The Influence of Metacognition on Managerial Hiring Decision Making: Implications for Management Development

Angela Ewell Kumar

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Albert Wiswell, Chair
Marcie Boucouvalas
Marvin Cline
K.C. Soares
Harold Stubblefield

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(ABSTRACT)

Cognitive processing has a primary role in decision making. In addition, metacognition, the regulation and knowledge of cognition, affects decision making in a consistent and predictable way. Novices explain situations in a simple way. Novices are more likely to make inappropriate decisions. Research suggests that training the novice on efficient use of metacognitive strategies can improve decision outcomes. The influence of metacognitive strategies on managerial decisions has received little attention. Two questions developed to guide this research. First, how do expert and novice managers differ on metacognitive awareness? And second, how does the level of metacognitive awareness influence successful hiring decisions? Subjects for this study were thirty-one hiring managers employed by a large national corporation. And two hundred eight-five hiring professionals from an association.

Data collection involved four sources: (1) A hiring ratio used to report hiring outcomes, (2) Five hiring scenarios provided a measure of managers' ability to select the most appropriate candidate; (3) A 52-item instrument designed to assess metacognitive awareness in both knowledge of cognition and regulation of cognition; and (4) demographic data relating to expertise and experience in hiring.

The results identified that metacognition has three underlying structures that influence hiring decision making. Expert and novice managers differ in a consistent way on metacognitive awareness. In exploring and testing the ill-defined mental process model of hiring decision making a methodological tool was established. And the results provided important implications for human resource development professionals with respect to the relevance of metacognitive awareness on managerial development and instructional design.

This study is dedicated to my mother,

Adeline Ewell

(March, 1943 - June, 1988)

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CHAPTER 1
Introduction

Decision-making has captured the attention of many organizations over the past three decades. Businesses have examined the phenomena in an effort to understand its influence on operations. In 1986 the chair of the board for Sony Corporation claimed that the primary function of management is decision making (Bryne, 1996). Earlier, cognitive psychologist Herbert Simon (1960) had described decision making as the "heart of executive activity." The strong implication of these assertions is that businesses need to find a tool or strategy to understand and develop the decision making abilities of their managers.

The need exists for research about the development of decision making skills in business education. Responding to the increasing pressure to be competitive, business leaders are demanding that workers have higher thinking abilities. The interest in educating the business workforce to be higher order thinkers was investigated by the Carnegie Task Force on the Teaching Profession's report: A Nation Prepared, which concluded that American students lacked thinking ability (1986). Decision making skills has been identified as one of the foundation competencies of higher order thinking skills by the Secretary's Commission on Achieving Necessary Skills in What Work Requires of Schools; A SCANS Report for America 2000 (U.S. Department of Labor, 1991). The increased pressure of workers to be higher order thinkers has put emphasis on the need for research that will assist business educators in providing instruction that will enhance the thinking skills of workers. Since the primary responsibility of managers is decision making, this study will investigate managerial decision making.

One method of understanding the processes associated with managerial decision making is to assess the difference between expert and novice managers. Another method of understanding decision making is to understand the influence of metacognition on outcomes of decisions. Therefore, understanding the influence of metacognitive awareness between expert and novice managers can provide an avenue for management development. The avenue may then allow human resource professionals to design appropriate practical applications for decision making.

Management decision making cannot be described as systematic, logical, or certain. Many theorists, scientists, and philosophers have suggested models and strategies of rational

ways to make decisions in the dynamic organizational environment. The organizational environment has factors that greatly influence decision making due to complexity, uncertainty, and simultaneity. Many decision making environments cannot be explained as a well-defined linear process moving from one step or phase to another. Usually decisions require the decision maker to attend to several aspects of the problem simultaneously. Additionally, one should not assume that any situation is as logical as portrayed by the models for decision making. Therefore, the dynamics of the organization coupled with the complexity of managerial decisions may influence the model's effectiveness.

Among the most powerful and dynamic managerial decisions are hiring decisions. Hiring decisions are vital, complex, and variable. A particular linear decision model or heuristic (rule of thumb) is not always optimal in these cases. Decision science research v suggests that expert hiring managers use metacognitive strategies when making hiring decisions.

Perkins and Salomon (1989) asked the question: do aspects of effective decision making depend on expertise based on content knowledge (cognition) or on reflective awareness and general strategies (metacognition)? Cognition is the act of knowing and metacognition is the ability to reflect upon, understand and control that knowledge (Dennison & Schraw, 1994). Metacognition has also been noted as the awareness and control over one's thinking (Brown, Bransford, Ferrara & Campione, 1983; Flavell, 1978; Jacobs & Paris, 1987; Metcalfe & Shimamura, 1994).

A long standing argument in metacognition was that it cannot be separated from cognition (Garner & Alexander, 1989; Jacobs & Paris, 1987; Slife, Weiss, & Bell, 1985). More recently, Swanson (1990) has influenced the argument by establishing the independence of metacognition from cognition. His focus is on characteristics associated with metacognition and how those specific characteristics influence problem solving or decision making. The importance of the specific characteristics is that they can be learned. The separation of metacognition from cognition is important for researchers of adult education because the separation implies that individuals with low aptitude or little knowledge (novices) can compensate their performance with higher levels of metacognition, which can be learned. The implication for the novice manager is the ability to improve decision making by using metacognitive strategies. Research studies have suggested that metacognitively aware individuals are more strategic and perform better when solving problems (Garner & Alexander,

1989; Pressley & Ghatala, 1990). This study answers the question: how is a manager's decision making behavior influenced by metacognition?

Background of the Problem

Traditionally, decision making has been labeled as strictly a cognitive process, influenced primarily by age, experience, domain specific knowledge, beliefs, attitudes, judgments, and values. Studied extensively by researchers, philosophers, and neurologists, the process is not fully understood or defined. Experts agree that the role of cognition is important in decision making. But, metacognition is believed to have an equally important role. Perkins and Salomon (1989) argue that metacognition is a component of cognition (p.17). McCormick, Miller, and Pressley (1989) refer to metacognition as a component of a triple alliance with cognition and motivation playing an equally important role in decision making. This study is an attempt to better understand the unique influence of metacognition on managers' decision making behavior as Swanson suggested in 1990.

Metacognition was first introduced by Flavell (1979) in the field of psychology and later expanded by Brown (1980). Flavell (1976) furnished a broad definition:

> Metacognition refers to one's knowledge concerning one's own cognitive processes.... Metacognition refers, among other things, to the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects or data on which they bear, usually in the service of some concrete goal or objective (p. 232).

McCormick, Miller & Pressley (1989) concede that metacognition refers to knowledge about and control of certain cognitive processes such as attention, memory and comprehension (p.186). These cognitive processes include: (a) mental awareness of strategies and skills that are necessary for a given situation, (b) knowledge of how internal and external variables interact to affect the importance of incoming information, and (c) knowledge of strategies to facilitate thinking and learning. In essence, metacognition is an awareness of one's own cognitive activity; the methods employed to regulate one's own cognitive processes; and a command of how one directs, plans, and monitors cognitive activity (Brown, 1978). Metacognition should include active checking, planning, monitoring, testing, revising, evaluating, and thinking about cognitive performance (Baker & Brown, 1984; Van Haneghan & Baker, 1989). Short and Weissberg (1989) suggest an interpretation of metacognition as "whether the learner is aware of

how knowledge about the 'self', the 'task' and the 'strategies' influences his/her performance" (p.42).

Metacognition begins in an unconscious mode and is followed by increased conscious regulation and self-monitoring in the use of strategies, knowledge, and the acquisition of new knowledge (Brown & DeLoache, 1978; Vygotsky, 1962). Researchers have distinguished two components of metacognition, which consist of knowledge of cognition and regulation of cognition (Brown, 1987; Flavell, 1987; Jacobs & Paris, 1987). Understanding both dimensions of metacognition when making decisions is the focus of this study.

The Importance of Management Decisions

Most managers make many decisions each day. They decide where to put the new office chair and who should be hired to sit in it. They decide what to pay the person to sit in the chair, how to evaluate him and when and if he gets promoted. This study will focus on one of the burning issues that managers are facing today: deciding whom to hire. The rationale for focusing on the decision to hire is the need for research that will improve hiring decisions and will provide strategies to develop skills in hiring decision making. No studies investigate the relationship between the metacognitive strategies and measures of success related to hiring decisions. None highlight the metacognitive differences of experts versus novices in hiring decisions. This study will examine metacognitive strategies, measures of success, and metacognitive differences between experts and novices in making hiring decisions.

According to Naylor, Pritchard and Ilgen (1980), decisions are often based on routines or previously established principles that do not require conscious effort on the part of the decision maker. When conscious thought is not given to a situation, the decision is based on habit or heuristics. Habits and heuristics are based on a routinized, memorized, and proceduralized skill that assumes that all situations are the same. The complexity of the hiring decision requires "a reasoning process with an idiosyncratic flavor that cannot be routinized, memorized, or automatically applied" (Pressley, Synder, Symons & Cariglia-Bull, 1989).

Hiring decisions could be the decisions to which McCormick, Miller, and Pressley refer when they suggest that decision making requires the use of strategies which involve the development of the cognitive process and metacognitive knowledge (1989, p.141). Schraw & Dennison (1994) suggest that metacognitive knowledge plays a role in cognitive performance by improving strategy use (p. 461). A strategy is a plan of action pertaining to the cognitive process

that one uses to make a decision. Heuristic serves as a prescriptive technique or method used to make decisions. Heuristics have been classified into two categories by organizational behavior researchers Naylor, Pritchard and Ilgen (1980): involuntary and voluntary. Involuntary heuristics are used without conscious thought by decision makers. Tversky and Kahneman (1974) have explained the three major types of involuntary heuristics as representativeness, availability, and anchoring. Representativeness is used when the process of the decision maker includes the comparison of features of the present situation with features of a previous event. Availability is when the decision maker uses the first example of a similar situation that they recall. An anchor is an arbitrary starting point used when initially making a decision. The anchor changes with each similar decision.

Decision makers consciously use voluntary heuristics. An example of a voluntary heuristic is a rule. Rule governed behavior can include the use of simple grammatical rules, which are used by many every day, or more complex combinations of simpler rules. Rules are used often times by decision makers without clear knowledge of the conditions for which the rules were designed. Many rules are used without decision makers' full understanding or agreement with the rules they use. Rules require conscious use but not conscious thought. Effective decision making requires conscious thought.

The dynamic environment in which managers make hiring decisions necessitates all conscious processes to be used. An essential part of the conscious processes is thinking. Thinking influences the abilities of conscious recognition of strategies, the selection of an appropriate strategy and the ability to apply a strategy. Thinking has been described by Baron (1985) as "a conscious, goal-oriented episode consisting of a series of independent phases" (p. 5). Symons, Synder, Cariglia-Bull, and Pressley (1989) suggest that thinking is goal-oriented by stating "thinking is a process in which evidence is used to choose among potential possibilities in order to satisfy a goal" (p. 4). The goal of hiring decision making is to select the most appropriate candidate.

Considerable research efforts have engendered frameworks, models and other tools to help managers make rational, logical and reasonable decisions. Many frameworks and models borrow from the mathematical model of Polya's (1973) problem solving stages: (a) understanding the problem, (b) making a plan, (c) carrying out the plan, and (d) looking back. These stages are often presented in linear steps. Fernandez, Hadaway, and Wilson (1994)

suggest that the linear stages of Polya's framework "do not capture the dynamic inquiry involved in problem solving, to include self-monitoring, self-regulating, and self-assessment" (p. 197). More recently, Schoenfeld (1987) and Lester (1985) have developed frameworks based on Polya's stages. Schoenfeld combined Polya's stages with information-processing theories to develop five episodes of problem solving: (a) reading, (b) analysis, (c) exploration, (d) planning/implementation, and (e) verification. Lester referred to Polya's stages as the cognitive component and proposed that another equally important component of the problem solving framework is the metacognitive component, which consists of strategies that guide the cognitive actions. These models and frameworks are only a few that have been developed to guide decision making in the general domain. However, no models have been developed to provide decision making strategies for managers making hiring decisions.

The differences between expert and novice decision makers have been the subject of many research studies (Anderson, 1981; Chi, Feltovich, & Glaser, 1981; Simon, 1979). Many of the studies were to investigate differences in problem solving, judgments and techniques. Studies within traditional cognitive research have revealed novice-expert differences in nearly every aspect of cognitive functioning. Expert-novice comparisons have shown that the differences are not only in amount of knowledge but the organization of knowledge, accessibility of knowledge, and the knowledge structures (Rohwer & Thomas, 1989, p.104). Although research has established the differences between experts and novices in most domains, the management decision making domain remains unexplored. This research answers questions about the variability of managerial hiring decision making across an expert-novice continuum. The purpose is to provide a framework to predict expert behavior in managerial hiring decision making. Once this framework is established, the researcher was able to investigate the correlation between expert hiring behavior and metacognitive awareness.

Statement of the Problem

The hiring process is more complex today than in the past. In making decisions hiring managers are faced with more environmental factors, more information, and less time to make the decision. The nation's unemployment rate as of January 27, 1998 was 4.7%, which is the lowest rate in a generation (Department of Labor, Bureau of Labor Statistics, January 27, 1998). This decline in unemployment has created a different employment issue centered around the problem of un-employee-ment, which is the employer's inability to stay completely staffed.

Another aspect of the problem involves the cost of turnover. According to an article written for the Society of Human Resource Management, the average cost per hire for exempt personnel in 1994 was $6,359 (Thaler-Carter, 1994). A professional emphasis group within the Society for Human Resources Management, Employment Management Association, reports that a geographic analysis for 1996 concludes the average cost per hire for exempt personnel to be $8,512. Cost per hire includes advertising, training, recruiting, and down time. The average turnover for 1995 was 29%. That means an organization pays over six thousand dollars per hire to turnover, almost one third of the staff per year. And estimates predict an increase in the turnover rate as the competition for staff increases. One of the issues associated with turnover is making a decision on the most appropriate candidate. Denton (1996) concedes that organizations pay little attention to the effectiveness of hiring decisions within organizations. He further concludes that the link between an organization and a skilled and committed workforce is the hiring decision.

Excessive openings invite better strategies for selecting the best employees expeditiously. In the context of many components surrounding the decision to hire, the focus for this study is on the metacognitive strategies.

Purpose of the Study

The purpose of this study is to determine the extent to which metacognitive strategies influence expert behavior in hiring decisions. Metacognitive strategies include planning, sequencing, self-checking for understanding, self-questioning, evaluating, and revising to improve performance (Schraw & Dennison, 1994; Zimmerman, 1990). Research suggests that metacognitive awareness can be identified when experts make decisions. But, the decisions are usually problems that have linear, well-defined characteristics. Therefore, to assume that the same findings can be transferred in the hiring decision making domain is unrealistic. One of the purposes of this study is to verify the relationship of metacognitive strategies used by expert managers versus novice managers when making hiring decisions. If the metacognitive strategies used by expert managers can be verified and those same strategies can be predictive of successful hiring decisions, then novice managers can likewise learn metacognitive strategies to improve their decision making performance.

Research Questions

To understand managerial hiring decision making within the organizational environment, the metacognitive awareness of hiring decision makers was distinguished by a framework detailing their knowledge about self and strategies, when and how to use the strategies, and their planning, monitoring and evaluation of strategy use. The primary notion is that only through an understanding of the strategies used when making hiring decisions can insights be gained for their improvement. The understanding of strategies used by experts has been demonstrated to improve the performance of novices (Greeno, 1978; Mayer, 1987; Shavelson, 1981; Voss, 1986). Thus, drawing on the literature, a framework has been developed highlighting the metacognitive dimension of expert decision makers. Once the demographic characteristics of experts have been identified and validated, the study may focus on the appropriate interventions for novices.

The focus is on the following questions:

1. To what extent does the metacognitive awareness inventory developed by Schraw and Dennison (1994) measure the components of metacognition -- regulation and knowledge of cognition?
2. How do expert and novice managers differ on metacognitive awareness?
3. What is the predictive contribution of regulation of cognition on successful hiring outcomes?
4. What is the predictive contribution of knowledge of cognition on successful hiring outcomes?
5. What is the predictive contribution of age, management experience, hiring experience, education, confidence in hiring, and metacognitive awareness on successful hiring outcomes?

Significance

The questions are presented to address issues that will contribute to the body of knowledge in both the management and adult learning literature. The research questions provide a basis for testing the hypothesis, which will indicate the specific relationships to be examined. Thus, the questions imply a positive relationship between expert hiring decisions and metacognitive awareness in managers.

The management literature will benefit from this study by understanding better how metacognition influences managers hiring decision making. Adult learning literature will benefit

because this study will provide a bridge to research, models and learning aids associated with improving metacognition. The bridge is new use of research that was geared to a different audience. Improving metacognitive abilities is not new to the educational domain in that educators use models and learning aids to help students. Managers are another audience that could benefit from improved metacognition. Considerable research effort has been directed toward developing conceptual frameworks, decision models, decision support systems and other tools to aid managers in decision making. This study is directed toward understanding that if metacognition is used when managers make hiring decisions and if it influences their decisions. The framework of this study involves research in the areas of cognitive science, managerial decision making and education. The importance of the various areas of research underlying this study is to give an overview of what multiple disciplines have uncovered and how they are all trying to solve the same problem, which is to improve human performance. The significance of this study is to expand the reach of researchers of adult education into other domains of research and to find the applicability. Once the applicability has been confirmed, then adult education researchers are able to incorporate the tools, models and learning aids into adult development programs. This research provides an understanding of managers' metacognitive awareness and how it improves their hiring decision making.

Theoretical Framework

Many disciplines study decision making, including operations research, computer and information sciences, and organizational theory (McNamara & Chisolm, 1988).

Many decision theorists (Simon, 1977) propose that two types of decisions are based on a continuum with well-structured decisions on one end and ill-structured decisions on the other. The well-structured decisions are classified as repetitive and routine with a defined solution. The ill-structured decisions are uncertain and have no defined solution. Simon (1977) suggests that research has continuously progressed in contributing to the development of tools to aid decision makers with well-structured decisions. Mathematical algorithms coupled with computers have provided a wide array of decision support systems for managers to use on well-structured problems. Ill-structured decisions have been supported through the use of computer programs as well, based on heuristic techniques. The current tools and models available for ill-structured decisions are inadequate due to their focus on a computational technique that is not subject to ambiguity. Researchers investigate ill-structured decision making utilizing self-report, prompted

recall and protocol analysis. These examinations assess how people reason and cognitively process information. In addition, the analysis of decision outcomes has played an important role in assessing decision making processes. Analyzing outcomes is important to understand, but the method does not help in understanding the mental process utilized to reach the outcome. In trying to understand decision making, information should be gathered from both the individuals and the outcomes. Decision science has provided extensive research on outcome measures of decision making, while metacognitive processes have essentially been avoided due to issues associated with the "black box", which refers to the unknown.

This research will be of interest to the adult educator both in the management development setting and in psychological research. While investigating how expertise can inform decision making processes, the research may reveal how decision making can inform us about expertise and metacognition. No studies inform us about how these areas affect each other in the hiring decision domain.

This dissertation will provide a framework to explore these perspectives. First, the research will explore the relationship between expertise and metacognition. Extensive research has investigated this relationship (Anderson, 1983; Brown, 1978; Chi, Feltovich, & Glaser, 1981; Flavell, 1979, 1987; Glaser, 1987) usually utilizing students in a learning setting. The most knowledge about metacognition has been tested and discovered in the learning domain. This research will test the assumptions associated with the relationship between expertise and metacognition in the management domain. The researcher will utilize an instrument developed for adult students in the learning environment. The instrument assesses metacognitive awareness suitable for adolescents and adults. The instrument was evaluated using a number of unrestricted and restricted factor analyses.

Second, the researcher explains a specific metacognitive model based on theoretical assumptions about two underlying components of metacognition established by various researchers (Brown, 1987; Flavell, 1987; Jacobs & Paris, 1987; Paris & Winogad, 1990; and Schraw & Dennison, 1994).

This study attempts to understand how the two assumptions associated with metacognitive relate to the management decision making domain. One assumption is the indication that metacognition has a positive relationship with both knowledge of cognition and regulation of cognition (Baker, 1989; Flavell, 1987; Jacobs & Paris, 1987; Paris & Winograd,

1990). Many of the studies that support this assumption have been conducted using children and college students in the learning domain. Brown (1987) and Jacobs and Paris (1987) proposed that the relationship is so apparent that knowledge and regulation of cognition are actually categories of metacognition. Paris & Winograd (1990) assert that metacognition has two aspects of cognitive states, cognitive self-appraisal and cognitive self-management, which follow the same underlying theoretical structure that Brown, Jacobs, and Paris (1987) proposed. This study investigates these relationships as they relate to metacognition of managers in the hiring decision making domain.

Another assumption is concerned with expertise in the management decision making domain. Age, experience and education have a predictive relationship with metacognition. This study provides a further understanding of how the specific characteristics-- age, experience and education -- explain metacognitive awareness of hiring managers. This study also attempts to determine whether those variables, age, experience, education and metacognitive awareness predict successful hiring outcomes of managers. The analyses of these assumptions allows this study to correlate managers' metacognitive awareness and expertness, and then, examine how they correlate with successful hiring outcomes.

This research will serve the purpose of adding to the scholarly research and literature in three ways:

1. The study provides a more in-depth understanding of the metacognitive strategies used by managers when making hiring decisions.

2. The study provides practical applications to the decision making domain.

3. The study provides management science other pathways to develop management decision making ability.

In summary, this dissertation develops the framework to explain the relationships among age, experience, education, hiring outcomes and metacognition.

Definition of Terms

Terms used in this study are defined as follows:

Metacognition refers to the knowledge individuals have of their own thinking processes and strategies and their ability to monitor and regulate these processes. This process requires learners to analyze, reflect on, and monitor their own thinking and learning. Metacognition is an outcome of conscious reflection or consciousness (McCormick & Miller, 1989). The importance

of consciousness is crucial if individuals are to adjust or adapt their thinking strategies to changing circumstances.

Self-assessment is the personal skills that provide information about one's past actions (McCormick & Miller, 1989).

Self-reflection is the act of personally analyzing and making judgments about internal and external environmental factors (McCormick & Miller, 1989).

The *cognitive dimension* is the collection of mental events and knowledge used when making a decision (Ashcraft, 1993, p.4).

Cognition literally means "to know"; the process of thinking (Ashcraft, 1993, p.10); "the process of knowing in the broadest sense, including perception, memory, judgment, etc." (*Webster's New World Dictionary*); and the process by which information is manipulated in the brain, retrieved from memory storage, provided available motor responses, and the integration of newly received sensations both internal and external. Yet, cognition is only one step in the thinking process.

Cognitive style is the habitual way a thinker responds to cognitive tasks. The concept includes motivational beliefs and/or attributions that create a general tendency to respond to thinking tasks a certain way (McCormick & Miller, 1989, p.8).

Cognitive monitoring is any activity aimed at evaluating or regulating one's own cognition's (Flavell, 1979), e.g., planning, checking, self-testing, assessing progress, correcting errors. The use of cognitive monitoring refers to an attempt to determine whether an individual has chosen a correct strategy for solving a problem or understanding a concept (McCormick, Miller & Pressley, 1989, p.216).

Domain-specific cognition is the identification of the structures of content knowledge needed to become proficient in particular subject-matter domains. Metacognition is important during this process by allowing one to identify one's own cognitive procedures needed in order to acquire and deploy content knowledge more effectively (McCormick, Miller & Pressley, 1989, p.104).

Schema refers to one's "knowledge structure for a particular class of concepts. A schema describes the organization of information in human memory in terms of a conceptual network" (Rumelhart & Ortony, 1977). The schema can be explored as a strategy for understanding one's cognitive construct in a particular domain.

Mental processes are complex processes involving the simultaneous occurrence of motor skills, perceptual abilities, and mental acts. The process occurs with little conscious awareness (Ashcraft, 1993, p.7).

Reasoning is to consider implications, inferences, and other unstated connections in making a decision (Ashcraft, 1993, p.9). Prior knowledge of the issue can lead to a more specific inference (p.9).

Memory is "the power, act, or process of recalling to mind facts previously learned or past experiences" (*Webster's New World Dictionary*, p.11). Memory is the knowledge we have acquired. Memory can be characterized as the mental processes of acquiring and retaining information for later retrieval and the mental storage system that enables these processes (Ashcraft, 1993, p.10-11).

According to Benson (1994) "thinking is a process, a biological function performed by the brain -- it operates through firmly established patterns" (p. 5).

The *thought process* is referred to as the "receiving, perceiving, comprehending, storing, manipulating, monitoring, controlling, and responding to data" (Benson, 1994, p.5).

A *heuristic* is a rule or strategy for directing cognitive search processes and the use of previous knowledge or evidence in a particular class of situations (McCormick & Miller, 1989, p.5). According to Bolger & Wright (1992) a heuristic often leads to biases or judgmental errors due to the attributions it usually represents (p.12).

Motivational beliefs are based on attitude about competency for particular tasks in specific domains, or about ability in general, and will affect motivation to perform strategically. Motivational beliefs are usually tied to self-esteem (Bolger & Wright, 1992).

Experts in the decision making domain are characterized as individuals with the following attributes: content knowledge; highly developed perceptual/attention abilities; a sense of what is relevant when making decisions; and the ability to simplify complex problems. Experts can communicate their expertise; handle adversity by not worrying about past errors; identify and adapt to exceptions; express self-confidence in their decision-making; know how and when to adapt their decision strategies; and take responsibility for their decisions by not allowing a mistake to interrupt their next decision. Experts in decision making use the following techniques: continuous feedback from their environment; group interaction; formal or informal decision aids to avoid heuristics; and avoidance of making large mistakes by their willingness to

admit a mistake and stop (Bolger & Wright, 1992, p.18). Three general assumptions are associated with expertise:

1. Expertise is domain-specific, which implies that domain adapted thinking relies on automated processes and pattern recognition (Bolger & Wright, 1992).

2. Expertise can be studied through verbal protocols (protocol analysis) -- asking experts to think aloud providing qualitatively rich accounts of expert reasoning (Ericsson & Simon, 1980).

