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THE BEHAVIORAL EFFECTS OF CONTENT RATING INFORMATION ON KNOWLEDGE SYSTEM CONTENT USE

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ABSTRACT

THE BEHAVIORAL EFFECTS OF CONTENT RATING INFORMATION ON KNOWLEDGE SYSTEM CONTENT USE

By

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Knowledge management system content reuse is critical to leveraging the intellectual capital within a firm, especially when high quality content is reused. While following the recommendations of others (i.e. ratings) as to what is high quality content can be a good strategy, it is possible that these recommendations are intentionally or unintentionally biased, leading to poor recommendations and inappropriate reuse of content. To address this, knowledge systems offer indicators of credibility in content ratings and content recommendations to better direct knowledge workers to high quality content. Individual psychology theory suggests inaccurate ratings may trigger individuals to use credibility indicators and content recommendations. In this study two different credibility indicators—sample size and source expertise—and one content recommendation characteristic—filter sophistication—are examined to see if individuals can use this information to overcome inaccurate content ratings. Four laboratory experiments provide evidence that ratings have a strong influence on content usage decisions regardless of rating accuracy and the moderating effect of source expertise matters while the effect of sample size as indicators of rating credibility and filter sophistication in content recommendations does not.

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CHAPTER 1

1.INTRODUCTION AND RESEARCH QUESTIONS

1.1 Introduction and Research Questions

Professional services firms, such as Ernst & Young, Accenture, and PricewaterhouseCoopers, were some of the earliest adopters of electronic knowledge systems and they continue to promote the use of knowledge repositories to capture knowledge gained from providing client services (Orlikowski 1993, 2000; O'Leary 2001a, 2001b). These firms maintain large electronic repositories of work outcomes that are accessed by all employees (a.k.a. intra-organizational knowledge management systems) (O'Dell and Grayson 1998; Davenport and Hansen 1999). Items stored in repositories are usually submitted by anyone in the firm and include deliverables to clients, work plans, budgets, lessons learned, and anything that someone thinks might have future value to others in the firm (Hansen, Nohria and Tierney 1999; Davenport and Hansen 1999).

Companies support these systems in order for their employees to access and re-use old work products when doing new work, which should increase overall firm productivity (Orlikowski 2000; DeTienne and Jackson 2001). Users typically perform a keyword search to find system content for a current task by specifying industry, revenue size, job type, etc. If the search algorithm is sufficient, a long list of the system contents that are relevant to the current task is generated (Balabanovic and Shoham 1997; Ansari, Essegaier and Kohli 2000). Finding relevant content is not always the issue, because contents can vary in quality and the user's goal is to find the most relevant, highest quality (i.e., most reliable) content as input for the current task (Sarvary 1999; Thomas, Sussman and Henderson 2001). Contents vary in quality because employees are free to contribute whatever they want to electronic knowledge systems, which means knowledge of high quality along with less than high quality could be put into the system due to differing motivations, knowledge levels and skill sets (Connolly and Porter 1990; Constant, Kiesler and Sproull 1994; Hansen and Haas 2001). The focus of this study is on how users find high quality content (see Chapter 3 for definition of content quality).

Firms cannot delete all the low quality items or ensure only high quality items are submitted originally because manually monitoring all content is costly (Shon and Musen 1999). As a result, knowledge systems help users find high quality content by maintaining a user feedback scheme, where content is rated as it gets used, for example, on a scale of one, meaning worthless, to five, meaning excellent (Standifird 2001; Wathen and Burkell 2002). Normally, when using the system, users will rank-order search results by ratings to help in selecting what content to use first. But, this low cost solution of sharing user opinions on system content may do more harm than good because content is subjectively evaluated and ratings are voluntarily given (Jadad and Gagliardi 1998). Also, ratings can be either intentionally or unintentionally incorrect (i.e., rating level does not accurately reflect actual content quality level) because those supplying the ratings may: manipulate them for self-serving purposes, not have the ability to recognize content quality, hold incorrect assumptions of what is salient to others, not foresee how others will be using the same content, be influenced by already published ratings, or use a different context when assessing content quality (Davenport and Hansen 1999; Falconer 1999; Cramton 2001; Cosley, Lam, Albert, Konstan and Riedl 2003). Much of the inaccuracy in ratings cannot be eliminated by more accurate future ratings because current ratings influence future ratings, which would reinforce the inaccuracy

(Cosley, Lam, Albert, Konstan and Riedl 2003). Thus, electronic content may be ineffectively re-used, where high rated but low quality content is used or low rated but high quality content is ignored leading to inferior task performance.

To help users determine when ratings are incorrect, the knowledge system provides additional information such as indicators of rating credibility and content recommendations (Balabanovic and Shoham 1997; Im and Hars 2001). Content ratings are often reported as an average of the ratings supplied along with credibility indicators such as the number of raters supplying ratings or the level of rater expertise, and content recommendations with the level of sophistication of recommendation algorithms (Cosley, Lam, Albert, Konstan and Riedl 2003; Balabanovic and Shoham 1997). While not necessarily the reason provided, highly sophisticated filters supporting content recommendations may suggest to users a certain level of credibility in ratings. That is, because a highly sophisticated filter recommends certain items, this may suggest to users high ratings associated with these items are accurate while low ratings are inaccurate. Decision theory research that examines the effectiveness of this type of information in decision settings has provided mixed results and has suggested features of the decision process may determine when this type of information gets used (Tversky and Kahneman 1974; Sedlmeier and Gigerenzer 1997, 2000; Stiff 1994). This study investigates the conditions when system-provided ratings, credibility indicators and content recommendations are used in making system content use judgments. The following research questions are addressed:

> *How can credibility indicators help people determine the level of accuracy in ratings of knowledge system content?*

How can content recommendations help people determine the level of accuracy in ratings of knowledge system content?

An important goal of this research is to strengthen our theoretical understanding of how system supported features influence how knowledge system users select and use system contents.

1.2 Importance Of Topic

This research is important from both theoretical and practical perspectives. Theoretical importance focuses on the way in which this research builds and tests decision theory related to how individuals use rating information. Practical importance focuses on the relevance of this research to practitioners in designing and using knowledge systems with ratings schemes provided.

1.2.1 Practical Importance

In many companies, system users need to screen content to find what is most appropriate (including highest quality) for their specific tasks (Davenport, DeLong and Beers 1998). It would be beneficial for people to use their own judgment and not just blindly following ratings and find the highest quality content in the quickest manner. Accordingly, it is time consuming for system users to judge all content individually themselves. If users are highly expert in the subject matter, search results may be rank-ordered by ratings and incorrect ratings are overcome by personal judgments of the content meaning incorrect ratings get ignored. However, a more efficient solution might be to provide credibility indicators of ratings and/or content recommendations that direct users to accurate ratings helping them more quickly find high quality content.

Also, many knowledge system users are searching for solutions to tasks where subject matter experience will be low causing them to be uncertain about which content is high quality (Nonaka and Takeuchi 1995, 1996; Brajnik, Mizzaro, Tasso and Venuti 2002). Highly expert senior employees typically delegate the cumbersome process of searching the knowledge system to those more junior (Orlikowski 1993, 2000). Junior employees will be experienced enough to have a belief about content quality but need reassurance in determining what content is the highest quality. Ratings along with credibility indicators and/or content recommendations may provide this reassurance.

Informing users and designers on how content ratings, credibility indicators, and content recommendations help screen knowledge system content is an important system usage issue (Davenport and Hansen 1999). Users with low subject matter expertise need help deciding when ratings are incorrect while users with more experience need help quickly assessing when ratings are incorrect in order to efficiently and effectively use knowledge system contents. Knowledge systems provide help through rating credibility indicators and content recommendations, but it does not always work as intended. The research is designed to determine whether providing additional help in the form of system supported indicators of rating credibility and system generated content recommendations can prompt users to: 1. not use incorrect ratings but evaluate content quality personally and 2. use correct ratings to screen content quality in order to achieve the highest level of task performance. Results from the research may influence the design of knowledge system ratings schemes by suggesting improvements in rating information disclosures. Results may also provide guidance to system users in understanding the implications of rating information characteristics.

1.2.2 Theoretical Importance

Two rating credibility indicators (e.g., sample size and source expertise) and one content recommendations characteristic (e.g., filter sophistication) are examined as influences on deciding whether to rely on ratings or not in assessing content quality. To examine the two rating credibility indicators, research dealing with how humans use statistical sample size and source credibility information guides predictions (Tversky and Kahneman 1971, 1974; Sedlmeier and Gigerenzer 1997, 2000; Hovland and Weiss 1951). While research results are mixed, one dominant theme indicates specific features of the decision process prompt the use of this information. The main contribution of this study is in identifying an important new setting and application for investigating the use of system provided rating information in decision-making.

To examine content recommendations, an exploratory approach is followed in studying when and how humans use system-generated recommendations to determine whether to rely or not on ratings (Ansari, Essegaier and Kohli 2000; Balabanovic and Shoham 1997). System-generated content recommendations are a recent phenomenon and their influences on human decision-making are not widely understood. Finally, the influence of rating information on task decision quality (i.e., decision effectiveness) is the focus of this study, although task decision time is also measured and analyzed given the trade offs between quality and time.

CHAPTER 2

2. PRIOR RESEARCH

The primary research in the literature covering knowledge management and information usage topics is summarized in this section.

2.1 Knowledge Management

Definitions of knowledge have been consistent in the literature, where knowledge is unlike data or information. Data is raw or unabridged descriptions of observations about the past, present or future world and information is a collection of facts or data. Knowledge is the product of human reflection and experience, dependent on context and located in the individual(s) or embedded in routines or processes (DeLong and Fahey 2000; Alavi and Leidner 2001). Knowledge is more unstructured than data or information and little research exists about how to codify it (Roos and Von Krogh 1996; Zack 1999).

Many studies have been focused on developing taxonomies of knowledge (for a list of these studies see Holsapple and Joshi 2001). Taxonomies generally classify knowledge as tacit, explicit, individual, social, declarative, procedural, causal, conditional, relational, and/or pragmatic (Alavi and Leidner 2001). Also, there are four knowledge processes that are generally discussed as creation/construction, storage/ retrieval, transfer and application of knowledge (Holzner and Marx 1979; Nonaka 1994; Pentland 1995).

Many studies have discussed that knowledge management is essential to the competitive advantage of the corporation in general (Riesenberg 1998; Argote and Ingram 2000; Teece 2000; DeTienne and Jackson 2001) and consulting firms specifically

(Teece 1995; O'Dell and Grayson 1998; Hansen, Nohria and Tierney 1999). Competitive advantage comes from converting intangible knowledge into a product or service for which customers will pay (Edvinsson and Sullivan 1996). Competitive advantage also results because knowledge is an asset that complements production and is difficult for competitors to imitate (Grant 1996; Rivkin 2000). The need for knowledge management to sustain competitive advantage was spawned by the exodus of middle managers during the downsizing of the late eighties and early nineties. Organizations discovered that institutional memory and unique knowledge was leaving with exiting employees (Erickson and Rothberg 2000; Shah 2000). Thus, knowledge management became a more important concept to corporate leaders.

Measuring and understanding changes in knowledge has been widely investigated (Pirolli and Wilson 1998). New knowledge is created by the exchange and combination of information and data (Nahapiet and Ghoshal 1998). Without knowledge transferring tools, people are central to the flow of information, share social relationships with knowledge sources and connect with those who have information for knowledge creation (Floyd and Woolridge 1999; Hansen and Morten 1999). Trust, certainty, information transfer, speed and co-specialization all determine how social networks of information transfer are built (Rangan 2000; Mehra, Kilduff and Brass 2001).

Knowledge management systems are tools for building social networks and fostering knowledge creation (Hackbarth and Grover 1999; Tiwana 2000). Different types of knowledge system practices are evident, such as performing formal training, adopting knowledge repositories, holding knowledge fairs, building communities of practice, maintaining expertise yellow pages, and supporting talk/chat rooms (Gray

2001). The most common application of knowledge systems are coding and sharing best practices in a repository, creating corporate knowledge directories, and creating knowledge networks (Alavi and Leidner 2001). Another term used for these systems is organization memory information systems (Stein and Zwas 1995; Wijnhoven 1999; Olivera 2000). Expert systems, artificial neural networks and artificial intelligence are specialized tools that can be embedded into knowledge systems assisting users in decision-making and are not the subject of this study.

