTOR	YEAR 1985	1986	1987
Spencer	$ 2,700,000	$ 2,810,460	$ 2,750,600
Dynamic	$ 693,000	$ 722,500	$ 846,600
Ozark Agency	$ 376,000	$ 482,000	$ 636,400
TOTAL (A)	$ 3,769,000	$ 4,014,960	$ 4,233,600

TOY BOATS:

DISTRIBUTOR	YEAR 1985	1986	1987
Spencer	$ 397,540	$ 553,500	$ 720,000
Dynamic	$ 528,800	$ 889,000	$ 1,552,400
Leo Toys	$ 396,500	$ 533,990	$ 550,000
TOTAL (B)	$ 1,322,840	$ 1,976,490	$ 2,822,400
TOTAL (A+B)	$ 5,091,840	$ 5,991,450	$ 7,056,000

SPRINGFIELD WHEELERS, INC.




SPRINGFIELD WHEELERS, INC.
TOY BOATS—DISTRIBUTOR SALES DATA
SALES (in $)
(Millions)
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1985
1986
1987
Spencer
Dynamic
Leo Toys

SPRINGFIELD WHEELERS, INC.

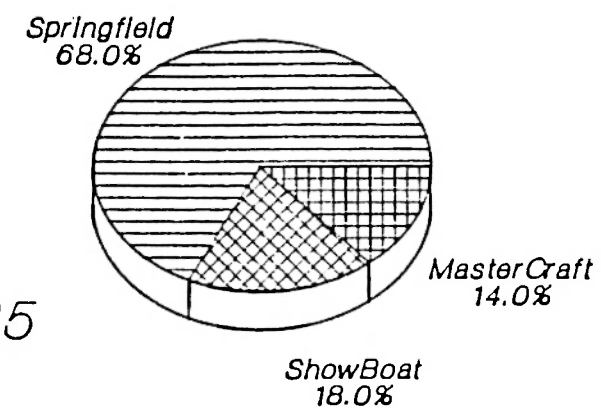
SALES & PURCHASE DEPARTMENT

MARKET SHARE ANALYSIS
(in dollars per year)

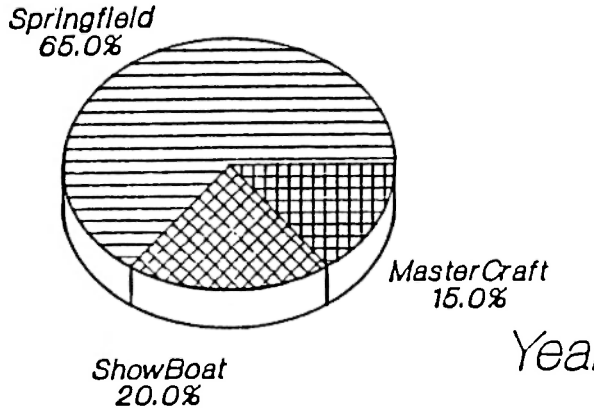
(On the basis of last 3 years)

Company	Year 1985	1986	1987
Springfield Wheelers	$ 5,091,840	$ 5,991,450	$ 7,056,000
ShowBoat	$ 1,350,000	$ 1,845,000	$ 3,528,000
MasterCraft	$ 1,048,000	$ 1,384,000	$ 3,000,000
TOTAL	$ 7,489,840	$ 9,220,450	$ 13,584,000