3. Experts think in qualitatively different ways than novices (Bolger & Wright, 1992, p.14).

Limitations

The sample of this study consists of hiring professionals in an information technology organization. The scope of the study is hiring decision making. The sample and scope of this study may limit generalizability of the results to other populations. The results of this study are limited to hiring decisions made by managers in the information technology services business.

Organization of Study

Chapter 1 contains an introduction to the study, a statement of the problem, the purpose of the study, the research questions, definitions, significance, and limitations of the study.

In Chapter 2, the literature is divided into several different research domains. The literature reviewed addresses issues and concepts that form the theoretical framework for this study. The review of the literature will also summarize research relevant to the various domains represented in this study. The sections will provide the framework for the theoretical arguments. First, the characteristics and literature supporting the use of expertise as a predictor variable associated with metacognition are presented. Then, the various issues related to decision making and ill-structured versus structured problem-solving will be presented in the management domain. Finally, metacognition will be presented with its theoretical categories and their significance in this study. The titles include Theoretical Issues about Experience, Age, and Education; Experts and Decision Making; Managerial Decision Making; The Influence of Metacognition on Decision Making; and The Influence of Metacognition on Instructional Design.

Chapter 3 provides a description of the methodological approach in this study. Research design, subject sample, and instrumentation are presented. Then the collection and analysis of data and limitations of the study are recorded.

Chapter 4 will provide the interpretation of the data as collected utilizing the literature and based on the prescribed methods.

Chapter 5 summarizes the study, presents conclusions, and makes recommendations about practical applications and implications of the findings.

CHAPTER 2: LITERATURE REVIEW

Introduction

The researcher first provides historical information about managerial decision making and hiring decisions. Then, the introduction of literature surrounding the metacognitive dimension of decision making. Finally, instructional theories that relate to the metacognitive dimension of decision making are discussed to provide implications for management development.

This chapter reviews the literature relating to the domains of concern to this study. The chapter is organized into these sections: (a) theoretical issues about experience, age, and education; (b) experts and decision making; (c) managerial decision making; (d) the influence of metacognition on decision making; and (e) the influence of metacognition on instructional design.

Literature in management, education, cognitive sciences, and decision sciences provided a better understanding of the issues involved in decision making and the metacognitive characteristics of expert decision makers. This literature review provides a framework of models, strategies, and research about expert decision makers and the metacognitive characteristics exhibited when they make decisions. The review attempts to define experts and their metacognitive characteristics according to literature about their origins and assumptions. Understanding metacognitive characteristics and strategies used for hiring decision making provides implications for development of those skills. Teaching metacognitive strategies to managers may improve their decision making abilities.

In preparation for this review, literature was sought from the following sources: Dissertation Abstracts, ABI/INFORM, ERIC, the Internet, and many library publications. After reviewing the sources obtained, the researcher selected relevant sources from management, cognitive science, education and decision science. The purpose of engaging the literature is to frame the arguments that identify characteristics of experts and link expert decision makers with the use of metacognitive strategies that enhance decision making. Additionally, the aim is to investigate management decision making in the hiring domain. The literature search initially targeted metacognitive predictors of expert behaviors in hiring decisions, but no research on this topic was available. The researcher then looked at metacognitive characteristics and strategies of

expert decision makers and was able to find a few sources primarily from Dissertation Abstracts and various publications.

The studies conducted on metacognitive characteristics of expert decision makers emerged from neurological research in controlled experiments. The lack of information outside of the laboratory apparently stems from the difficulty in doing research in an uncontrolled environment. The major impacts are the dynamics of metacognition and the inability of the human eye to witness or acknowledge the mental processes associated with any cognitive process.

Theoretical Issues about Experience, Age, and Education

Theoretical assumptions associated with expertise suggest indicators of expertise are experience, age and education. The issues surrounding the influence of experience on cognition have been debated for decades. Piaget and Gestalt theorists hold the most prominent discussions. The Piaget and Gestalt theorists agree that experiences are organized and that prior experience influences present experience (Piaget, 1976, p.278). The Gestalt theorists contend that experiences are assimilated into existing cognitive structures. They also believe that slowly changing cognitive structures are influenced by cumulative experiences. The distinction between the two theoretical positions is over the development of cognitive organization. Gestalt theorists believe that experiences are organized according to a tendency for completeness, simplicity, and meaningfulness (Piaget, 1976, p.264). Piaget theorists, on the other hand, believe that experiences are organized in cognitive structures, which are always changing.

Many studies that involve expertise use experience as a criterion for expertise. Westerman (1991) conducted a study utilizing expert teachers, and one of her criteria for expertise was at least five years of teaching experience. She used senior level undergraduate teaching assistants as novices. This research was able to provide critical variables for the professional development of teachers. Investigating the differences in the characteristics, responsibilities, and values of the teachers and the learners identified the variables.

Age has been identified as another indicator of expertise. This study will refer to age is the maturation process, formally defined as growth due to biological factors. As a result of the interaction of age and environmental experiences, specific cognitive abilities develop. Cognitive development related to age and experience is identified in this study as structural knowledge and adaptation.

Piaget's theory on cognitive development due to maturation is identified in this study because it is one of the most famous cognitive development theories that is based purely on maturation. Piaget (1969) suggested the two components of adaptation are assimilation and accommodation. Assimilation transforms information to become compatible with an available knowledge structure or schema. Accommodation changes the schema itself when new knowledge is added. The changes in the schema are progressive changes in what and how one knows. The criticism associated with Piaget's theory of cognition is that it is based on chronological developmental stages. Experimental evidence over the decades both supports and contradicts Piaget's theory (Flavell, 1977; Piaget & Inhelder, 1969). Post-Piaget developmental psychology or the growth of intellectual competence has viewed cognitive development from many different directions. Piaget's theory relies on the premise that the growth of mental functions is dependent on maturation. This section was not to argue or agree with developmental psychology, it is to illuminate theories associated with maturity as it relates to cognition.

The facets of cognition that develop with maturity are undefined. However, a critical variable affecting the development of cognition is the knowledge one has already acquired (Piaget, 1969). Piaget's theory posits that knowledge is represented in schema, which encompass the stored consequences and interpretations of experiences (Rumelhart & Ortony, 1977). Gallini (1989) defines *schema* as the "general approach of recognizing patterns of relationships and organizing ideas into a conceptual network". The schema is suggested to be highly organized. Apparently, adult's schema undergoes changes according to motivation levels and according to usefulness of some strategies (Brown, 1977, 1978). Flavell and Wellman (1977, 1979) offer metacognition as a initiator to determine which strategy will be used to serve as a component in the control system used to transform external information. The transformation occurs between interpretation and strategy use. Metacognition is the mechanism suggested to determine which strategy would be appropriate based on interpretations and experiences.

The final component representing expertise is education which is directly associated with domain-specific knowledge. Rohwer & Thomas (1987) suggest that research has produced two propositions about domain-specific knowledge and metacognition. First, that proficiency in any intellectual domain requires distinct content knowledge. Second, proficiency in content knowledge requires metacognition. Domain-specific knowledge has been investigated in many domains. Most of the research focused on comparative analyses of domain-specific knowledge

between experts and novices. Research indicates that experts not only differ in their amount of knowledge but how the information is organized and accessed (Rohwer & Thomas, 1989).

Researcher	Domain	Results
Sharon J. Derry, 1989	Complex Arithmetic Problems/Word Problems	Experts utilize strategies to use domain-specific knowledge. Problem solving can possibly be improved to "informed novice" by directly training poor problem solvers to use the skills and strategies of high ability students. The aim of the research was to identify strategies that foster learning and expert use of domain-specific knowledge.
Glaser, 1987 Larkin, 1985 Chi, Glaser, & Rees, 1982	Physics	Knowledge structure of novices in physics is organized around concrete phenomena within the domain. Knowledge of experts is organized around fundamental principles of the domain.

According to Derry (1989) "researchers working in various domains have observed that one essential defining feature of expert problem solving is its heavy reliance on domain-specific schemata" (p. 242). In every study education on content was proposed to be directly associated with the domain-specific knowledge.

Experts and Decision Making

This section of the review examines existing models and strategies based on the linear processing of decision sciences and their use in the organizational setting. The primary reason that the decision making strategies used by experts have been effective is the time saved and the errors eliminated by the decision makers.

Researchers have studied the cognitive differences between experts and novices in such disciplines as weather forecasters (Murphy & Winkler, 1977), accountants (Tomassini, Solomon,

Romney, & Krogstad, 1982), and professional bridge players (Keren, 1987). The general differences have been identified as knowledge structure, content knowledge, and strategy utilization.

DeGroot (1965), Chase & Simon (1973), and Mayer (1983) have revealed that cognitive differences occur in nearly every aspect of novice-expert mental functions. Anderson (1981) and Chi, Glaser, & Farr (1988) suggest that experts are skilled, competent, and think differently than novices. The differences are not only in amount of knowledge but the organization, accessibility, and the knowledge structures also contribute to the differences. Novices represent situations in a simpler, more concrete and imprecise way and are more likely to make inappropriate decisions (Champagne, Gunstone, & Kloper, 1985). The following chart depicts some of the cognitive differences between experts and novices.

Novices	Experts
Knowledge is organized around the concrete phenomena of the domain.	Expert's knowledge is organized around fundamental principles. The expert uses these principles as procedures for solving problems. They use these principles as propositions or declarative knowledge. The principles include specifications of applicable conditions. Therefore, the expert has both concrete and principle connections to the phenomena (Chi, Glaser & Rees, 1982).
Novices read a problem and embark on a course of action immediately and persist on the course usually requiring more time and effort. Novices also view problems in terms of concrete components of the phenomena (Chi, Glaser & Rees, 1982).	Experts spend more time constructing the representation of the problem. They spend more time analyzing and planning. Experts use the representation as cues to the procedural principles in their knowledge structure (e.g., this statistical problem can be solved by ANOVA). (Schoenfeld, 1987).
	Schoenfeld (1987) suggest that experts ask themselves three question when problem-solving (p.366): a) What am I doing? b) What is the reason for doing it? c) How will the result be used?

Shanteau (1992) suggests that experts have different psychological characteristics as well as utilize different techniques and decision strategies (p.17). The psychological characteristics are:

1. Experts have highly developed perceptual/attention ability, the ability to extract information that nonexperts overlook (Shanteau, 1992, p. 17).

2. Experts have a sense of what is relevant when making decisions. When trained to make explicit distinctions between relevant and irrelevant, the decisions of novice decision makers improved (Gaeth & Shanteau, 1984).

3. Experts are able to simplify complex problems, which "allows experts to deal more effectively with the cognitive limitations experienced by all humans" (Shanteau, 1992, p. 17).

4. Experts communicate and convince others of their expertise (Shanteau, 1992, p. 17).

5. Experts continue to make effective decisions even when there are adverse circumstances (experts can work under stressful conditions whereas novices cannot) (Shanteau, 1992, p. 17).

6. Experts identify and adapt to exceptions when making a decision. According to Shanteau (1992), "When exceptions are encountered, experts could generate meaningful special-situation strategies" (p. 17).

7. Experts have a highly developed reliance on their own abilities. They believe in themselves and their ability to make good decisions (Shanteau, 1992, p. 17).

8. Experts know when and how to adapt their strategies based on the specific situation and conditions of the decision (Shanteau, 1992, p. 17).

9. Experts are responsible and stand behind their decisions. If a decision is bad they take responsibility for the decision and move on. They do not allow a bad decision to impact a future decision (Shanteau, 1992, p. 17).

Another difference between expert and novice decision making stems from metacognitive factors. Experts have a proficiency in metacognitive skills, which organizes decision making criteria into a larger sequential concept. This proficiency requires experts to plan and coordinate goal-specific strategies and monitor them (McCormick, Miller & Pressley, 1989, p.106).

Novices tend to organize knowledge around the concrete phenomena of the domain. They do not connect or associate the current decision conceptually with any other factors. Novices read a problem and embark on a course of action immediately and persist on the course even when the correct path is incorrect, which usually wastes time and effort (Schoenfeld, 1987).

On the other hand, experts organize knowledge around fundamental principles. The expert uses these principles as procedures for solving problems. Experts use principles as

propositions or declarative knowledge. The principles include specifications of applicable conditions. Therefore, the expert has both concrete and principle connections to the phenomena (Chi, Glaser & Rees, 1982). The experts spend more time constructing the representation of the problem (Schoenfeld, 1987). The experts spend more time analyzing and planning. Experts use the representations as cues to the procedural principles in their knowledge structure (e.g., this statistical problem can be solved by ANOVA). Schoenfeld (1987) suggests that experts ask themselves three questions when problem-solving (p.366): (a) what am I doing? (b) what is the reason for doing it? and (c) how will the result be used in the solution? According to McCormick, Miller, Pressley (1989), "experts are characterized as being more capable than novices, of recognizing patterns of relationships and organizing ideas into conceptual networks or schema" (p.156).

Additionally, the evidence indicates that few demands are made for the kinds of knowledge structures and procedures that research has shown to be characteristic of expert problem-solvers. Many educational test items for example do not require declarative and procedural knowledge organized around principles in the subject-matter domain. Most high school test items required only recall of terms, facts, or principles (McCormick, Miller, & Pressley, 1989, p.115).

Managerial Decision Making (Ill-Structured Problems)

Mintzberg (1975) ascertained that observation of managers' actual daily routines suggested that they only had three roles: interpersonal, informational and decisional. The changing role of the manager has exponentially increased their responsibility for making decisions. Earlier Drucker (1969) had addressed the issue of managers' changing by proposing that our society would be knowledge-oriented and would require knowledge workers. Drucker believed that the knowledge worker would contribute to the overall viability of the organization by her ability to make decisions. His prophecy did not address managers' ability to regulate and influence their decision making ability. Managerial decision making literature is heavily influenced by mathematical models, which have been suggested to be of limited value to managers and organizations (Kline, 1992, p.42). Many researchers have hypothesized and developed models and tools based on various theories about management decision making. Edwards (1954) believed that managers should use a logical and rational process when making decisions. Bennett and Felton (1974) proposed that managers use analysis to attain more

effective decisions and suggested a four-step model to facilitate the analysis: (a) define the problem, (b) set the criteria, (c) identify alternatives, and (d) evaluate. This basic model has been used by many theorists and researchers as a model for decision making (Stein, 1981). The problem with this model is that it is not designed to handle situations in which the decision making conditions are uncertain or complex. Thus, mathematical, logical, rational, and analytical models are not the ideal tools for managers in hiring decision making.

In addition, since the sixties, research in decision making has been increasingly influenced by the information-processing paradigm developed in psychology (Wright & Bolger, 1992, p.31). As a result, an increased interest from the decision making domain has enhanced understanding of the strategies and processes underlying decisions (Einhorn & Hogarth, 1981; Kahneman, Slovic, & Tversky, 1982; Svenson, 1979). Much of the research has been conducted in artificial laboratory settings or restricted to the undergraduate population. Whether or not these findings can be generalized to managers or even in a real world situation is questionable.

Managerial decision making remains a largely underexplored and oversimplified research problem. Several reasons for the paucity of this research include cost, time, methodological issues, and difficulty in accurately measuring reflections of decision making behavior (Simon, 1979).

Bukszar and Connolly (1988) conducted a study of management decision making that examined experience with decision making. They argued that, although the skill set required to make successful decisions is uncertain, experience in making decisions is useful. Two groups were given the same information about a fictitious problem. They were asked to make a decision. The two groups' decisions were either favorable or unfavorable based on retrospective predictions of a previous fictitious problem with a known outcome. Analysis showed the managers making favorable decisions had had more experience making decisions than those managers making less favorable decisions.

Research indicates that managers are not inclined to use mathematical models advocated in earlier research. Researchers are continuously striving to understand the processes both cognitive and psychological that managers use to make ill-structured decisions.

Managerial decision making has been and continues to be a research topic of interest to many disciplines. Despite interest, understanding the important phenomena of managerial decision making remains incomplete.

Historically, decision sciences have focused on outcome prediction, not process or strategy. The reason was due to the ambiguous nature of decision making and the need for outlining a consequence in order to measure the effectiveness of a decision. Modern decision science is making incremental gains in understanding the processes and strategies used by the human mind to make decisions.

The Influence of Metacognition on Decision Making

Many components, definitions and theories are associated with metacognition. Metacognitions are thoughts about thoughts, knowledge about knowledge, or reflections about actions. Consciousness, which is commonly unresolved when investigating cognition, is a primary component when investigating metacognition (Brown, 1987, p. 72). Measures of metacognition may include introspection and verbal or a non-verbal report about one's thought processes associated with a behavior. Metacognition has been referred to as global or general, not domain specific. Strategies are subject to the same assumptions. Strategies are considered to be a component of metacognition. A strategy is operationalized as a general procedure that can be applied to several domains (Chi, 1987, p. 246).

Chi (1987) describes a strategy as represented by four properties. First, a strategy is domain-independent. Second, a strategy has a goal. Third, the strategy can have several components. And finally, the total number of strategies in memory is finite and relatively small. The final component of metacognition is what differentiates a strategy from procedural knowledge, which is considered to be a different component of metacognition. Procedural knowledge will be discussed as a subcomponent of *knowledge of cognition.*

Knowledge of cognition is considered one of the two major components of metacognition. Knowledge of cognition facilitates the reflective aspect of metacognition with three subcomponents: procedural knowledge, declarative knowledge, and conditional knowledge (Brown, 1987; Flavell, 1987; Jacobs & Paris, 1987; Schraw & Dennison, 1994). Paris & Winograd (1990) refer to this component of metacognition as *cognitive self-appraisal* (p. 17).

Procedural knowledge is the knowledge about how to use strategies for problem solving. Procedural knowledge allows one to use and manipulate skills and knowledge through the organization of activities. According to Piaget (1971) procedural knowledge is a concept of biological and cognitive autoregulation. He further emphasized that

> what knowledge really consists of is not just the acquisition and accumulation

> of information, since that alone would remain inert and sightless, as it were. But knowledge organizes and regulates this information by means of autocontrol systems directed...toward the solving of its problems (1971, p.61).

Anderson (1983) developed a general theory for research on cognitive strategies capable of providing descriptions of processes that stimulate metacognition. The assumption associated with Anderson's theory is that most information is stored in long-term memory as either declarative or procedural knowledge. Anderson refers to procedural knowledge as the "knowledge how" and declarative knowledge as the "knowledge that." Anderson's assumptions are not universally accepted, but they are fundamental to a number of influential theories on learning and instruction (Derry, 1989, p.278). Anderson (1981) influenced a three-stage process of instruction. The first stage consists of instruction and information about a skill. Then the instruction is encoded as a set of facts (declarative knowledge). Finally with practice, the declarative knowledge is converted to procedural knowledge.

Declarative knowledge is one's knowledge about intellectual resources and abilities. Derry's (1989) description is one's network of facts and ideas used to represent the external world (p.278). Rummelhart & Norman (1983) concede that declarative knowledge is "explicit" because it emerges directly from external sources, while procedural knowledge is "implicit" in that the cognitive processes must be executed to get information. And the third subcomponent, conditional knowledge, is knowing when and why to use strategies (Duffy & Roehler, 1987, p.134; Schraw & Dennison, 1994).

The second major component of metacognition is *regulation of cognition,* which facilitates the control aspects. The five subcomponents that have been identified by researchers are: planning, information management, comprehension monitoring, debugging, and evaluation (Artzt & Armour-Thomas, 1992; Baker, 1989; Schraw & Dennison, 1994). Paris & Winograd (1990) refer to this component as *cognitive self-management* (p. 18). Planning involves goal setting and allocating the appropriate resources for the task at hand. Information management includes organizing, summarizing and selective focusing. Monitoring is one's assessment of strategy use. Debugging strategies are used to correct performance errors. And evaluation requires analysis of performance and strategy effectiveness after the task.

Regardless of the various models, theories, and philosophies about metacognition, most theorists believe, and the research confirms, that metacognitive strategies are teachable

(Anderson, 1983; Baker & Brown, 1984; Duffy & Roehler 1987; & Gagne, 1985). The studies were conducted with students and the metacognitive strategies used when learning. The studies indicate that students who underwent instruction on cognitive strategies generally scored better on outcome measures (Chance, 1986; Nickerson, 1984; Nickerson, Perkins, & Smith, 1985; Sternberg & Kastoor, 1986). The instruction included the encompassing aspect of what is taught (i.e., theory) to enable learners to build mental models which has been proven to facilitate learning and performance (Smith & Goodman, 1982; Kieras, 1981; Tourangeau & Sternberg, 1982). The studies also included how instruction was conducted in the learning environment (i.e., information-processing approach) to facilitate learning and performance. The information-processing approach to instruction emphasizes the use of internal strategies to deal with information, such as mnemonics.

Swanson (1990) found that the performance of students who were metacognitively aware was better than those that were unaware when solving problems. The findings suggested that metacognitive awareness improved performance by improving strategy use. The results reported that the advantage for high-metacognitive groups was localized to the hypothetico-deductive thinking and the prioritization of strategies. Swanson also suggests that metacognitive awareness is independent of intelligence. The important implication of Swanson's study is that if "metacognition is separable from other cognitive constraints" such as domain knowledge, then, it can be influenced to improve the performance of a novice (Schraw & Dennison, 1994, p. 461).

A similar study that investigated the achievement of college students based on their goal orientation, strategy use, and metacognition was conducted. It examined differences in metacognitive knowledge with a 2 (learning orientation) X 2 (performance orientation) X 2 (type of metacognitive knowledge: knowledge of cognition, regulation of cognition) repeated measures ANCOVA. The students high on the learning dimension reported more metacognitive knowledge ($M = 3.66$, $SD = .51$) than those low on this dimension ($M = 3.38$, $SD = .53$). An interaction was found between metacognitive and learning orientation, $F(1,391) = 4.33$, $Mse = .104$. The results suggested that high learning students reported more strategy use and metacognitive knowledge (Schraw, Horn, Thorndike-Christ, & Bruning, 1995).

Expertise in the use of metacognition is developed through increased experience with strategies. Strategies that have been studied and found to increase refinement in children's development include predicting, monitoring, and self-testing (Brown, Campione, & Barclay,

1978). Research on metacognitive processes associated with expert behavior suggests that metacognitive activities are important in complex problem solving as stated in chart below.

Researcher	Domain	Results
Smith and Good (1984)	Genetics	Experts were more likely to recheck the problem statement after the solution, check that the solution was reasonable, and monitor their progress.
Champagne, Klopfer, and Anderson (1980)	Physics	More successful students engaged in reflective thinking and made more comments about their own thinking.
Schoenfeld (1987)	Mathematics	Students failed because they did not monitor and evaluate their problem solving activities.

Growth of metacognitive knowledge begins in the unconscious mode and then increases conscious self-regulation and self-monitoring in the use of knowledge and the acquisition of new knowledge (Brown & DeLoache, 1978; Vygotsky, 1962).

Only a few studies about the cognitive or metacognitive strategies are associated with ill-structured decision making due to the difficulty of measuring the process one uses to arrive at a decision.

The Influence of Metacognition on Instructional Design

Gagne & Briggs (1973) suggested that four basic assumptions associated with instructional design. First, instruction should be planned and designed for the individual. Second, instructional design has both immediate and long-range aspects. Third, systematically designed instruction can affect human development. And fourth, instructional design must be

based on how individuals learn (p. 5). They went on to suggest that factual information, intellectual skills, cognitive strategies, motor skills and attitudes are capabilities that instruction should aim to establish (p. 11).

The importance of Gagne and Briggs' suggestions at that time was their insight into the cognitive strategies that should influence instructional design. They provided instructional guidance on cognitive outcomes resulting from instruction. They presented cognitive strategies as the capability to govern one's own learning, remembering, and thinking behavior (p. 24). Their instructional design strategy involves providing opportunities for development and use of cognitive strategies. The conditions for providing such an environment include internal conditions, which suggest that the learner have a variety of cognitive strategies available to him; external conditions, which suggest that the problems presented are different and require thought; and conditions for performance, meaning the solutions are not presented by anyone other than the learner (p. 49).

Brown, Hedberg, and Harper (1993) contend that the recent developments in computer technology and the evolving role of the instructor invite learners to become more skilled in metacognitive strategies (p. 3). They suggested that learning and performance support tools enable learners to construct their own knowledge systems using multimedia. Mindmap (multimedia device used to brainstorm ideas) and Learning FourMat Processor (allows learner to construct knowledge graphically) were presented as systems based on higher-order thinking that help to develop metacognitive strategies. They report that developments in technology have given instructional designers the ability to create tools that could facilitate learning cognitive skills and strategies and allow for different learning styles (p. 11). The flexibility of using metacognitive strategies in instructional design is the ability to incorporate them into the lesson or to teach them separately. Instructional design incorporating metacognitive strategies involves using appropriate strategies for the task, providing explicit instructions to the learner, using complementary strategies, and encouraging learners to discuss the learning process (p. 17).

Rohwer and Thomas (1989) concluded that advances in research on domain-specific knowledge and metacognitive knowledge have provided at least four implications for instructional design that should increase learner proficiency.

1. Instruction should be designed to facilitate construction of knowledge.

2. Instruction should be designed to incorporate both declarative and procedural knowledge.

3. Instruction should be designed to include conditions of applicability of the knowledge.

4. Instruction should be designed to include metacognitive skills (p. 107).

The influence of metacognition on instructional design is extensive. Rohwer and Thomas (1989) suggest that research has produced two propositions for instructional design on domain-specific and metacognitive knowledge (a) proficiency in any intellectual domain requires distinctive content knowledge, and (b) the prerequisite for proficiency of the content knowledge is metacognitive strategies, effective ways of acquiring, retrieving and manipulating content knowledge.

Glaser (1985) suggests that all of the models of instructional theories relating principles of cognitive psychology to instructional design have: (a) strategies -- prescribed procedures to accomplish educational goals, (b) monitoring-- performance checked regularly by the instructor or the student, (c) metacognition -- strategies for generalization, (d) context -- real-world materials, (e) interactions between strategies and knowledge base -- practical examples, (f) interactive and direct teaching -- generalizations, and (g) long-term instruction -- detailed and extensive presentation and practice.

Regardless of the model used to develop metacognitive awareness or higher order thinking skills, most theorists believe, and the research confirms, that metacognition is a teachable skill. Students who experience thinking instruction generally do score better on outcome scores than individuals who do not (Chance, 1986; Nickerson, 1984; Nickerson, Perkins, & Smith, 1985; Sternberg & Kastoor, 1986).