Various case studies of how firms have deployed knowledge management systems in corporations have been performed highlighting that successful knowledge systems: are expensive, require solutions of people and technology, recognize the politics involved, require knowledge managers, achieve benefits more from knowledge markets than hierarchies, acknowledge sharing and using knowledge are unnatural acts, improve work processes, and require a knowledge contract (Graham and Pizzo 1996; Mullin 1996; Davenport and Prusak 1998; Pan and Scarbrough 1999; Zack 1999). Additional case studies of knowledge systems have focused on consulting firms such as Accenture (a.k.a. Andersen Consulting), Ernst & Young, PriceWaterhouse Coopers, and KPMG (Quinn 1992; Wijnhoven 1999; Davenport and Hansen 1999; O'Leary 1998, 2001a, 2001b). Lessons learned from these studies include the need to foster cooperation and mutual trust among employees (Orlikowski 1993; Nelson and Cooprider 1996; Falconer 1999). Also, not all consulting firms adopt the same type of knowledge system due to differing business models. Smaller boutique firms like McKinsey use their knowledge system to connect people more efficiently and not codify all available knowledge (e.g., they adopt knowledge yellow pages). Meanwhile, the Big-4 consulting firms like Ernst & Young take all available consultant experiences and categorize and codify them with formal methods (e.g., they adopt knowledge repositories full of work outcomes) (Maister 1993; Kubr 1996; Sarvary 1999).

Given all the potential benefits however, additional case studies have shown knowledge system projects can fail (Davenport, DeLong and Beers 1998). With over 50% of knowledge management projects failing based on corporate surveys, studies have tried to measure the return on knowledge to the company (Ambrosio 2000; Housel, El Sawy, Zhong and Rodgers 2001). Studies have also tried to measure the perceived output quality of knowledge systems in focus groups of CIOs (Kankanhalli, Tan and Wei 2001) and perceived knowledge management effectiveness via academic surveys (Khalifa, Lam and Lee 2001). Additional research has examined the factors affecting knowledge system adoption based on innovation diffusion theory (Ryan and Prybutok 2001).

Individual and organizational barriers to knowledge sharing make managing this process difficult (DeLong and Fahey 2000; Chow, Deng and Ho 2000). Those that possess knowledge are reluctant to share that knowledge because they feel it would threaten their status in the firm (Orlikowski and Hofman 1997; Orlikowski 2000). As a result, free rider problems ensue as individual may refuse to contribute to the creation of knowledge while accessing and using knowledge that others have contributed (Ba, Stallaert and Whinston 2001). Knowledge asymmetries between employees can lead to differences in organizational performance and reduced firm productivity (Thomas, Sussman and Henderson 2001). Even if knowledge is fully shared, people have limited attentional capacity and cannot absorb all the information provided to them (Greco 1999).

It is unclear exactly how these inhibitors affect knowledge sharing, especially the inability of individuals to effectively and efficient use knowledge system content, has not been fully examined. Little significant research addresses how system supported features (i.e., information about knowledge content such as ratings or indicators of rating credibility and content recommendations) of knowledge management systems affect knowledge system content use in decision tasks. The next section will address the psychology literature related to how decision makers use certain types of information.

2.2 Information Retrieval

The information retrieval literature examines how individuals seek out, retrieve, and determine relevance of documents (Maglaughlin and Sonnenwald 2002; Brajnik, Mizzaro, Tasso and Venuti 2002). While various system-oriented relevance definitions exist, user-oriented relevance is defined as whatever content the information seeker says is useful to his/her purpose (Park 1994; Howard 1994). Studies indicate information seekers make judgments regarding what information to select based on their specific task, with a primary criteria being content reliability (Spink and Greisdorf 2001; Maglaughlin and Sonnenwald 2002). Studies also suggest individuals place authority and confidence in documents based on author competence and trustworthiness, content reliability, and institution affiliations (Fritch and Cromwell 2001; Sundnar 1998, 1999).

In electronic environments, however, some of the traditional indicators (e.g., author background, qualifications, and credentials) of document reliability are absent, making judgments less straightforward (Fritch and Cromwell 2001; Tate and Alexander 1996). People fail to properly evaluate electronic information driving a need for independent verification, identification and validation of information sources (Fritch and

Cromwell 2001; Lynch 2001). While recent studies have suggested improving how information systems are designed to optimize information retrieval given the criteria of relevance, most system features support user feedback on reliability through user assessments (Hjorland 2001; Brajnik, Mizzaro, Tasso and Venuti 2002). But findings show electronic searchers are not comfortable with advanced search features, make little use of feedback when available, and typically do not scan results beyond the first page of hits (Jansen, Spink and Saracevic 2000).

2.3 Information Search Strategies

Acknowledging that different strategies of information searching exist and examining the search patterns of individuals may provide insights into how rating information is utilized in knowledge system content usage decisions. While the immediate research does not fully analyze search strategies, post hoc analysis may benefit from a discussion on prior research in information search strategies and future research is needed to more fully examine these issues. Before discussing search strategies, however, an understanding of the dimensions of information processed in using knowledge system search results is helpful. One dimension is the number of search result items listed (i.e., old work plans) and the other dimension is the number of lines in each search result item (i.e., project steps). These dimensions are called "search results complexity" in this study and are consistent with the natural format of knowledge system search results and consistent with the model which consumer and cognitive psychologist use to study how people process/search information (Payne 1976; Svenson 1979).

Cognitive psychologists believe that when individuals use a particular decision process, they will tend to search and acquire information in a manner consistent with the information needs of the decision process. The needs of the decision process guide the search process reducing the demands of cognitive load. Models of search behavior have been described based on information inputs and do not require the performance of complex arithmetic calculations as suggested by the models (Payne 1976; Montgomery and Svenson 1976). This is important because individuals appear to process information using heuristic methods not arithmetic expressions (Slovic and Lichtenstein 1971; Newell and Simon 1972; Svenson 1979). These heuristic methods appear to be associated with patterns of information processing/search. How individuals search in knowledge systems is a open question and future research is needed to better understand how people search knowledge system contents, especially determining when their selection strategy is based on judging search result items as an entire unit (i.e., entire old work plans) versus comparing parts of content across search result items (i.e., by project steps) (Tversky 1969; Einhorn 1971).

When individuals perform complex tasks, they use search patterns (or decision models or heuristics) to keep the information processing requirements of the task within the limits of their cognitive processing capabilities. They possess many search patterns that are systematically used in different task situations and individuals (Montgomery and Svenson 1976; Newell and Simon 1972; Payne 1976; Svenson 1979; Tversky and Kahneman 1974). However, in general, individuals try to match the search pattern and the task in order to keep within their cognitive limits or reduce their cognitive stain. Future investigations are needed to determine how search patterns and using additional information provided along with search results interact to influence search strategies.

Using additional information provided along with search results may offer help and is the topic of discussion in the next section.

2.4 Information Usage

To help users retrieve system content given the complexities of the environment, knowledge systems offer content ratings, credibility indicators and content recommendation schemes. Prior research on how people use this information is covered in this section.

2.4.1 Content Ratings

While little has been investigated about knowledge management systems and content rating schemes, research examining other rating schemes has found negative ratings of sellers is highly influential and detrimental to the final bid price for eBay auctions (Standifird 2001). Knowledge system ratings and other information about system content are cues that persuade users to select and use certain content. To better understand how knowledge system content ratings might influence decisions to select and use content, the literature on persuasive effects of information is explored next.

A theoretical model often used in the persuasion literature is the elaboration-likelihood model (ELM) which says the amount of thought the message receiver devotes to a message (e.g., in this study, a message is an item listed in the search results along with its rating and other information) is the primary determinant of which specific message cues (e.g., own judgment of item quality and rating value) drive attitude change (e.g., selection and use of an item from the list) and what processes cause cues to influence this change. The high end of the elaboration continuum is based upon diligent consideration of relevant information and corresponds to the *central route* to persuasion.

The low end is based on the receiver associating an attitude with some positive or negative cue and represents the *peripheral route* to persuasion. Another model used is the heuristic-systematic model (HSM) which says *systematic processing* where the message receiver accesses and scrutinizes all available information relevant to the judgment task (e.g., considers own judgment of content quality and rating value) is different from *heuristic processing* where the message receiver only uses a subset of the available information then applies basic inferences (e.g., follow the advice of experts and do not rely on own judgment of quality) to complete the judgment task.

While not explicitly tested in this study, ELM and HSM[1] suggests individuals process ratings using diligent consideration through the central route and process credibility indicators and content recommendations using an attitude association through the peripheral route of persuasion. Research using ELM and HSM has specifically tried to determine what heuristics people employ when not diligently processing information. With little thought to the main message content (e.g., own judgment of content quality), group opinions operate as simple cues where the group not the quality of the message influences people and heuristics are used such as consensus implies correctness (Maheswaran and Chaiken 1991). However, with the opportunity to think about the main message content, people who are presented with group opinions generate explanations as to why those opinions were expressed causing them to focus only on supporting evidence and changing their own attitudes to agree with the group (Petty and Cacioppo 1981).

[1] ELM and HSM have been used to examine the persuasive effects of numerous communication variables, including: source credibility (Ratneshwar and Chaiken 1992), source attractiveness (Petty, Cacioppo and Schumann 1983), rhetorical questions versus direct statements (Munch and Swasy 1988), implied versus stated conclusions (Kardes 1988), multiple versus single message execution (Schumann, Petty and Clemons 1990), visual message elements (Miniard, Bhatla, Lord, Dickson and Unnava 1991), message repetition (Batra and Ray 1986), and comparative versus non-comparative message claims (Droge 1989).

These findings suggest ratings may not be processed diligently, but could be viewed as group opinions and processed using the heuristic consensus implies correctness. Limited research has addressed the persuasion of specific knowledge system rating information or heuristics that users utilize when selecting and using knowledge system content. Nonetheless, for this study, ELM and HSM suggest differences exist in how rating as opposed to credibility indicators and content recommendation information may influence user decisions of knowledge system content usage.

2.4.2 Credibility Indicators

This section discusses the literature on decision theory, which is focused on how people use information in decision-making. First is a discussion about sample size then source expertise.

2.4.2.1 Sample Size

Empirical studies have mixed findings about whether people can adequately use credibility indicators like the number of raters submitting ratings aggregated into the reported rating level within knowledge systems (i.e., called sample size, where larger sample sizes suggests higher credibility). Studies show sample size is usually ignored in decision-making (Nelson, Bloomfield, Hales and Libby 2001; Griffin and Tversky 1992; Tversky and Kahneman 1974). Griffin and Tversky (1992) distinguish information according to two characteristics: strength and weight (i.e., sample size). In their terminology, the strength of information is the degree to which it appears favorable or unfavorable. The weight of evidence is its statistical reliability. They provide evidence that people tend to pay too much attention to strength and not enough to weight (i.e., sample size).

While these and other studies cover contexts that include narrow and simple domains (e.g., information about coin flips), they provide insights on how information is used in decision-making that can guide predictions for this study. Other relevant studies have illustrated that making use of sample size is conditional on the setting examined. Settings where people used sample size in decision-making include when the decision made involved determining *how often* something happened versus what was the *average outcome* of a situation (Sedlmeier and Gigerenzer 1997, 2000; Keren and Lewis 2000; Sedlmeier 1998) and when the tasks involved determining a *cause*-effect relationship (Van Overwalle and Van Rooy 2001). These studies suggest a trigger in the task setting that causes the decision maker to use additional information (i.e., sample size). Limited empirical evidence exists examining whether and how knowledge system users utilize sample size (i.e., the number of raters) when deciding whether to rely or not on ratings of knowledge system content.

2.4.2.2 Source Expertise

In addition to rater sample size, rater expertise (i.e., the percentage of raters designated as an expert in the content topic) presented by the knowledge system aids users in determining rating credibility by providing insight into the raters' authority, competence, and reliability (Fritch and Cromwell 2001; Flanagin and Metzger 2000). Typical demographic data provided by a knowledge system about raters includes length of membership in the electronic community, education credentials, hierarchical position, or business subunit assigned to in the firm (Thompson, Levine and Messick 1999; Davenport and Prusak 1998). System users may rely more on ratings provided by those considered experts versus non-experts in the topic (Strasser, Stewart and Wittenbaum

1995; Stewart and Strasser 1993). However, people are known to inadequately assess the expertise of themselves or others accurately (Kennedy and Peecher 1997; Koriat 1993) leaving the question of whether they will accept and use a reported level of expertise of a group of raters. Also, users might rely on ratings when judging content quality even when raters mis-rate the content.

The source credibility literature provides additional background into people's perceptions of expertise of raters. Source credibility is defined either as beliefs about the source's character (i.e., perceived social status) or about the source's competence (i.e., perceived expertise) and is shown to have an impact on the receiver (Ilgen, Fisher and Taylor 1979; Coleman and Irving 1997). Source credibility has been studied in many information environments, including commercial lending (Beaulieu 1994), earnings forecasts (Hirst, Koonce and Miller 1999), auditing (Beaulieu 2001), on-line support groups (Wright 2000), advertising (Settle and Golden 1974), and employer feedback (Levy, Albright, Cawley and Williams 1995). In the knowledge system context, these findings suggest users will utilize ratings more when high source expertise is present than when low source expertise is present. Nonetheless, limited research exists examining whether and how knowledge system users utilize source expertise (i.e., the percentage of raters who are experts) when deciding whether to rely or not on ratings of knowledge system content.