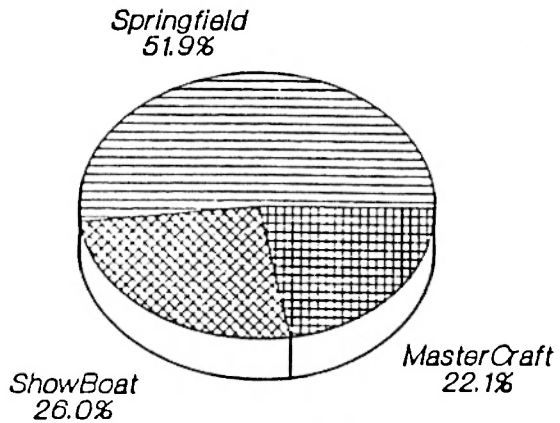
MARKET SHARE ANALYSIS



Year 1985



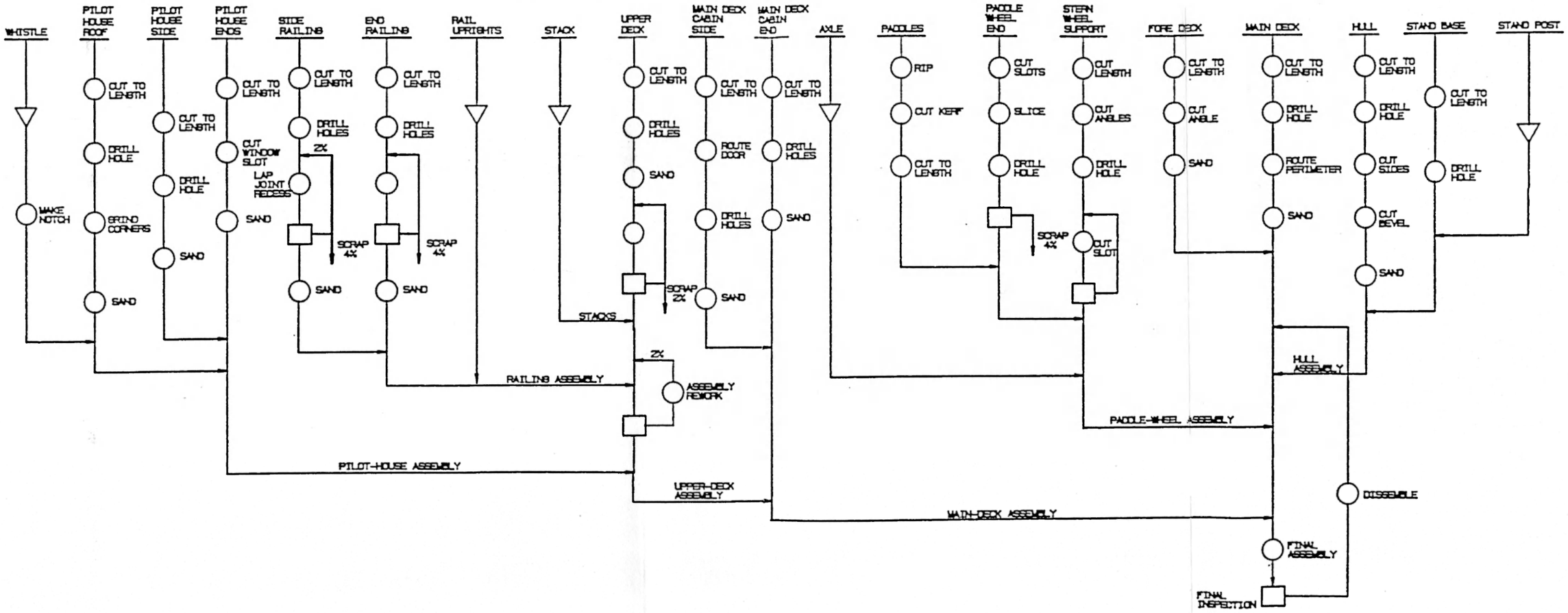
Year 1986



Year 1987

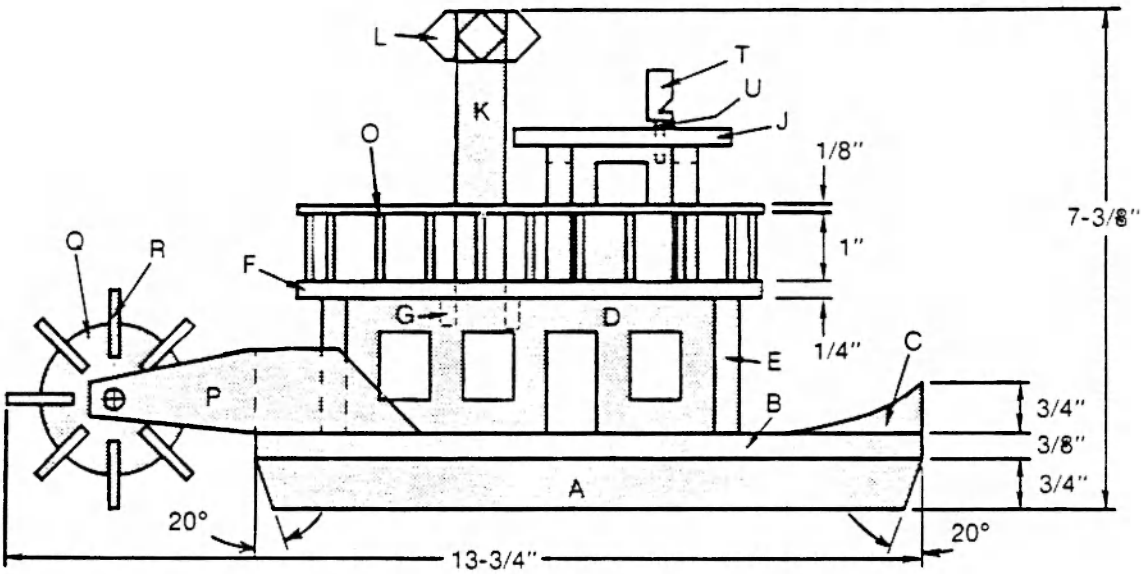
Source: Sales & Marketing Department

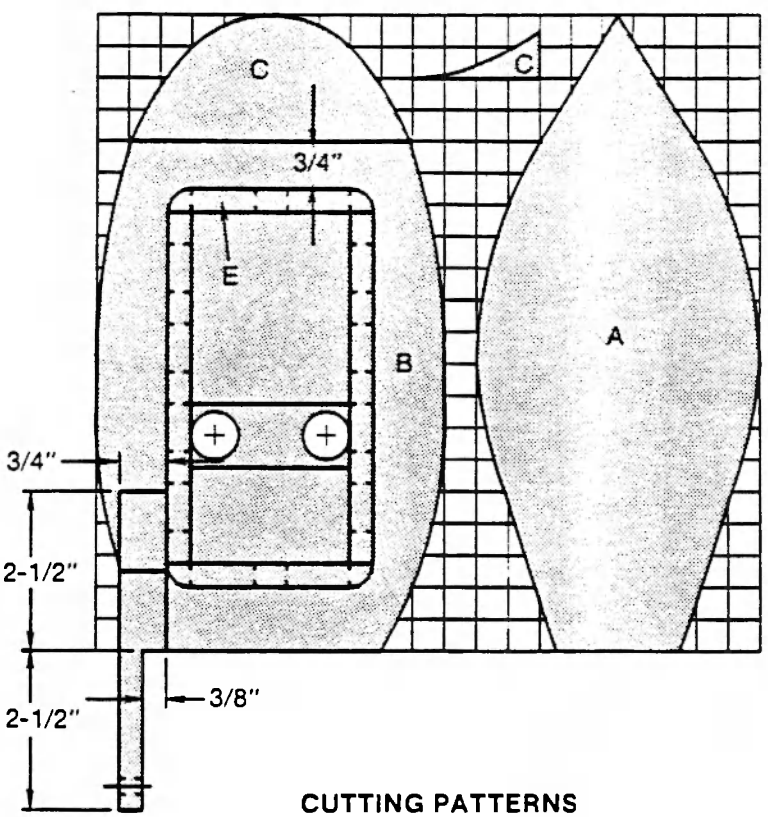
ASSEMBLY FLOW DIAGRAM



MACHINERY DATA

Type of Machine	Numbers
6 HP Rockwell Saw	16
2.5 HP Sears Saw	6
Radial Arm Saw	4
2.5 HP Sears Router	4
Column Drilling Machine	12
4 HP Rockwell Router	8
4 HP Disk Sander	4
Continuous Belt Sander	10





CUTTING PATTERNS

MATERIALS

Part	Description	Pieces	Dimensions
			(finished dimensions in inches)
A	Hull	1	3/4 × 4-1/2 × 10
B	Main deck	1	3/8 × 5-1/2 × 10
C	Foredeck	1	3/4 × 2 × 4-1/2
D	Main deck cabin sides	2	3/8 × 2 × 5-1/2
E	Main deck cabin ends	2	3/8 × 2 × 3-1/4
F	Upper deck	1	1/4 × 4 × 7