Conclusion

The goal of this chapter was to provide a theoretical background of how metacognition influences expertise, successful decision making strategies and instructional design. Managerial decision making was defined to illuminate ill-structured problems in the business environment, providing a framework for the influence of metacognition. The theoretical background allowed the researcher to design a study that examine theoretical assumptions about metacognition and expertise and substantiate the influence of metacognition on hiring decisions. The value of the study is the implications on instructional design in the business environment.

CHAPTER 3: METHOD

Introduction

This study addressed prediction of success of managerial hiring outcomes by metacognitive awareness. The relationship explored was between expert and novice managers. Successful hiring outcomes was defined using two variables -- hiring ratio score and hiring scenario score -- which are considered the hiring outcome score. The study used six variables -- age, management experience, hiring experience, education, confidence in hiring and hiring outcome score -- as predictors of managerial expertise. The researcher used a 52-item instrument --The Metacognitive Awareness Inventory (MAI)-- to measure metacognitive awareness. A large association of hiring professionals was used to determine its utility as a measure of metacognitive awareness in the hiring decision making domain.

This chapter describes the selection of both sets of subjects, instrumentation, data gathering techniques, field procedures and data analyses.

Selection of Subjects and Sample Descriptions

Two sets of participants serve as subjects for this study. One sample is an association of recruiters in the Northern Virginia area with approximately 500 members, called Project Save. The group's primary function is to provide guidance and support to recruiters in the Metropolitan Washington D.C. area. The average member of this group has at least one year of hiring experience. Originally created to serve as a community service group providing assistance to individuals caught in downsizing, the group now has a different charter due to the explosion of the economy. Their new charter is to help fellow hiring professionals find candidates for open positions and to improve hiring decision making skills. This group was used to determine the utility of the MAI instrument in measuring metacognitive awareness in hiring decision making.

The second group of participants was selected from a corporation located in Fairfax, Virginia, Corporation X, who will be anonymous. The for-profit organization provides information technology services to the government on a contractual basis. The organization has a total of 1200 employees and has hired 973 new employees in 1995. The management hierarchy consists of a Chairperson, President/CEO, Chief Operating Officer, Chief Financial Officer and six Vice Presidents at the top layer with six Business Area Managers reporting to them nationwide. The researcher selected the participants based on their job description and responsibility to make hiring decisions. The titles in some cases did not indicate that the

participants were managers. Some were labeled as Senior Analysts, Senior Engineers, Senior Programmers, etc. Ninety-one individuals were identified within this organization as having hiring decision making responsibility.

The workforce at this corporation consists of individuals highly skilled in information technology and engineering. Many of the vacant positions have high skill requirements as well. Many of the vacant positions require individuals versed in some of the most sought after technological skills: web page designers, database designers and developers, programmers, analysts, engineers, and configuration management specialists. The challenging aspect of hiring individuals in this company is that the requisite skills for the majority of the vacant positions are in high demand. The competition for candidates with the various requisite skills is vigorous. Competitors include well established government and commercial businesses (i.e., Oracle Corporation, IBM, Lockheed Martin, and American Management Systems). Corporation X had a involuntary and voluntary turnover rate for January 1, 1996 - November 30, 1996 of 35%, with ninety-one vacancies nationwide. An involuntary termination could include layoffs, poor performance, and legal issues.

This group of managers was used to investigate the predictive contributions of age, education, experience, metacognitive awareness, and confidence in hiring on successful hiring outcomes.

Instrumentation

The initial step in this study was to identify an instrument that accurately represented metacognitive awareness in adults. The Metacognitive Awareness Inventory (MAI), a 52-item self-report instrument developed by Schraw and Dennison (1994) is an adolescent and adult assessment instrument used to measure metacognitive awareness.

The instrument is comprised of two constructs, knowledge of cognition and regulation of cognition and eight scales. The eight scales are (1) declarative knowledge, (2) procedural knowledge, (3) conditional knowledge, (4) planning, (5) information management, (6) strategies, (7) debugging strategies, and (8) evaluation. The scales are represented by at least four items per scale with each item on the instrument rated on a 5-point Likert scale with 5 being “Always True” and 1 being “Always False”. The instrument was selected for its high internal consistency reliability reaching .91 in a restricted factor analysis. The coefficient α for the entire instrument reached .95 (Schraw & Dennison, 1994). The instrument was tested with a forced two-factor

solution, which confirmed hypothesis about knowledge of cognition and regulation of cognition. The two-factor analysis provided evidence in previous research that the MAI measured two kinds of metacognitive knowledge reliably, knowledge of cognition and regulation of cognition (Schraw & Dennison, 1994). Knowledge of cognition referred to knowledge about self, strategies, and the conditions under which strategies are most useful. Regulation of cognition referred to knowledge about ways to plan, implement strategies, monitor, correct errors, and evaluate learning (Schraw & Dennison, 1994, p. 466). The MAI was used as the data collection tool to assess managers' metacognitive awareness when making hiring decisions.

The demographic cover sheet was used to collect demographic data on each manager. The questions regarding age, education, experience in management, experience making hiring decisions, hiring outcomes, and confidence in hiring decisions contributed to the assessment of managerial expertise based on theoretical assumptions about expertise.

The overall successful hiring outcomes score (SHO) was assessed by averaging the hiring ratio (proportion of new hires that stayed versus those that left) and the hiring scenario score (the percentage of correct hiring decisions made within five hiring scenarios).

The data collected required the researcher to access the company's human resource information system (HRIS) to obtain reports on new hires and to occasionally gather information from personnel files. The company consented to allow the researcher to have access to all personnel files. Hiring outcomes scores were calculated individually for each manager.

Data Collection

The data were collected for the validation study by distributing the instrument in two separate Project Save meetings in the months of August and November 1997. The researcher gave instructions and allowed the hiring professionals to complete the instrument with hiring in mind. The researcher then collected all instruments and entered data into SPSS for analyses.

Managers' data were received in packets hand delivered or by mail. Managers completed the packet of data and mailed it back to the researcher. The researcher entered the data into SPSS for analyses.

Field Procedures

Two Project Save meetings provided the venue for the collection of validation data for the MAI. A brief presentation with instructions about the scale on the instrument, the

participants were asked to complete the instrument and return it via a self-addressed stamped envelope.

The management data were gathered by the distribution of packets to managers of the participating corporation. The managers were given two weeks to complete the packet due to the amount of data that needed to be collected. Each participant was given a package with instructions, the MAI, the demographic cover, and five hiring scenarios to complete and return in a self-addressed stamped envelope. The hiring scenarios were color coded to match resumes with requisitions. The packets took approximately sixty minutes to complete.

First, the participants were asked to complete the demographic cover (Appendix B), an inventory developed to capture purely demographic data. This data was important because it provided characteristics identified by the literature as identifiers of expertness. Participants were then asked to read the same five hiring requisitions and rank order each candidate from (5) the best candidate to (1) the least appropriate candidate. The rankings were recorded by the name of each candidate on the bottom of each requisition form (Appendix C). The rankings were scored according to a 100 point scale based on the proper ranking for each scenario. The perfect score for each scenario was 55. The rankings from 1 to 5 were added together then divided by 55 to providing 3.67 as the 100 point perfect score. The individual's score was then calculated by adding the weighted scores for each candidate.

The next phase of the study required managers to complete the Metacognitive Awareness Inventory (MAI) (Appendix D) which evaluates their propensity to use metacognitive strategies while making decisions. All forms associated with this study were labeled and packaged for ease of use. Full confidentiality was assured.

The resulting data was submitted to SPSS for analyses. Two sets of data were included: (a) data from the Project Save group to validate the instrument; and (b) data collected from managers at a Northern Virginia corporation to test the regression model.

Analyses

Instrumentation

Question One: To what extent does the metacognitive awareness inventory developed by Schraw and Dennison (1994) measure the components of metacognition -- regulation and knowledge of cognition?

Factor analysis. Question one was addressed by conducting a factor analysis. The purpose of using the factor analysis was to assess the validity of the espoused two categories within metacognition.

The two categories are represented in the data collection instrument based on eight scales. The eight scales are theoretically based on (a) knowledge of cognition, which include declarative knowledge, procedural knowledge or conditional knowledge, and (b) regulation of cognition, which includes planning, information management, strategies, comprehension monitoring, debugging strategies, and evaluation (Artzt & Armour-Thomas, 1992; Baker, 1989). The instrument has fifty-two items, which represent the eight scales subsumed under knowledge and regulation of cognition. The instrument uses a five-point likert scale for ease of scoring. A high score on the MAI indicates high metacognitive awareness. The instrument underwent a factor analysis in a study conducted by Schraw and Dennison (1994) utilizing undergraduates in the learning domain. Whether metacognition is domain specific is undetermined; therefore, another factor analysis was conducted to allow the management domain to be explored. The factor analysis was used to define the underlying constructs of the items representing the instrument. The items on the instrument were created to reflect two constructs, knowledge and regulation of cognition. The factor analysis requires two stages, factor extraction and factor rotation. Factor extraction yields the number of factors underlying a set of items. Principal components analysis, a type of factor analysis was used to extract factors. Factor rotation statistically rotates factors to make them more meaningful and allows final determination of the underlying factors (Green, Salkind & Akey, 1997, p. 346). The rotation method used in this analysis was the VARIMAX.

The results from the Schraw and Dennison's factor analysis indicated that the MAI measured two kinds of metacognitive knowledge reliably, knowledge of cognition and regulation of cognition. A restricted factor analysis yielded these findings. Items included in knowledge of cognition loaded unambiguously on Factor 1 while the items included in regulation of cognition loaded on Factor 2. The two factors accounted for 65% of the sample variance. Coefficient α

for items loading on each factor reached .91 (p.467). Table 1 presents loadings from the two-factor solution for each item.

Table 1
Loadings for the Original Forced Two-Factor Analysis Conducted by Schraw and Dennison (1994)

Item	Factor 1	Factor 2
32	.70	.00
26	.66	.00
5	.65	.00
30	.59	.00
46	.57	.00
10	.56	.00
13	.55	.00
3	.55	.00
29	.54	.00
16	.53	.00
15	.53	.00
9	.51	.00
20	.51	.00
52	.48	.00
33	.48	.00
12	.46	.00
18	.43	.00
17	.42	.00
7	.41	.00
51	.40	.00
39	.38	.00
45	.38	.00
25	.34	.00
31	.34	.00
42	.31	.00
22	.00	.70
36	.00	.70
8	.00	.68
50	.00	.65
38	.00	.62
1	.00	.62
23	.00	.60
6	.00	.59
49	.00	.55
21	.00	.55
24	.00	.52
28	.00	.50
11	.00	.46

Item	Factor 1	Factor 2
14	.00	.46
19	.00	.44
47	.00	.39
37	.00	.38
2	.00	.36
41	.00	.32
27	.42	.37
43	.37	.37
44	.34	.41
34	.34	.36
40	.34	.30
35	.31	.43
4	.00	.00
48	.00	.00

The Metacognitive Awareness Inventory (MAI) was used to collect data on the hiring managers' knowledge about themselves, strategy use, and conditions under which strategies are most useful.

Question Two: How do Expert and Novice Managers Differ on Metacognitive Awareness?

Expert and novice variables were established using the demographic cover sheet. The information was used to identify the individual manager's propensity to expertise along a continuum, from novice to expert. The level of expertise was determined to test the research questions about the predictive relationships between expertise and metacognition. The specific variables were age, management experience, hiring experience, education, confidence in hiring decision, and successful hiring outcomes score (SHO) (hiring ratio and scenario scores). The hypothesis is that the pattern of MAI responses was positively correlated with expert managerial characteristics. Those managers who are higher on their propensity to expertness (older, more experienced, highly educated, and have higher SHO's) will score higher on the MAI (more utilization of metacognition). The Pearson coefficient of correlation (r) was used to measure the magnitude and direction of the relationship between the variables. In addition, the Pearson coefficient determined the degree of the relationships between metacognitive awareness and SHO. The index ranges from –1 to +1. The coefficient provides an indication of the relationship of a low or high score on one variable to the low or high score on another. A correlation of +1 indicates that as scores on one variable increase across cases, the score on

another variable increases at a constant rate. A regression model will explore the relationships between metacognitive awareness in hiring decision making and managerial characteristics.

Questions Three and Four: What is the Predictive Contribution of Knowledge and Regulation of Cognition on Successful Hiring Outcomes?

A linear regression analysis was conducted to determine the significance of metacognitive awareness on SHO. The predictor variable was MAI scores. The criterion variable was the SHO score. The purpose of this analysis was to determine the linear equation that predicts the importance of metacognition on successful hiring outcomes and how accurate the equation predicts the success of hiring outcomes.

The SHO consists of the hiring ratio and the hiring scenario score for each manager. The hiring scenario score was analyzed according to the manager's rank order of the candidates from most qualified (5) to least qualified (1). The rankings were weighted and multiplied by the correct ranking which was assessed by a panel of expert hiring professionals and pilot tested by a group of managers. The panel of expert hiring professionals was a group of five professionals with at least ten years of hiring experience with hiring as their primary function. The group was hand selected by the researcher to develop and test the hiring scenarios for use in this study. The pilot group of managers was three managers with at least fifteen years of management experience and ten years of hiring experience. The pilot group was also hand selected by the researcher to participate in the pilot study of the hiring scenarios. The selection of the eight professionals participating in the pilot study was based on their professional reputations in the business environment. Their professional reputation included high retention, an ability to interview effectively, and to select the most appropriate candidate. The score for each scenario was calculated to provide a score from 63% to 100%. A hiring scenario score of 100% was an exact match on all of the candidate's rankings. This was identified as one factor in SHO.

The second factor in the SHO is a ratio of new hires that stayed versus new hires that terminated within the first twelve months of employment. The hiring ratios were calculated for each manager.

Question Five: What is the Predictive Contribution of Age, Management Experience, Hiring Experience, Education, Confidence in Hiring, and Metacognitive Awareness on Successful Hiring Outcomes?

Multivariate analyses tested the entire theoretical model by analyzing the variables to answer the fifth research question investigating the predictive relationships of the predictor variables on the successful hiring outcomes of managers? Hierarchical multiple linear regression analyses determined how well each predictor variable predicted successful hiring outcomes over and above the other predictor variables. Hierarchical regression provides the selection of the predictor variable or set of variables with the highest correlation with the criterion variable. The procedure allows variables to be grouped to form a prediction model.

Limitations

Because organizational constraints will introduce some extraneous variables in this research, the statistical procedure provides an estimation of explained variance and not proven causal relationships.

Utilizing the coefficient correlation for analysis assumes that the measures used for the variables are adequate. The successful hiring outcome variable provides a sound but not necessarily conclusive measure of hiring outcomes. Using real outcome data coupled with hiring scenarios is at least a reasonable beginning toward the development of a more refined way of studying hiring outcomes. The use of company files and numerical data provides a ratio based on the most accurate and up-to-date information available.

In summary, the MAI instrument was analyzed for its utility in the hiring decision making domain. The predictors of expertise were analyzed with correlational statistics. Data were collected and scored as indicators of successful hiring outcomes. All of the variables contributed to the investigation of the theoretical model, metacognition influences expertise, decision making, and successful hiring outcomes. The verification of the theoretical model could help to influence metacognitive strategies being incorporated into instructional design in the business environment.

CHAPTER 4 - RESULTS

Introduction

This chapter contains information concerning the subjects in the sample, the instruments used in the study, and the procedures used to answer the research questions. Results of this research suggest demographic differences between metacognitively aware hiring managers and less metacognitively aware managers. The results also suggest that there is a possible third factor of metacognitive awareness present in hiring decision making. This chapter will provide detailed analyses of the research findings in this study.

Results

Instrumentation

Question One: To What Extent Does the Metacognitive Awareness Inventory Developed by Schraw and Dennison (1994) Measure the Components of Metacognition -- Regulation and Knowledge of cognition?

Factor analysis. A factor analysis was used to test the underlying structure of the MAI and how it relates to theoretical propositions about metacognitive awareness proposed by Brown (1987), Flavell (1987), Jacobs and Paris (1987) and Paris & Winogad (1990). The proposed underlying structure of the MAI and metacognitive awareness consists of two constructs: knowledge and regulation of cognition.

The factor analysis was conducted in two phases, factor extraction and factor rotation to statistically explain the variation and covariation among the items

Subjects for the factor analysis. One hundred and sixty-five hiring professionals from a large association for hiring professionals participated in this study (N = 165). The participants were given the instrument and a coversheet, which explained the purpose of the study (Appendix E). The instrument was distributed during two separate Project Save meetings where the participants were instructed to complete the instrument at home and return it to the researcher via a pre-addressed, stamped envelope. Three hundred and fifty surveys were distributed and one hundred and sixty-five returned for a 47% response rate.

The average respondent was thirty-eight years old, had at least a bachelors degree with eight to ten years of management and hiring experience. Table 2 shows the means, standard deviations, and possible ranges for the variables used in the factor analysis.

Table 2
Summary of Means, Standard Deviations and Ranges (N= 165)

Variable	M	SD
Age	38.42	10.38
Education	16.46	1.97
Hiring Experience	8.48	7.16
Management Experience	9.63	9.28

Analysis of Instrument Used on Hiring Managers. The purpose of the factor analysis on the Metacognitive Awareness Inventory was to validate the underlying latent structure of the instrument. The researcher also wanted to validate the instrument on managers in the hiring domain. The instrument represents two constructs of metacognitive awareness, knowledge and regulation of cognition. Schraw and Dennison (1994) validated the instrument used to measure the metacognitive awareness of teenagers in the learning environment.

The instrument was initially examined with a forced two-factor solution as performed in previous factor analytic research conducted by Schraw and Dennison (1994). The results of the forced two-factor solution yielded a solution that produced the results shown in Appendix G. After examining the results of the two-factor solution it was determined that a third factor may exist based on the large number of promiscuous items that loaded on both factors. A forced three-factor solution was performed to examine the possibility of three factors. The loadings for the forced three-factor solution are listed in Table 3.

Table 3
Loadings for the Forced Three-Factor Analysis of Metacognitive Behavior (N = 165)

Item	Factor 1	Factor 2	Factor 3
51	**.64**	.04	.13
50	**.64**	.08	.07
24	**.64**	.02	.11
36	**.60**	.09	.07
38	**.57**	.08	.20
42	**.55**	.01	.17
22	**.55**	.14	.15
49	**.54**	.02	.21
52	**.52**	.02	.06
6	**.51**	.36	.09
11	**.51**	.17	.11
43	**.50**	.11	.17
44	**.46**	.24	.15
21	**.43**	.12	.27
23	**.41**	.25	.02
8	**.39**	.10	.15
9	**.37**	.09	.26
4	**.36**	.21	.25
41	**.33**	.15	.20
25	**.25**	.13	.15
1	**.25**	.09	.19
10	.20	**.58**	.07
16	.16	**.55**	.03
20	.23	**.54**	.02
27	.40	**.53**	.20
32	.09	**.53**	.07
35	.31	**.46**	.29
17	.02	**.46**	.10
33	.21	**.45**	.23
29	.10	**.42**	.39
18	.12	**.42**	.40
5	.19	**.41**	.15
30	.36	**.39**	.01
26	.20	**.37**	.14
3	.06	**.36**	.15
15	.09	**.35**	.04
7	.31	**.31**	.22
39	.25	.14	**.56**
13	.16	.31	**.53**
31	.10	.31	**.46**

14	.19	.36	**.46**
40	.03	.17	**.45**
37	.18	.23	**.44**
47	.08	.02	**.42**
34	.39	.02	**.42**
2	.28	.12	**.41**
48	.05	.03	**.40**
28	.33	.39	**.40**
12	.02	.14	**.37**
19	.28	.06	**.32**
46	.05	.12	**.14**
45	.07	.07	**.13**

Twenty-one items represented (Factor 1) (51, 50, 24, 36, 38, 42, 22, 49, 52, 6, 11, 43, 44, 21, 23, 8, 9, 4, 41, 25, and 1), 15 of which loaded above .40. The items that loaded on Factor 1 are best summarized as 'Regulation of Cognition'. Regulation of Cognition denotes planning, information management, monitoring, debugging, and evaluation. Sixteen items represented (Factor 2) (10,16, 20, 27, 32, 35, 17, 33, 29, 18, 5, 30, 26, 3, 15, and 7), 11 loaded above .40. The items that loaded on Factor 2 are best summarized as 'Knowledge of Cognition'. Knowledge of Cognition denotes declarative, procedural, and conditional knowledge. Factors 1 and 2 include many of the items generated by Schraw and Dennison (1994) and roughly parallel the theoretical scales proposed in their study. The names represent the same theoretical scales identified by the Schraw and Dennison (1994) study. A third factor was identified, fifteen items loaded on (Factor 3) (39, 13, 31, 14, 40, 37, 47, 34, 2, 48, 28, 12, 19, 46, and 45), 11 loaded above .40. The third Factor identified items associated with the scales, information management-- skills and strategies used to process information more efficiently and monitoring-- assessment of one's strategy use. The items that loaded on Factor 3 are summarized by the research as 'Cognitive Processing'. The three factors explain 28.1 percent of the variance. Coefficient α for Factor 1 was .80. Coefficient α for Factor 2 was .68 and .73 for Factor 3. Coefficient α for the entire instrument reached .89.

The factor solutions led to factors different from the previous study conducted by Schraw and Dennison (1994). The three factors suggest that the eight scales are subsumed under three components of metacognition instead of two for managers in the hiring domain. See Appendix F

for an identification of items by theoretical scale as presented in previous research by Schraw and Dennison (1994).

Relationship of Findings to Previous Research. This factor structure is similar to previous work on the instrument (Schraw and Dennison, 1994). The items included in 'knowledge of cognition' in the previous research also loaded under 'knowledge of cognition' in this study. Many of the items included in 'regulation of cognition' in the previous study also loaded on 'regulation of cognition in this study with the exception of most of the items identified under the scales information management and monitoring. The fifteen items that loaded under Cognitive Processing absorbed most of the information management and monitoring items. Item 27 loaded highly on both Factors 1 and 2 in both studies. Three of the items that loaded highly on both factors in the previous study loaded high on all three factors in this study (4, 34, and 35). The other items loading highly on two or three factors in this study were items 6, 7, 13, 14, 18, 28, 29, and 31. Previous research indicated that two items failed to load on either factor (items 4 – I pace myself while decision making in order to have enough time and 48 – I focus on overall meaning rather than specifics). This research resulted in item 4 loading highly on Factors 1 and 2, and item 48 loading above .40 on Factor 3. The coefficient α for the items loading on both factors reached .91 in the previous research (p. 494), while this research produced a coefficient α of .89. The results of both research studies suggest that the MAI measures at least two kinds of metacognition.

This study was able to find two scales that roughly correspond to the findings of Schraw and Dennison (1994). The results of the factor analysis produced the discovery of an additional factor, which will allow the researcher to more accurately assess metacognitive awareness of hiring decision makers.

Framework of Hypotheses Testing

The first hypothesis investigating expertise was submitted to a significance test. The Pearson correlation coefficient (r) gauged the extent of the relationship between the expertise variables. The second hypothesis investigated the relationship of the differences between age, education, hiring experience, and management experience and expert and novice managers based on literature. The analysis was performed using regression analysis in which hiring confidence score (HCS), hiring scenario score (HSS), and hiring ratio score (HRS) served as the criterion

score, the three metacognitive scores, Regulation of Cognition, Knowledge of Cognition and Cognitive Processing served as the predictor variables and age, education hiring experience and management experience served as adjusting or co-variables. The third, fourth and fifth hypothesis were tested using a hierarchical multiple regression analyses which HCS, HSS, and HRS served as the criterion score, the three metacognitive scores served as the predictor variables and age, education, hiring experience and management experience served as adjusting or co-variables.

Question Two: How Do Expert and Novice Managers Differ on Metacognitive Awareness?

Subjects. Thirty-five managers with hiring responsibility from a medium-sized government contracting organization headquartered in Northern Virginia participated in this study (N = 35). The participants were given a packet, which contained a coversheet, hiring scenarios and the MAI Instrument. The packets were hand-delivered to 91 managers. The managers were instructed to complete the packets and return them to the researcher via a pre-addressed, stamped envelope. The response rate was 38%.

Table 4 shows the means, standard deviations, minimum and maximum possible ranges for the variables used in the following analyses.

Table 4
Summary of Means, Standard Deviations, Minimum and Maximum Range for Expertise and Metacognitive Measures(N= 35)

Variable	M	SD	Min	Max
Age	44	8.44	23	60
Education	16.74	1.74	13	20
Hiring Experience	10.66	7.24	1	27
Management Experience	14.89	8.76	0	31
Hiring Confidence Score	3.71	.62	3	5
Hiring Ratio	82.54	12.50	60	100
Hiring Scenario Score	87.95	7.95	73	98
Total MAI Score	111.09	10.27	92	130
Regulation of Cognition	57.23	6.0	44	68
Knowledge of Cognition	42.20	4.29	34	51
Cognitive Processing	44.51	4.55	35	55

Correlation of Variables of Expertise. A significance test determined the relative degree to which age, experience, education, confidence in hiring, hiring scenario score, and hiring ratio score can be indicators of expertise. The seven indicators of expertise -- age, management

experience, hiring experience, education, and confidence in hiring score (CHS), hiring scenario score (HSS), and hiring ratio score (HRS) -- were variables. The correlations (r) and p-values from the analysis are shown in Table 6. The results of the significance tests for r shown in Table 6 indicate that 5 out of the 7 correlations were statistically significant. Correlation coefficients were computed among the seven indicators of expertise. Three variables correlated significantly with age: education, hiring experience, and management experience. Management experience correlated significantly with age, hiring experience, education, and confidence in hiring. Hiring experience correlated significantly with age, management experience, and confidence in hiring. Confidence in hiring correlated significantly with management experience, hiring experience and hiring scenario score. Hiring scenario score correlated significantly with hiring ratio score.