2.4.3 Content Recommendations

Collaborative filters are computer algorithms that recommend content for users to select by identifying users whose choices of content are similar to those in a given individual and recommends content they have selected (Ansari, Essegaier and Kohli

2000; Balabanovic and Shoham 1997). Collaborative filtering could be used to better support the search for high quality knowledge content (Ansari, Essegaier and Kohli 2000; Balabanovic and Shoham 1997). Although collaborative filtering cannot recommend entirely new content, it does incorporate user preference similarities across individuals (Ansari, Essegaier and Kohli 2000). For example, collaborative filter recommendations are used by amazon.com and barnesandnoble.com to recommend books, CD's and movies on the basis of the preferences of their other customers (Ansari, Essegaier and Kohli 2000). Little research has been performed on the behavioral effects of collaborative filter recommendations on decision-making.

CHAPTER 3

3. THEORY DEVELOPMENT

This section begins with a definition of content quality, followed by a description of content ratings, credibility indicators and content recommendations in the context of knowledge systems. Subsequently examined is how content ratings are expected to affect the decision process of selecting and using knowledge content. Finally, a research model is developed with specific hypotheses to be tested regarding how credibility indicators and content recommendations help and mislead in the decision process of selecting and using knowledge content.

3.1 Definition Of Content Quality

High quality in knowledge system content can be defined as work products that are informative, helpful, useful, desirable, meaningful, good, or significant. When content varies along these dimensions, using the content with the highest quality is desired. These characteristics have been examined as dimensions of information in the information systems (Gallagher 1974; Swanson 1974; Zmud 1978), consumer research (Wilton and Myers 1986), and management literatures (Moenaert, Deschoolmeester, Meyer and Souder 1992). More specifically, from the information systems perspective, Zmud (1978) drawing on Swanson (1974) and Gallagher (1974) defined four dimensions of information: 1. significance, usefulness or helpfulness, 2. accuracy, factualness, and timeliness, 3. quality of format or physical presentation and readability and 4. meaningfulness or reasonableness[2].

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[2] Swanson (1974) identified the following items related to an evaluation of information received by a system user: timely, relevant, unique, accurate, instructive, concise, unambiguous and readable. Gallagher (1974) used a scale of whether information is: informative, helpful, useful, desirable, meaningful, good, relevant, important, valuable, applicable, necessary, material, responsive, effective, and successful. Also,

When knowledge system users perform searches, all the characteristics listed above are pertinent in judging system content. System users utilize ratings as a cue regarding the level at which system content was informative, helpful, useful, desirable, meaningful, good, and significant (Gallagher 1974; Zmud 1978), which, for purposes of this study, is how content quality is defined.

In this study, content quality is examined while all other information characteristics were held constant. For example, the timeliness of system content was held constant by dating every item within the last year, so ratings should not have been perceived as cues about whether contents were timely. Another example is that all system content was related to the task subject matter and hence relevant to the task, so ratings should not have been perceived as cues about whether contents were relevant.

3.2 Content Ratings, Credibility Indicators, and Content Recommendations

Often, those who have utilized knowledge system content for a particular task are asked to evaluate and provide a rating of that content. Then the system aggregates and reports the average of all submitted ratings for that content. Content ratings reported in knowledge systems have several inherent characteristics as shown in Table 3.1. Ratings can be described by their *level*, which should indicate the level of content quality (e.g., 1 = worthless, 3 = moderately useful, through 5 = highly useful), *strength* or extremeness (e.g., considered strong if the ratings is at scale ends [rating = 1 or 5] versus weak if the rating is in the middle [rating = 3]) and *scale type,* which can be continuous or dichotomous. The last two characteristics are not examined in this study. Another characteristic of ratings is that ratings can be either intentionally or unintentionally

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Larcker and Lessig (1980) summarize these measures into perceived importance and perceived usableness of information.

incorrect because those supplying the ratings may manipulate them or use a different context when assessing the rating level. Thus, while not reported by knowledge systems, ratings may be on a continuum, which is the degree of *accuracy* in reflecting actual content quality (e.g., if they are accurate, ratings = 5 and content is of high quality versus if they are inaccurate, ratings = 1 and content is of high quality).

Table 3.1. Characteristics of Content Ratings, Credibility Indicators and Content Recommendations (shaded rows refer to characteristics covered in this study)

Characteristic	Description	Predicted Behavior Effect
Content Ratings		
Level	Reflects level of content quality (i.e., 1 = worthless, 3 = moderately useful, through 5 = highly useful)[3].	If an item is rated a 1 (5), then it will be ignored (used).
Degree of accuracy	Degree to which rating level accurately reflects the content quality level.	When ratings are accurate (i.e., rating is 5 and content is of high quality), decision-making performance should be higher.
Strength (not examined in this study)	Reflects the strength (i.e., extremeness) of content quality. Strong if rating is at scale ends (rating = 1 or 5) versus weak if rating is in the middle (rating = 3).	Strong ratings will be more quickly judged as use or ignore while weak ratings will take some effort to determine whether to use or ignore.
Scale type (not examined in this study)	Continuous versus dichotomous categorical. Research suggests for evaluation scales should be continuous in order to capture weak assessment levels.	Continuous scales will be more trusted than dichotomous categorical due to their granularity and assumed greater precision.
Credibility Indicator		
Rater sample size (i.e., number of users providing ratings)	Discloses the number of users providing ratings that were aggregated into final rating level provided. Could be high (i.e., 100 users) or low (i.e., 3 users).	More (fewer) raters that rated the content, the more (less) credible the rating level is assumed to be.
Rater expertise	Percentage of raters providing ratings considered experts in content topic.	More reliance should be placed on ratings provided by experts than non-experts.
Text explanations (not examined in this study)	Raters provide explanations to substantiate the rating level they chose.	Explanations provide a rationale for rating levels chosen and should shed light on the appropriate rating level for the content.
Consistency (not examined in this study)	Whether the aggregated rating level provided comprises the average of all the same level or a wide dispersion of levels	Greater variance in ratings reported should reduce the reliance placed on the rating values reported.

[3] A low rating (rating = 1) means others found content a waste of time. This could be because the information contained in the content is erroneous or **misleading** but it could also be because the information was **useless**, basic or too general to be useful.

	(i.e., if the rating provided = 3, does it comprise all 3's or one-half 1's averaged with one-half 5's).	
Content Recommendations		
Collaborative filter sophistication	Highly sophisticated collaborative filters refer someone selecting a high (low) quality to other high (low) quality content. Low sophisticated collaborative filters refer someone selecting a high (low) quality to other content that is low (high) quality.	If high (low) quality content is selected in the first place, better filters direct system users to other high (low) quality content supporting them in getting their task done more (less) effectively and efficiently. If high (low) quality content is selected in the first place, worse filters direct users to low (high) quality content.

To provide additional insight about the credibility of rating levels, the underlying characteristics of rating credibility can also be reported as shown in Table 3.1. Examples of credibility indicators include: *rater sample size,* which discloses the number of raters providing ratings that were aggregated into the final rating levels provided; *rater expertise,* which provides the percentage of those submitting ratings who are classified within the firm as experts in the content topic; *text explanations,*[4] which substantiates reasoning behind rating levels chosen; and *consistency,* which reflects the degree of rating dispersion or variance around the aggregated rating value (i.e., if the rating provided = 3, does it comprise all 3's or does it average equal numbers of 1's and 5's). The last two rating credibility characteristics are not covered in the study.

While not intended to directly deliver insights into the credibility of ratings, system-generated content recommendations, also shown in Table 3.1, are provided to help users identify quality content and may suggest whether to rely on ratings or not in deciding content quality. Content recommendation algorithms recommend content by identifying users whose choices of content are similar to those by another user and recommending content the other user has selected (Balabanovic and Shoham 1997;

[4] See research by Gregor and Benbasat 1999.

Ansari, Essegaier and Kohli 2000). One limitation of examining content recommendations is their main purpose is to help users find additional *relevant* system content and not necessarily help find the highest *quality* content, which is the focus of this study. Nonetheless, while providing content recommendations is not a widely applied concept in knowledge systems, large professional services firms are considering using them for their intra-organizational knowledge systems and they are a highly accepted search tool on the Internet (Balabanovic and Shoham 1997; Ansari, Essegaier and Kohli 2000). This research is an initial attempt to better understand how content recommendations help users in the knowledge system environment.

The *collaborative filter* algorithms can vary in *sophistication*, where highly sophisticated collaborative filters consistently refer someone selecting a certain quality level to other content of like quality based on other similar users' selections. However, low sophisticated collaborative filters are not as refined and are less able to develop a strong linkage in recommending content. This causes less sophisticated collaborative filters to be inconsistent in matching the quality levels of original and recommended content, which, in turn, causes less consistency in decision-making. Thus, less sophisticated collaborative filter could refer someone selecting high quality content to content that is lower in quality even though it is still based on other similar users' selections. Nonetheless, it is likely that system users will learn through experience whether filter sophistication is high or low based on evaluating the quality of content recommended. Filtering systems typically do not inform users about underlying algorithms or sophistication levels (Ansari, Essegaier and Kohli 2000).

3.3 The Effect of Content Ratings on the Knowledge Content Selection and Use Process

When using the knowledge system, users first perform a content-based search using keywords of the task topic, and the knowledge system returns a list of content matching the keywords as search results (Brajnik, Mizzaro, Tasso and Venuti 2002). This can be a long list, given the large amount of content that may be stored in the knowledge system (Davenport and Prusak 1998). System users hold prior beliefs that screening content based on ratings reduces the amount of searching and increases the chance of finding high quality content[5]. Relying on prior beliefs to follow ratings is beneficial when ratings are *highly accurate* because ratings will guide users to high quality content. However, following *less accurate* ratings causes system users to select and evaluate highly rated but low quality content, increasing the chances of low task performance outcomes. This proposition is straightforward and will be examined as a baseline condition. Knowledge system users will typically have low subject matter experience, which reduces the level of certainty about what is high quality content, and causes them to rely more on ratings, even when they should not. Thus, to help people decide whether to rely on ratings or not in content quality decisions, knowledge systems offer credibility indicators and/or content recommendations, and their influence on decisions is further discussed in the next section.

3.4 The Effect of Credibility Indicators and Content Recommendations on Knowledge Content Selection and Use

Credibility indicators purport to signify and content recommendations may imply how believable content ratings are and suggest whether users should rely on or discount the use of ratings. For example, if there are many (few) raters or experts who submitted

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[5] Based on interviews with those using knowledge systems in large consulting firms.

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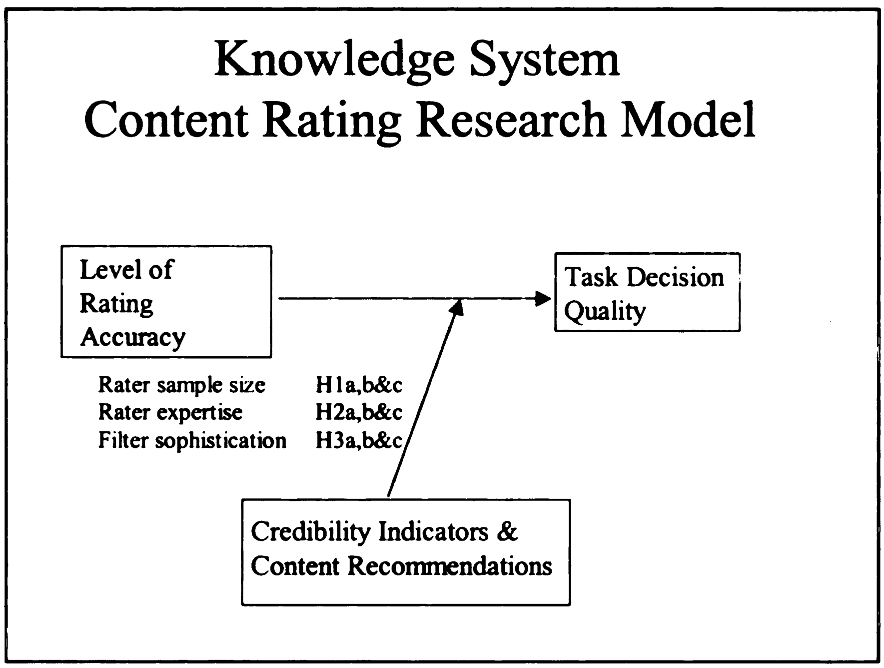
ratings, this should indicate the rating level is more (less) credible. Another example is that users may believe ratings associated with content that is recommended by filters with highly (low) sophisticated algorithms are more (less) credible. Thus, knowledge system users may use credibility indicators and content recommendations as input to making a decision on whether to rely on rating levels or not. Then, reliance on rating levels affects judgments on content quality, which determines what content is reviewed and selected for use in the task. The research model being examined is found in Figure 3.1.