G	Stack support	1	1/2 × 1 × 2-1/2
H	Pilot house sides	2	3/8 × 2 × 1-1/2
I	Pilot house ends	2	3/8 × 2 × 2
J	Pilot house roof	1	1/8 × 2-1/2 × 3-1/4
K	Stacks	2	3/4 dia. × 4-3/4
L	Stack crowns	2	1-7/8 dia. × 3/4
M	Side railings	2	1/8 × 3/8 × 6-1/4
N	End railings	2	1/8 × 3/8 × 4
O	Rail uprights	28	1/8 dia. × 1-3/8
P	Sternwheel supports	2	3/4 × 1-1/4 × 5
Q	Paddle wheels	2	2-1/4 dia. × 3/8
R	Paddles	8	kerf × 1 × 4
S	Sternwheel axle	1	1/4 dia. × 4-3/4
T	Whistle	1	3/8 dia. × 3/4
U	Whistle stem	1	1/8 dia. × 1-1/4

CONSTRUCTION NOTES

1. May use solid stock or plywood for parts B, F, and J.
2. Cut contours for parts D, E, H, I, and Q out of 3/4" stock; then resaw.
3. Use hardwood dowel for parts K, O, S, T, and U.
4. Form with hole saw for parts L and Q.
5. Cut long strip for part R; then crosscut to length.