Table 5
Correlations Among the Indicators of Expertise and the Demographic Variables (N= 35)

Expertise	Age	Mgmt Exp	Hiring Exp	Education	CHS	HSS	HRS
Age	1.00						
Management Experience	.78**	1.00					
Hiring Experience	.59**	.68**	1.00				
Education	.62**	.55**	.25	1.00			
Confidence in **H**iring **S**core	.33	.38*	.41*	.20	1.00		
Hiring **S**cenario **S**core	.29	.26	.25	.11	.42*	1.00	
Hiring **R**atio **S**core	.19	.19	.23	.005	.23	.76**	1.00
Successful **H**iring **O**utcomes	.24	.24	.25	.05	.32	.90	.96

** $p < .01$; * $p < .05$

The results suggest that older managers are more experienced in management and hiring decision making, are more educated, and have more confidence in their hiring decisions. The managers that are more confident in their hiring decisions tend to have more management and hiring experience and have more successful hiring outcomes. And managers that rated high on their ability to make the most appropriate hiring decision tended to have lower employee turnover. The results do not support the hypothesis that hiring outcomes are correlated with age, experience and education. Hiring ratio has a linear relationship to the hiring scenario score, $r = .76$ which suggests that the hiring scenario score and the hiring ratio are measuring the same thing. Further analysis indicated that hiring experience has a linear relationship with management experience and confidence in hiring decision, which suggests that more experienced hiring managers have more confidence in their ability to hire the most appropriate candidate.

The results of the significance test among expertise variables indicated a statistical significance at the .01 level among six of the seven indicators. The four theoretical indicators age, management experience, hiring experience and education were statistically significant and were greater than or equal to .55. The correlations of hiring scenario score and hiring ratio score were statistically significant at .76, and the confidence in hiring score correlated with

management experience, hiring experience and the hiring scenario score. In general, the results suggest that expert managers are older, are more educated, have greater management and hiring experience, and tend to have more confidence in their hiring decisions. And managers with more confidence in their hiring decisions tend to have the ability to choose the most appropriate candidate for a position.

Table 6
Descriptive Statistics of the Differences Between Expert and Novice Hiring Managers (N= 35)

Variable	Experts		Novices	
	M	**SD**	**M**	**SD**
Age	45.06	10.28	43.11	6.69
Management Experience	17	9.83	13.11	7.56
Hiring Experience	11.69	8.55	9.79	6.02
Education	16.50	2.10	16.95	1.39
Confidence in Hiring Score	3.69	.70	3.74	.56
Hiring Scenario Score	88.94	8.90	87.13	7.96
Hiring Ratio Score	85.13	10.61	80.37	13.81
MAI	120.31	5.90	103.32	5.57

Hierarchical Analyses

The multiple regression analyses used ordered sets to determine the significance of age, management experience, hiring experience, education, confidence in hiring, knowledge of cognition, regulation of cognition and cognitive processing on successful hiring outcomes (SHO). The purpose of these analyses was to determine the linear equation or model that predicts successful hiring.

Question Three: What is the Predictive Contribution of Regulation of Cognition on Successful Hiring Outcomes (SHO)?

Regulation of cognition is the control aspect of decision making. The five components include a) planning, b) information management, c) comprehension monitoring, d) debugging strategies, and e) evaluation (Artzt &Armour-Thomas, 1992; Baker, 1989).

The purpose of the regression analysis was to determine how well successful hiring outcomes are predicted by regulation of cognition. In addition, the analysis reveals how well

regulation of cognition predicts successful hiring outcomes over knowledge of cognition. The regression equation with regulation of cognition as the predictor of successful hiring outcomes was significant, R = .55, R^2 = .305, F (13,20) = .67, p = .76.

Question Four: What is the Predictive Contribution of Knowledge of Cognition on Successful Hiring Outcomes?

Knowledge of cognition is the reflective aspect of decision making. The three components include a) declarative knowledge, b) procedural knowledge, and c) conditional knowledge (Artzt &Armour-Thomas, 1992; Baker, 1989).

Multiple regression was used to analyze the relationship between knowledge of cognition and successful hiring outcomes. The purpose is to determine how well successful hiring outcomes are predicted by knowledge of cognition. In addition, an analysis of how well knowledge of cognition predicts successful hiring outcomes over regulation of cognition. The regression equation with knowledge of cognition as a predictor of successful hiring outcomes was significant, R = .65, R^2 = .429, F (17,17) = .75, p = .72.

Question Five: What is the predictive contribution of age, management experience, hiring experience, education, confidence in hiring, and metacognitive awareness on successful hiring outcomes?

Multiple Regression analyses using ordered sets to determine the significance of age, management experience, hiring experience, education, confidence in hiring, knowledge of cognition, regulation of cognition and cognitive processing on successful hiring outcomes (SHO). The purpose of this analysis was to determine the linear equation or model that predicts successful hiring. A scatterplot showing the relationship between metacognition and successful hiring outcomes was first examined. Figure 1, indicates that metacognitive awareness and successful hiring outcomes are possibly linearly related. The scatterplot shows that as metacognition increases, successful hiring outcomes increases.

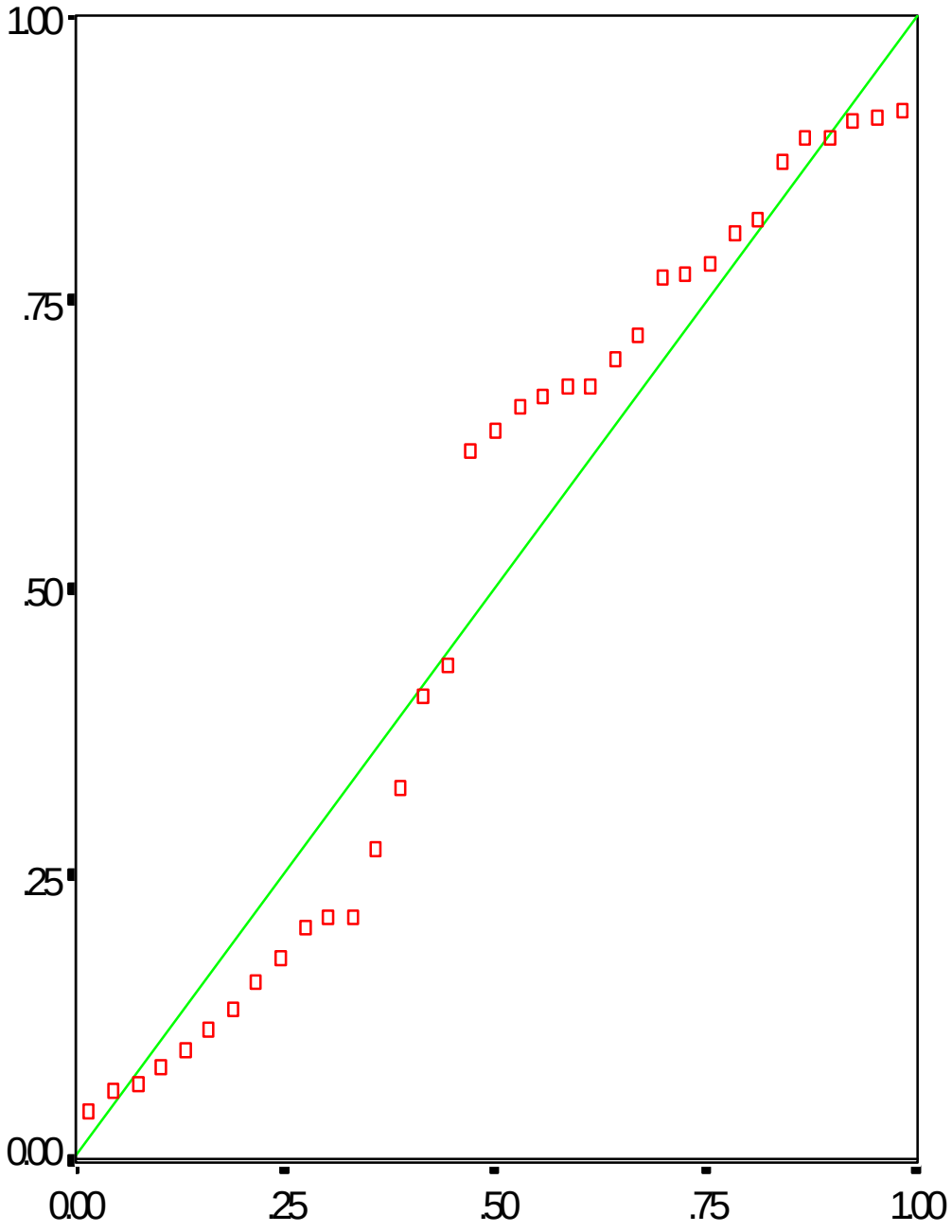

Figure 1. **Regression Scatterplot for the Predictive Contribution of Metacognitive Awareness on Successful Hiring Outcomes**

Four multiple regression analyses were conducted to predict successful hiring outcomes. The equations were ordered to determine their predictive contribution based on the order of the model. The first analysis ordered the sets by the five demographic predictors (age, education, confidence in hiring, management experience, and hiring experience) (Set 1), then, cognitive processing (Set 2), then, knowledge of cognition and regulation of cognition (Set 3). The second analysis ordered the sets by the five demographic predictors (Set 1), then, regulation and knowledge of cognition (Set 2), then, cognitive processing (Set 3). The third analysis was the five demographic predictors (Set 1), then, regulation of cognition and cognitive processing (Set 2), then, knowledge of cognition (Set 3). And the fourth analysis included the demographic predictors (Set 1), then, knowledge of cognition and cognitive processing (Set 2), then regulation of cognition (Set 3). The results of the first analysis presented an evaluation of how well successful hiring outcomes are predicted by age, education confidence and experience (Set 1), and how well cognitive processing (Set 2) and knowledge of regulation of cognition (Set 3) predicts successful hiring outcomes over and above Set 1.

The first set of predictors in all of the analyses, age, education, confidence and experience, did not account for a significant amount of successful hiring outcomes variability, $\underline{R}^2$ = .06, $\underline{F}$ (4,28) = .49, $\underline{p}$=. 740. The examination of Set 2 and 3 in the first analysis did not account for a significant proportion of successful hiring outcomes variance after controlling for the effects of Set 1, $\underline{R}^2$ change = .03, $\underline{F}$ (1,27) = 1.120, $\underline{p}$ = .299 and $\underline{R}^2$ change = .019, $\underline{F}$ (2,25) = .272, $\underline{p}$=. 764, respectively. The examination of Set 2 and 3 in the second analysis did not account for a significant proportion of successful hiring outcomes variance after controlling for the effects of Set 1, $\underline{R}^2$ change = .19, $\underline{F}$ (2,26) = .265, $\underline{p}$ = .770 and $\underline{R}^2$ change = .038, $\underline{F}$ (1,25) = 1.073, $\underline{p}$=. 310, respectively. The examination of Set 2 and 3 in the third analysis did not account for a significant proportion of successful hiring outcomes variance after controlling for the effects of Set 1, $\underline{R}^2$ change = .054, $\underline{F}$ (2,26) = .794, $\underline{p}$ = .462 and $\underline{R}^2$ change = .003, $\underline{F}$ (1,25) = .072, $\underline{p}$=. 791, respectively. The examination of Set 2 and 3 in the fourth analysis did not account for a significant proportion of successful hiring outcomes variance after controlling for the effects of Set 1, $\underline{R}^2$ change = .041, $\underline{F}$ (2,26) = .597, $\underline{p}$ = .558 and $\underline{R}^2$ change = .015, $\underline{F}$ (1,25) = .436, $\underline{p}$=. 515, respectively.

The analysis of expert managers indicated that metacognition accounts for 12 percent of the variance for successful hiring, $\underline{R}$ = .35, R^2 = .12, $\underline{F}$ (1,14) = 1.93, $\underline{p}$ = .005. However, the

analysis of novices' success of hiring outcomes indicated that none of the variance was accounted for by metacognition, $\underline{R} = .027$, $\underline{R}^2 = .00$, $\underline{F}\ (1,17) = .012$, $\underline{p} = .104$. This finding suggests that there is something working between expertise, metacognition and successful hiring decisions, but there is not enough evidence to conclude the exact source. Tables 7 through 10 display the results of the multiple linear regression analyses for the four ordered models.

Table 7
Multiple Linear Regression Analysis for Model 1

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	Mgmt Exp, educ, Hire Exp, AGE[c,]	.	.257	.066	-.068	9.99	.066	.494	4	28	.740
2	REGR factor score 3 for analysis 1[e,d]	.	.321	.103	-.063	9.97	.037	1.120	1	27	.299
3	REGR factor score 1 for analysis 1 , REGR factor score 2 for analysis 1[f,d]	.	.350	.122	-.124	10.25	.019	.272	2	25	.764

a. Dependent Variable: SHO

b. Method: Enter

c. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE

d. All requested variables entered.

e. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 3 for analysis 1

f. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 3 for analysis 1 , REGR factor score 1 for analysis 1 , REGR factor score 2 for analysis 1

ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	196.951	4	49.238	.494	.740[b]
	Residual	2793.052	28	99.752		
	Total	2990.002	32			
2	Regression	308.187	5	61.637	.621	.685[c]
	Residual	2681.816	27	99.327		
	Total	2990.002	32			
3	Regression	365.356	7	52.194	.497	.828[d]
	Residual	2624.646	25	104.986		
	Total	2990.002	32			

a. Dependent Variable: SHO

b. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE

c. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 3 for analysis 1

d. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 3 for analysis 1 , REGR factor score 1 for analysis 1 , REGR factor score 2 for analysis 1

Correlations

		SHO	AGE	educ	Hire Exp	Mgmt Exp	REGR factor score 3 for analysis 1	REGR factor score 2 for analysis 1	REGR factor score 1 for analysis 1
Pearson Correlation	SHO	1.000	.204	.017	.196	.180	-.173	.080	.153
	AGE	.204	1.000	.607	.559	.766	-.032	.020	.072
	educ	.017	.607	1.000	.220	.536	-.002	.122	-.156
	Hire Exp	.196	.559	.220	1.000	.633	.216	.201	-.012
	Mgmt Exp	.180	.766	.536	.633	1.000	-.047	.035	.070
	REGR factor score 3 for analysis 1	-.173	-.032	-.002	.216	-.047	1.000	.000	.000
	REGR factor score 2 for analysis 1	.080	.020	.122	.201	.035	.000	1.000	.000
	REGR factor score 1 for analysis 1	.153	.072	-.156	-.012	.070	.000	.000	1.000
Sig. (1-tailed)	SHO	.	.128	.463	.137	.158	.167	.329	.198
	AGE	.128	.	.000	.000	.000	.430	.457	.345
	educ	.463	.000	.	.110	.001	.495	.250	.193
	Hire Exp	.137	.000	.110	.	.000	.114	.131	.473
	Mgmt Exp	.158	.000	.001	.000	.	.396	.423	.348
	REGR factor score 3 for analysis 1	.167	.430	.495	.114	.396	.	.500	.500
	REGR factor score 2 for analysis 1	.329	.457	.250	.131	.423	.500	.	.500
	REGR factor score 1 for analysis 1	.198	.345	.193	.473	.348	.500	.500	.
N	SHO	33	33	33	33	33	33	33	33
	AGE	33	33	33	33	33	33	33	33
	educ	33	33	33	33	33	33	33	33
	Hire Exp	33	33	33	33	33	33	33	33
	Mgmt Exp	33	33	33	33	33	33	33	33
	REGR factor score 3 for analysis 1	33	33	33	33	33	33	33	33
	REGR factor score 2 for analysis 1	33	33	33	33	33	33	33	33
	REGR factor score 1 for analysis 1	33	33	33	33	33	33	33	33

Table 8
Multiple Linear Regression Analysis for Model 2

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	Mgmt Exp, educ, Hire Exp, AGE[c]	.	.257	.066	-.068	9.99	.066	.494	4	28	.740
2	REGR factor score 1 for analysis 1 , REGR factor score 2 for analysis 1[e,d]	.	.291	.084	-.127	10.26	.019	.265	2	26	.770
3	REGR factor score 3 for analysis 1[f,d]	.	.350	.122	-.124	10.25	.038	1.073	1	25	.310

a. Dependent Variable: SHO

b. Method: Enter

c. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE

d. All requested variables entered.

e. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 1 for analysis 1 , REGR fa analysis 1

f. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 1 for analysis 1 , REGR fa analysis 1 , REGR factor score 3 for analysis 1

ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	196.951	4	49.238	.494	.740[b]
	Residual	2793.052	28	99.752		
	Total	2990.002	32			
2	Regression	252.655	6	42.109	.400	.872[c]
	Residual	2737.348	26	105.283		
	Total	2990.002	32			
3	Regression	365.356	7	52.194	.497	.828[d]
	Residual	2624.646	25	104.986		
	Total	2990.002	32			

a. Dependent Variable: SHO

b. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE

c. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 1 for analysis 1 , REGR factor score 2 for analysis 1

d. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 1 for analysis 1 , REGR factor score 2 for analysis 1 , REGR factor score 3 for analysis 1

Correlations

		SHO	AGE	educ	Hire Exp	Mgmt Exp	REGR factor score 1 for analysis 1	REGR factor score 2 for analysis 1	REGR factor score 3 for analysis 1
Pearson Correlation	SHO	1.000	.204	.017	.196	.180	.153	.080	-.173
	AGE	.204	1.000	.607	.559	.766	.072	.020	-.032
	educ	.017	.607	1.000	.220	.536	-.156	.122	-.002
	Hire Exp	.196	.559	.220	1.000	.633	-.012	.201	.216
	Mgmt Exp	.180	.766	.536	.633	1.000	.070	.035	-.047
	REGR factor score 1 for analysis 1	.153	.072	-.156	-.012	.070	1.000	.000	.000
	REGR factor score 2 for analysis 1	.080	.020	.122	.201	.035	.000	1.000	.000
	REGR factor score 3 for analysis 1	-.173	-.032	-.002	.216	-.047	.000	.000	1.000
Sig. (1-tailed)	SHO	.	.128	.463	.137	.158	.198	.329	.167
	AGE	.128	.	.000	.000	.000	.345	.457	.430
	educ	.463	.000	.	.110	.001	.193	.250	.495
	Hire Exp	.137	.000	.110	.	.000	.473	.131	.114
	Mgmt Exp	.158	.000	.001	.000	.	.348	.423	.396
	REGR factor score 1 for analysis 1	.198	.345	.193	.473	.348	.	.500	.500
	REGR factor score 2 for analysis 1	.329	.457	.250	.131	.423	.500	.	.500
	REGR factor score 3 for analysis 1	.167	.430	.495	.114	.396	.500	.500	.
N	SHO	33	33	33	33	33	33	33	33
	AGE	33	33	33	33	33	33	33	33
	educ	33	33	33	33	33	33	33	33
	Hire Exp	33	33	33	33	33	33	33	33
	Mgmt Exp	33	33	33	33	33	33	33	33
	REGR factor score 1 for analysis 1	33	33	33	33	33	33	33	33
	REGR factor score 2 for analysis 1	33	33	33	33	33	33	33	33
	REGR factor score 3 for analysis 1	33	33	33	33	33	33	33	33

Table 9

Multiple Linear Regression Analysis for Model 3

Model Summary [a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	Mgmt Exp, educ, Hire Exp, AGE [c,d]	.	.257	.066	-.068	9.99	.066	.494	4	28	.740
2	REGR factor score 1 for analysis 1 , REGR factor score 3 for analysis 1 [e,d]	.	.346	.120	-.083	10.06	.054	.794	2	26	.462
3	REGR factor score 2 for analysis 1 [f,d]	.	.350	.122	-.124	10.25	.003	.072	1	25	.791

a. Dependent Variable: SHO

b. Method: Enter

c. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE

d. All requested variables entered.

e. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 1 for analysis 1 , REGR factor score 3 for analysis 1

f. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 1 for analysis 1 , REGR factor score 3 for analysis 1 , REGR factor score 2 for analysis 1

ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	196.951	4	49.238	.494	.740[b]
	Residual	2793.052	28	99.752		
	Total	2990.002	32			
2	Regression	357.817	6	59.636	.589	.736[c]
	Residual	2632.185	26	101.238		
	Total	2990.002	32			
3	Regression	365.356	7	52.194	.497	.828[d]
	Residual	2624.646	25	104.986		
	Total	2990.002	32			

a. Dependent Variable: SHO

b. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE

c. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 1 for analysis 1 , REGR factor score 3 for analysis 1

d. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 1 for analysis 1 , REGR factor score 3 for analysis 1 , REGR factor score 2 for analysis 1

Correlations

		SHO	AGE	educ	Hire Exp	Mgmt Exp	REGR factor score 1 for analysis 1	REGR factor score 3 for analysis 1	REGR factor score 2 for analysis 1
Pearson Correlation	SHO	1.000	.204	.017	.196	.180	.153	-.173	.080
	AGE	.204	1.000	.607	.559	.766	.072	-.032	.020
	educ	.017	.607	1.000	.220	.536	-.156	-.002	.122
	Hire Exp	.196	.559	.220	1.000	.633	-.012	.216	.201
	Mgmt Exp	.180	.766	.536	.633	1.000	.070	-.047	.035
	REGR factor score 1 for analysis 1	.153	.072	-.156	-.012	.070	1.000	.000	.000
	REGR factor score 3 for analysis 1	-.173	-.032	-.002	.216	-.047	.000	1.000	.000
	REGR factor score 2 for analysis 1	.080	.020	.122	.201	.035	.000	.000	1.000
Sig. (1-tailed)	SHO	.	.128	.463	.137	.158	.198	.167	.329
	AGE	.128	.	.000	.000	.000	.345	.430	.457
	educ	.463	.000	.	.110	.001	.193	.495	.250
	Hire Exp	.137	.000	.110	.	.000	.473	.114	.131
	Mgmt Exp	.158	.000	.001	.000	.	.348	.396	.423
	REGR factor score 1 for analysis 1	.198	.345	.193	.473	.348	.	.500	.500
	REGR factor score 3 for analysis 1	.167	.430	.495	.114	.396	.500	.	.500
	REGR factor score 2 for analysis 1	.329	.457	.250	.131	.423	.500	.500	.
N	SHO	33	33	33	33	33	33	33	33
	AGE	33	33	33	33	33	33	33	33
	educ	33	33	33	33	33	33	33	33
	Hire Exp	33	33	33	33	33	33	33	33
	Mgmt Exp	33	33	33	33	33	33	33	33
	REGR factor score 1 for analysis 1	33	33	33	33	33	33	33	33
	REGR factor score 3 for analysis 1	33	33	33	33	33	33	33	33
	REGR factor score 2 for analysis 1	33	33	33	33	33	33	33	33

Table 10

Multiple Linear Regression Analysis for Model 4

Model Summary[a,b]

Model	Variables Entered	Variables Removed	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	F Change	df1	df2	Sig. F Change
1	Mgmt Exp, educ, Hire Exp, AGE[c,]	.	.257	.066	-.068	9.99	.066	.494	4	28	.740
2	REGR factor score 2 for analysis 1 , REGR factor score 3 for analysis 1[e,d]	.	.327	.107	-.099	10.13	.041	.597	2	26	.558
3	REGR factor score 1 for analysis 1[f,d]	.	.350	.122	-.124	10.25	.015	.436	1	25	.515

a. Dependent Variable: SHO

b. Method: Enter

c. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE

d. All requested variables entered.

e. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 2 for analysis 1 , REGR factor score 3 for analysis 1

f. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 2 for analysis 1 , REGR factor score 3 for analysis 1 , REGR factor score 1 for analysis 1

ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	196.951	4	49.238	.494	.740[b]
	Residual	2793.052	28	99.752		
	Total	2990.002	32			
2	Regression	319.549	6	53.258	.519	.789[c]
	Residual	2670.453	26	102.710		
	Total	2990.002	32			
3	Regression	365.356	7	52.194	.497	.828[d]
	Residual	2624.646	25	104.986		
	Total	2990.002	32			

a. Dependent Variable: SHO

b. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE

c. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 2 for analysis 1 , REGR factor score 3 for analysis 1

d. Independent Variables: (Constant), Mgmt Exp, educ, Hire Exp, AGE, REGR factor score 2 for analysis 1 , REGR factor score 3 for analysis 1 , REGR factor score 1 for analysis 1

Correlations

		SHO	AGE	educ	Hire Exp	Mgmt Exp	REGR factor score 3 for analysis 1	REGR factor score 2 for analysis 1	REGR factor score 1 for analysis 1
Pearson Correlation	SHO	1.000	.204	.017	.196	.180	-.173	.080	.153
	AGE	.204	1.000	.607	.559	.766	-.032	.020	.072
	educ	.017	.607	1.000	.220	.536	-.002	.122	-.156
	Hire Exp	.196	.559	.220	1.000	.633	.216	.201	-.012
	Mgmt Exp	.180	.766	.536	.633	1.000	-.047	.035	.070
	REGR factor score 3 for analysis 1	-.173	-.032	-.002	.216	-.047	1.000	.000	.000
	REGR factor score 2 for analysis 1	.080	.020	.122	.201	.035	.000	1.000	.000
	REGR factor score 1 for analysis 1	.153	.072	-.156	-.012	.070	.000	.000	1.000
Sig. (1-tailed)	SHO	.	.128	.463	.137	.158	.167	.329	.198
	AGE	.128	.	.000	.000	.000	.430	.457	.345
	educ	.463	.000	.	.110	.001	.495	.250	.193
	Hire Exp	.137	.000	.110	.	.000	.114	.131	.473
	Mgmt Exp	.158	.000	.001	.000	.	.396	.423	.348
	REGR factor score 3 for analysis 1	.167	.430	.495	.114	.396	.	.500	.500
	REGR factor score 2 for analysis 1	.329	.457	.250	.131	.423	.500	.	.500
	REGR factor score 1 for analysis 1	.198	.345	.193	.473	.348	.500	.500	.
N	SHO	33	33	33	33	33	33	33	33
	AGE	33	33	33	33	33	33	33	33
	educ	33	33	33	33	33	33	33	33
	Hire Exp	33	33	33	33	33	33	33	33
	Mgmt Exp	33	33	33	33	33	33	33	33
	REGR factor score 3 for analysis 1	33	33	33	33	33	33	33	33
	REGR factor score 2 for analysis 1	33	33	33	33	33	33	33	33
	REGR factor score 1 for analysis 1	33	33	33	33	33	33	33	33

There are many possible explanations for the insignificant findings of the predictors variables, age, education, hiring experience, management experience, regulation of cognition, knowledge of cognition, and cognitive processing on successful hiring outcomes. The predictors may not be useful as predictors of successful hiring outcomes because metacognitive skill may not be related to hiring skill. The predictors may not be useful because the method used to measure hiring skill is not a good predictor of hiring skill. The metacognitive instrument may not be measuring the metacognitive skill associated with hiring decisions. The sample size could be too small. Whatever the explanation is, it could be determined that assessing the relationship of metacognitive awareness alone is a complicated task. It could also be determined that assessing successful hiring outcomes is a complicated task. This research study was far more complicated than determining the metacognitive awareness of students in a semi-controlled environment --the classroom. This study has allowed the research to determine that an instrument needs to be developed to capture the complexity of the adult decision maker in the dynamic workplace. In addition, the research has created a tool that is the foundation for developing a tool to assess successful hiring decisions.