Figure 3.1. Knowledge System Content Rating Research Model



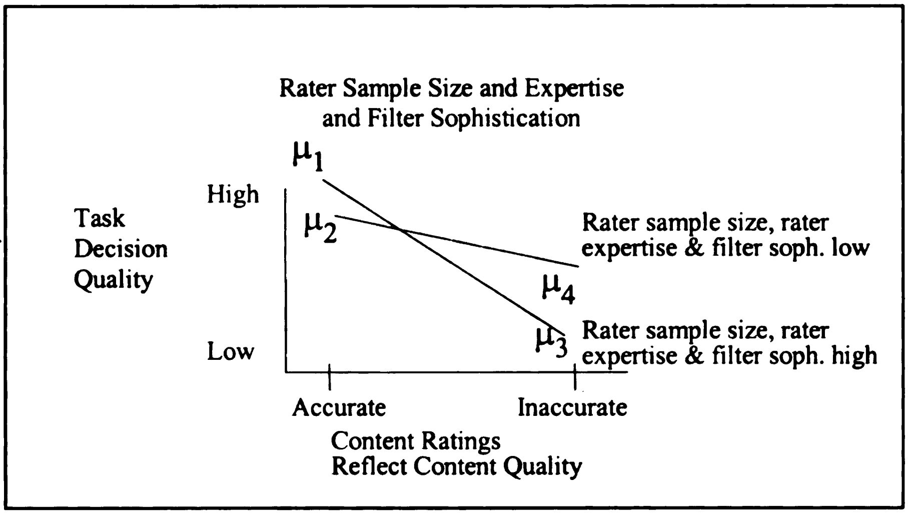
3.4.1 Credibility Indicators and Content Recommendations Influence on Rating Judgment

The two salient credibility indicators potentially used by system users that will be examined are rater sample size and rater expertise and the one content recommendation dimension that will be examined is filter sophistication. First, the proposed logical cognitive process of how system users utilized rater sample size in decision-making is discussed. Then, since this process is assumed to be the similar regardless of which credibility indicator or content recommendation item is provided, only the unique qualities of rater expertise and filter sophistication and not the entire process are discussed next. At the end of the discussion for each item are formal hypotheses.

3.4.2 Rater Sample Size

The proposed process of how system users utilized rater sample size in decision-making contains two main arguments. The first is that *inaccurate* ratings more than *accurate* ratings should prompt system users to attend to rater sample size and when rater sample size is *small*, this may cause users to rely less on ratings. Thus, the effect of rater sample sizes on decision-making should be greater when ratings are inaccurate than when they are accurate (i.e., in Figure 3.2 this is represented as comparison in magnitudes: $|\mu_1 - \mu_2| < |\mu_3 - \mu_4|$). The second argument is that less reliance on ratings is expected to reduce decision quality when ratings are *accurate* and to improve it when ratings are *inaccurate* (i.e., in Figure 3.2 this is represented as a comparison of directions: $[\mu_1 - \mu_2] > 0$ and $[\mu_3 - \mu_4] < 0$). Next is a more detailed discussion of the first argument, followed by a more detailed discussion of the second argument, then the formal hypotheses.

Figure 3.2. Interaction Effect of Credibility Indicators/Content Recommendations and Content Rating Accuracy on Task Decision Quality



H1a, H2a, H3a = $(\mu 4 - \mu 3) - (\mu 1 - \mu 2) > 0$
H1b, H2b, H3b = $\mu 4 - \mu 3 > 0$
H1c, H2c, H3c = $\mu 1 - \mu 2 > 0$

The first argument suggests the effect of rater sample sizes on decision-making should be greater when ratings are inaccurate than when they are accurate. Knowledge system users initially review highly rated content. When the ratings are *highly inaccurate,* ratings direct system users to highly rated but low quality content first. They are expected to review the content, question its quality, and try to determine whether ratings are credible. Unexpected inaccuracies in ratings and uncertainty in judgments caused by low subject matter experience should prompt a search for reasons why an inaccuracy might happen (Wong and Weiner 1981; Weiner 1985). In other settings, the on a facet of the process may have prompted the use of sample size information; for example, when determining how often something happened versus what the average outcome of a situation was, when the tasks involved determining a cause in a cause-effect relationship, when the decision was based on rational not intuitive thought processing, and when the context was familiar versus unfamiliar (Kunda and Nisbett 1986; Denes-

Raj and Epstein 1994; Epstein 1994; Gigerenzer and Todd 1999). Consistent with these studies, the unexpected inaccuracy in ratings in the current study's setting may cause knowledge system users to turn to rater sample size for help in determining whether ratings are credible and in explaining why they might not be (Rhine and Kaplan 1972; Stiff 1994; Sedlmeier and Gigerenzer 1997, 2000; Van Overwalle and Van Rooy 2001). Although rater sample sizes are always normatively relevant, users are more likely to use them when prompted by the conflict between ratings and the user's initial assessment of content quality they purport to suggest.

Inconsistencies in how many users provide ratings (i.e., rater sample size) for different content results because the typical knowledge systems allow anyone in the company using the content to rate it. More users submitting ratings about content should indicate the ratings are more credible and should be relied on in making content selection decisions. When *rater sample size* is a *high value* provided along with either a high or low rating level, this should suggest more people agree on the rating level and believe the rating indicates the content quality. With low subject matter experience, knowledge system users may rely on the judgment of others and rely more on ratings when many other users agree on that rating. High rater sample size should promote reliance on ratings and not on own judgments. High rated but low quality content could be accepted or may not be evaluated thoroughly; as a result, searching for a better answer is discontinued.

However, when *rater sample size* is *low*, knowledge system users may discount rating levels and decide the quality of content by reviewing search results individually. When ratings are *inaccurate*, discounting ratings may be beneficial. The unexpected inaccuracy should prompt using the low credibility indicators, which suggest discounting ratings, so knowledge system users should search and evaluate more content until finding a higher quality solution. Reducing reliance on inaccurate rating levels improves the chances that ratings will not influence what content is used in task solutions. However, studies indicate people get frustrated before reviewing all content and low subject matter experience users cannot always judge content correctly, so while performance quality improves it may not reach the highest possible level (Jansen, Spink and Saracevic 2000; Ford, Miller and Moss 2001).

When ratings *accurately* reflect content quality, knowledge system users select highly rated, high quality content first and evaluate the content as high quality. Since ratings are accurate, knowledge system users are not expected to turn to rater sample size for causal explanations. Given uncertainty in judgments due to low subject matter experience, ***high rater sample size*** may reinforce beliefs of high content quality. In this case, knowledge system users are not expected to question the ratings and should review the highest rated content first then select and use high quality content to solve the task.

Low rater sample size should suggest the rating level is less credible because less input is available most likely causing knowledge system users to determine content quality using their own judgment. When rater sample size is low and ratings are *accurate*, knowledge system users may start with highly rated, high quality content first and evaluate the content as high quality. Some users may believe low rater sample size indicated non-credible ratings (i.e., inaccurate ratings) and may perform additional selection and evaluation of search results. However, many knowledge system users should realize the first content reviewed was rated highly and was high quality or they may never pay attention to sample size since they were not prompted to do so and in either case they may ignore rater sample size. Thus, when ratings are accurate, knowledge system users are expected to have slightly lower decision performance on average when rater sample size is low since some users will tend to rely less on ratings.

The second argument suggests that less reliance on ratings is expected to reduce decision quality when ratings are *accurate* and to improve it when ratings are *inaccurate.* This argument suggests, given uncertainty in judgments, the perceived conflicts in rating levels and personal judgments of content quality should prompt knowledge system users to use rater sample size for help in determining why ratings may not be credible when ratings inaccurately more than when ratings accurately reflect content quality (Stiff 1994; Sedlmeier and Gigerenzer 1997, 2000). Thus, in the inaccurate ratings case users may be more likely to attend to rater sample size, while in the accurate ratings case they might not be. In the inaccurate ratings case, attending to low rater sample size may cause reliance on personal judgment resulting in improved decision quality. Meanwhile, since there is less conflict, doubt, and uncertainty when ratings are accurate, decision performance differences are expected to be smaller across rater sample size levels than when ratings are inaccurate. The formal hypotheses for rater sample size interactions and planned contrast predictions are (see Figure 3.2 for a graphical representation of this set of hypotheses):

- H1a: The difference in decision *quality* between being provided **high** and **low** rater sample size will be greater when the content ratings are **inaccurate** than when the content ratings are **accurate**.
- H1b: Given low subject matter experience, decision *quality* is higher when the rater sample size is **low** than when the rater sample size is **high** when content ratings are **inaccurate**.

- H1c: Given low subject matter experience, decision *quality* is higher when the rater sample size is **high** than when the rater sample size is **low** when content ratings are **accurate**.

3.4.3 Rater Expertise

Another indicator of rating credibility is the percentage of raters deemed experts in that content's topic. If knowledge system users perceive the users who are submitting ratings about content to be more expert than their own expertise level, they are more likely to accept and rely on the ratings (i.e., ratings are considered more credible and should be relied on in judgments) (Wegner 1986; Thompson, Levine and Messick 1999). Information thought to come from experts should have a greater impact on decisions because it is thought to be more authoritative (Slater and Rouner 1992). Evidence indicates that expertise of the source is important to perceptions of the credibility of information (Hovland and Weiss 1951; Birnbaum, Wong and Wong 1976; Olson and Cal 1984).

However, when recipients disagree with a statement from a highly credible expert, they may reduce their respect for the source, downgrade the importance of the statement, rationalize the disagreement with excuses for the source or change their own beliefs to agree with the source (Rhine and Kaplan 1972). Studies have found these different reactions to expertise disclosures depend on features of the decision process that encourage the use of information. To understand when recipients changed their own beliefs to agree with the source, a closer look at the decision process is needed. In each study where an expert source changed the person's beliefs, a facet of the process prompted the desire to change one's own beliefs to match the experts. These facets include a low level of personal expertise, highly relevant information from the source for the decision task, an expert taking a position opposed to his/her own best interest, and a large amount of disagreement between the expert's statement and the recipients' beliefs about the statement (Walster, Aronson and Abrahams 1966; Beach, Mitchell, Deaton and Prothero 1978; Slater and Rouner 1992; Stiff 1994). The specific facets of the decision process discussed previously in this study expected to influence whether people use rater expertise are inaccurate ratings. The formal hypotheses for rater expertise interactions and planned contrast predictions are (see Figure 3.2 for a graphical representation of this set of hypotheses):

- H2a: The difference in decision *quality* between being provided **high** and **low** rater expertise will be greater when the content ratings are **inaccurate** than when the content ratings are **accurate**.
- H2b: Given low subject matter experience, decision *quality* is higher when rater expertise is **low** than when rater expertise is **high** when content ratings are **inaccurate**.
- H2c: Given low subject matter experience, decision *quality* is higher when rater expertise is **high** than when rater expertise is **low** when content ratings are **accurate**.

3.4.4 Filter Sophistication

Collaborative filters objectively determine what content to recommend based on data sets of users' preferences. Their recommendations attempt to guide knowledge system users in managing the long list of search results from their content-based keyword query of the knowledge system (Brajnik, Mizzaro, Tasso and Venuti 2002). Thus, given low subject matter experience, knowledge system users may seek additional objectively derived guidance in finding high quality content for use in their task (Yao 1995). However, collaborative filters do not disclose how much uncertainty is involved, the reasons for their recommendations, or the level of sophistication in algorithms used (Ansari, Essegaier and Kohli 2000). While system users prefer high quality content, those whose preferences are input into the algorithms may have different understandings of what is high quality content. If knowledge system users do not understand how recommendations are derived, they may ignore content recommendations. Once again the specific facets of the decision process discussed previously in this study expected to influence whether people use filter sophistication are inaccurate ratings. The formal hypotheses for filter sophistication interactions and planned contrast predictions are (see Figure 3.2 for a graphical representation of this set of hypotheses):

- H3a: The difference in decision *quality* between being provided recommendations from a collaborative filter that is **low** and **high** in sophistication will be greater when the content ratings are **inaccurate** than when the content ratings are **accurate**.

- H3b: Given low subject matter experience, decision *quality* is higher when the collaborative filter sophistication is **low** than when the collaborative filter sophistication is **high** when content ratings are **inaccurate**.

- H3c: Given low subject matter experience, decision *quality* is higher when the collaborative filter sophistication is **high** than when the collaborative filter sophistication is **low** when content ratings are **accurate**.