APPENDIX - D

INFORMED CONSENT STATEMENT

1. I, _____, volunteer to participate in a project in connection with research studies to be conducted by the Kansas State University.

2. I fully understand the purpose of the study as outlined on the attached orientation statement.

3. I also understand that my performance as an individual will be treated as research data and will in no way be associated with me for other than identification purposes, thereby assuring anonymity of my performance and responses.

4. I understand that I am a volunteer for this research and that I may decline to participate with no penalty or loss of benefits to which I am otherwise entitled. I further understand that I will be permitted to leave the test at any time and I may discontinue participation without penalty or loss of benefits to which I am otherwise entitled.

5. I understand that I will receive no monetary compensation for my participation.

6. There is no compensation by Kansas State University for injured research subjects.

7. I hereby agree not to give information regarding the studies to any public news media nor to publicize any articles or accounts thereof without prior written approval of Kansas State University.

8. If I have any questions concerning my rights as a test subject, injuries or emergencies resulting from my participation or any questions concerning the study, I understand that I can contact Ketan R. Shukla at DU 230 or at 539-1984.

I have read the Subject Orientation and Test Procedures and signed the herein Informed Consent Statement, this _____ day of _____ , 1988.

_____

Signature

SUBJECT ORIENTATION STATEMENT

IE 501 EXTRA CREDIT PROJECT

Extra Points	:	2
# of Subjects Required	:	40
Requirement	:	Junior or Senior Standing in Engineering.

This experiment is designed to determine the effects of a Work Simulation and a Case-Study.

You are invited to participate in this experiment. This experiment may provide you an opportunity to experience a real world industrial situation either through a case study or a work simulation. Some large companies are using these techniques to assess a candidate's potential as an employee. Your participation may benefit you should you ever in the future, be asked to participate in such a selection process.

HOWEVER, IT IS NOT GUARANTEED OR PROMISED THAT YOU WILL RECEIVE ANY BENEFITS FROM THIS PARTICIPATION.

If you decide to participate, you will be asked to work for an hour on either a simulated job or a case study. Upon completion of this experiment you will be asked to answer a short questionnaire about your reactions to the experience. The entire experiment should take approximately one and half hours.

You should experience no discomfort or any unusual conditions during the experiment. Data on your performance and any personal information collected will be kept strictly confidential. The research publication on the basis of the data will not reveal the identity of any subject.

If you have any questions about the experiment, you may contact Ketan R. Shukla at Room 230, Durland Hall or 539-1984. If you have any questions about your rights as a research subject, you may contact Dr. Robert P. Lowman, Chairperson, University Committee on Research Involving Human Subjects.

APPENDIX - E

BRIEFING SCRIPT*

"This experiment is an attempt to determine the effects of an in-basket simulation and a case study. A production manager's job is simulated (A new production manager's job is described in the case study). Obviously, a production manager's job involves many activities like attending meetings and conferences, making business trips, etc. This experiment only attempts to simulate certain administrative tasks of this job (This case study discusses only certain administrative tasks of this job).

The experiment will be conducted in three parts. First I will provide you the scenario of the business environment and pertinent reference material for the simulation (First I will provide you the reference material for the business environment described in the case). The scenario also describes the circumstances under which you are to occupy the simulated position (The case description will be distributed thereafter. This contains the description of the business environment and the circumstances under which the new production manager is to assume his office). The tasks involved in the simulation (The tasks described in the case) are of general managerial nature that we would expect any production manager to perform routinely.

The in-basket that I am going to give you now, contains various memos, letters and messages (The case discusses information from various memos, letters and messages). Please feel free to write any note or comment regarding your action on the experimental material. As you would come to know from the scenario, you will have one hour's time in your office (The circumstances described in the case allows the new production manager an hour's time in his office. Hence you will also be allowed one hour's time to work). IT IS IMPORTANT THAT YOU WORK AT A PACE APPROPRIATE FOR THE CIRCUMSTANCES AND FIGURE OUT YOUR ACTIONS ON DIFFERENT TASKS.

When the work period is over, I will return to this room and we will proceed to second part of the experiment. I will give you a questionnaire. Part-I contains the questions pertaining to your reactions and feelings about the experience. Next, I will distribute part-II of the questionnaire. You will identify an alternative for each task which most closely represents your action on that particular task. Do you have any questions at this point?"

---

* Appropriate changes for case study are in parentheses.

APPENDIX - F

SIMULATION QUESTIONNAIRE: PART I

Sub.No. _____

* Please answer the following questions about the work-simulation you have just experienced.
* Use the scale given below each question and circle the number which most closely correspond to your feeling about the question.
* Please answer all the questions.