Evaluation

Interpretation and Discussion of Findings

The validation of the Metacognitive Awareness Inventory (MAI) focused on two issues: (a) whether the two theoretical components of metacognition were valid in the hiring decision making domain and (b) whether the instrument measured metacognition in hiring managers. The results roughly parallel the two component theoretical model suggested in previous studies (Brown, 1987; Flavell, 1987; Jacobs & Paris, 1987; Schraw & Dennison, 1990). The forced three-factor solution appeared to be a better solution for hiring decision makers. The three factors suggest that Cognitive Processing may be as equally important as the other two theoretical factors in the metacognitive awareness of hiring managers.

Significant relationships were found among age, management experience, hiring experience, education and confidence in hiring as measures of expertise. Hiring ratio and hiring scenario score correlated as measures of successful hiring outcomes. No significant relationships were found between the predictor measures, age, education, hiring experience, management experience, regulation of cognition, knowledge of cognition and cognitive processing and successful hiring outcomes. These findings support theoretical assumptions associated with

expertise and suggest that older managers tend to have more management and hiring experience and tend to be more confidence about their hiring decisions than younger managers. The correlation between hiring ratio and hiring scenario score suggests that managers who were successful at selecting the most appropriate candidate tended to have lower attrition as well. The most disappointing finding was that neither managerial expertise or metacognitive awareness were significant predictors of successful hiring outcomes.

Summary

In summary, the present research has performed construct validity of the Metacognitive Awareness Inventory. The study offers some advances in our understanding of the two components of metacognition. The explanation of a third factor that focuses on the processing of cognition is an important revelation. The measures of successful hiring outcomes -- hiring ratio and hiring scenario score-- offer a potentially valid mean of assessing hiring skill. Further, the results suggest that the metacognitive awareness of managerial hiring decision making warrants further study.

CHAPTER 5 – CONTRIBUTION OF RESEARCH AND IMPLICATIONS

Introduction

In recent years researchers and businesses have recognized and discussed problems posed by managerial decision making. Hiring strategies have been on the forefront of the business agenda. The nation's unemployment has caused great economic discussions. In spite of these discussions, the study of how cognitive strategies may influence managerial hiring decision making has been neglected.

The January 1998 employment report published by The Department of Labor showed the unemployment rate dropping to 4.7%. The drop was largely attributed to job growth: businesses reported an increase of 370,000 new jobs during that month. To compound the issue of extremely low unemployment coupled with job growth, the percentage of unemployment due to attrition rose to 12.6% (Bureau of Labor Statistics, January 27, 1998). With turnover cost at $8,512 per exempt person, these facts can be devastating to an organization's bottom-line. These labor studies suggest that employment growth is accelerating as the nation's pool of available candidates is both diminishing and changing jobs often. One aspect of the attrition could be related to hiring decisions. Even if hiring decisions are not a part of the reason for the attrition, hiring decision making has become a very important part of business today due to these trends.

The purpose of this study was to determine the extent to which metacognitive strategies influence expert behavior in hiring decisions. Research suggests that metacognitive awareness can be identified when experts make decisions. One of the purposes of this study was to verify the relationship of metacognitive strategies used by expert managers versus novice managers when making hiring decisions. If the metacognitive strategies used by expert managers can be verified and those same strategies can be predictive of successful hiring decisions, then novice managers can likewise learn metacognitive strategies to improve their decision making performance.

To assess managerial hiring decision making within the organizational environment, the researcher developed and pilot tested a set of five hiring scenarios, coupled with actual hiring ratios to determine successful hiring decisions.

The study focused primarily on an overall question: What is the predictive contribution of age, management experience, hiring experience, education, confidence in hiring, and metacognitive awareness on successful hiring outcomes?

This research represents a first attempt to investigate the influence of metacognition on managerial decisions in the hiring process. The premise for investigating the influence of metacognition on hiring decision making is to teach hiring managers decision making strategies that utilize metacognition. This research revealed a difference in the demographic characteristics differentiating expert and novice managers. There were other outcomes of the study that were of particular interest due to their theoretical and practical implications. This research makes contributions in several ways. First, identifying a third factor of metacognition and how it may influence hiring decision making contributes to theory. Second, methodological contributions emerged in developing and testing the ill-defined mental process model of hiring decision making. And third, the research yielded practical contributions involving implications to novice managers, management development and instructional design. This chapter will focus on the contributions of this research, implications of this research, and recommendations for further study.

Contributions of Study

Theoretical Contributions

The first theoretical contribution of this study investigated an assumption about underlying components of metacognition. Brown (1987), Flavell (1987), Jacobs & Paris (1987), Paris & Winogad (1990) and Schraw & Dennison (1994) proposed two components of metacognition. These components subsumed eight factors. Previous research on these underlying theoretical constructs was conducted with many audiences, primarily children, and in various domains, primarily learning. This study expanded the parameters of the theoretical assumptions associated with metacognition by investigating managerial hiring decisions in the business environment. The expansion yielded a third factor of metacognitive awareness. The third factor was named Cognitive Processing by the researcher based on the items that represented the factor. The factor could also be termed ‘cognitive maintenance’.

Metacognition refers to the knowledge individuals have of their own thinking processes and strategies and their ability to monitor and regulate these processes. This process requires learners to analyze, reflect on, and monitor their own thinking and learning. Schraw & Dennison (1994) suggest that metacognitive knowledge plays a role in cognitive performance by improving strategy use (p. 461). A strategy is a plan of action pertaining to the cognitive process that one uses to make a decision. Knowledge of cognition explains the reflective aspect of

decision making. The three scales include(a) declarative knowledge, (b) procedural knowledge, and (c) conditional knowledge. Regulation of cognition is the control aspect of decision making. Previous research identified the components to be (a) planning, (b) information management, (c) comprehension monitoring, (d) debugging strategies, and (e) evaluation (Artzt &Armour-Thomas, 1992; Baker, 1989). This study suggests that regulation of cognition include (a) planning, (b) debugging strategies, and (c) evaluation, all of which are regulatory activities. While comprehension monitoring and information management can be viewed as maintenance or processing activities.

The examination of the demographic differences between expert and novice managers in the hiring decision making domain was the second theoretical contribution. Researchers have studied metacognitive differences between experts and novices and its relationship to decision making for many years. One question raised about expert-novice differences was whether experts were more aware of their own cognitive activity and the methods they employ to regulate their own cognitive processes. Previous research has provided indication that experts were more metacognitively aware than novices in many domains (Anderson, 1983; Brown, 1978; Chi, Feltovich, & Glaser, 1981; Flavell, 1979, 1987; Glaser, 1987). This research has indicated that expert hiring decision makers monitor and assess their actions and cognitive processes more successfully than novices. The implication of this finding is that novice hiring decision makers can improve decision making behavior with increased metacognitive awareness, which can be taught.

Methodological Contributions

The method used to capture metacognitive awareness and hiring performance offers contributions to methodology. Brown (1987) concluded that most of the previous research used self-report, verbal protocols and questionnaires with imaginary situations (p. 77). Issues were raised by each of the research methods. Self-report required subjects to recall what they were thinking when the experience happened. Verbal protocols disrupted the cognitive processing of the subject, and subjects had difficulty articulating what they knew. Finally, questionnaires with imaginary situations were the least favorable way to collect data on metacognition (p.77).

This research contributes to methodology by providing a combination of self-report questions, real hiring scenarios, performance ratios, and a validated metacognitive awareness inventory. In utilizing the various factors, subjects were able to describe their effectiveness in

making hiring decisions and then perform real hiring decisions. Those hiring decisions were then validated with actual hiring ratios to assess hiring outcomes. In addition, the metacognitive awareness inventory was validated for managers in the hiring decision making domain.

Practical Contributions

This study provided two practical contributions. First, businesses can benefit from this research by utilizing the measure of successful hiring outcomes as an assessment tool for training. The hiring scenarios and hiring ratio allows trainers to assess managers proficiency with hiring decisions. The hiring scenarios classified a good hiring decision as the ability to select the most appropriate candidate based on the requisite skills for the job and the specific qualifications of the job. Once proficiency has been established the trainer can teach to the skill level of the student. The measure of successful hiring outcomes coupled with the instruction of metacognitive awareness would allow trainers to provide instruction that enhances each manager's metacognitive awareness. The instruction of metacognitive awareness in hiring decision making would address: (a) how to assess the facts associated with the job and the candidates; (b) the process of making a hiring decision; (c) knowledge about when and why to use hiring procedures; (d) how to plan a hiring decision; (e) the skills and strategies used to organize, summarize and select the appropriate candidate; (f) how to monitor hiring decision making strategies; (g) the skills and strategies used to correct decision making errors; and (h) how to analyze the effectiveness of a hiring decision.

Second, adult educators can utilize the implications of this study to improve instructional design for management development programs. Previous research on metacognition has provided a foundation for the reform of instruction. Many of the advancements pertain to domain-specific knowledge and advances that identify the structures of content knowledge to increase proficiency in a particular subject-matter. Other advances pertain to metacognition, which will allow the acquisition and deployment of increased proficiency (Rohwer & Thomas, 1989). Rohwer and Thomas (1989) hypothesize that research on domain-specific knowledge and metacognition will remain unfulfilled unless major changes are made in instruction (p. 105). Chapter two identified instructional design strategies suggested by previous research on metacognition for use to improve management development programs.

This research challenges businesses to change the ways in which they view hiring decision making and management development instruction.

Reform of Management Development Instruction

Metacognition's influence on performance implies positive possibilities for adult educators, curriculum developers and researchers in the management problem-solving/decision-making domain. The implications have already been prescribed to K-12 educators in cognitive science, psychology, neurology and artificial intelligence literature.

Research and theory concerning metacognition has renewed the interest and propelled curriculum developers to allow metacognition to influence academic course development in some primary school programs. But, the kinds of knowledge structures and procedures that research has shown to be characteristic of expert problem-solvers in management development programs has elicited little demand. Many educational test items for example do not require declarative and procedural knowledge organized around principles in the subject-matter domain (Rohwer & Thomas, 1989, p.115).

Although research on methods for developing the metacognitive awareness involved in decision making is limited, this study offers some practical applications that adult educators can use to devise a variety of instructional methods to enhance manager's decision making abilities

Metacognitive strategies include planning, sequencing, self-checking for understanding, self-questioning, evaluating, and revising to improve performance (Schraw & Dennison, 1994; Zimmerman, 1990). This research suggests that successful hiring decisions can be determined and that experts hiring managers can be identified. The implication that expert managers are more metacognitively aware than novice managers indicates that metacognition should be given attention.

Managers can learn metacognition in many different ways. Previous research on metacognition has provided insights into how to successfully teach individuals to be metacognitively aware. Two ways to approach teaching someone metacognition are (a) to demonstrate how to be metacognitively aware and (b) to teach metacognitive strategies. Teaching metacognitive awareness requires instruction in general processing approaches to decision making. General processing includes defining the decision, planning the solution, predicting the outcomes and monitoring the decision. Teaching metacognitive strategies applies specific decision making techniques to real-world situations (Clark, 1997, p.31).

Glaser (1985) suggests that all of the models of instructional theories relating principles of cognitive psychology to instructional design have strategies, monitoring, metacognition,

context, interactive teaching, and long-term instruction. Pressley, Synder and Cariglia-Bull (1987) investigated methods used to teach metacognitive strategies. They found the most effective method was direct explanation of the strategies, behaviorally modeling the strategies, student practice and corrective feedback. Both methods require reflective time to reflect on strategy selection and specific strategy knowledge about application.

Recommendations for Further Research

This research has provided a foundation for the investigation of metacognition on managerial decision making. Businesses have been posed with issues related to skills gaps, knowledge capital, and the decreased quality of American public education (Forbes, 2/23/1998). Further research on learning cognitive processing will help adults to fill the skill gaps quicker, help organizations to enrich knowledge capital, and potentially complement public education. Research has advanced information processing during the past decade, but mental processing must be more heavily researched to make the information useful. Expert-novice differences continue to be the vehicle that provides insight into the "black box" (mental processing).

The tacit question throughout this study has been whether metacognition correlates with managerial decision making on all levels. Are ill-defined decisions outside of hiring influenced by metacognition? Are managerial decisions more successful utilizing metacognition or computer-aided decision support systems? Further research designed to answer these questions is warranted.

Adult education research needs to be informed about both the intellectual tasks and the ways in which intelligence is processed. Because of the complexity of intellectual processes, the task must be carried out on many different levels. At one level the structure of real-world decisions should be studied. The laboratory cannot offer the dynamic realism of a real-world environment. This environment can be accomplished by collaborative efforts between universities and industry, which would offer a controlled experiment in a real-world setting. The study should include performance on all levels from novice to expert. The methodology should be developed and refined from psychological research or created and tested in a particular, real-world situation. These new methods may outline a specific cognitive structure, which has not been identified before. With particular cognitive specifications instructional design can be enhanced for learning.

Conclusion

All managers faced with hiring decisions can benefit from the development of strong metacognitive skills, incorporated in instructional design. Adult educators need to investigate their instructional methods and their effectiveness. Considerable support for the superiority of cognitively influenced instructional design has already been established. To explore these methods in the management classroom is important. Widespread cynicism persists about the effectiveness of instructor led lecturing or repetitive drill (different from carefully designed practice), yet these practices are still used in businesses today.

Thoughtful and responsible research on adult education in the business environment should be a welcomed addition to business strategy. This new approach could replace the faddish, unsystematic and unassessed methods currently used in the business environment. One of the more exciting and eventful areas of business will be innovation in research and education. This investigation of managerial metacognition shows promise as a powerful tool for further study of managerial decision making.

Expert decision making ability cannot be developed easily or by direct instruction alone. The characteristics that identify true expert performance require intense practice with appropriate decision making experiences. The integration of metacognitive research with instructional design and practice will enhance our decision making performance.

Decision making should be utilized as a competitive tool in businesses today. A balance of analytical, intellectual and cognitive factors is needed. The cognitive factors should include metacognition. The velocity of change and innovation has made knowledge temporal and logic only one aspect of a dynamic decision. The successful decision maker will use cognitive processes to regulate and manage the available evidence when making a decision.

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APPENDIX A

LETTER TO HIRING MANAGERS

October 25, 1997

Dear Hiring Manager:

I am a doctoral student and have an interest in understanding decision making in the business environment. I believe that hiring professionals have a unique and dynamic role in business today; therefore, I have selected hiring professionals as my investigative domain. In the interest of improving your ability to make better decisions, I need you to participate in my dissertation study. Having already established that you are a hiring professional, I need approximately fifteen minutes of your time to start my investigation into this important topic.

The purpose of this study is to assess the strategies used when hiring decisions are made. The questions on the inventory should be answered according to your hiring decision making behavior. The results of this research will provide important information for hiring professionals about how they can develop their decision making skills. Please follow the instructions carefully and answer all of the questions and statements as candid as possible.

____ First, complete the demographic form.

_____Second, read through the five requisitions and rank order the candidates for each position. The rankings can be recorded on the bottom of the requisition form next to each name. The ranks should be recorded form one to five; one indicating the least appropriate candidate and five indicating the most appropriate. The requisitions and candidates are color coded for ease of handling. Only the requisition forms need to be returned.

_____Third, complete the Hiring Behavior Inventory. The purpose of this instrument is to assess your awareness of strategies used when making hiring decisions. After you have read each question, circle the rating that best corresponds to how TRUE or FALSE that statement is about you when making hiring decisions.

Please be as open as possible and be assured that the data obtained in this study is confidential and under no circumstance will it be shared with anyone except the researcher.

Please return the demographic data sheet and the inventory via mail. If you have any questions, feel free to contact me. Thank you in advance for your assistance.

APPENDIX B

DEMGRAPHIC COVER SHEET

Demographic Data Sheet

Name_____ **Age**_____

Title_____

Years of Management Experience_____

Years of Hiring Experience_____

Education: High School _____
Some College
(number of years) _____
Associates _____
Bachelors _____
Masters _____
Doctoral _____
Post Doctoral _____

How many hiring decisions have you participated in during 1997? _____
How many of those decisions resulted in a hire?_____
How many of the individuals hired in 1997 also terminated?_____
How many of those hiring decisions do you believe were good?_____
How many do you believe were less appropriate? Explain. _____
_____

How do you rate your confidence in making hiring decisions? (circle one)

Never Confident	Hardly Ever Confident		Usually Confident	Always Confident
1	2	3	4	5

*****All data submitted on this sheet will be kept confidential**

APPENDIX C

HIRING SCENARIOS

Scenario # 1

PERSONNEL REQUISITION FORM Date: _____ Req. #: _____ Cost Center:

Department Name:	Location:	Date Required:
Position Title: **Senior Oracle DBA**	Salary Range: **65 - 80 k**	Fringe Amount:
Job Family:	SCA Wage Determined:*	Clearance Level Required:
Project Name:	Yes:_____ No:___X_____	
Interviewing Supervisor/Alternate:	WD Rate:	

____X____Addition _____X____Full-Time _____Part-Time _____Regular _____Hrs./Week

_____Replacement _____On Call _____Temporary _____Work Schedule

Duties: Describe duties and responsibilities of position. Attach position description if desired.

Models, designs, builds and maintains complex database for information management systems. Knowledge in tuning of database backup/recovery, adding and maintaining database users, and enforcing database security standards. Possess management skill which coordinate and manage support efforts from test and evaluation specialist, cost analysts, and computer software experts. Understands present database management system considerations and recommendations.

Qualifications: Describe education and experience (# years and type) required to perform the job.

M.S. in Computer Science and Six years of working experience in database management systems.

Skills and Abilities: List specific skills and abilities needed to perform the duties and responsibilities of the job. Indicate if the requirement is essential or nonessential. *

	Essential	Non-Essential
Oracle 7.x, NT servers, CASE tools, Oracle tools	XX	
Excellent interpersonal and writing skills	XX	
Powerbuilder, S-Designor		XX

*See reverse for definition

Rank Order the Most Appropriate Candidate from 1 - 5. (5 being the most appropriate)

Julie Jewels _____

Chris Doe _____

Jane Beau _____

Donald Dan _____

Jamie West _____

JULIE JEWELS
ORACLE DBA

SKILLS: UNIX, MVS, ORACLE, BASISplus, Model 204, Perl, C, PUT, JAVA, SGML, HTML, World Wide Web Server Development and CGI scripting, CASE (System Architect) including SSA, OOA, OOD, RAD, JAD

EXPERIENCE HIGHLIGHTS:

National Library of Medicine, 1991-present

Currently manage a staff of 3 in the rehosting of our legacy Medical Subject Headings (MeSH) thesaurus development software from the mainframe to a client-server environment using Oracle 7.3 with the Context Option under UNIX (Solaris 2.5) as the backend server and Delphi as the GUI front-end. Am responsible for the schedule and budget as well as being lead developer and performing ORACLE data base administration. As the Oracle DBA, installed and manage the Oracle environment including the sewer, utilities and SQL.NET. As the lead developer, designed the system and am developing its cntical functions. All of our server-based software is being developed as reusable triggers and PUSQL packages. Previously modeled the requirements of the system using OOA (CoaWourdon), ER and DFD diagrams for the requirements definition. Wrote a Perl-based browser to display MARC-formatted records in a legible format. Was technical lead of the NLM-wide effort to benchmark and prototype NLM's citation management functions in target DBMS's in an alternatives analysis of UNIX-based, computer-off-the shelf (COTS) automation approaches to meet our text, image and multimedia needs in the future. Wrote Perl scnpts to manipulate the multi-million record database to produce the appropriate test data for each test case to be benchmarked. Designed and implemented an SGML-tagged, full-text prototype database in BASISplus, demonstrating full and sectioned-text searching. Added email capability to DOCLINE, NLM's online, interlibrary loan product, which seMces 200 libraries concurrently. DOCLINE is an event-driven PU1 based software system running under MVS. Am a certified Oracle Developer and DBA (by Learning Tree) and am trained in C, HTML, JAVA and worldwide Web development.

SAIC, Inc., 1991.

Managed a staff of five in the design, development, and implementation of the software system supporting the Medicaid Drug Rebate Initiative (MDRI) of the Health Care Finance Administration (HCFA). The initiative, passed by Congress in November of 1990, had to be operational in May of 1991. Because of the tight deadlines imposed by Congress, the software was developed utilizing such CASE techniques as RADIJAD and rapid prototyping techniques as well as the Model 204 DBMS. Hired in January of 1991,1 was solely responsible for ensuring the success of the project for my company and brought it on time, under budget while meeting all of the project objectives.

Independent Consultant, 1985 - 1991. Managed my own business. Representative activities included:

Designing and implementing a SQL parser for NLM to allow librarians to easily retrieve information from NLM's Model 204based cataloging database. The parser parses the SQL query, translates it to a Model 204 query and runs that query. Chief designer in the rehosting of the Federal Procurement Data System (FPDS) from COBOUISAM to a DBMS environment. FPDS comprised 4 million historical contracts with an estimated 800k contracts to be added each year. Converted NLM's MeSH (Medical Subject Headings) Model 204 file to the USMARC format to enable the distribution of NLM records in the mandated format for distribution to other libraries. This required building records with internal indices mapping to varying length, varying format records. Designed and developed a PU1 program to load million record files into the Department of Health and Human Services MEDSTAT database. Because of the volume of processing, this required maximum use d such F 1 efficiency techniques as locate mode processing and pointer variables.

Boeing Computer Services, 1983-1985.

Managed the rehosting of the FM's Frequency Management System, which services 30 concurrent users on a 7/24 basis from another DBMS to MVS/Model 204. Because the system both selects optimum radio frequencies for air/ground and navigational communications and manages the subsequent application process for these frequencies, the conversion effort was a combination of FORTRAN model conversion and Model 204 application development. BCS liaison/support to BellSouth whose application modeled the optimum signal coverage and strength for antennas to service cellular telephones. Performed a cost/benefits analysis of Cray support of the models. Managed the systems administration group for a 25 million-dollar development contract for the General Accounting Office (GAO). The group provided systems administration, data base administration, and consulting support for Model 204 on the mainframe and UNIX on micros including such representative activities as developing tools for the application programmers, developing the project's data dictionary, designing the physical files, managing the Model 204 and UNIX environments and sizing hardware for the production system. Previously managed the conceptual design of a major subsystem of the same 25-million dollars contract. The subsystem, which supported GAO's audits, comprised approximately 50 screens and over 200 reports. In addition, l developed the standards for and physically configured the software development baseline.

Wilson Hill Inc., 1978 - 1983.

Developed and managed a division which specialized in ADP systems planning, management and evaluation. Work included areas such as requirements analysis and specification, preparation of acquisition strategies and plans, economic analyses, computer performance measurement and evaluation, and software/hardware evaluations. Previously, l was the project manager for an intra-agency-wide WT project responsible for defining processing requirements and developing representative benchmarks for the WT modal administrations. Planned the design and development of a System 1022 based Railroad Employee Information System for the FRA. Developed and taught training classes for users of Model 204. Advised the USCG on the effective use of System 2000 in a VM/370 environment.

Balcom and Rust, 1978.

Performed IV&V in a computer assisted litigation project which utilized the INQUIRE DBMS in a major Federal Trade Commission case. Activities included directing the implementation of a computer to computer link directing changes to INQUIRE's telecommunications code, and training and advising the client on the efficient use of the INQUIRE DBMS.

Computer Corporation of America.1978.

Designed and developed the first release of CCA's data dictionary and installed new releases of Model 204. Gave sales presentations and held formal classroom training for clients ranging from users to data base administrators.

Data Services Division, Informatics, 1975 - 1978.

Provided pre- and post-sales support to Informatics customers. Major projects included: converting DOT's Urban Transportation Planning System from OSNS to VM/370-this required major modification of its OS dependent assembly language UO routines to accept native VM access methods; designing and writing the prototype (in assembly language) of informatics' email system; and designing and writing tools in PL/1.

COMTEN, 1975-1976.

Wrote and installed the message enqueueing software (assembly language) to manage message traffic between the field and headquarters for the US Postal Service.

Grumman Data Systems, 1974 -1975.
Lead programmer analyst on Grumman's DASH DBMS commercial product (written in FORTRAN and assembly language) development team. Designed, implemented and installed new releases of DASH including installing text processing functions.

International Reservations Corp., 1973 -1974.
Developed and implemented software (PUT and assembly language) to analyze network utilization and provide billing statistics for an online, interactive reservation system.

EDUCATION

B.A. History, Tulane University

CHRIS DOE
ORACLE DBA

COMPUTER HARDWARE
IBM PC & compatibles 386 thru Pentium Pro, NCR & AT&T Servers

LANGUAGES
SQL;C/C++(MicroSoft, Borland & UNIX), COBOL, Ada, Basic, Assembler

OPERATING SYSTEMS
UNIX; WindowsNT 3.51; Windows95; DOS; Windows 3.11

DATABASES
Oracle v7; Oracle Forms 4.5; Oracle Designer/2000; Oracle Developer/2000 Informix, abase

EXPERIENCE
1994-Present United Communications Systems

Oracle DBA/UNIX Administrator/Senior Systems Analyst
Installed Oracle Server for UNIX and WindowsNT Server 3.51, configured and performed I/O and memory tuning to optimize database performance and space utilization. Wrote SQL scripts to automate creation of databases, users and administrative tasks, including roles, privileges and backup/recovery strategies. Part of development team tasked to perform requirements analysis for reengineering legacy applications utilizing Oracle's Designer/2000 tools, including relational database design, primary and foreign keys, check constraints, database triggers and PL/SQL packages, procedures and functions. Responsible for installing and administering the Oracle Designer/2000 repository. Developed Oracle forms for application prototype. Served as UNIX System Administrator. Tasked with product evaluation for all new software, database and tool products.