CHAPTER 4

4. RESEARCH METHODOLOGY

To test the hypotheses, four inter-related experiments were conducted. The first experiment tested the baseline condition for whether content ratings without credibility indicators influenced content use in the task solution. The subsequent three experiments tested whether providing credibility indicators impacted how ratings affected content use. Thus, the second experiment investigated the first set of hypotheses (H1a-H1c) and studied whether providing sample size along with ratings was important. The third experiment looked at the second set of hypotheses (H2a-H2c) to find out if providing the percentage of raters who were experts in the content along with ratings mattered. Finally, the fourth experiment tested the third set of hypotheses (H3a-H3c) and considered the influence of collaborative filter recommendations, along with ratings, on content use. The following is a description of the materials, participants and power analysis, and procedures. The section concludes with a separate discussion of the research design and measures that are the same across and unique to each experiment.

4.1 Participants and Power Analysis

Participants for the study were undergraduate students taking a business information systems and technology course open only to juniors or seniors in a large Midwestern university. Several steps were taken to ensure the participants selected were representative of the population of interest—juniors and seniors performing a first year consultant level task, verbal tutorial consistent with first year consultant training, and selection of a work plan topic (i.e., data modeling and database design) covered in their current coursework. During pilot tests of the experiment, changes were made to experimental materials and the tutorial to improve subjects' understanding of the task involved.

Subjects were randomly assigned to treatment conditions to help alleviate the possibility of individual characteristics affecting the results; however, specific individual characteristics thought to influence task performance were controlled (see Controls and other manipulations checks section below). Subjects received course credit (1.5%) for their participation. In order to ensure best efforts, incentive pay was provided based on both task performance quality and efficiency.

A power analysis was conducted to determine the sample size needed to detect significant effects in the population, given the experimental design. Based on an estimated population medium effect size of R^2=0.15, for power of 90%, twenty-one participants were needed for each of the fourteen separate experimental cells (294 in total) (Cohen and Cohen 1983) (see Appendix A for experimental cells). Based on this sample size, the chance of detecting a significant effect of the experimental manipulations when one exists is approximately 50%.

4.2 Experimental Materials

The following section describes the experimental materials used in this study which comprise the computerized consulting cases, knowledge system work plans, and a description of the task type.

4.2.1 Computerized Consulting Cases

With external validity to the consulting industry in mind, a simulated knowledge system was designed for subjects to perform a consulting related task. Since the subject population was junior and senior undergraduates, the experimental task was designed as a typical exercise that a consultant might perform during his/her first year in a firm. The experimental task was to select and use old work plan line items from a knowledge system to construct a new work plan to build a data model and design a database for a new client. Building a data model and designing a database were topics the students covered in their current classes increasing familiarity with terminology and work plan line items. Thus, subjects have some, but limited experience with the appropriate steps to follow in a data modeling and database design project.

All subjects across experimental conditions were provided a verbal ten-minute tutorial on building work plans and on using the computerized introduction materials, consulting case, knowledge system search results, answer spaces, and post-task questionnaires. The tutorial emphasized the layout of the work plans, the difference in work plan quality levels, and how to combine work plans. The introduction materials provided a review of data modeling and database design, the construction of work plans for client jobs, and the layout of the knowledge system including the ability to pull up sample work plans not used in the consulting case.

After reading the introduction materials, all participants were provided the consulting case. Then they were instructed to access and review knowledge system search results provided and to select line items of their choice to be transferred into an answer space to build, edit, and submit their answer. Subjects were told their manager asked them to build a work plan by re-using old knowledge system work plans and that the characteristics of a "good" work plan have the following: supervisor hours for all important tasks, consultant level(s) assigned to all project steps and informative/non-vague project steps (see Appendix B for screen prints of on-line experimental materials).

Rating accuracy was operationalized as ratings that either accurate or inaccurate (i.e., matched or mismatched with actual content quality). The manipulations for each experiment occur only in the knowledge system search results screen as ratings that are accurate or inaccurate and credibility indicators or content recommendations differ between subjects (see Appendix C for screen prints of manipulation screens). Subjects were not told explicitly whether ratings are accurate or inaccurate, while they were told whether credibility indicators or filter sophistication is high or low.

4.2.2 Knowledge System Work Plans

Knowledge systems work plans were designed to represent hypothetical work plans from work performed by colleagues employed by the subjects' hypothetical firm. These items were created using identical fonts, layouts, and lengths (i.e., work plan all had six steps), and were based on business world knowledge system work plans provided by practicing consultants. All work plans listed *project steps* and *consultant rank* and varied in the level of quality. The highest quality items (i.e., 100% quality) were designed as follows (see Appendix D for work plans):

- *project steps* were based on the steps identified in an undergraduate information systems text book (Whitten, Bentley and Dittman 2000) for building a work plan for data modeling and database design tasks, and
- *consultant ranks* for each project step were set based on feedback from practicing consultants.

Lower quality content items were created by changing the highest quality items in three ways (referred to below as the "three quality characteristics"): (1) deleting supervisor hours for many tasks needing supervision, (2) eliminating the assignment of any consultant level to a project step and (3) replacing project steps with uninformative/vague ones (see Rosenau 1998 and Murch 2001 for work plan design guidance). These three changes were the characteristics highlighted to subjects to guide them in their selection and use of knowledge system items. Pilot tests of work plans with practicing consultants suggested these three criteria were sufficient to accurately drive quality judgments as each consultant was able to identify the highest quality work plan. Additional pilot tests with undergraduates suggested less consistency, but a high capability to identify high quality work plans.

Fourteen work plans, which became the list of knowledge system search result items, were produced for how to do a data modeling project. These work plans varied in quality by changing the contents across the three quality characteristics: 1 item had none of the characteristics, 6 items only included one of the characteristics, 6 items had combinations of two of the characteristics and 1 item included all three characteristics of quality. Another fourteen items were produced of a database design work plan with the same quality distribution as the data modeling work plans. There were twenty-eight items in total (see Appendix E for screen prints of all work plans). Four different orders of items to be listed as knowledge system search results were randomly generated. All participants across treatment conditions accessed the same set of twenty-eight items, which were provided in one of the four orders to preclude an order effect.

4.2.3 Description of Task Type

McGrath (1984) defines three types of task for groups: idea-geneartaion, intellective and judgment. Based on McGrath's (1984) definitions, idea generation is a collaborative task where individuals add ideas, intellective is a coordination task where individuals are trying to solve problems with correct answers, and judgment is a conflict resolution task where no correct answer exists and group consensus is necessary. While the three types of tasks were originally defined for group interactions, they have been used in computer-human interaction settings, which the current task entails (Straus and McGrath 1994). In the current study, a correct (i.e., best) answer from the search results exists for building a new work plan for a data modeling and database design project. Thus, the current task most closely resembles the definition of an "intellective" task.

4.3 Experimental Procedures

Experimental sessions were at a pre-set location and times in order to monitor participation. A ten-minute tutorial on the task of building work plans was administered. The experimental materials were programmed in HTML, ASP, and MS Office products and placed on a host computer so that subjects participated in the study via the Internet. Subjects were provided an individual identification number upon arrival to their experimental session time. Controls were built into the program such that each identification number was granted one-time authorization to the cases and once answers to each case and each screen of the questionnaire were submitted they could not be changed. The program allowed participants to return to and review the introduction materials while performing the case (see Appendix F for copies of administrative materials).

4.4 Design and Measures

This section discusses the experimental design, independent variables, dependent variables, process variables, and controls and other manipulation checks.

4.4.1 Design and Independent Variables

To check the baseline condition of the effect of rating accuracy on decision performance, the first experiment employed a two level (content rating and content quality: accurate and inaccurate) between-subjects randomized design. Content ratings[6] were operationalized as a reported rating value equal to five indicating the item is "highly valuable", four indicating the item is "somewhat valuable", two indicating the item is "somewhat worthless" or one indicated the item is "worthless" (a list of variables and their operationalizations is found in Table 4.1). Content rating value equal to three was not included in order to improve the strength of the ratings accuracy manipulation. Subjects viewed a list of items from the knowledge system where each item had accurate or inaccurate ratings.

Table 4.1. Variables and Operationalization

Variable	**Operationalization**
Independent Variables for H1-H3	
High Rating Accuracy	*Accurate* ratings, where work plan contents include the following # of quality characteristics: • all three and rating = 5 (1 Knowledge System item), • two and rating = 4 (6 Knowledge System items), • one and rating = 2 (6 Knowledge System items), and • none and rating = 1 (1 Knowledge System item).
Low Rating Accuracy	*Inaccurate* ratings, where work plan contents include the following # of quality characteristics: • all three and rating = 1 (1 Knowledge System item), • two and rating = 2 (6 Knowledge System items), • one and rating = 4 (6 Knowledge System items), and • none and rating = 5 (1 Knowledge System item).
Specific Independent Variables for H1	
Subjects told: "across the system, Number of Raters is 3 to 97 depending on the item. The Number of Raters in your search results is LOW [HIGH] compared to the average for an item of 50."	
Rater sample size high	Number of raters randomly assigned to work plan item ranged from 93-97.
Rater sample size low	Number of raters randomly assigned to work plan item ranged from 3-7.
Specific Independent Variables for H2	

[6] The following is evidence the scale used is consistent with the natural setting: one system explained the assessment process as "casting a vote…is entirely optional, if you think that the [item] is superb, you might rate it as a five star…, or if you think that it's unspeakably dismal, you might choose to rate [it] a single star" (http://www.allforums.net/forums/). Also, one large consulting firm asks "How would you rate this …item? Best Item(5), Very Useful(4), Useful(3), Less Useful(2), and No longer Useful(1)."

Subjects told: "across the system, % of Raters Who are Experts is 4% to 92% depending on item. The % of Raters Who are Experts for your search results is LOW [HIGH] compared to the average for an item of 48%."	
Source expertise high	Number of raters randomly assigned to work plan item ranged from 88-92.
Source expertise low	Number of raters randomly assigned to work plan item ranged from 4-8.
Specific Independent Variables for H3	
Subjects told: "Recommendations from the system can exactly or not exactly match the quality of the original item. Recommendations from the system in your search results are known to [NOT] EXACTLY match in quality between items recommended and the original item."	
Collaborative filter sophistication high	Recommendations of work plan items were provided by recommending item that had the *same* level of quality.
Collaborative filter sophistication low	Recommendations of work plan items were provided by recommending item that had the *reverse* level of quality.

To test H1a-H1c, the second experiment employed a two (content rating and content quality: accurate and inaccurate) by two (rater sample size: low and high) between-subjects[7] randomized design. Rater sample size was operationalized as "number of raters" where each knowledge system item was randomly assigned a value from 93 to 97 (3 to 7) for the high (low) condition. Sample size was allowed to vary slightly to maintain external validity. Even though sample size ranges were kept narrow, the highest and lowest quality items were assigned the mid-point value for sample size of 95 (5) for the high (low) condition in order to eliminate subjects using extreme values to direct inferences of rating credibility. Narrow ranges for sample size are important because this study examines between-subjects treatment conditions of how the number of raters affects perceptions of rating credibility not how the variance in the number of raters influences these perceptions. Subjects were told "across the system, Number of Raters is 3 to 97 depending on the item. The Number of Raters in your search results is LOW [HIGH] compared to the average for an item of 50." Subjects viewed a list of knowledge

[7] A between-subjects design is consistent with the natural setting where people will have ratings from only a large or a small number or raters (experts) such as between departments or subject areas within a firm or between firms. A hypothetical example includes when more work is being performed on a topic, it may be accessed and rated by more raters, while other content related to work performed less often will be used and rated less.

system items with accurate or inaccurate ratings and between 93 to 97 or 3 to 7 number of raters.

To test H2a-H2c, the third experiment employed a two (content rating and content quality: accurate and inaccurate) by two (percentage of raters are experts: low and high) between-subjects randomized design. Percentage of raters are experts was operationalized as "% raters experts" where each knowledge system item was randomly assigned a value from 88% to 92% (4% to 8%) for the high (low) condition. The highest and lowest quality items were assigned the mid-point value of 90% (6%) for the high (low) condition to neutralize the effect of the variance of the percentage of raters on inferences of rating credibility. Subjects were told the balance of raters were not experts in the item's topic. Subjects were "across the system, % of Raters Who are Experts is 4% to 92% depending on item. The % of Raters Who are Experts for your search results is LOW [HIGH] compared to the average for an item of 48%." Subjects viewed a list of knowledge system items with accurate and inaccurate ratings and between 88% to 92% or 4% to 8% raters who are experts.

To test H3a-H3c, the fourth experiment employed a two (content rating and content quality: accurate and inaccurate) by two (collaborative filtering sophistication: low and high) between-subjects randomized design. Collaborative filtering was operationalized by providing subjects referrals to other items under the heading "recommend also". High (low) filtering sophistication was operationalized as a referral to another item of equal (unequal) quality, regardless of rating level. Subjects were told "Recommendations from the system can exactly or not exactly match the quality of the original item. Recommendations in your search results are known to [NOT] EXACTLY match in quality between items recommended and the original item." Subjects viewed a list of knowledge system items with accurate or inaccurate ratings and a note that the helpfulness of recommendations from the system in their search results do [NOT] EXACTLY match.