1. I felt nervous about my performance level on this job.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

2. The job gave me opportunities to use personal initiative or judgment in carrying out the work.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

3. I knew the importance of proper allotment of my time during the exercise.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

4. I knew what my responsibilities were in the simulated job.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

5. I found the work period interesting.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

6. I knew exactly what was expected of me in the simulated job.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

7. Generally speaking, I was satisfied with the experience of "working" on this simulated job.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

8. I liked this simulated job.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

9. This job gave me realistic job experience.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

10. I think I performed well on this job.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

11. I can do a similar job <u>even</u> <u>better</u> next time.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

12. It was easy to prioritize the different tasks.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

13. I felt as if this simulation was based on a real situation!

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

14. This experience showed me the value of delegating work to others.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

15. As the simulation progressed, I understood more clearly how the information is interrelated.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

16. This simulation helped me to see how difficult it is to find the real cause of any problem.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

17. I tried to apply the knowledge I acquired from different courses.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

18. It seemed like I had too much work for one person to do.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

19. I understand the functional responsibilities of this simulated position.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

20. I feel that I learned methods which could be used for similar tasks.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

21. I understood the functions of other people in Springfield Wheelers.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

SIMULATION QUESTIONNAIRE: PART II Sub.No. _____

* Please answer the following questions about the work-simulation you have just experienced.

* Use the choices given below each question and put a "X" against the answer which most closely describes <u>what</u> <u>you did</u> on the simulation exercise.

* **You may refer to your material in order to find your decision on a particular task (a memo or letter, etc.).**

* Please answer all the questions.

---

1. What action did you take on "Telephone Message from Gary Johnson (Marketing Manager) about SIA Meeting"?

I decided to inform Gary that-

_____ I will <u>not</u> attend the meeting.

_____ I will attend the meeting.

_____ I decided to discuss this with Mike Smith in order to get his guidance.

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided to discuss this with Gary Johnson.

_____ I decided to do the task after getting some information from _____ (Name of person).

_____ I decided <u>not</u> to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I <u>could</u> <u>not</u> do this task. (Give brief reason)

_____

_____ Other (Please explain briefly)

_____

Comments (If any) _____

2. What action did you take on Quality Supplies Company's letter?

I decided to write to Mr. Mason that-

_____ all the future orders are to be revalidated by our Purchasing authority.

_____ he should send the replacement immediately.

_____ I decided to discuss this with Mike Smith in order to get his guidance.

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided to do the task after getting some information from _____. (Name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

3. What action did you take on "Mike Smith's Letter about Production Performance"?

_____ I decided to discuss this with Mike Smith in order to get his guidance.

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided to do the task after getting some information from _____. (Name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

4. What action did you take on "Draft by Bob to Mike about Absenteeism"?

_____ I decided to tell Lisa (secretary) to prepare the same letter with my name.

_____ I decided to prepare a new draft in order to include this major point-

_____

_____

_____ I decided to do the task after getting some information from _____. (Name of person)

_____ I decided to talk to Mike Smith about this instead of writing this memo.

_____ I decided to call a meeting with workers' union in the presence of personnel officer.

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided <u>not</u> to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I <u>could</u> <u>not</u> do this task. (Give brief reason)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

5. What action did you take on "Gary's Letter about quality of purchased parts and Vendor Report"?

_____ I decided to inform Gary (Marketing Manager) to write to all vendors about new policy.

_____ I decided to do the task after getting some information from _____. (Name of person)

_____ I decided to discuss this issue with Mike Smith in order to get his guidance.

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

6. What action did you take on "Gary's Letter indicating William Spencer's visit and next order problem"?

_____ I decided to prepare the list of important points for discussion with William Spencer.

_____ I decided to inform Spencer to postpone his visit by _____ (days/weeks).

_____ I decided not to meet Mr. Spencer.

_____ I decided to do the task after getting some information from _____. (Name of person)

_____ I decided to discuss this issue first in the morning tomorrow with Mike Smith before Spencer's arrival in order to get his guidance.