1993-1994 General Analytics Corporation
Senior Applications Analyst
Technical Programmer/Analyst designing and programming for the Department of Labor and OSHA utilizing C and CISAM, MSDOS, and UNIX, Vermont Views, Informix database.

1989-1992 Stauffer Media Systems, Joplin, Missouri
Director of Programming Services
Designed, programmed, and tested accounts receivable and circulation software for multiple newspaper customer base. Responsible for customer helpdesk (for 80 sites).

1986-1989 TELOS Federal Systems, Lawton, Oklahoma
Systems Engineer
Responsibilities included specification analysis, programming, and documentation as well as providing training to programmers in assembly language and debugging tools.

1980-1985 Cardinal Scales, Webb City, Missouri
Software Engineer
Coordinated with engineers in creating computerized weighing systems, including both general purpose scales and custom designed systems, from design specifications thru customer training.

EDUCATION & TRAINING

Oracle Training Center
Oracle Database Administration/Tuning and Oracle Forms

Cameron University, Lawton, Oklahoma
Major: Computer Science

Florida International University, Miami, Florida
Major: Computer Science

Murray State College, Tishomingo, Oklahoma
Major: Engineering

JANE BEAU
ORACLE DBA

OBJECTIVE:
Work as an Oracle database administrator. Can also provide DB2 DBA support and/or database systems programming support if needed.

EXPERIENCE OVERVIEW:
Seventeen years in data processing, through successive assignments have managed, designed and built systems in various databases. Participated in an Oracle database design for SPAWARS and recently provided backup ORACLE 7 DBA and systems programming support for Oracle on IBM MVS/ESA. Have 7 1/2 years of DBA and database systems programmer experience supporting production and development environments.

Have worked steadily with IBM MVS with continued use of the IBM PC. This includes seven years designing and building database applications. My understanding of the IBM MVS environment is excellent and thorough. This includes ISPF, IBM utilities and MVS/ESA JCL. Started in 1979 as an archive technician preparing and maintaining IBM 370 COBOL programs.

Have recently attended Oracle Database Administration I & II, EC096, and PL/SQL training. Am currently ICCP Certified as Certified Computing Professional (CCP).

PROFESSIONAL EXPERIENCE:

DB2 Database Administrator — ATS, Inc (consultant)
Aug 1996 to present — Washington, DC

Working currently at U.S. Housing and Urban Development (HUD) providing DB2 DBA support for both production and development using DB2 ver 2.3 and IEF. Use SQL, BMC, and DB2 utilities to provide migration, problem solving, and security support.

Database Systems Programmer — DynCorp/CBIS (consultant)
Apr 1993 to Aug 1996 — Washington, DC

Worked at U.S. Dept of Transportation doing planning, trouble shooting, installs, and other DBA tasks using MVS/ESA. Work primarily supporting large Federal Highways database applications' to include support in modifying database definitions and expanding database files. Interface with DASD and tape management for backups. Work with other database staff to support several different DBMS's with Oracle being the most active for developing new applications, also provide extensive support for other databases to include IDMS. Use SQL, SAS, and FDR when automating database utilities.

Data Base Administrator — Dept of Labor (consultant)
Dec 1988 to Apr 1993 — Washington, DC

Worked at the U.S. Dept of Labor as a senior IDMS DBA technician doing application and systems DBA work building systems, databases, backing up, restoring, trouble shooting IDMS database problems. Automated many database functions using FDR, JCL, & utilities.

SR Database Analyst — ISA, Inc.
Sept 1987 to Dec 1988 — Merrifield, VA

Worked as a senior database analyst, interfaced with the client, guided and taught IDMS to the project team members, and designed the overall project architecture. For the last six months at ISA served as a PC expert and a relational database (Oracle) designer and planner doing system configuration design and writing FD, RD, cost analysis & other documents.

SR Database Programmer/Analyst — IMS, Inc.
Jul 1986 to Sept 1987 — Rockville, MD

Worked as a sr. database programmer/analyst writing methodologies, designing application systems, prototyping them, and coding them in IDMS using ADSO. This included building and designing within large-scale information architecture as IDMS database/ applications.

Computer Programmer — U.S. OCC
Mar 1984 to Apr 1986 — Washington, DC

Worked as a computer programmer using IDMS database. Also used SAS.

EDUCATION: B.A. History (Dickinson College 1970) and 40+ ADP courses since 1978,

DONALD DAN
ORACLE DBA

Education: B.S. In Computer Information Systems
American University, Washington, DC

Data Processing Aids, LTD., Colombo, Sri Lanka August 1990
Diploma in Computer Programming, specialized in programming in PASCAL

Related
Project: - Program Analyst in designing a system registration system for American University
using MS ACCESS.

- Designed a Library Boot checkout system for. American University using ORACLE 7.

Computer
Skill:
Systems: Local Area Network (LAN); UNIX; NOVELL; Internet; HTML; TCP/IP, IPX
Languages: Turbo Pascal. C, Assembly Language, Dbase III+, Paradox, Oracle 7.
Applications: Paradox, dBase, WordPerfect 6.1, MS Word, MS Access, MS Mail, MS Excel, MS Work, PowerPoint, Quattro Pro, Windows 3.11, Windows 95, PC Tools, Westlaw, Lexis, Harvard Graphics, Winfax, ProComm.
Hardware: IBM-PC/XT/AT/PS/2, HP Laser Printers, Hayes Modems and Compatibles.

Relevant
Experience: Systems Administrator July 1992 - Present
D. C. La" Students in Court Program, Washington DC

- Administer and maintain a LAN Novell 4.1 system consisting of 30 terminals and two servers.
- Provide training for staff and law interns on software, hardware and systems operations.
- Access software and hardware, perform maintenance, and recommend upgrades and new additions.
- Supervise firm wide Novell network backups including daily incremental's and hill archives.
- Installed and configured 486 systems using Windows 3.1 I for a windows platform. Utility systems such as; virus scanners and WordPerfect.

Database Management:
- Use Paradox and Dbase III+ to setup database tables, forms. and customized reports for the

Maintenance of Dbase and Paradox which consists of 2,000 clients and 1,000 active cases.

- Perform legal research using LEXIS/>IEXIS to track cases and Westlaw to update data for
  Fundraising.

Communications:

- Perform backup responsibilities as a communication support specialist for the firms attorneys, and
  Other legal staff using Novell's Onlan, Lexis System using a dedicated ISDN line.
- Assist legal staff with on-line research. database and perform file transfer via modem.

UNIX Systems Administrator April 1991 - May 1992
The Computer Science Lab, American University, Washington DC

- Principle member of the operating system that supported and administered the university UNIX system, which consist of 100-200 terminals with more than about 20 software programs.
- Distributed accounts to students and the staff.
- Assisted approximately 2000 students and staff members in software training and in operating tutorial programs.

Data Base and Processing Assistant June 1990- January 1991
The Bender Library, American University, Washington, DC

- Assisted in data processing, entry, cataloging, filing and updating library records.
- Performed complex library tasks of a professional nature, requiring specialized knowledge of a subject area, standard library resources and procedures.
- Handled user complaints working independently within broad limitations of library policies.

JAMIE WEST
ORACLE DBA

SUMMARY:
Having over 12 years working experiences with strong independent working ability. Good at OOP design and programming. Knowing main programming language and operating system. Finished numerous projects. With computer skills, engineering background and EDI knowledge.

EXPERIENCE:
Senior Programmer Analyst, Century Technologies, Inc. (CENTECH)
Using C, UNIX tool successfully extracted the EDI data and selected the information, which needed by statistic analysts and put them into Oracle database. As the DBA role, Maintained the Oracle 7 database on HP 9000 server. Installed the Web Server on HP. Developed the CCR on line (World Wide Web) registration forms with HTML and CGI. The PC version of registration forms was developed by Visual C++. (April 1996 - Present)

Computer Scientist, Computer Sciences Corporation (CSC)
Simulated the war game environment with high fidelity physical model. Successfully applied the COMBIC smoke model, which produced various smokes, and demonstrated at 94'SuperComputing. In the model, distributed computing technique was used. Smoke Server was developed to pass command through the network. Fractal concept was used in developing terrain model, which dynamically supplies the terrain information to users. Global Positioning system (GPS) model was developed based on the object orientated program which is capability of combining new models and maintaining old ones. The program language was C++. 2D graphics were developed using MOTIF (June 1994 - April 1996).

Research Assistant. Glenn L. Martin Wind Tunnel University of Maryland at College Park
Studied flight dynamics of airplane; analyzed stability and controllability of extra light airplane; calculated performance of propeller; optimized free wing aircraft landing path for the vehicle of thrust/weight less than one (January 92 - June 1994).

Project Administrator China State Science & technology Commission, Beijing, China
Responsible for administrative supervision of science technology projects involving European Community and China; involved in projects for FIJ CHUN Reservoir Control Optimum, Beijing Science and Technology Commission Office Automation, and Beijing Traffic Automation. (January 1986 -- August 1990).

Engineer. Ministry of Aviation and Aerospace Industry, Beijing, China Involved in science & technology projects at Third Research Institute of Ministry; analyzed the stability scope of airplane with different configuration; Using FORTRAN to simulate the stability of airplane.

EDUCATION: MS. Aerospace Engineering University of Maryland, Dec. 1994 BS. Aircraft Design and Applied Mechanics, Beijing University of Aeronautics and Astronauts January 1982

TRAINING: Oracle 7 for Database Administrators (5 days training in learning tree international)

SKILLS: Programming under UNIX and PC environment; excellent experience in C, C++, UNIX SHELL Script, Pearl; Good at X Windows/Motif, Open GL, Visual C++, Visual Basic; qualified in FORTRAN, CM FORTRAN, MATLAB, PVM, MPI, and RPC, HTML; one year of experience with Web site maintain, Web page developing.

Scenario # 2

PERSONNEL REQUISITION FORM Date: _____ Req. #: _____ Cost Center:

Department Name:	Location:	Date Required:
Position Title: **Technical Writer**	Salary Range: **25 - 40 k**	Fringe Amount:
Job Family: Analyst V	SCA Wage Determined:*	Clearance Level Required:
Project Name:	Yes:_____ No:___X_____	
Interviewing Supervisor/Alternate:	WD Rate:	

____X____Addition _____X____Full-Time _____Part-Time _____Regular _____Hrs./Week

_____Replacement _____On Call _____Temporary _____Work Schedule

Duties: Describe duties and responsibilities of position. Attach position description if desired.

Writes and /or rewrites reports, articles, software documentation for information management systems. Follows DoD standards, and new releases of technical materials. Applies word processing and graphics to technical and scientific material. Maintains efficiency when quality and quantity are required

Qualifications: Describe education and experience (# years and type) required to perform the job.

B.S. in English/ Journalism and two years experience in information technology.

Skills and Abilities: List specific skills and abilities needed to perform the duties and responsibilities of the job. Indicate if the requirement is essential or nonessential. *

	Essential	Non-Essential
Knowledge of DoD Standards	XX	
Excellent interpersonal and writing skills	XX	

*See reverse for definition

Rank Order the Most Appropriate Candidate from 1 - 5. (1 being the most appropriate)

Hans Kiera _____

Fran Dairy _____

Donna Dee _____

Wesley Kay _____

Joe James _____

HANS KIERA
TECHNICAL WRITER

A CHALLENGING AND REWARDING POSITION WHERE EXPERIENCE AND TRAINING WILL E3E UTILI ED IN AN ORGANIZATION THAT PROMOTES PROFESSIONAL DEVELOPMENT AND PERSONAL GROWTH.

UNIVERSITY CF THE DISTRICT OF CCLUMBIA
MAJOR: MASS MEDIA AND ARTS
BACHELOR OF ART – MAY 1996

INTEGRATED MANAGEMENT SERVICES INC., ARUNGTON, VA
JUNE I 996 - PRESENT
RESPONSIBLE FOR THE DEVELOPMENT. WRITING AND DISTRIBUTNG OF NEWS RELEASES AND ARTICLES. COORDINATE INTERVIEWS WITH VARIOUS SOURCES. COMPILE NECESSAR1 DATA FOR RELEASE THROUGH CONDUCTING SURVEYS. REVIEW ANO ANALYZE FACTS RELATIVE TO INFORMATION OBTAINED FOR NEWS RELEASES. INTERPRET INFORMATTION CONCERNING COMPANYWIDE ACTIVITIES FOR THE PUBLIC USE. COORDINATE MANY MARKETING PROJECTS W H EMPHASIS IN THE ADVERTISING MARKET OF RADIO BROADCAST.

U.S. SECRET SERVICE. WASHINGTON. D.C.
ADMINISTRATIVE ASSISTANT
SEPTMBER I 99 1 - MAY 1 995
PERFORM ALL ADMINISTRATIVE FUNCTIONS OF THE OFFICE. PROVIDE TELEPHONE COVERAGE USING THE ROLM TELEPHONE SYSTEM. COORDINATE THE SCHEDULES OF MANAGEMENT STAFF AND SPECIAL AGENTS. PROCESSED APPLICATIONS FOR PASSPORTS, TRAVEL REGUESTS AND REIMBURSEMENTS. RESPONSIBLE FOR ALL EXTERNAL AND INTERNAL COMMUNICATIONS BETWEEN STAFF ANO VENDORS DURING TENURE AT U.S. SECRET SERVICE DETAINED A TOP SECRET CLEARANCE. TRAVELED TO JORDAN IN SUPPORT OF VICE PRESIDENTAL VISIT.

BLACK ENTERTAINMENT TELEVISION, WASHINGTON, D.C.
PRODUCTION ASSISTANT INTERSHIP
SEPTEMEER I 989 - MAY I 990
ASSIST WITHH VIDEO PRODUCTION AND EDITING. COORDINATED AND CONDUCTED ON LOCATION INTERVIEWS. RESPONDED TO INBOUND FAN MAIL AND ASSIST WITH OTHER DUTIES AS NEEDED.

SKILLS
PAGEMAKER
DESKTOP PUBLISHING
GRAPHICS DESIGN
MICROSOFT WORD
WORDPERFECT 6.1

FRAN DAIRY
TECHNICAL WRITER

SUMMARY:
Web Developer/Technical Writer with over ten years of employment experience including documentation, HTML, UNIX administration, LAN support and network operations. Extensive knowledge in the production of user manuals, technical and subsystem documentation, in addition to providing program specifications and using Microsoft Office products.

HARDWARE:
IBM PC COMPATIBLES

OPERATING
SYSTEMS:
UNIX, DOS, OS/2, WINDOWS NT

SOFTWARE:
MS OFFICE, WORD, WORDPERFECT, LOTUS, EXCEL, HARVARD GRAPHICS, PAGEMAKER, COREL DRAW, POWERPOINT, VISIO, ABC FLOWCHARTER, PARADOX, FOXPRO, HOTDOG PRO, WEBSUITE, NETSCAPE, NOVELL, LANTASTIC, and others.

EDUCATION:
Computer Science, J. Sargeant Reynolds Community College A.A. Business Management, Kautmaennische Schulen 11

Present: COMPUTER HORIZONS CORPORATION
As a Technical Writer, responsible for writing and editing architectural design documents, business requirement documents, training manuals, and related program documentation from conception to finalization. Converted documents into HTML, created and edited web pages for the corporate Intranet. Responsible for the standardization of documentation inside the division. Utilized MSWord, CorelDraw, PowerPoint, Excel, Visio, Netscape, HotDog Pro, Web Author and WebSuite. Operating Systems: Windows NT and UNIX.

1995 -1996: PSI INTERNATIONAL
As a Technical Writer, responsible for writing and editing general requirements documents, detailed functional requirements documents, program specifications, subsystem documents, user manuals, books of reports, processing procedures, and operations manuals for the Federal Family Education Loan application. Utilized WordPerfect 5.2, Word 6.0, Excel, ABC Flowcharter, PowerPoint and Visio. Performed the migration of FFEL applications to a UNIX client/server platform for new requirements. Provided technical writing leadership for all documentation required for the migration in addition to providing system administration guides, processing procedures, and user manuals.

1994: VIRGINIA COMMUNITY COLLEGE SYSTEMS

As a Network Administrator, responsibilities included the administration of an OS/2 LAN, database management using FoxPro, hardware and software installation, PC configuration, and troubleshooting for the LAN as well as individual PCs. Acquired knowledge of transfer protocols, TCP/IP specifically Prepared lesson plans to instruct users from the various colleges on new library software. Performed individual user training on Windows applications.

1993 - 1994: KSB INC.
As a System Administrator/Executive Secretary, responsible for the administration of a UNIX LAN. Created scripts in UNIX, including backup routines and menu driven user applications. Isolated and resolved system problems. Trained users on Symix, an accounting system running under UNIX, as well as on Windows programs including MS Word, Excel, and Corel Draw. Additionally, in direct support to the company's President, created applications in Paradox reducing the time required to prepare monthly statistics from two days to four hours.

1986 - 1991: ROSEMOUNT GMBH
As an Executive Secretary, prepared correspondence and monthly statistics. Scheduled and organized meetings, prepared meeting materials and kept minutes. Managed itineraries and corporate travel planning. Screened resumes and scheduled interviews.

1981 - 1986: PORTAS GMBH
As a Network-Administrator, responsible for the operation of an IBM36 network, including scheduling batch jobs, trouble shooting the system, and data entry. Supervised data entry personnel and scheduled shifts. Reported directly to the MIS manager.

DONNA DEE
TECHNICAL WRITER

OBJECTIVE A challenging position within the graphics/drafting field that:
- utilizes my acquired skills and abilities
- encourages continuing education and growth
- promotes advancement opportunities
- provides a friendly, team-oriented environment

SKILLS MacDraw PRO, MacDraw II, MacDraft, Canvas, MS Word 5.1a, PageMaker 5.0, Norton Utilities//Macintosh, Quadra 610, Graphic Scanner & Plotter, Stat Camera

TRAlNlNG Microsoft PowerPoint 4.0, Intro. and Advanced Adobe PhotoShop 3.0, Intro. to QuarkXpress 3.3, Intro. to Adobe Illustrator 6.0, Total Quality Management Seminar, periodic testing on DoD procedures in the handling and storage of classified materials.

EXPERIENCE

ANSTEC, Inc. Fairfax, VA
1994-1996
1989-1993
Satisfy graphics requirements on technical documentation contract for the National Security Agency; produce high quality artwork for inclusion in technical manuals primarily utilizing MacDraw PRO; perform QA on graphics to ensure accuracy and text/graphics continuity; create graphics on award-winning proposals; graphics coordinator on NSA contract ('89-'92); generated presentation graphics supporting National Aeronautics and Space Administration ('92-'93); designed pilot issue of HR Focus newsletter ('92); assisted in design of NSA's Special Projects Group's yearbook ('93). Macintosh platform

1993-1994
Comprehensive Technologies International, Inc. Fairfax, VA
Created engineering drawings to support the US Army's Mobile Integrated Tactical Transport (MITT) project utilizing AutoCAD V12. The MITT group was tasked with outfitting a basic Hummer vehicle with racks to accommodate computers programmed to gather/analyze troop movement data; proofreading/checking, logging & tracking projects. PC platform

1984-1989
Systematics General Corporation Sterling, VA
Managed graphics department as graphics coordinator ('89); submitted weekly status reports to the Program Manager; prepared and submitted time/labor estimates which were the basis for departmental funding allocations; familiarized new employees with company policy; performed routine maintenance on photographic equipment; ensured adequate reserve of graphic supplies; resolved co-workers' problems; occasionally interviewed prospective employees; satisfied company's graphic needs from: it's TEMPEST engineered product line to picnic invitations to blood drive posters; designed company logo for SGC's New Jersey affiliate; knowledge of MIL

specs and standards; responsible for full-line drawing package for Army's MICROFIX project. Macintosh platform

1982-1984
E-Systems, Melpar Division Fairfax, VA
Produced drawings in accordance with MIL standards for engineering department including: printed wiring assemblies, circuit card assemblies, schematic diagrams and exploded views; assisted in redesign of card cage assembly; provided technical illustrations in ink on linen; purged departmental drawing tree in effort to reconcile all documentation.

1986-1987
Northern Virginia Graphics (p/t) Arlington, VA
Developed patent drawings based on customers' sketches for submission to U.S. Patent Office. Employed illustration, perspective, shading and drafting techniques.

1983-1985
Keyboard Communications, Inc. (p/t) McLean, VA
Created graphics for use in presentations and technical publications by IBM Corporation.

1982
Racal Airstream, Inc. (p/t) Potomac, MD
Prepared line drawings to aid engineers in the development of new breathing appartus. Assisted in design and testing of experimental air filtration system.

EDUCATION
Gestalt Systems, Inc. Herndon, VA Desktop Publishing package
Lord Fairfax Community College Middletown, VA AutoCAD 11/12, Computer Information Systems, Basic Accounting
Maryland Drafting Institute Langley Park, MD DraRing/Technical Illustration
US Army Corps of Engineers Ft. Belvoir, VA Cartographic Drafting
Prince George’s Community College Largo, MD Mathematics

ACHIEVEMENTS
Y2 Award for Excellence-presented by Dr. W. Taylor in recognition of continuous superior performance.

CLEARANCE
Level/VSECRET status/ACTIVE

JOE JAMES
TECHNICAL WRITER

QUALIFICATIONS:
An experienced, knowledgeable, award winning Technical Writer with good organizational and analytical skills. A highly creative and adaptable writer, especially adept at research and training. Effective editing and proofreading skills.

EXPERIENCE:
AUTOMETRIC, INC., Alexandria, VA
Technical Writer 1994 - Present

Managed junior staff and tasking on various project and product related documentation efforts.

Technical lead on development of the EDGE Product Family on-line (HTML) Reference Guide.

Developed EDGE Whole Earth Programmer's Interface User Manuals.

Developed the task oriented VIEW 911 ™ V1.4 User's Manual.

Developed DataMaster User's Guides

Assisted in development of WINGS Mission Rehearsal™ User's Guides.

Developed Imagery Exploitation Workstation (JEWS) User's Manuals.

Developed Digital Product Server Administrative Functions (DPS Admin) User's Manuals.

Developed the Universal Data Import Export (UDIE) User's Manual.

Developed the Joint Maritime Computer Information System (JMCIS) Imagery Segments Training Guide. Spent six days onboard the U.S.S. Eisenhower during September 1994 for on-site development with the primary users. Received commendation from NRAD for development efforts.

Proofread and edited the User's Manual for the Spatial Query Server (SQS) product.

Performed technical edits and assisted in developing format for the Warpit™ v1.0 User's Guide.

Fielded customer service calls, received via the company 800 phone line, and dispatched them to the appropriate product developers for resolution.

LORAL FAIRCHILD SYSTEMS DIVISION, INC., Syosset, NY
Senior Technical Writer 1990 - 1994

Developed operation and maintenance manual for USAF Program Loader - Verifier (PL-V) project. Received letter of commendation for document development efforts.

Developed On-the-Job Training (OJT) Instructor and Trainee Handbooks for the PL-V project.

Developed technical procedure source data for Space Station Freedom internal video system.

Wrote theory of operation for the ground exploitation station of the EO-LOROPS reconnaissance system.

Incorporated engineering changes into maintenance and operation instruction manuals for U.S. Army tactical communications jammer system.

Wrote product training plans and plan outlines for various Military projects.

Technical Writer 1989-1990

Developed general information, maintenance task and fault isolation manuals for Sikorsky Japan Blackhawk program.

Generated safety summary, abbreviations/ acronym tables and instruction manual for USAF Rockwell B-1 B Hydraulic Test Stand program.

GRUMMAN AEROSPACE CORP., Bethpage, NY
Technical Writer- Cooperative Education Program 1986 - 1988

Duties included: Developing internal design specification flowcharts, formatting critical design review documentation, researching and developing of manuals, incorporating engineering changes into maintenance manuals, and validating and up-dating operation/maintenance manuals.

Received letter of commendation for work on the C-2A aircraft re-procurement program.

COMPUTER HARDWARE/SOFTWARE:
Silicon Graphics IRIS Indigo/ Indy: UNIX, SGI Snapshot, SGI xv

Macintosh llcx/ Macintosh LCI11/ Power Mac 7500:

Microsoft Word 6.0.1	NCSA/BYU Telnet 2.5	rtftohtml 2.7.5
Graphic Converter 2.0.2	FileMaker Pro 2.0	Enhanced NCSA Mosaic
HTML Editor 1.0	Netscape 1.1,1.2	MacDraw Pro 1.5

SECURITY INFORMATION:
Possess a current SSBI (DISCO, 27 December 1994)

EDUCATION:
DOWLING COLLEGE, Oakdale, NY

M.S. Education -1995

NEW YORK INSTITUTE OF TECHNOLOGY, Old Westbury, NY B.S.
Technical Writing - Magna Cum Laude - 1989

INDEPENDENT STUDY:
AMERICANMANAGEMENTASSOCMTION:
Designing and Writing User Manuals for Software Systems, 1995

FRED PRYOR SEMINARS: Exceptional Customer Service, 1995
Managing Tasks, Achieving Goals, 1995

HONORS AND AWARDS:
Letter of Commendation: USAF, PL-V program documentation effort - 1991

Letter of Commendation: Grumman Aerospace Corp., C-2A re-procurement program - 1987

Recipient of the 1989 NYIT Technical Writing Award.

Winner: 1989 NYIT and Society for Technical Communication Technical Writing Contest.

NYIT Presidential Achievement Award.

Scenario # 3

PERSONNEL REQUISITION FORM Date: _____ Req. #: _____ Cost Center:

Department Name:	Location:	Date Required:
Position Title: **Administrative Assistant**	Salary Range: **23 - 37 k**	Fringe Amount:
Job Family:	SCA Wage Determined:*	Clearance Level Required:
Project Name:	Yes:_____ No:___X_____	
Interviewing Supervisor/Alternate:	WD Rate:	

____X____Addition _____X____Full-Time _____Part-Time _____Regular _____Hrs./Week

_____Replacement _____On Call _____Temporary _____Work Schedule

Duties: Describe duties and responsibilities of position. Attach position description if desired.