All subjects received the same information at the beginning of the experiment. After reading the introduction materials and consulting case (i.e., task instructions), subjects activated the knowledge system search results screen. At this point, each subject viewed a different manipulated independent factor operationalized as discussed on the knowledge system search results screen depending on the case to which they were randomly assigned before the experiment began.

4.4.2 Dependent Variables

Knowledge systems should support the joint objectives of a decision-maker to maximize decision quality and minimize effort (Todd and Benbasat 1992). Thus, for all four experiments, the dependent variable was a measure of task performance quality based on using the highest quality items. The study also measured task performance time as a potential control being examined during data analysis for its correlation with performance quality. Since a subject could trade off task decision quality for time, experimental performance incentives rewarded participants for both decision quality and time efficiency:

- **Task decision quality**— The "best" answer is defined as a work plan submitted where its contents matched the contents of combining the two 100% quality items. Each subject's score was calculated as the number of line items in the subject's answer matching the line items in the "best" answer divided by the total number of line items in the "best" answer minus 75%[8] of the number of line items included in the subject's answer that were not found in the "best" answer, and

[8] See further discussion in section 4.4.2.1.

- o **Task decision time**—measured as duration of time from when the participant accesses the case screen to when the participant submits an answer.

4.4.2.1 Scoring Procedures for Decision Quality

The decision task was to create the best work plan for a new client given a list of old work plans in a search result from the company knowledge system. Subjects were told to develop the best work plan, based on criteria provided by their manager, they could as quickly as possible. Work plans varied in quality from the most reliable and accurate (i.e., high quality content) to similar versions but lacking informative steps, personnel assignments, or enough senior time allocated (i.e., lower quality content). Thus, the highest quality work plan became the benchmark for scoring subjects' answers to the task. There were 36 line items in the highest quality work plan, including 19 for data modeling combined with 17 for database design.

Subjects could not add or delete text, but only choose line items from the work plans provided. The line items of each subject's answer were compared to the 36 line items of the highest quality work plan. For every line item matching a line item in the highest quality work plan, subjects received one point. Subjects were told the best answer had between 26-50 line items. As long as the answer had less than 36 lines (i.e., the number of lines in the best answer), the final score was calculated as the total number of points earned by including line items that matched the highest quality work plan. However, if the subject's answer had more than 36 lines, his/her final score was calculated as the total number of points earned minus three-fourths of a point for each line over 36.

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A penalty was used to penalize those who "dumped" content into their answer without careful selection. However, including extra line items is not as egregious as leaving out important content as managers can always prune subordinates work easier than figuring out what is missing from it; thus, a penalty of <100% was used. A 75% penalty was selected because errors of commission affect work efficiency but not effectiveness (i.e., time is lost by the senior who must sift through work plan lines provided by the junior to determine what to use in the final work plan).

Identical procedures were followed in scoring all subject's answer regardless of treatment condition. The objectivity of the scoring procedure was enhanced by scoring answers without any indication of subject's treatment condition.

4.4.3 Process Variables

Content ratings, credibility indicators, and content recommendations were expected to influence what items subjects select as well as their judgments of work plan quality. Thus, in an exploratory nature, to understand item selection behaviors better, this study captured the "click stream" or item selection pattern of participants. The data was used to find patterns across experimental conditions for item clicked first, item clicked most often, number of items selected, and items used most often in answers.

4.4.4 Controls and Other Manipulation Checks

The computer screens, settings, information, procedures and incentives were the same for all subjects, except for information related to manipulated independent variables. Thus, the environment and motivational influences were held constant across all subjects. While individual differences between subjects should be controlled by random assignment of subjects, some individual differences were deemed important to control. Important individual differences in information processing in decision-making were shown to exist for gender and experience (Newell and Simon 1972). Thus, gender was captured as a self-reported value and one-item measures regarding prior task and system use were included as a measure of prior experience for work plan design and knowledge system usage.

Because subjects think the task involved using information provided by others, how much someone relies on the input from others to manage their actions may be important. Accordingly, six measures capturing propensity for self-monitoring were used (Snyder 1974; Snyder and Gangestad 1986). Finally, a person's inherent trust in documented information on a computer screen could influence judgments and was measured based on modified versions of validated items for trust in on-line shopping (Borchers 2001; Cheung and Lee 2000) (a list of items measuring each control construct are in Table 5.7).

To reduce order effects (i.e., order of knowledge system item presentation), items were randomized in four different sets of orders; however, order effects were also be tested. Manipulation checks include measures to determine whether content ratings, credibility indicators and content recommendations were attended to based on the different treatment conditions.

CHAPTER 5

5. ANALYTICAL PROCEDURES AND RESULTS

The results of statistical analyses of data gathered during experimental sessions are presented in this chapter. The experimental subjects are described first, followed by the statistical methods used to analyze the data. The assumptions related to statistical techniques and results of appropriate manipulation checks are then presented.

5.1 Tests of Order Effects

Experiments are designed to achieve internal validity by eliminating biases that could cause the results instead of the intended manipulations predicted to cause the results. To increase internal validity, the experiment is designed to hold constant all influences on the results except the ones under systematic study. Important variables that are not controlled in this manner, or which are not sufficiently important to control, are allowed to vary randomly across treatment conditions (Keppel 1973). However, due to design limitations, some experimental factors may threaten internal validity. To check whether these factors affected internal validity, several order effects tests were performed on potentially non-random influences on task performance: session order and work plan order.

Subjects signed up for one of thirty lab experiment session times. Session times were limited to twenty students because the lab used for students to receive the oral tutorial and to access experimental materials only had twenty-four computers. Since decision time could be traded against decision quality, both variables are included in analyses. ANOVA results indicate there were no significant differences in decision quality across sessions ($F=1.161$, $p=.263$) as expected, but there were significant differences in decision time across sessions (F=2.575, p<.000) which was not expected. Mean decision quality and times by session are listed in Table 5.1.

Table 5.1 Mean Decision Quality and Decision Time by Session

Session	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Decision Quality	24.6 (9.3)	19.3 (10.6)	17.1 (10.9)	15.3 (9.9)	14.1 (9.1)	22.0 (9.1)	19.6 (8.9)	18.1 (11.2)	20.0 (13.1)	14.3 (2.0)
Decision Time	30.8 (6.1)	30.6 (16.5)	28.0 (11.4)	35.3 (10.1)	29.4 (8.5)	29.4 (9.9)	40.3 (9.2)	32.0 (14.4)	22.5 (8.3)	33.0 (7.5)
n =	6	8	19	12	13	15	11	6	6	3

Session	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Decision Quality	17.7 (13.1)	16.0 (10.0)	23.3 (3.4)	18.5 (11.2)	19.0 (9.1)	15.6 (12.6)	23.6 (6.4)	17.1 (10.7)	16.3 (13.8)	15.5 (4.9)
Decision Time	29.8 (13.5)	31.6 (7.2)	40.3 (11.9)	26.0 (6.2)	36.1 (7.5)	27.2 (9.5)	26.7 (10.9)	30.6 (12.8)	30.0 (9.4)	51.5 (2.1)
n =	12	14	3	19	18	18	7	10	15	2

Session	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Decision Quality	13.9 (10.3)	21.3 (12.4)	20.5 (10.6)	7.0 (-)	19.3 (14.7)	14.3 (12.2)	15.9 (9.5)	11.3 (9.5)	24.3 (11.2)	17.7 (11.0)
Decision Time	31.6 (10.0)	33.3 (10.1)	38.7 (11.9)	44.0 (-)	24.9 (7.7)	30.3 (10.3)	25.6 (8.8)	30.6 (7.5)	34.9 (10.0)	27.0 (9.1)
n =	21	19	15	1	18	18	14	20	16	20

Key: Mean, (Standard Deviation), n = number of participants.

The number of participants in a session could be driving the time differences. Having a large number of participants in a session increases the chance that different treatment conditions and diverse task performance strategies among subjects will influence other subjects through social pressures. Thus, mean decision time per session was regressed on the number of participants and the standard deviation of decision time for each of the thirty sessions. Results indicate *more* participants in a session resulted in *less* time spent on the task (t = -2.139, p = .042), while a greater standard deviation in time per session is not related to the average decision time per session (t = -1.237, p = .227).

Accordingly, since small and large sessions may provide different environments, data from the four smallest sessions (i.e., sessions 10, 13, 20, and 24 in Table 5.1) were eliminated. Mean decision time was again regressed on the number of participants and the standard deviation of decision time for the remaining twenty-six sessions. As anticipated, results indicate no relationship between task time and number of participants (t = .361, p = .721) or the standard deviation in time (t = .919, p = .368). The four small sessions eliminated appear to have created a different environment for subjects than the remaining twenty-six large sessions. Therefore, to maintain environmental homogeneity, the data from these sessions are eliminated bringing the total number of subjects included in analysis to three hundred seventy (370).

Subjects were randomly assigned to one of four experimental materials with the sequence of work plans presented as search results reordered, regardless of treatment condition used. However, the highest and lowest rated work plans were always located in position 5 to 10 among the total fourteen work plans listed for both data modeling and database design on the search results screen. This was done to reduce the chances of work plan position influencing decision performance. As expected, ANOVA results indicate there were no significant differences in decision quality (F=.199, p=.897) or decision time across different work plan orders (F=1.093, p=.352). The means of decision quality and times by work plan orders are listed in Table 5.2.

Table 5.2 Mean Decision Quality and Decision Time by Work Plan Orders

Work Plan Order	**1**	**2**	**3**	**4**
Decision Quality	18.2 (11.8)	17.8 (11.2)	17.0 (10.8)	16.8 (10.3)
Decision Time	29.6 (9.1)	30.6 (10.2)	31.7 (10.9)	29.5 (10.9)
n =	52	192	73	53

5.2 Descriptive Data About Experimental Subjects

Subjects in the experiment were students enrolled in an Introduction to Management Information Systems course during the Fall 2002 semester at a large public university in the Midwestern U.S. The course is a required component of a Business major at this university and is typically taken in a student's junior or senior year. Four hundred ten students participated in one of the four inter-related experiments. The data from nine students were removed because each subject indicated participation in previous pilots of the same experiment. The data from twelve more students who indicated English was not their native language were removed because pilot studies indicated that these subjects found it difficult to read experimental instructions and complete the experimental task timely. Additionally, the data was excluded for five subjects because of an insufficient attempt to complete the task or because they included almost all of the content choices into their answer without deciding what to use. After eliminating the nine subjects in the smallest sessions, data from the remaining 370 participants is analyzed below[9].

The experiment was held in the same week in the semester in order for students to have adequate and comparable exposure to the course content, which provided the necessary background to perform the experimental task. Additionally, 98% of students were business majors and 97% of the students in the subject pool were in their junior or senior year. These characteristics of the subject pool suggest a fairly homogeneous sample with respect to background, experience levels, skills, and knowledge of

[9] When eliminated data are included in ANCOVAs, main effects of rating accuracy on decision quality remain significant while interactions for all three experiments are insignificant. However, the eliminated data were removed to ensure homogeneity of subject pool based on objective criteria as noted above, not based on their contribution to statistical significance.

computing and creating work plans. However, to further check whether the sample was homogeneous, demographic factors were captured and analyzed for variance across treatment conditions: year in school, age, gender and experience with knowledge management systems (see Appendix G which summarizes sample sizes by treatment for year in school in Table G.1, for age in Table G.2, for gender in Table G.3 and for experience in Table G.4). Random assignment of subjects to treatment conditions are expected to eliminate any systematic differences among the treatment conditions due to additional demographic factors.

Chi-square tests were conducted on year in school, age, gender and experience to check for possible differences across treatments within each of the four inter-related experiments. The chi-square test is a non-parametric test with no assumptions regarding the underlying distribution of the data. The test does assume a random sample and expected frequencies should be at least one with no more than twenty percent of the categories being less than five. The data analyzed here meets these requirements. The chi-square statistics indicate no significant differences for year in school, age, gender or experience across treatments in any of the experiments (for chi-square statistics for year in school see Table 5.3, for age see Table 5.4, for gender see Table 5.5, and for experience see Table 5.6).