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided <u>not</u> <u>to</u> <u>do</u> this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I <u>could</u> <u>not</u> <u>do</u> this task. (Give brief reason)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

7. What action did you take on draft of memo by Bob to foremen and supervisors about overtime?

_____ I decided to tell Lisa (secretary) to prepare the same memo with my name.

_____ I decided not to send the memo and took no other action.

_____ I prepared a new draft.

_____ I decided to discuss this issue with Mike Smith in order to get his guidance.

_____ I decided to do this task after calling a meeting of foremen and supervisors.

_____ I decided to do this task after getting some information from _____.
(name of person)

_____ I decided to delegate this task to _____.
(name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to postpone this task until after tomorrow's meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

8. What action did you take on letter from Mike regarding Quality Control requirement?

_____ I decided to discuss this issue with Mike Smith in order to get his guidance.

_____ I decided to do the task after getting some information from _____. (Name of person)

_____ I decided to go through the process and try to find the stages where Q.C. inspectors are required.

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

9. What action did you take on letter from Robert Wilson (exe. vice president) about manufacturing cell possibility?

_____ I decided to prepare some information like number of machines available, expected new machines etc. to discuss with the executive vice-president today.

_____ I decided to discuss this issue with Mike Smith in order to get his guidance. So, I would not discuss this today with Mr. Robert Wilson.

_____ I decided to do the task after getting some information from _____. (Name of person)

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with the executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

10. What action did you take on Bill Crane's memo (2nd shift foreman) about overtime permission?

_____ I decided to allow overtime for Spencer's order.

_____ I decided not to allow overtime.

_____ I decided to call a meeting of 2nd shift supervisors and foreman.

_____ I decided to discuss with Gary (Sales & Purchase) to contact local vendors for subcontracting possibility for part of the job.

_____ I would tell Gary to write a letter to Spencer Brothers saying that there may be delay.

_____ I decided to discuss this issue with Mike Smith in order to get his guidance.

_____ I decided to do the task after getting some information from _____.(Name of person)

_____ I decided to delegate this task to _____.
(Name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

11. What action did you take on Bill Crane's memo (2nd shift foreman) about defective raw material?

_____ I decided to call a meeting of 2nd shift supervisors and foreman.

_____ I decided to discuss with Gary (Sales & Purchase) to contact local vendors for subcontracting possibility for part of the job.

_____ I informed Gary to write a letter to supplier company to replace the defective lot at the earliest.

_____ I decided to discuss this issue with Mike Smith in order to get his guidance.

_____ I decided to do the task after getting some information from _____.(Name of person)

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

12. What action did you take on Greg Stevens' memo about inspection changes?

_____ I decided to study present inspection stages in the process in order to find out additional inspection requirements.

_____ I decided to schedule a meeting with Greg and Harry after _____ days.

_____ I decided to discuss this issue with Mike Smith in order to get his guidance.

_____ I decided to do the task after getting some information from _____. (Name of person)

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow's meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

13. What action did you take on chief engineer Greg Stevens' memo about maintenance problems with routers?

_____ I scheduled a meeting with Greg, two foremen and the maintenance staff to get their views.

_____ I decided to find out the frequency of breakdowns on these machines and tell Harry to bring the estimates for replacements and repair.

_____ I decided to discuss this issue with Mike Smith in order to get his guidance.

_____ I decided to do the task after getting some information from _____. (Name of person)

_____ I decided to delegate this task to _____. (Name of person)

_____ I decided not to do this task.

_____ I decided to do this task after meeting with executive vice-president of the company.

_____ I decided to do this task after tomorrow (April 25)'s meeting with Mr. Spencer.

_____ I could not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

APPENDIX - G

CASE STUDY QUESTIONNAIRE: PART I

Sub. No. _____

* Please answer the following questions about the case study you have just read.
* Use the scale given below each question and circle the number which most closely corresponds to your feeling about the question.
* Please answer all the questions.

1. If I were Pat, I would have felt nervous about my performance level on this job.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

2. Reading the case gave me opportunities to use my personal initiative or judgment, such that I could carry out Pat's work if I were to do it.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

3. I know the importance of proper time allocation if I were to do Pat's job.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

4. I understood the responsibilities of Pat's job from the case.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

5. Reading the case was interesting.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

6. I learned from the case what can be expected for Pat's job.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

7. Generally speaking, I was satisfied with the case study because it gave me a feeling of working in a real situation.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

8. I liked this case study.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

9. This case gave me a realistic job experience.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

10. I think I could perform well in Pat's job.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

11. My ability to do a job similar to Pat's job is better after reading the case.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

12. I think it is easy to prioritize the different tasks Pat had to do.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

13. I felt as if this case was based on a real situation!

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

14. The case showed me the value of delegating the work.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

15. As I was going through the case, I understood more clearly how the information was related.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

16. This case study helped me see how difficult it is to find the real cause of any problem.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

17. I tried to apply the knowledge I acquired from different courses.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

18. It seemed that Pat had too much work for one person to do.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

19. From this case, I understood the functional responsibilities of Pat's position.

1	2	3	4	5	6	7
(Very false)			(Neutral)			(Very true)

20. I feel that I learned methods which could be used for tasks similar to Pat's, from the case.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

21. I understood the functions of other people in Springfield Wheelers from this case.

1	2	3	4	5	6	7
(Disagree strongly)			(Neither agree nor disagree)			(agree strongly)

CASE STUDY QUESTIONNAIRE: PART II Sub. No._____

* Please answer the following questions about the case study you have just read.