Provide executive assistance to the Chief Financial Officer. Responsibilities will include: scheduling meetings, sorting mail, and maintaining supplies. Exceptional secretarial skills and workiing knowledge of financial processes for a government based client organization.

Qualifications: Describe education and experience (# years and type) required to perform the job.

Two years executive assistant experience. Experience working in accounting or finance department preferable.

Skills and Abilities: List specific skills and abilities needed to perform the duties and responsibilities of the job. Indicate if the requirement is essential or nonessential. *

	Essential	Non-Essential
Computer skills MS Office Suite	XX	
Excellent verbal communication skills	XX	
Secretarial and accounting experience	XX	

*See reverse for definition

Rank Order the Most Appropriate Candidate from 1 - 5. (5 being the most appropriate)

Asia Augh _____

Mary Base _____

Simon Say _____

Mike Up _____

Laura Down _____

ASIA AUGH
ADMINISTRATIVE ASSISTANT

OBJECTIVE

To obtain a challenging career where I am able to utilize my skills to benefit a company and add to my personal growth.

EXPERIENCE

REBUILD, INC. STERLING VIRGINIA
Administrative Assistant, October 1995 to Present

Responsible for all general administrative office duties such as typing memos, letters and, general correspondence. Prepare creative chart and overhead presentations for the Chief Operating Officer's briefings (PowerPoint). Arrange catered business and company functions. Provide daily administrative support to the Executive Assistant and Human Resources Manager and serve as back-up in her absence. Prepared company policy and procedures manual (Policies now) and prepared all employee job descriptions (Descriptions now). Assist Public Relations and Marketing Manager with day to day activity. Assist and train other administrative personnel with office procedures and software programs. Keep track of all chargeable project hours using Excel spreadsheet and submit for billing. Create and maintain employee vacation and sick leave summary sheets and prepare for distribution each pay period.

TOLL ROAD INVESTORS PARTNERSHIP II, “DULLES GREENWAY”, STERING, VIRGINIA
General Secretary, April 1993 to October 1995

Responsible for all general administrative office duties such as typing memos and letters, copying, faxing, sorting and distributing mail, and petty cash. Prepaid creative chart and overhead presentations for the Chief Operating Officer’s briefings (Freelance Graphics). Typed and edited proposals and contracts (WordPerfect 5.2 for Windows). Assembled monthly board books. Arranged catered business and company functions. Provided daily administrative support to the Chief Operating Officer, Executive Assistant and Human Resources Manager and served as back-up in her absence. Responsible for requisitioning and ordering of all office supplies for four office locations, preparing requests for proposals, identifying and recommending, vendors for the company keeping cost implications in mind. Created and maintained a complete file system for the company’s central document control room. Inventoried and monitored all property accountability for four locations. Maintained vehicle coordination for company vehicles. Assisted the Contracts Administrator with the insurance certification process. Assisted and trained other administrative personnel with office procedures and software programs.

SELECT TEMPS, RESTON, VIRGINIA
Word Processor, September 1992 to April 1993

Scored well in typing and WordPerfect tests. Worked for various companies in which the duties included: answering telephones, word processing, data entry, typing, and general office duties.

CRESTAR BANK, CHANTILLY, VIRGINIA
Bank Teller, May 1992 to September 1992

Qualified by participating in a three-week training course in banking. Responsible for the drive-through banking and daily settlement of the Automatic Teller Machine.

ADVANCED COMPUTER SYSTEMS, FORT BELVOIR, VIRGINIA
Word Processor, December 1991 to May 1992

Processed Military Specifications (Word Perfect 5.0) which involved editing, correcting, and typing. Prepared visuals using Harvard Graphics.
Security Clearance – Secret

Data Clerk Specialist, May 1991 to December 1991

Maintained, extracted, summarized, and retrieved data from drawings and specifications. Indexed file material such as correspondence, reports, and technical documents in an established filling system containing a number of varied subject letter files. Operated the duplication and copier machines, performed weekly routine maintenance of machines and coordinated maintenance with subcontractors.
Security Clearance – Secret

SKILLS

Excellent working knowledge of WordPerfect, Freelance Graphics, Microsoft Word, PowerPoint and Excel

Strong creativity skills

Notary Public for the Commonwealth of Virginia – June 1993

EDUCATION

Chantilly High School, Chantilly, Virginia, Diploma – June 1989
Powerful Communication Skills for Women – July 1994
The Take-Charge Assistant business course, Certificate – March 1995
Solomon Software – Using Payroll – November 1995
The basics of design using DeskTop Publishing – November 1995

MARY BROWN
ADMINISTRATIVE ASSISTANT

Objective: To obtain a management development position within a progressive organization that allows the opportunity to broaden my skills for career advancement.

Experience:

6/94 - Present
Executive Assistant
Student Loan Marketing Association (Sallie Mae)

Assist Vice President of Corporate Development & Analysis in management of Investor Relations, Credit and Business Development. Provide financial information by using Lexis/Nexis to obtain annual reports and 10-Ks for new business ventures. Coordinate annual operating budget preparation process and track for variances to ensure that the department stays within approved budget. Review and process personnel forms and records, and other confidential materials. Establish and maintain Vice President's files and records, as well as department's personnel files. Coordinate the preparation of management reports and presentations on a regular basis to allow management to make informed business development decisions. Compose letters and memoranda. Arrange travel and hotel accommodations for department head. Prepare and submit all travel expense reports and charges to accounts payable for reimbursement. Review correspondence prepared by others for supervisor's signature. Delegate work as necessary to ensure the efficient coordination and timely accomplishment of support functions.

12/93 - 6/94
Legal Assistant
Student Loan Marketing Association (Sallie Mae)

Provided support to two attorneys in the Corporate Law Department by performing various administrative and legal assignments which included working as a Contract Administrator. This position required daily processing of Professional Service Agreements into a database for execution by SallieMae. Maintained legal files and completed extensive word processing documents. Arranged travel itineraries and hotel accommodations as needed. Performed legal research on D.C. codes and regulations.

5/90 - 12/93
Administrative Assistant
Massachusetts Mutual Life Insurance Co. (MassMutual)

Provided administrative and secretarial support to Second Vice President/Regional Director and staff. Responsibilities included: Word processing, accounts payable, preparing monthly/weekly leave reports and completing travel expenses. Assisted the Office Manager in the maintenance of administrative records, mortgage and equity records and office budget.

Education:

University of Maryland, College Park, MD
B.S. Bachelor of Science, Business and Management - May 1997, Minor - Paralegal Studies Curriculum will be completed Spring 1997 (full-time evening student)
A.A.S. Associate of Applied Science Paralegal Studies December 1994 Certified Paralegal 1993

Honors:
1991 - 1996 State Senatorial Scholarship of Maryland

Skills: Proficient in Word Perfect 5.2, Microsoft Word 6.0, PowerPoint, Lotus 1-2-3 for Windows, Email, it-base, Lexis/Nexis, Excel, Bloomberg

Affiliations: Active participant in planning the summer intern program for D.C. Mentors, Inc. at Sallie Mae. I am also the mentor of a ninth grade student.

SIMON SAY
ADMINISTRATIVE ASSISTANT

Knowledge of the following systems: Aim Pro, Word Perfect 5.2 and 6.0, Lotus 1-2-3, Quattro Pro 5.0, and Microsoft Office for Windows (including Excel, PowerPoint, and Word).

· Graduated: MBA at Marymount University, 1996 Emphasis on Finance and Marketing
· Graduated: AA (Business) at Burlington County College, 1993 Member of Phi Theta Kappa
· Graduated: BA (Interior Design) at Western Washington University, 1985

EXPERIENCE:

9/95 to 8/96
Legal Secretary, Washington, D.C.
Patton Boggs, L.L.P.
Floated as a legal secretary, working for various attorneys on different projects.
Gained a better understanding of civil law rules and procedures.
· Used Ami Pro software
· Used RS6000 (Timesheet) software
· Learned general processes of law office (research, filing methods)

2/95 to 9/95
Payroll Assistant, Fairfax, VA
Vance International
Worked in payroll department for uniformed services division.
· Used Ensemble software/10-key calculator
· Updated employee records
· Received phone calls regarding deductions, taxes, garnishments

8/94 to 11/94
Administrative Assistant, Vienna, VA
Temporary Solutions
Held numerous positions as an Administrative Assistant, using a variety of software packages.
· Word Perfect 5.1, 6.0
· Microsoft Word 3.0
· Used fax machine, filed documents and received phone calls

1/92 to 7/92
Administrative Assistant, ML Laurel, NJ
Singer Equipment Company, Inc.
Held front office position as Administrative Assistant/Estimator.
· Estimated bids for kitchen equipment
· Used an IBM Selectric typewriter, fax machine and phones
· Worked with blueprints the company utilized for contracts

MIKE UP
ADMINISTRATIVE ASSISTANT

Occupational Objective:
Office Manager/Executive Assistant

Summary: Over 19 years experience as Executive Asst. to Corporate V.P. Worked with Word Perfect 5.1, Windows 3.1, Microsoft Word 6.0, E-Mail software, secure Facsimile, and STU III equipment. Typing and shorthand 70 wpm. Performed the duties of the Asst. Facility Security Officer and administered the DoD Security Program for all company personnel assigned to the Washington office. Cleared Secret. Completed periodic reinvestigation February 1996.

Education:

1955 – 1959	Woodside Senior School, Glasgow, Scotland
June 1986	Essentials of Industrial Security Management
Feb. 1992	Protecting Secret and Confidential Documents
	On-The-Job Training for Word Perfect 5.1, Windows 3.1, Microsoft Word 6.0 for Windows, E-Mail, Secure Facsimile and STU III.

Professional Organizations:

1990-1996	Joint Industry and Government Security Group (JIGSAG)

Experience:

E-SYSTEMS, Incorporated
[October 1976 to April 1996]
Nineteen years experience as Executive Assistant to the Vice President of Government Operations who administered seven field offices and nine at large Technical Representatives. Finalized weekly activity report inputs from field personnel via E-Mail, tracked projects to meet deadlines, typed briefings, scheduled meetings and travel arrangements, expense reports. Organized semiannual offsite meetings for all field office reps.. Maintained all personnel files, including security files – typed annual evaluation reviews. Performed the duties of the Asst. Facility Security Officer. Processed all incoming/outgoing classified material, visit requests, security clearances and all related areas of security.

Computer Sciences Corporation
[April 1974 to October 1976]
Executive Secretary to Principal Director/Manager of Field Marketing Office.

LAURA DOWN
ADMINISTRATIVE ASSISTANT

OBJECTIVE
To obtain an entry-level position in the computer science field directed toward hardware integration.

EDUCATION
BS, University of Maryland Eastern Shore, Princess Anne, Maryland. May 1996

Major: Computer Science
Minor: Business Administration

COMPUTER EXPERIENCE
Paradox, COBOL, Machine and Assembly Language, Pascal, FORTRAN, C++, QuatroPro, Dbase, WordPerfect, Windows, MS Word, Excel, PowerPoint, and Lotus 123.

WORK EXPERIENCE

Maryland National Capitol Park & Planning Commissions, Riverdale, MD
Program Facility Manager Aide I

Provide direct support to the Department Heads by handling administrative details, inquiries and coordinating various activities within and between departments. Administrative details include handling monetary transactions and registering individuals for various programs. Responsibilities also include compiling data for statistical reports, correspondence and financial reports, as well as maintaining budget expenditure records through the use of various computer programs. (October 1995 – Present)

One Staffing Service/STI, Falls Church, VA.
Receptionist

Responsible included management of office telecommunications, incoming and outgoing correspondence, scheduling conference meetings, ordering office supplies, filling, designing documents and spreadsheets, as well as other various office management functions. (May 1996 – November 1996)

Brandon Systems/IBM, Reston, VA.
Computer Tape Clerk

Accountable for making sure that tape and disk files required for processing were available to computer operators. Responsibilities included: mounting and filling back-up tapes, loading and unloading printers, and ensuring that scheduled jobs were processed. (March 1996 – May 1996)

Univ. MD Eastern Shore (Human Ecology Department), Princess Anne, MD.
Student Technical Assistant

Data entry of questionnaires, verified information for regional projects. Assisted students with computer tasks. Handled and resolved problems that occurred with the computer hardware and software. Provided computer and clerical support for staff. (January 1994 – July 1995)

Department of Labor Mine Safety and Health Admin. Arlington, VA.
Office Automation Clerk

Assisted and provided electronic general clerical assistance in processing transactions and performing office support to the assigned office. Maintained administrative records for the unit using an existing database. Processed organizational and technical files, correspondence, memoranda and reports for staff. Followed-up on appropriate routine correspondence in accordance to procedures. (June 1993 – August 1993)

Department of Justice Immigration and Naturalization, Washington, DC.
Computer Clerk

Provided computer and clerical support for the assigned office. Maintained related records, on line data files, program applications and charts on computer systems that were pertinent to unit functions. Prepared accurate, updated documentation requested by systems operators on remote terminals, and ensured timely distribution in accordance with systems operations manuals.

REFERENCES
Available Upon Request

Scenario # 4

PERSONNEL REQUISITION FORM Date: _____ Req. #: _____ Cost Center:

Department Name:	Location:	Date Required:
Position Title: **Programmer**	Salary Range: **40 - 70 k**	Fringe Amount:
Job Family:	SCA Wage Determined:*	Clearance Level Required:
Project Name:	Yes:_____ No:___X_____	
Interviewing Supervisor/Alternate:	WD Rate:	

____X____Addition _____X____Full-Time _____Part-Time _____Regular _____Hrs./Week

_____Replacement _____On Call _____Temporary _____Work Schedule

Duties: Describe duties and responsibilities of position. Attach position description if desired.

Must be capable of using Powerbuilder and third/forth generation languages/tools to meet systems requirements and devising program logic in microcomputer distributed processing environment. Must be able to develop detailed preliminary design language code, flow charts, and instructions for programs. Must be able to prepare operating procedures and documentation which identify the principal production runs for the application and provide an outline of the work products desired. Must be familiar with database management systems and programs. Must be able to analyze systems specifications and designs outlined by a software engineer and be able to design detailed programs, flowcharts and diagrams showing mathematical computations and sequences of machine operations necessary to meet these specifications and design requirements.

Qualifications: Describe education and experience (# years and type) required to perform the job.

B.S. in computer science, a minimum of four years programming experience beyond formal programming training.

Skills and Abilities: List specific skills and abilities needed to perform the duties and responsibilities of the job. Indicate if the requirement is essential or nonessential. *

	Essential	Non-Essential
Powerbuilder, structured design	XX	
Excellent interpersonal and writing skills	XX	
Workflow, Novell, Oracle, C++, Case tools, Windows NT		XX

*See reverse for definition

Rank Order the Most Appropriate Candidate from 1 - 5. (5 being the most appropriate)

Donnie Add _____

Mony Baye _____

Evan Cane _____

Missy Goop _____

Lona Burn _____

DONNIE ADD PROGRAMMER
To obtain a position as a PowerBuilder developer that will utilize my programming skills and challenge me to grow.

POWERBUILDER SPECIFIC EXPERIENCE

ChemAware System using Oracle and Sybase SQLAnyWhere.
Material Safety Data Sheet (MSDS) Authoring System using Oracle, MS SQL Sewer and SQLAnyWhere. Mail Correspondence and Workflow System using Oracle as the back end.
Text Storage and Retrieval System integrated with the Conquest search engine.
Point of Contact System, U.S. Marshals Service contacts database for SAMS contract.
Hardware tracking system, Tracks government provided equipment for the SAMS contract.
Job Search, Tracks job ads, contacts, creates "personalized" cover letters and mailing labels.

PROFESSIONAL TRAINING
Developing PowerBuilder 5.0 Applications CBT, PowerSoft June 1996.
Developing PowerBuilder 5.0 Applications in Windows 95, Powersoft February 1996.
Introduction to PowerBuilder 5.0, Powersoft January 1996.
Performance Tuning, Powersoft, June 1995
Advanced Datawindows, Powersoft, May 1995
PowerBuilder 3.0 CBT, Compunnel Software, February, 1995
Reengineering Business: The Shift to Client/Server, Microsoft Corporation, January 1995
Creating a Well-Designed User Interface, Microsoft Corporation, November 1994
Introduction to PowerBuilder and the Client/Sewer Environment Powersoft, February, 1994

PROFESSIONAL EXPERIENCE

GRC International Inc., VIENNA, VA
Came on board after starting out as a Maxim Group Technical consultant.

Programmer/Analyst
1/96 - Present
Developed the Non Visual User Object (NVO) that is responsible for performing the multiple table updates necessary, to carry, out our multi-language support.
Made major changes to the underlying ChemAware source to make it object oriented.
Modifications and enhancements to three separate releases of the Material Safety Data Sheet (MSDS) System. The MSDS Author System supports Oracle, Microsoft SQL Sewer and Sybase SQLAnyWhere as the ODBC databases. MSDS Author runs on Windows 3.11, Window 95 and Windows NT platforms.

Intelligent Solutions, Falls Church, VA
Intelligent Solutions is a Correspondence Tracking, Workflow, and Network solutions provider specializing in client sewer applications.

Programmer
5/95 - 1/96

One of the lead team members that developed a PowerBuilder based Text Storage and Retrieval System using the Conquest Search engine. Utilized PowerBuilder's Object Oriented Non Visual User Objects to encapsulate Conquest's C API function calls.
Modifications and Enhancements to three separate Correspondence System releases.
Developed an advanced adhoc Workflow definition interface.
Created and standardized the report formats.

DynCorp Information and Engineering Technology, Fairfax, VA
DynCorp l&ET is an Information technology and management consulting firm. DynCorp l&ET was recently formed when DynCorp purchased and merged Viar & Company, Meridian, NMI and CBIS Federal.

U.S. Marshals Service - Seized Asset Management System (SAMS)
Programmer
10/90 - 5/95
Point of Contact System (PowerBuilder 3.0, Watcom).
Developed SAMS software in ACCELL (4GL) using the UNIFY RDMS.
Enhanced Data Transfer software using UNIX Shell, AWK, C and SQL.
Coded installation and data conversion scripts in UNIX Shell, SQL.

Task Leader
Responsible for monthly Data Transfer from 98 districts to 8 regions, and then up to the national database.
Trained two employees to manage monthly Data Transfer.
Provided on site technical support to client during two weeks of SAMS national training.

System Administrator
Maintained ALTOS 3068EP Mini Computers running UNIX System 5.
Made printer, modem, PC and dumb terminal cables and connectors.

Department of Justice - Environmental Protection Agency Data Transfers Senior ADP Technician
Modeled existing EPA -DOJ data transfer system using the ADW Case tool.
Developed client interviews.

Environmental Protection Agency
Quality Assurance Specialist
Tested EPA WasteLANnd CleanLAN Systems (Foxbase, Novell).
Prevented WasteLAN's LINKS Subsystem from being released with major software error.
Assisted LINKS developers from two other contracting firms in locating the code errors.

Department of Continuing and Alternative Education, Arlington, VA
The Department of Continuing and Alternative Education of George Mason University's Law School provides software instruction to private and government clients.

Assistant Software Instructor (part-time evenings and weekends)

01/90 - 8/90
Taught dBase lll+, Lotus 123, WordPerfect, MS DOS, Enable, and Harvard Graphics.
Worked with the students that required individual instruction.

McLaughlin Associates, Crystal City, VA
McLaughlin Associates was a management consulting firm.

01/89 – 01/90
Junior Programmer
Maintained and enhanced dBase lll+ Security and Barcode Inventory systems.
Provided training and user support to federal client on custom applications.
Prepared and edited technical instructional manuals.

TECHNICAL SKILLS
GUI Development: PowerBuilder 5, 4, 3 Enterprise
Operating Systems: Windows NT, Windows 95 and Windows 3.1, UNIX System 5, DOS 6.2
Hardware: IBM PCs and Compatibles, Altos 3068 EP (mini)
Languages: PowerScript, C, SQL, UNIX Shell, ACCELL, BASIC and dBASE lll+
RDMS: Oracle, Microsoft SQL Server, Watcom, UNIFY
EDUCATION
George Mason University, Fairfax, VA
Bachelor of Science: information Resource Management, August 1990

MONY BAYE
PROGRAMMER

Objective: To utilize skills in management information systems in the business field

Technical Skill Areas:

Development Tools: PowerBuilder, C/C++, Java, IDEFIX, S-Designor, ERWin/ERX, PowerTOOL, FUNCky, Esperant
RDBMS: SQL Server, Oracle, SQL Anywhere
Operating Systems: Windows 3.1, Windows 95, Windows NT, MS-DOS, Banyan, Unix, VAX/VMS
Architectures: Client – Server, N-Tier, Standalone
Methodologies: Object Oriented

1995-Present
Programmer/Analyst, EAI
Client: DHHS, Administration on Aging

Developed a resource projection model application PACES (Personnel Analysis and Cost Estimate System) using PowerBuilder and SQL Server. Techniques used include stored procedures for simulation engine, triggers for data integrity maintenance, graphic displays for simulation output information, windows with single and multiple datawindows and a broad range of built in visual and class user objects and features of PowerBuilder.

Developed Letter factory Application using dynamic datawindows and MS-Word to produce reports from three databases.

Using object Oriented methodologies to encapsulate business logic separately from user interface to develop Formula Grants System and Certification and Edit applications.

Created stored procedures to get and rotate data from data warehouse. Created views in SQL Server and dataviews in Esperant to teach other people to build complicated reports (some of them about 140 columns in one reports).

Maintained GMS and CATS applications.

All of the systems are PC-based, Client-Server applications running in Windows NT on a Banyan LAN.

1995 – 1995
Programmer, CTI

Developed an Accounting System using PowerBuilder. Developed a Payroll System using dBase 4.

1987 – 1991
Assistant Professor
International Trade Department Jilin Industrial University, Jilin, P. R. China

Planned, developed, and executed instruction of undergraduates graduates chief engineers, and government officers in Accounting, Finance, Technology Transaction, and Export/Import Practices.

Authored textbook on International Finance.

1983 – 1985
Lecturer, Chemistry Department, Jilin Industrial University

Taught undergraduates level chemistry courses; directed students in chemical experiments.

Education and Certifications:

1996
Certificate of Completion, Mastering Datawindows and PowerBuilder; Performance Tuning and Techniques

1994
Master of Science, Management Information Systems Bowie State University, Bowie, Maryland

1987
Graduate Certificate in Industrial Foreign Trade Shanghai Jiaotong University, Shanghai. P. R. China
Certificate of Achievement in International Trade US Education Service Exchange with China

1983
Bachelor of Science, Chemistry
Shanghai Tongji University, Shanghai. P. R. China

EVAN CANE
PROGRAMMER

GOAL STATENIENT
Computer science professional with 10 year's experience in application development, database management, and project management. Seeking technical team leader/senior position on dynamic, cutting edge team developing Internet/distributed database applications.

PROFESSIONAL EXPERIENCE

General Research Corporation International, August 1995 - present
Technical Team Leader
Responsible for requirements analysis, specification documentation, and project tasks of eight developers on development of version 4 of MSDS and Chemical Inventory modules of Flow Gemini, a suite of environmental software applications for pharmaceutical and oil/chemical refining businesses. Coding was performed in Powerbuilder 5 - 30 Mbytes code size. Also, developed/managed the datamodel using ERwin- 159 tables for these two modules, 300+ tables overall. Targeted DBMSs: Oracle 7.x, Microsoft SQL Server 6.5, Watcom SQL Anywhere. Targeted client: Windows NT 3.51, Window 3.11.

American Technical Resources, McLean, VA November 1994- August 1995
Consultant Client Server Applications at General Research Corporation

Senior member of development team creating Flow Gemini 3.05. Tasks included analysis of specifications, and coding in Powerbuilder 3 and 4. Developed interface to Microsoft Word using DLLs and Word Basic.

User Technology Associates, Ballston, VA, February 1993-November 1994
Senior Applications Programmer/Analyst
Various software development projects at the United States Department of Labor: Designed and coded components for AWAS a mail enabled, automated workflow system. DBMS: Watcom and SQL Server.
Client: Windows 3.11. Tools: Powerbuilder, Visual Basic, MFC/Windows SDK, Delrina FormsFlow.

Developed Lotus Notes databases: Regulation Tracking System and School To Work System. Server: OS/2. Client: Windows 3.11. Tools: Lotus Notes 3, some prototyping in LotusScript I.0, Lotus Forms I .0, Visual Basic/ Lotus Notes interface VBX.

NISH, Vienna, VA, March 1989-February 1993
Senior Systems Analyst/Programmer
Developed database applications in the entire life cycle in Clipper and Foxpro. Administrated 50 user Novell 3. ll network. Provided technical support to local staff and six regional offices.

Designed and implemented Clipper application(s) for project management in the national and six regional offices. System updates were automatically performed by modem.

Provided technical support for electronic data interchange (EDI) with GSA. Designed and implemented EDI document reader, which interfaced with NISH accounting system.

Alexandria Hospital, Alexandria, VA, December 1987 - March 1989 Database Consultant Application Developer
Developed applications for the hospital's Wellness Center, Workplace Health Systems, First Call, and public relations departments in dBase, Foxbase and Clipper. Wrote user manuals, trained users.

Softgraf USA, Alexandria, VA, August 1986 - December 1987
Systems Engineer
Configured systems and provided technical support. Trained customers on popular PC software such as WordStar and Lotus 1-2-3. Assisted in maintaining the Softgraf USA bulletin board system (BBS).

SOFTWARE
4GLs: Powerbuilder 5, Visual Basic 3, Clipper, Foxpro, Lotus Script, Delrina Formflow, Word Basic, Excel Basic
3GLs: C++, MFC, C, Pascal, FORTRAN, Ada, Prolog, Java, X-Windows/Motif

HARDWARE Intel, HP, Sun

EDUCATION

Master of Computer Science, George Mason, December 1995.
Honors graduate: 3.8/4.0. Key areas of interest included software engineering and distributed databases.

Bachelor of Science, Electrical Engineering, Virginia Tech, May 1986.
Emphasis on computer hardware design and computer engineering.