Table 5.3 Chi-Squared Statistics for Subject Year in School by Treatment

Exprmt	**Baseline**	**Rater Sample Size**	**Rater Expertise**	**Filter Sophistication**
Chi-square	.340 (d.f.=2,p=.844)	3.445 (d.f.=6,p=.751)	6.719 (d.f.=6,p=.348)	5.055 (d.f.=6,p=.537)

Table 5.4 Chi-Squared Statistics for Subject Age by Treatment

Exprmt	Baseline	Rater Sample Size	Rater Expertise	Filter Sophistication
Chi-square	1.525 (d.f.=4,p=.822)	21.929 (d.f.=15,p=.110)	17.903 (d.f.=15,p=.268)	16.206 (d.f.=18,p=.578)

Table 5.5 Chi-Squared Statistics for Subject Gender by Treatment

Exprmt	Baseline	Rater Sample Size	Rater Expertise	Filter Sophistication
Chi-square	1.574 (d.f.=1,p=.210)	.559 (d.f. = 3,p = .906)	2.984 (d.f. = 3,p = .394)	3.099 (d.f. = 3,p = .263)

Table 5.6 Chi-Squared Statistics for Subject Experience by Treatment

Exprmt	Baseline	Rater Sample Size	Rater Expertise	Filter Sophistication
Chi-square	.219 (d.f.=3,p=.974)	7.448 (d.f. = 9,p = .591)	11.166 (d.f. = 9,p = .265)	5.438 (d.f. = 12,p = .942)

5.3 Statistical Method

The analytical techniques used to evaluate the experimental data, control variables, and assumptions underlying the use of the statistical tests are presented in this section. Analysis of variance (ANOVA) models are intended for applications when the effects of one or more independent variables (i.e., classification or experimental factors) on the dependent variable are of interest (Neter, Kutner, Nachtsheim and Wasserman 1996). ANOVA, ANCOVA, and post-hoc planned comparisons were used to analyze the data.

For more than one dependent variable, the use of MANOVA or MANCOVA are needed to maintain control over the experiment-wide error rate and are used when there is some degree of inter-correlation among the dependent variables (Kerlinger 1986). The purpose of this study is to understand how each manipulation affects decision quality;

however, decision quality could be traded for decision time. Since higher quality decisions can be achieved through longer decision time, the relationship between decision quality and time was evaluated. The inter-correlation between decision quality and time is not significant in this study (r =.001, p=.978), and thus, MANOVA/ MANCOVA was not used and decision time will not be considered.

5.3.1 Covariate Measures

The covariates examined and measures used in the experiment are presented in Table 5.7. To remove extraneous influences from the dependent variable increasing the within-group variance, specific individual characteristics (gender, domain expertise, distrust, and self-monitoring) were examined as potential covariates that may influence task decision quality. (See Chapters 4 for details regarding the necessity for controlling for these characteristics). While the intent of random assignment is to eliminate systematic differences among the treatment conditions, some individual characteristics may be deemed too important not to control. The use of ANCOVA is recommended when the covariates under examination are highly correlated with the dependent variables but not with the independent variables (Hair, Anderson, Tatham and Black 1998).

Table 5.7 Covariates and Post Hoc Analysis Construct

Potential Covariate	**Measures (all self reported unless indicated otherwise)**	**Reference**
Gender	Check box for Female or Male (female = 1, male = 0)	--
Expertise	On a scale of 1 (know nothing) to 5 (am an expert = 5), how would you rate your knowledge about knowledge management systems?	--
The following use a 10-point scale from 1=Strongly agree to 10=Strongly disagree:		
Distrust	Relying on "ratings" of Search Result items is risky. The "rating" provided for a Search Result item cannot be trusted.	Wrightsman 1991
Self-Monitoring	I can only argue for ideas, which I already believe. (reverse)	Snyder 1974;

	I guess I put on a show to impress or entertain others. I would probably make a good actor. In a group of people I am rarely the center of attention. (reverse) I have considered being an entertainer. At a party I let others keep the jokes and stories going. (reverse)	Snyder and Gangestad 1986
Post Hoc Construct	**Measures (all self reported unless indicated otherwise)**	**Reference**
Confidence	I would like to run another search to look at more work plans, then possibly revise the work plan I submitted. I do not want to give the plan of work that I submitted to my manager. There are better answers than the one I submitted. I am confident my choices were the best ones possible. (reverse)	--

5.3.2 Confirmatory Factor Analysis of Covariate Measures

To maximize the explanation of the entire set of covariates and make data analysis more parsimonious, confirmatory factor analysis was used to assess discriminant validity for the covariate constructs of distrust and self-monitoring and post hoc construct of confidence. Factor analysis is an interdependence technique where all variables are simultaneously considered, each related to all others. With twelve measures and 340 in the smallest sample size for the measures, there is a 28-to-1 ratio of observations to variables, which is greater than necessary and there appears to be adequate sample size for calculating the correlations between measures (Hair, Anderson, Tatham and Black 1998). Factor analysis was performed using the scores for all the measures related to confidence, distrust, and self-monitoring. To examine the factorability of the correlation matrix, some degree of multicollinearity is needed since the objective of factor analysis is to identify interrelated sets of variables. Thus, the bi-variate correlations among the original measures are shown in Appendix H. Inspecting the correlations reveals many correlations above .30, the Bartlett Test of Sphericity = 766.9 (p=.000), however, this test is sensitive to large sample sizes, and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy = .648 indicating factor analysis is appropriate (Hair, Anderson, Tatham and Black 1998).

Each item with low loadings on the factor it was purported to measure and high loadings on other factors was eliminated. Only one measure was removed which was the first measure for self-monitoring. The result is four measures for confidence, two for trust, and five for self-monitoring. The remaining measures were factor analyzed together providing the eigenvalues for three factors as shown in Table 5.8. The three factors represent 55 percent of the variance of the eleven measures. The VARIMAX rotation component analysis matrix is shown in Table 5.9.

Table 5.8 Results for the Extraction of Component Factors

Label	**Eigenvalue**	**Percent of Variance**	**Cumulative Percent of Variance**
1	2.556	23.2	23.2
2	1.869	17.0	40.2
3	1.579	14.4	54.6

Table 5.9 Principal Components Analysis Factor Matrix
(with coefficients below 0.2 suppressed, highest loadings are italicized)

Meas-ure	**Factor 1**	**Factor 2**	**Factor 3**	**Communality**
Conf1	.28640	*.43779*		.29171
Conf2	.32741	*.63175*	-.21114	.55089
Conf3	.34799	*.74624*		.70003
Conf4	.24399	*.55745*		.40212
Dist1		.24643	*.85891*	.79847
Dist2		.28430	*.83939*	.79426
Self2	*.65982*			.46501
Self3	*.74689*	-.29119		.66024
Self4	*.70443*	-.25695		.56233
Self5	*.64000*	-.20289		.45137
Self6	*.52721*	-.21873		.32665

Factors scores were generated and used in ANCOVAs because they are orthogonal while summated scores are not.

5.3.3 Effect of Covariate Measures on Dependent Variable

Before including potential covariates in the remaining analysis, decision quality was regressed on each variable alone for each of the four inter-related experiments separately. This is to determine if the potential covariates provide explanatory power (see t-statistics in Table 5.10). Regression results indicate a significant relationship between decision quality and domain expertise depending on experiment.

Table 5.10 Regression of Decision Quality on Control Variables
Post Factor Analysis
t-statistic (p-value)

Experiment	**Baseline**	**Rater Sample Size**	**Rater Expertise**	**Filter Sophistication**
Decision Quality				
Gender	.048 (.962)	-1.602 (.112)	-.558 (.578)	1.445 (.152)
Expertise	-.158 (.875)	***2.867 (.005)***	***-2.626 (.010)***	***-2.680 (.009)***
Distrust	.395 (.695)	.692 (.490)	.749 (.456)	-.367 (.714)
Self Monitoring	.168 (.867)	.022 (.983)	.146 (.884)	1.225 (.224)

The effect of control variables on the dependent variables is more random than anticipated. Domain expertise and no other control variables appears to matter consistently across experiments. Thus, variables with significant relationships with a dependent variable were included only as covariates in the ANCOVA model in the experiment for which the significant relationship occurred.

5.3.4 Assumptions Underlying Statistical Analyses

The univariate test procedures of ANOVA are valid when assuming the dependent variable is normally distributed and variances are equal for all treatment groups. Evidence indicates when sample sizes are equivalent and relatively large, F tests

in ANOVA are robust with regard to these assumptions except in extreme cases (Hair, Anderson, Tatham and Black 1998). All of the tests conducted in this study are made between cells with fairly large, equal sample sizes, however, this study will examine these assumptions regardless of whether the F tests are robust. While the assumption of independence among observations only applies to MANOVA type tests, this assumption is also examined in this study.

First, Kolmogorov-Smirnov tests were conducted to assess the distribution of each of the dependent variables in each treatment condition. As expected, none of the tests of normality within each cell were significant for either dependent variable (see test results in Table 5.11). Thus, the null hypothesis of each test stating a normal distribution fits the data cannot be rejected and the assumption of normal distribution within treatments was satisfied.

Table 5.11 Results of the Kolmogorov-Smirnov (K-S) Goodness of Fit Test

Experiment	**Manipulation**	**K-S Z**	**p-value**
Decision Quality			
Baseline Condition	Accurate Ratings	.735	.652
	Inaccurate Ratings	.414	.995
# of Raters	Accurate X Low Sample Size	.837	.486
	Inaccurate X Low Sample Size	.991	.280
	Accurate X High Sample Size	.743	.640
	Inaccurate X High Sample Size	1.068	.204
Rater Expertise	Accurate X Low % Experts	.714	.687
	Inaccurate X Low % Experts	.825	.503
	Accurate X High % Experts	.636	.814
	Inaccurate X High % Experts	.846	.471
Filter Sophistication	Accurate X Low Sophistication	.519	.950
	Inaccurate X Low Sophistication	.887	.411
	Accurate X High Sophistication	.990	.281
	Inaccurate X High Sophistication	.757	.615

Second, the Levene test was used to assess the homogeneity of variances across treatment conditions within each experiment. The Levene test is computed performing a 1-way ANOVA on the absolute difference of each case from the mean. The Levene test was not significant for either dependent variable in all treatments, except for the treatments related to the percentage of raters who are experts (see test results in Table 5.12). Thus, the null hypothesis of each test stating variances are equal across groups cannot be rejected and the assumption of equal variances within treatments was satisfied for all treatments (see Table 5.14 for a summary of means and standard deviations per treatment condition).

Table 5.12 Results of the Levene Test of Homogeneity of Variance

Exprmt	**Baseline**	**Rater Sample Size**	**Rater Expertise**	**Filter Sophistication**
Decision Quality				
Levene	1.579	2.063	.751	.237
p-value	.215	.110	.524	.870

Third, random assignment of subjects to treatments was used to insure the independence among observations in all treatment conditions.

5.4 Manipulation Checks

Data collected in the post-experiment questionnaire was used to perform manipulation checks to assess the adequacy of the experimental manipulations in all four experiments. Subjects were only asked questions related to the manipulations of the experiment for which they were assigned. Across all experiments, ratings provided to subjects either accurately or inaccurately reflected the actual content quality [i.e., highly rated items were actually high (low) quality content in the accurate (inaccurate) conditions]. Thus, all subjects in each experiment were asked about this manipulation.

Then in the experiments that also provided the number of raters, percentage of raters who were experts, and collaborative filter recommendation sophistication level, those subjects were only asked about the specific information they received. F-tests from ANOVAs were used to compare subjects' answers to these questions between associated treatment conditions (see Table 5.13 for results). As expected, all the test statistics are significant, including the marginally significant one for collaborative filter sophistication; thus, subjects in different treatment conditions perceive the differences between their conditions and manipulations appear to be working as anticipated[10].

Table 5.13 Results of Manipulation Checks for Treatment Conditions

Treatment	Means	Direction Expected	F-test	p-value
Baseline Condition	Accurate = 3.59 Inaccurate = 4.84	Accurate<Inaccurate	32.647	.000
Rater Sample Size	High = 4.06 Low = 6.86	High < Low	26.431	.000
Rater Expertise	High = 3.59 Low = 6.22	High < Low	30.438	.000
Filter Sophistication	High = 4.97 Low = 6.02	High < Low	3.555	.060

5.5 Hypothesis Testing

Based on the experimental data, this section describes the results of testing the hypotheses using statistical analyses.

5.5.1 Hypothesis Testing Results

The ANCOVA results for the test of each hypothesis are presented in Table 5.14, Table 5.15 and Table 5.16. The means and standard deviation for each hypothesis is presented in Table 5.14, the hypothesis number, experimental manipulation, dependent

[10] In addition, data from those subjects whose answer to manipulation checks were completely incorrect were removed from the sample. Statistical results without these data are the same as those reported below.

variable, degrees of freedom, test-statistic and p-value for each is presented in Table 5.15, and the control variable significance tests are in Table 5.16. All tests results include covariate effects and decision quality as a raw score for the entire task. Identical tests were run without covariates, with decision quality as a percentage of total score, and separately for decision quality scores for the data modeling and database design portions of the task, which all provided similar results.