* Use the choices given below each question and put a "X" against the answer which most closely describes **what you would do, if you were Pat.**

* **You may refer to the case and other material in order to find your decision on a particular task.**

* Please answer all the questions.

---

1. What action would you take about SIA Meeting on April 27?

I would inform Mike and Gary that-

_____ I will <u>not</u> attend the meeting.

_____ I will attend the meeting.

_____ I would discuss this with Mike Smith in order to get his guidance.

_____ I would delegate this task to _____. (Name of person)

_____ I would discuss this with Gary Johnson (Marketing Manager).

_____ I would do the task after getting some information from _____. (Name of person)

_____ I <u>would not</u> do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow's meeting with Mr. Spencer.

_____ I <u>can not</u> do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

Comments (If any) _____

2. What action would you take about Quality Supplies Company?

I would write to Mason that-

_____ all the future orders are to be revalidated by our Purchasing authority.

_____ he should send the replacement immediately.

_____ I would discuss this with Mike Smith in order to get his guidance.

_____ I would delegate this task to _____.
(Name of person)

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow's meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

3. What action would you take on Mike Smith's inquiry about Production Performance?

_____ I would discuss this with Mike Smith in order to get his guidance.

_____ I would delegate this task to _____.
(Name of person)

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow's meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

4. What action would you take about the memo drafted by Bob to Mike about absenteeism?

_____ I would tell Lisa (secretary) to prepare the same letter under my name.

_____ I would prepare a new draft in order to include this major point-

_____

_____

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would talk to Mike Smith about this instead of writing a memo.

_____ I would call a meeting with workers' union in presence of personnel officer.

_____ I would delegate this task to _____.
(Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow's meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

5. What action would you take on Gary's concern about quality of purchased parts and vendor report?

_____ I would inform Gary (Marketing Manager) to write to all vendors about new policy.

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would discuss this issue with Mike Smith in order to get his guidance.

_____ I would delegate this task to _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow's meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

6. What action would you take on Gary's request to meet William Spencer about problems on next order?

_____ I would prepare the list of important points for discussion with William Spencer.

_____ I would inform Spencer to postpone his visit by _____ (days/weeks).

_____ I would not meet Mr. Spencer.

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would discuss this issue first in the morning on April 25 with Mike Smith before Spencer's arrival in order to get his guidance.

_____ I would delegate this task to _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

7. What action would you take on draft of memo by Bob to foremen and supervisors about overtime?

_____ I would tell Lisa (secretary) to prepare same memo under my name.

_____ I would not send the memo and would take no other action.

_____ I would prepare a new draft.

_____ I would discuss this issue with Mike Smith in order to get his guidance.

_____ I would do this task after calling a meeting of foremen and supervisors.

_____ I would this task after getting some information from _____.
(name of person)

_____ I would delegate this task to _____.
(name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would postpone this task until after April 25's meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

8. What action would you take on Mike's view regarding inspection arrangement?

_____ I would discuss this issue with Mike Smith in order to get his guidance.

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would go through the process and try to find the stages where Q.C. inspectors are required.

_____ I would delegate this task to _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow's (April 25) meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

9. What action would you take on exe. vice-president Robert Wilson's inquiry about cellular manufacturing possibility?

_____ I would prepare some information like number of machines available, expected new machines etc. to discuss with the exe. vice-president on April 24.

_____ I would discuss this issue with Mike Smith in order to get his guidance, so I would not discuss this on April 24 with the exe. vice-president.

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would delegate this task to _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with the exe. vice-president of the company.

_____ I would do this task after tomorrow's (April 25) meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

10. What action would you take on Bill Crane's (2nd shift foreman) request about overtime permission?

_____ I would allow overtime this time for Spencer's order.

_____ I would not allow overtime.

_____ I would call a meeting of 2nd shift supervisors and the foreman.

_____ I would discuss with Gary (Sales & Purchase) to contact local vendors for subcontracting possibility for part of the job.

_____ I would inform Gary to write a letter to Spencer Brothers saying that there may be a delay.

_____ I would discuss this issue with Mike Smith in order to get his guidance.

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would delegate this task to _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow (April 25)'s meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

11. What action would you take on Bill Crane's (2nd shift foreman) information about defective raw material?

_____ I would call a meeting of 2nd shift supervisors and foreman.

_____ I would discuss with Gary (Sales & Purchase) to contact local vendors for subcontracting possibility for part of the job.