TRAINING

Powerbuilder User's Conference, August 1996.
Best Practices of Client/Server Seminar, June 1996
Java, Northern Virginia Community College, April 1996.
Powerbuilder Datawindows Course, Financial Dynamics, March 1994.
Borland, C++ with Application Frameworks Seminar, September 1992.
Northern Virginia Community College, Oracle and SQL Course, July 1992
Riverbend Group, Novell Advanced Netware 3.11 Course, March 1992
Treasurer, Washington Area Clipper User's Group, 1991-1992
General Electric's Electronic Data Interchange User's Group Meeting, February 1990.

MISSY GOOP
PROGRAMMER

TECHNICAL SKILLS
Operating Systems: Windows 3.x, Windows NT, Windows 95, MS-DOS
Databases: SQL Server, Oracle, Sybase SQL Anywhere
Development Software: PowerBuilder 4.0/5.0, Paradox, Natural, COBOL

PROFESSIONAL EXPERIENCE

Programmer/Analyst (April 1996 – present)
Commercial Information Solutions division, GRC International, Vienna, VA

Key member of development team for large-scale PowerBuilder applications. Perform various functions against multiple back-end databases.

Convert existing PowerBuilder application into Object Oriented framework
Maintain and enhance commercial environmental applications
Develop PowerBuilder application to track distribution of Material Safety Data Sheets
Assist in designing functional requirements for future software

Technical Support Representative (January 1996 – April 1996)
Commercial Information Solutions division, GRC International, Vienna, VA

Provide Quality Assurance for commercial environmental software. Provide multiple levels of support to internal and external clients.

Create software installation programs using InstallShield
Trained in building and supporting LANs

Systems Analyst/Programmer Inter (May 1995 – December 1995)
MIS Department, Perdue Farms Inc., Salisbury, MD

Developed, correct and enhance Natural programs and provide continual support to customers.
Implement large-scale downloading process to provide field accountants with needed financial information

Student Lab Monitor, Consultant, Manager (December 1993 – December 1995)
Department of Computer Services, Salisbury State University, Salisbury MD

Perform general Help Desk support functions. Solve and Document Hardware, Software and Network problems. Assist department managers and other student managers with administrative decisions.

Create Paradox application to manage scheduling and substitutions for employee shifts
Conduct various training classes for faculty, staff and students

EDUCATION

Bachelor of Science, December 1995.
Salisbury State University, Perdue school of Business, Salisbury, MD
Major: Information Systems Management with additional course work in Finance
Major GPA: 4.0/4.0
Overall GPA: 3.8/4.0

HONOR AND AWARDS

Graduated Magna Cum Laude
Deans List
Member Beta Gamma Sigma
Awarded Outstanding Academic Achievement Award by DPMA

LONA BURN
PROGRAMMER

OBJECTIVE
To perform analysis, design and develop client/server software systems to user's specifications.

CURRENT TECHNICAL SKILLS
GUI Development: PowerBuilder Enterprise 5.0, Visual Basic 3.0, Oracle Designer 2000
RDBMS: Oracle 7.1, Sybase SQL Anywhere, Microsoft SQL Server, Watcom, Access
Languages: PowerBuilder, Oracle PL/SQL, SQL, C, C++, Unix Scripting
Software: Erwin, Word 7.0, WordPerfect 6.1, SQL*Plus, HiJack, FTP
Operating Systems: Windows NT, Windows 95, Unix
Hardware: IBM PCs and Compatibles, RS6000s, and Power PCs
Other Languages: Unidata/Pick, Natural, Pascal, dBASE

PROFESSIONAL EXPERTISE
Certified PowerBuilder Developer with three years experience
- Team leader on many projects
- Object Oriented methodology: Non-Visual User Objects, Inheritance, Polymorphism

Experience of developing a client/server system from beginning to end..
Thorough understanding of Oracle and its architecture
- Oracle triggers, Stored Procedures and Embedded SQL/C
- Taught the helpline SQL and Oracle Maintenance routines
- Database management such as creating and resizing databases

PROFESSIONAL EXPERIENCE
GRC International, Inc.
5/96 – Present
GRCI develops and markets client/server software for environmental, health and safety professionals. Flow Gemini runs across various operating systems and multiple backends. I am the technical lead for new PowerBuilder development on a team of 19 programmers. I am primarily responsible for developing modules that are common to the various applications that we distribute.

Dynamic Table Construct – Gives our applications the flexibility to customize the windows to our customer's needs. The user can create tables or add columns to existing tables through this graphical interface. They then can draw the datawindow to fit their needs and attach it to a new tab on an existing window.

Titan Corporation, Reston VA
Consultant – Programmer/Analyst
11/95 – 5/96
Titan provides Citicorp with Consultants to develop technologies in maintaining their Accounting Information using PowerBuilder as the front end tool.

Product Pricing System – I enhanced and improved the performance for the internal financial application which records budgets and actual amounts spent within each department.

Intelligent Solutions Inc., Falls Church VA
Research & Development – Senior Programmer
02/95 – 11/95
ISI provides Correspondence Management, Workflow and imaging systems to Capitol Hill and variety of Federal Agencies suing PowerBuilder as the front end tool.

Correspondence Management – I designed and developed a Quick Constituent Entry window which allowed the user to enter the names and addresses as they would appear on a label. The software placed the data in appropriate fields.

Text Retrieval Imaging System – I was the team lead on this add on package. The user scans in correspondence, which is OCRed and indexed in a user assigned folder. The user can search the folders for related topics by entering in key words or phrases.

Wordflow – I designed and developed Adhoc Rules, which gives the user the power of defining their own rules and actions on Workflow templates. This involved dynamic sql and submitting corn jobs from within the Oracle environment. These are both new features with Oracle 7.1.

Automate Merge – Stored procedures/Packages that locates duplicate Constituents and Constituents that belong in one household. It merges the duplicates and households Constituents living at the same residence. A report is printed to show each action.

I participated in core design and implementation of the database schema. I wrote all the string manipulation functions in Watcom C.. I designed and developed 60% of the stored procedures to improve software performance by 50%.

ICS Information Technologies, Tysons Corner VA
Junior Programmer
01/91/ - 02/92
ICS developed Accounting and Billing Software for Comsat and Cable & Wireless.

Programmed in Natural on IBM Mainframes: Creating data entry screens and reports.
Maintained their Payroll system in dBASE III.

PROFESSIONAL TRAINING
PowerBuilder Advanced Datawindows
PowerBuilder Performance, Tuning and Techniques
Oracle 7 Architecture, Database I and Database II and turning CBTs
Excaliber Text Retrieval Systems

EDUCATION
George Mason University, Fairfax VA
Bachelor of Science: Computer Science, December 1991

Scenario # 5

PERSONNEL REQUISITION FORM Date: _____ Req. #: _____ Cost Center:

Department Name:	Location:	Date Required:
Position Title: **Data Technician**	Salary Range: **16 - 25 k**	Fringe Amount:
Job Family:	SCA Wage Determined:*	Clearance Level Required:
Project Name:	Yes:_____ No:___X_____	
Interviewing Supervisor/Alternate:	WD Rate:	

____X____Addition _____X____Full-Time _____Part-Time _____Regular _____Hrs./Week

_____Replacement _____On Call _____Temporary _____Work Schedule

Duties: Describe duties and responsibilities of position. Attach position description if desired.

Compile data/files and maintain database for programs documents. Prepare and distribute letters and memorandums. Duplication and distribution of various program documents. Review reports, letters, memorandums, and other program documents for grammatical accuracy. Assist Senior Engineers with the arrangement and layout of technical reports, scientific equations, charts, letters and briefing materials. Coordinate and schedule events between government personnel and Engineers. Development of program related graphics and incorporation of these graphics into various documents and briefs.

Qualifications: Describe education and experience (# years and type) required to perform the job.

H.S. graduate, a minimum of three to five years office administration experience.

Skills and Abilities: List specific skills and abilities needed to perform the duties and responsibilities of the job. Indicate if the requirement is essential or nonessential. *

	Essential	Non-Essential
Word processing (MS Word and Word Perfect)	XX	
Excellent typing skills	XX	
Ability to prepare presentation material	XX	

*See reverse for definition

Rank Order the Most Appropriate Candidate from 1 - 5. (5 being the most appropriate)

Darla Adams _____

Austin Duke _____

Sandra Tony _____

Raul Garia _____

Neal Room _____

DARLA ADAMS
DATA TECHNICIAN

General Summary
I possess eight years experience in computer operations. Knowledge of over ten software Programs including Windows 95; Eleven years experience in professional corporate environment, and over four years public relations (retail) experience.

EXPERIENCE:
Present
Capital One
Fredricksburg, Virginia 22406
Customer Service Representative

March 96 – May 96
Langley First Fighter Wing Medical Hospital Langley AFB, VA
Computer Specialist Volunteer
Installed 486 IBM compatible PC's Windows based Software and Hardware (CPU's and Monitors).
Customer Service Support on Software Programs (Win 95, Word, Excel, FoxPro).
Assisted Head Specialist with Server Setup
Assisted with basic operations of the Medical Systems Office

Feb. 94 – Oct. 94
Charlotte Area Health Education Center Charlotte, North Carolina
Program Assistant/Research Specialist/Design Consultant
Create and Design Brochures for AHEC's medical departments
Medical research for AHEC's Mental Health Department at John Hopkins University, UNC Charlotte, and Johnson C. Smith University.
Computer Operator/Data entry specialist (Wind., Lotus123, Word, dBase IV, ARClist, Macintosh, and Harvard Graphics).

May 92 – Sept. 92
US Army HQ TRADOC Retention Division Ft. Monroe, Virginia
Clerk Typist GS-3 (Summer)
Daily Retention of 26 US Army Installation
Create Monthly and Bi-Aannual Reports (Lotus 123, Word)
Continual Revising and Filing of US Government Documents (Lotus 123)
Create and Design Government slides (Harvard Graphics).

EDUCATION:
September 92 – September 93
ITT Technical Institute Norfolk, Virginia 23502
Computer Aided Design

June 89 – May 91

James Madison University Harrisonburg, Virginia 22807
Architecture (Concentration of Interior Design).

COMPUTER KNOWLEDGE:
Programs: Windows 95; Word 7.0; Excel 7.0; PowerPoint 7.0; Microsoft Word windows; Lotus 1-2-3 windows; Harvard Graphics windows; PageMaker; AUTOCAD release 9-12; WordPerfect windows; Familiar with UNIX and Visual Basic.

AUSTIN DUKE
DATA TECHNICIAN

CAREER OBJECTIVE: To be a member of a dynamic company w which I can apply my strong data entry, supply clerk, and quality control skills.

Inventory Manager / supply Specialist
Maintain an automated inventory database.
Manage the acquisition, maintenance, stock substitution and disposition of assets.
Reconcile and monitor daily requisitions using computer printout.
Ensure issues are forwarded to warehouse on the date of receipt.
Determine supply source, manufacturer, and quantity for immediate and long term requirements
Initiate disposal and/or reutilization of excess serviceable or unserviceable assets.
Continuously resolve supply discrepancies with procurement, source of supply, warehouse personnel and customer.

Supply Clerk/Clerk Typist
Typed and word-processed a wide variety of documents as necessary.
Logged all incoming requests using Personal Computer.
Assigned all voucher and document numbers used for various transactions and maintained suspense file on all requests.
Ensured transmittals were routed to proper source.
Used the appropriate Federal Supply Class and assigned and logged a control number to items being requisitioned that did not posses valid stock numbers.
Logged all purchase orders to cross reference file and forwarded to Item Managers.
Researched documents and furnished supply status to user when follow-ups were received.
Researched supply catalogs and other listings to determine if there was a standard of like item of supply in the systems.
Assured all reference files were current by updating Federal Supply Schedules, vendor catalogs microfiches and hardback supply lists as received.
Reviewed requests for completeness and accuracy of accounting authorizations and closed document register when requisitions were complete.

1986 - PRESENT - Department of the Army, Vint Hill Farms Station, Warrenton, Virginia 22186

SPECIAL SKILLS & ABILITIES:
Thorough working knowledge of WordPerfect (5.1), Lotus 1-2-3 (2.2. 2.3), MultiMate Advantage (1.0), dBase III (3.3), ProComm (2.4.3), Microsoft Word for Windows (2.0a & 6.0), Microsoft Windows for Workgroups (3.11), Microsoft Mail (3.0b), Microsoft Excel (5.0), and Microsoft Access (2.0).

Nine and half years of office experience using photocopier, electric typewriter, telefax machine, microfiche machine, and ten-key calculator.

Highly motivated to learn new things, and adapt easily and quickly to new situations.

SANDRA TONY
DATA TECHNICIAN

OBJECTIVE: To obtain a clerical position where I can use my office and mail clerk skills.

EMPLOYMENT HISTORY:

Distribution Clerk
Department of Energy, Washington, D C.
1/95 to present

Assemble and route punted materials throughout the organization. Organize and assemble requested materials according to written and verbal instructions Package and forward materials by mail or messenger Responsible for keeping accurate records of requests and transactions. Order supplies when needed Hold Level 1 security clearance.

Mail Clerk
Army Corps of Engineers, Washington, D.C.
9/90 to present

Received, sorted and distributed mail throughout the building Collected and processed bulk and Federal Express/UPS deliveries Prepared mail for delivery by using scale and postal meter. Answered and transferred phone calls.

EDUCATION: Marshall High School, Falls Church, VA (Graduated 1990)

RAUL GARCIA
DATA TECHNICIAN

EDUCATION:
Culpeper High School, Culpeper, VA
Piedmont Vocational School, Rapidan, VA
Associate Degree in Data Processing
Germanna Community College, Locust Grove, VA

WORK EXPERI ENCE:
CGW Cashflex
1993 to 1996

Lead Proof Clerk
Supervise and manage proof area and four individuals with reconciliation of all processed work for 30 accounts.
Determining if documents and reports are accurate.
Correct errors on Tartan System.
Prepare deposit slips for each account and process appropriate reports.
Encode checks for all accounts with a NCR 7760 encoding machine
Add-tape for scanning work on an IDT System to locate and check to make sure the checks are encoded correctly.

Quality Assurance Clerk
Reconcile all processed work for 30 accounts.
Determine accuracy of documents and reports.
Correct all errors to have an accurate balance on Tartan System
Prepare deposit slips with totals, encoding and dates.

Packaging Clerk
Packaged all customers processed work and rejects by detailed checklists.

Administrative Assistant
Mail opening and distributions.
Typed all correspondence, memos, letters, proposals and contracts for all Supervisors, Leads and Managers.
Fax and distribute all documents.
Comparing and assisting Controller with current prices on items.
Screen all applicants for available positions, testing and interviews.
Kept daily records to assist with billing and invoices.
Assigned and issued all security keys to employees and vendors.

Receptionist
Answered phones on an AT&T blLX-20L Phone System with 8 incoming lines and 32 extensions.

Forward all calls to appropriate parties, paged on the loud speaker or take messages and distribute them.

Zenith/Integ
1987 to 1990

Secretary
Calculate and type purchasing orders and filing.
Assisting Expeditor and order representative in comparing and confirming with company Controller with price comparison and current purchase orders.
Preparation of shipping forms and return material orders.
Telefax rushed documents to Vendors.
Distribute mail and copies to the appropriate staff personnel.
Type memorandums and letters for the Purchasing Director.
Expeditor--Day to day telephone contact with Vendors on delivery dates, quantity and returns.
Occasionally placed orders with Accounting Department on outstanding invoices, payment, collection and contracts.
Assisted productions on parts scheduling and trained all temporaries on purchasing procedures.

Temps and Company
1985 to 1987
Worked long and short-term assignments as a Receptionist, Word Processor, Data Entry, Administrative Assistant and Loan Officer.

ILM Corporation
Fredricksburg, VA 1984 to 1985

Data Entry Clerk
Keyed confidential data on CRT computer.

ABLITIES AND SKILLS:
IBM 256 Mainframe Computer
Macintosh Computer
10-Key by touch
Telex
Xerox Machine.
AT&T MLX-20L Phone System
386 IBM Computer
Typing of 60-65 wpm
Software: WordStar, WordPerfect 5.0, Lotus 1-2-3, dBase III, Microsoft Word, Professional Write

OBJECTIVE:
I am well organized and a confident individual, looking for a position in a professional atmosphere. Working in a high-pressure fast paced office in my idea as a great career.

NEAL ROOM
DATA TECHNICIAN

Employment History:

11/94 to Present
Bethesda, Maryland

National Institutes of Health Position · Clerk
Clerk responsible to perform clerical duties for one or more individual The duties follows: enormous Xeroxing projects, answering multi-phone lines in a professional respectful manner, typing wide variety of material, filing and greeting and directing visitors. Alternate timekeeper, which consist of entering tune and attendance in to the computer, scheduling meetings, assist staff with travel information etc.

8193 to 9194
Wheaton, Maryland

Kids R Us Position - Lead Sales
Responsible for tagging clothes, distribute clothes from shipment onto the floor. Handling two or three sections at once, being able to maintain the service desk, which involves doing layaways, returns, exchanges, holds, and even exchanges.

6193 to 8/93
Takoma Park, Maryland (Summer Position)

City of Takoma Park Position · Secretary
Secretary responsib1e for answering multi-phone lines, filing, typing letters and memos, keep track of office attendance7 Xeroxing documents.

6/92 to 8/92
Wheaton, Maryland (Summer Position)

Highland Elementary School Position - Secretary
Secretary responsible for answering multi-phone lines filing for the coming year, labeling books and binders, Xeroxing and typing.

6/91 to 8/91
Wheaton, Maryland (Summer Position)

Wheaton Regional Library' Position - Book Keeper
Bookkeeping responsible requires close attention. Putting books in order, putting books back on shelves, labeling books, entering over due books into the computer.

Computer Skills

Knowledge of Macintosh, Microsoft Word, Excel, and Advanced Word Perfect, Dbase, Lotus 123.

Special Qualifications
Typing 45 wpm., l0-key Calculator, Fax and Skills Machine, Photocopy Machine. Excellent Communication and organizational skills, customer service, ability to perform various projects simultaneously, how to fill out Time Cards.

Education
Wheaton High School, Wheaton Maryland (1995) Montgomery College, Rockville

APPENDIX D

METACOGNITIVE AWARENESS INSTRUMENT

Metacognitive Awareness Inventory

		Always True	Sometimes True	Neutral	Sometimes False	Always False
1.	I ask myself periodically if I am meeting my goals.	1	2	3	4	5
2.	I consider several alternatives to a problem before I answer.	1	2	3	4	5
3.	I try to use strategies that have worked in the past.	1	2	3	4	5
4.	I pace myself while decision making in order to have enough time.	1	2	3	4	5
5.	I understand my intellectual strengths and weaknesses.	1	2	3	4	5
6.	I think about what I really need to learn before I begin a task.	1	2	3	4	5
7.	I know how well I did once I finish a task.	1	2	3	4	5
8.	I set specific goals before I begin a task.	1	2	3	4	5
9.	I slow down when I encounter important information.	1	2	3	4	5
10.	I know what kind of information is important in a hiring decision.	1	2	3	4	5
11.	I ask myself if I have considered all options when solving a problem.	1	2	3	4	5
12.	I am good at organizing information.	1	2	3	4	5
13.	I consciously focus my attention on important information.	1	2	3	4	5
14.	I have a specific purpose for each strategy I use.	1	2	3	4	5
15.	I learn best when I know something					

	about the topic.	1	2	3	4	5
16.	I know what my manager expects me to do. (in a hiring situation)	1	2	3	4	5
17.	I am good at remembering information.	1	2	3	4	5
18.	I use different hiring strategies depending on the situation.	1	2	3	4	5
19.	I ask myself if there was an easier way to do things after I finish a task.	1	2	3	4	5
20.	I have control over how well I make decisions.	1	2	3	4	5
21.	I periodically review to help me understand important relationships.	1	2	3	4	5
22.	I ask myself questions about the decision before I begin.	1	2	3	4	5
23.	I think of several ways to solve a problem and choose the best one.	1	2	3	4	5
24.	I summarize what I've done after I finish a task.	1	2	3	4	5
25.	I ask others for help when I don't understand something.	1	2	3	4	5
26.	I can motivate myself to learn when I need to.	1	2	3	4	5
27.	I am aware of what strategies I use when I make decisions.	1	2	3	4	5
28.	I find myself analyzing the usefulness of strategies while I make decisions.	1	2	3	4	5
29.	I use my intellectual strengths to compensate for my weaknesses.	1	2	3	4	5
30.	I focus on the meaning and significance of new information.	1	2	3	4	5
31.	I create my own examples to make information more meaningful.	1	2	3	4	5

32.	I am a good judge of how well I understand something.	1	2	3	4	5
33.	I find myself using helpful strategies automatically.	1	2	3	4	5
34.	I find myself pausing regularly to check my comprehension.	1	2	3	4	5
35.	I know when each strategy I use will be most effective.	1	2	3	4	5
36.	I ask myself how well I accomplished my goals once I'm finished.	1	2	3	4	5
37.	I draw pictures or diagrams to help me understand while.	1	2	3	4	5
38.	I ask myself if I have considered all options after I solve a problem.	1	2	3	4	5
39.	I try to translate new information into my own words.	1	2	3	4	5
40.	I change strategies when I fail to understand.	1	2	3	4	5
41.	I use the organizational structure to help me.	1	2	3	4	5
42.	I read instructions carefully before I begin a task.	1	2	3	4	5
43.	I ask myself if what I'm reading is related to what I already know.	1	2	3	4	5
44.	I reevaluate my assumptions when I get confused.	1	2	3	4	5
45.	I organize my time to best accomplish my goals.	1	2	3	4	5
46.	I learn more when I am interested in the topic.	1	2	3	4	5

47.	I try to break work down into smaller tasks.	1	2	3	4	5
48.	I focus on overall meaning rather than specifics.	1	2	3	4	5
49.	I ask myself questions about how well I am doing while I am learning something new.	1	2	3	4	5
50.	I ask myself if I learned as much as I could have once I finish a task.	1	2	3	4	5
51.	I stop and go back over new information that is not clear.	1	2	3	4	5
52.	I stop and reread when I get confused.	1	2	3	4	5

APPENDIX E

LETTER TO HIRING PROFESSIONALS

Dear Hiring Professional:

I am a doctoral student and have an interest in understanding decision making in the business environment. I believe that hiring professionals have a unique and dynamic role in business today; therefore, I have selected hiring professionals as my investigative domain. In the interest of improving your ability to make better decisions, I need you to participate in my dissertation study. Having already established that you are a hiring professional, I need approximately fifteen minutes of your time to start my investigation into this important topic.

The purpose of this study is to assess the strategies used when hiring decisions are made. The questions on the inventory should be answered according to your hiring decision making behavior. The results of this research will provide important information for hiring professionals about how they can develop their decision making skills. Please follow the instructions carefully and answer all of the questions and statements as candid as possible.

____ First, complete the demographic form.

____ Second, complete the Hiring Behavior Inventory. The purpose of this instrument is to assess your awareness of strategies used when making hiring decisions. After you have read each question, circle the rating that best corresponds to how TRUE or FALSE that statement is about you when making hiring decisions.

Please be as open as possible and be assured that the data obtained in this study is confidential and under no circumstance will it be shared with anyone except the researcher.

Please return the demographic data sheet and the inventory via mail. If you have any questions, feel free to contact me. Thank you in advance for your assistance.

APPENDIX F

OPERATIONAL DEFINITIONS OF COMPONENT CATEGORIES

Operational Definitions of Component Categories

Knowledge of Cognition

1. **Declarative knowledge**: knowledge about one's skills, intellectual resources, and abilities as a learner.

2. **Procedural knowledge**: knowledge about *how* to implement learning procedures (e.g., strategies).

3. **Conditional knowledge**: knowledge about *when* and *why* to use learning procedures.

Regulation of Cognition

1. **Planning**: planning, goal setting, and allocating resources *prior* to learning.

2. **Information management**: skills and strategy sequences used on-line to process information more efficiently (e.g., organizing, elaborating, summarizing, selective focusing).

3. **Monitoring**: assessment of one's learning or strategy use.

4. **Debugging**: strategies used to correct comprehension and performance errors.

5. **Evaluation**: analysis of performance and strategy effectiveness after a learning episode.

APPENDIX G

LOADINGS FOR THE FORCED TWO-FACTOR ANALYSIS

Loadings for the Forced Two-Factor Analysis of Metacognitive Behavior (N = 165)

Item	Factor 1	Factor 2
29	**.53**	.13
14	**.52**	.21
13	**.52**	.21
18	**.51**	.00
31	**.48**	.14
10	**.46**	.20
33	**.46**	.22
32	**.41**	.11
16	**.37**	.16
20	**.37**	.23
17	**.37**	.00
40	**.35**	.08
26	**.34**	.20
3	**.32**	.00
12	**.28**	.06
5	**.22**	.16
15	**.20**	.00
50	.10	**.61**
24	.05	**.61**
51	.00	**.59**
36	.12	**.57**
38	.18	**.54**
22	.19	**.52**
49	.14	**.51**
42	.00	**.48**
52	.03	**.47**
11	.20	**.47**
43	.18	**.47**
6	.23	**.46**
44	.27	**.44**
21	.24	**.42**
34	.25	**.40**
23	.22	**.37**
8	.17	**.36**
19	.21	**.28**
39	.20	**.27**
7	.12	**.26**
9	.22	.35
4	.30	.35
30	.29	.33

41	.31	.29
2	.31	.29
35	.52	.31
28	.52	.35
37	.52	.40
25	.17	.24
1	.17	.24
37	.07	.19
46	.14	.07
48	.18	.09
47	.19	.11
45	.01	.04

VITA

Angela Ewell Kumar received a Bachelor of Science in Business Management from National-Louis University in 1994. She received a Master of Science in Adult and Continuing Education from Virginia Polytechnic Institute and State University in 1995 and completed the requirements for a Ph.D. in Adult and Continuing Education at Virginia Polytechnic Institute and State University in June 1998.

Mrs. Kumar has served in Human Resources as an administrator, facilitator, course designer, consultant, and she teaches a graduate level class in human resources. She is currently employed as a consultant, specializing in innovative solutions for human resource issues. Her particular interests are corporate education and educational reform.

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Angela Ewell Kumar