_____ I would write a letter to the supplier company to replace the defective lot at the earliest.

_____ I would discuss this issue with Mike Smith in order to get his guidance.

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would delegate this task to _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow (April 25)'s meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

12. What action would you take on chief engineer Greg Stevens' suggestion about inspection changes?

_____ I would study present inspection stages in the process in order to find out additional inspection requirements.

_____ I would schedule a meeting with Greg and Harry after _____ days.

_____ I would discuss this issue with Mike Smith in order to get his guidance.

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would delegate this task to _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow (April 25)'s meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

13. What action would you take on chief engineer Greg Stevens'memo about maintenance problems with routers?

_____ I would schedule a meeting with Greg, two foremen and the maintenance staff to get their views.

_____ I would find out the frequency of breakdowns on these machines and tell Harry to bring the estimates for replacements and repair.

_____ I would discuss this issue with Mike Smith in order to get his guidance.

_____ I would do the task after getting some information from _____. (Name of person)

_____ I would delegate this task to _____. (Name of person)

_____ I would not do this task.

_____ I would do this task after meeting with exe. vice-president of the company.

_____ I would do this task after tomorrow (April 25)'s meeting with Mr. Spencer.

_____ I can not do this task. (Give brief reason.)

_____

_____ Other (Please explain briefly)

_____

_____

Comments (If any) _____

_____

APPENDIX - H

ORIGINAL WORDINGS OF ITEMS FROM REFERENCES

From Hackman and Oldham (1980):

(1) The job gave me opportunities to use personal initiative or judgment in carrying out the work.

Answers: 1 (Strongly disagree) to 7 (Strongly agree).
Questionnaire- Part I item #: 2.

(2) Generally speaking, I am satisfied with this job.

Answers: 1 (Strongly disagree) to 7 (Strongly agree).
Questionnaire- Part I item #: 7.

From McCright (1987):

(1) I felt fidgety or nervous as a result of this experiment.

Answers: 1 (Disagree strongly) to 7 (Agree strongly).
Questionnaire- Part I item #: 1 - Reverse scored.

(2) It seemed like I had too much work for one person to do.

Answers: 1 (Disagree strongly) to 7 (Agree strongly).
Questionnaire- Part I item #: 18- Reverse scored.

From Rizzo, House, and Lirtzman (1970):

(1) I know that I divided my time properly.

Answers: 7 (Very false) to 1 (Very true).
Questionnaire- Part I item #: 3.

(2) I know what my responsibilities are.

Answers: 7 (Very false) to 1 (Very true).
Questionnaire- Part I item #: 4.

(3) I know exactly what is expected of me.

Answers: 7 (Very false) to 1 (Very true).
Questionnaire- Part I item #: 6.

From Miles, Biggs, and Schubert (1986):

Rate the cases on the extent to which they have actually helped you:

(1) Integrate learning from functional areas (Accounting, Finance, Marketing, etc.).

Answers: Very much 1 2 3 4 5 6 Not at all.
Questionnaire- Part I item #: 17.

(2) Increase your confidence in your ability to work independently.

Answers: Very much 1 2 3 4 5 6 Not at all.
Questionnaire- Part I item #: 11.

(3) The cases helped me to better understand the basic principles of the course.

Answers: 1 (Agree strongly) to 5 (Disagree strongly).
Questionnaire- Part I item #: 20.

(4) The cases added a lot of realism to the class.

Answers: 1 (Agree strongly) to 5 (Disagree strongly).
Questionnaire- Part I item #: 9 and 13.

EFFECTIVENESS OF IN-BASKET SIMULATION AS AN INSTRUCTIONAL TOOL FOR INDUSTRIAL MANAGEMENT

by

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Global competitiveness and rapid technological progress demands an understanding of effective management strategies for the business environment. This concept can be realized through an action-oriented approach in management training and engineering education. The application of case studies and job simulations is found in management schools. The industrial engineering curriculum has the potential to incorporate the action-oriented approach in the courses with the management perspective. The purpose of this study was to evaluate the relative effectiveness of an in-basket simulation compared to a case study for the instruction of industrial management in engineering education. The experiment considered a model industrial environment as a frame of reference. Administrative aspect of a production manager's job was simulated in the in-basket simulation. Identical information was contained in the case description for the case study group. Perception measures and task decisions of the subjects were used as the measures of effectiveness. The analysis of data revealed statistically significant differences between group-means for learning, potential for performance, satisfaction and realistic experience. The results indicated that in-basket simulation can be a potential tool of instruction for industrial management.