Table 5.14 Summary of Means and Standard Deviations by Treatment Condition for Decision Quality

Providing Content Ratings (baseline condition)

Rating Level and Content Quality	Accurate	20.09 (8.89)
	Inaccurate	10.41 (7.77)

Providing Rater Sample Size

		Rater Sample Size	
		Low	High
Rating Level and Content Quality	Accurate	27.43 (6.67)	22.76 (10.37)
	Inaccurate	9.24 (8.19)	9.76 (8.91)

Providing Rater Expertise

		Rater Expertise	
		Low	High
Rating Level and Content Quality	Accurate	23.75 (8.26)	25.89 (7.37)
	Inaccurate	10.31 (8.53)	5.54 (7.27)

Providing Collaborative Filtering

		Filter Sophistication	
		Low	High
Rating Level and Content Quality	Accurate	23.00 (9.06)	25.30 (8.21)
	Inaccurate	9.40 (9.09)	11.18 (10.21)

Table 5.15 Summary of F-Statistics and p-values for each Hypothesis (results from ANCOVA, see control variables in Table 5.16)

Hypothesis	Manipulation	d.f.	F	p-value (1-tailed)
Baseline	Accurate vs. Inaccurate	1,43	17.241	.000**
Interaction Hypotheses				
H1a	In/Accurate X High/Low Sample Size	1,97	1.777	.093^
H2a	In/Accurate X High/Low % Experts	1,106	2.936	.045**
H3a	In/Accurate X High/Low Sophistication	1,98	.087	.384
		d.f.	**t**	**p-value**
Planned Contrasts				
H1b	Inaccurate, High/Low Sample Size	104	.440	.331
H1c	Accurate, High/Low Sample Size	104	1.679	.048^
H2b	Inaccurate, High/Low % Experts	105	1.682	.048**
H2c	Accurate, High/Low % Experts	105	1.158	.125
H3b	Inaccurate, High/Low Sophistication	105	.532	.301
H3c	Accurate, High/Low Sophistication	105	.539	.296

Key: ^ direction of mean comparisons not as hypothesized, ** p<.05.

Table 5.16 Summary of t-Statistics and p-values for Control Variables by Hypothesis
(results from ANCOVA, controls only included if found significant in regressions with dependent variable, see Table 5.10)

Hypothesis	Control Variable		
	Gender	**Domain Expertise**	**Distrust**
Baseline	--	--	--
H1a	--	3.824 (.053)	--
H2a	--	5.504 (.021)	--
H3a	--	7.421 (.008)	--

To illustrate the interaction of means in each experiment, see Figures 5.1 for rater sample size, Figure 5.2 for rater expertise and Figures 5.3 for collaborative filter sophistication results for decision quality.

Figure 5.1 Mean Plots for Decision Quality in Rater Sample Size Experiment

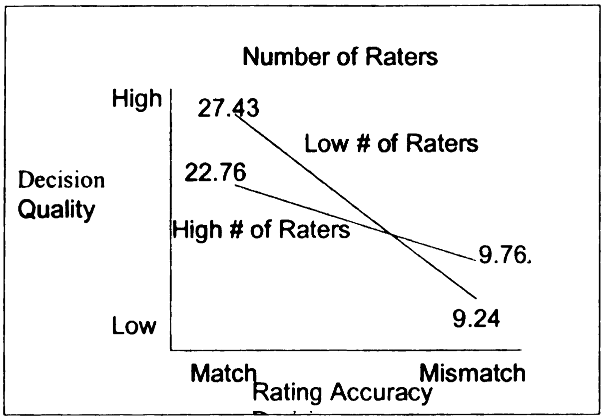


Figure 5.2 Mean Plots for Decision Quality in Rater Expertise Experiment

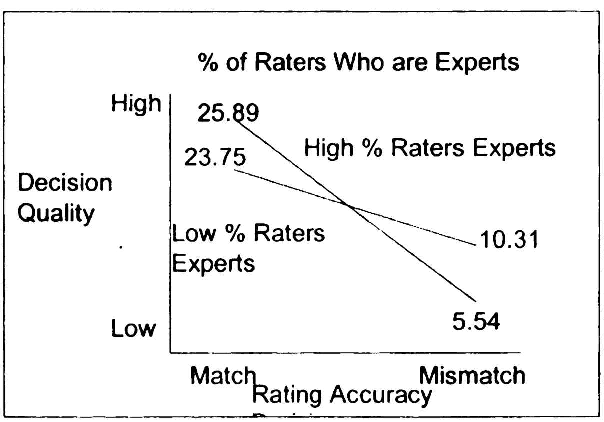
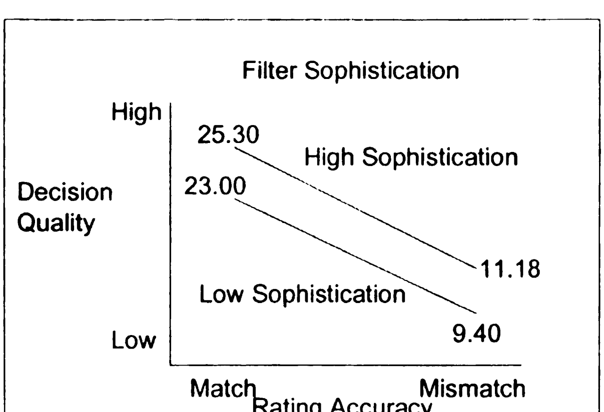


Figure 5.3 Mean Plots for Decision Quality in Collaborative Filter Experiment



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5.5.2 Baseline Condition

While no formal hypothesis was constructed, the main effect of rating accuracy levels was hypothesized as a baseline condition. It was predicted that those with accurate ratings would have higher decision quality than those with inaccurate ratings. The statistical results from the ANCOVA used to test this baseline condition are presented in Table 5.15 under column Hypothesis, the row labeled Baseline. The accurate ratings treatment resulted in significantly higher decision quality (p=.000) than the inaccurate ratings treatment. Hence the baseline condition is supported for decision quality.

5.5.3 Rater Sample Size (H1)

For all remaining hypothesis tests, the statistical results from the ANCOVA used are presented in Table 5.15 and the hypothesis number being examined is listed under the column labeled Hypothesis for both interactions and planned contrasts tests. Hypotheses H1a examined the interaction effect of rating accuracy and high/low sample size for decision quality. The interaction between rating accuracy treatment and high/low sample size is marginally significant for decision quality (p=.093), but opposite the direction hypothesized, meaning H1a is not supported.

Hypotheses H1b examined the difference between decision quality for high and low sample size when ratings were inaccurate. With inaccurate ratings, the difference between high/low sample size does not appear to be significant for decision quality (p=.331). Thus, H1b is not supported.

Hypotheses H1c examined the difference between decision quality for high and low sample size when ratings were accurate. While the difference for decision quality appears to be significant (p=.048), the difference between means is not in the direction predicted, so H1e is not supported.

5.5.4 Rater Expertise (H2)

Hypotheses H2a examined the interaction effect of rating accuracy and high/low rater expertise for decision quality. The interaction between rating accuracy treatment and high/low rater expertise is significant for decision quality (p=.045) and in the direction predicted. Thus, H2a is supported.

Hypotheses H2b examined the difference between decision quality for high and low rater expertise when ratings were inaccurate. With inaccurate ratings, the difference between high/low rater expertise does appear to be significant for decision quality (p=.048). Thus, H2b is supported.

Hypotheses H2c examined the difference between decision quality for high and low rater expertise when ratings were accurate. With accurate ratings, the difference between high/low rater expertise does not appear to be significant for decision quality (p=.125). Thus, H2c is not supported.

5.5.5 Filter Sophistication (H3)

Hypotheses H3a examined the interaction effect of rating accuracy and high/low collaborative filter sophistication for decision quality. The interaction between rating accuracy treatment and high/low collaborative filter sophistication is not significant for decision quality (p=.384). Thus, H3a is not supported.

Hypotheses H3b examined the difference between decision quality for high and low collaborative filter sophistication when ratings were inaccurate. With inaccurate ratings, the difference between high/low collaborative filter sophistication does not appear to be significant for decision quality (p=.301). Thus, H3c is not supported.

Hypotheses H3c examined the difference between decision quality for high and low collaborative filter sophistication when ratings were accurate. With accurate ratings, the difference between high/low collaborative filter sophistication does not appear to be significant for decision quality (p=.296). Thus, H3e is not supported.

5.5.6 Summary of Hypothesis Testing

Predictions regarding the direct influence of ratings on content use were generally supported for decision quality. However, only the percentage of raters who were experts and none of the other predicted influences of additional information, such as number of raters or collaborative filter sophistication, had a significant influence on decision behaviors in the direction predicted. This leads to the question:

> Why did the percentage of raters who were experts influence decisions while rater sample size and collaborative filter recommendations did not?
>
> Why did people given bad data (inaccurate ratings) not access and use more information when rater sample size and collaborative filter recommendations were provided?

The following post-hoc analysis examines data gathered during experimental sessions regarding information selection and use in the subjects' performance of the task.

5.6 Summary of Results of Post Hoc Analysis on Information Search Data

Additional post hoc analyses were performed to investigate search process behaviors of subjects' task performance to support ex ante theoretical predictions. Post hoc analyses include 1) examining answers to post-task questions regarding beliefs, 2) investigating if subjects who knew their performance level is related to outcomes, 3) exploring information search processes based on both click stream and work plan answer data, and 4) studying initial search strategy effects on task performance. Each section contains a summarized description of the data and discussion of significant findings. The following is a summary of findings only; a complete detailed discussion of post hoc statistical analyses is located in Appendix J.

5.6.1 Answers to Post-Task Questions

After subjects completed the experimental task, they were asked several questions regarding their beliefs about rating information. Unexpected answers to post-task questions reveal that subjects did not believe rater sample size and rater expertise were from objective sources as they were intended to convey. On average, subjects, regardless of treatment condition, agreed with the following statement: "The number of raters (level of rater expertise) value provided in my Search Results was based on the opinions of other consultants in the firm." This may be evidence that subjects may not fully understand the intended source of information provided. Subjects may believe the rater sample size is prone to manipulation and rater expertise is based on a subjective (i.e., from the correctness of ratings) instead of objective criterion arrived at separately from ratings. Future research should investigate beliefs about rating information sources and how these beliefs influence rating information usage.

Additionally, when credibility indicators or content recommendations are low, the expectation was that individuals should ignore ratings, but this does not appear to be the case. In fact, the opposite was found where those with high credibility indicators/content recommendations indicated they used ratings less than those in the low credibility indicators/content recommendations in the experiments for rater sample size and filter sophistication. Meanwhile, reliance on ratings does appear to be consistent with predictions in the rater expertise experiment where those with low rater expertise values indicated they used ratings less than those with high rater expertise. However, these differences are not statistically significant. This evidence indicates individuals may use rater expertise but not rater sample size or filter sophistication information as predicted by the decision theory guiding hypotheses.

5.6.2 Subjects Who Knew Their Performance Level and Rating Accuracy

This section examines whether subjects who know how well or badly they did or how useful or unuseful ratings were do better than those who did not know. This was measured using two measures of self-calibration, which were calculated as the correspondence between subjective assessment of own performance and the actual objective performance achieved and as the correspondence between subjective assessment of rating correctness and the actual rating accurately reflecting content quality (Phillips 1973). Rating Condition Calibration and Quality Performance Calibration are described in Table 5.17. Rating Condition Calibration and Quality Performance Calibration are both positively correlated with decision quality but have no relation with decision time. In general, when subjects knew ratings were helpful or not or knew their performance level, they were able to perform more effectively. The lack of correlation with time is not surprising as those in the accurate ratings condition should have faster times offsetting those in the inaccurate ratings condition who should have slower times, regardless of self-calibration levels.

Table 5.17 Post Hoc Analysis Constructs and Measures

Construct	Measure (all self reported unless indicated otherwise)
The following use a 10-point scale from 1=Strongly agree to 10=Strongly disagree:	
Decision Quality Calibration	Calculated as the value of Confidence Factor if score >=18 and the value of reversed scale Confidence Factor if score <18, where 18 is the midpoint of the possible quality score.
Rating Condition Calibration	Calculated as the value of Manipulation Check for Rating if assigned to the accurate rating condition and the value of reversed scale of Manipulation Check for Rating if assigned to the inaccurate rating condition. Manipulation Check for Rating: I felt the "ratings" provided were actually consistent with the overall quality of their associated work plan.
Confidence	I would like to run another search to look at more work plans, then possibly revise the work plan I submitted. I do not want to give the plan of work that I submitted to my manager. There are better answers than the one I submitted. I am confident my choices were the best ones possible. (reverse)

Unexpectedly, t-tests indicate across all experiments, no difference exists between treatments for Decision Quality Calibration, but for Ratings Condition Calibration, subjects in the accurate ratings conditions were better calibrated than those in the inaccurate ratings condition. This suggests subjects tended to believe ratings reflected content quality regardless of whether ratings were accurate or inaccurate. This could mean subjects knew ratings were accurate when ratings were accurate but did not know they were inaccurate when they were inaccurate. Alternatively, it could mean subjects tended to assume ratings are accurate regardless of reality.

To further examine how Rating Condition Calibration may influence decision performance, Table 5.18 illustrates the decision performance differences between those who knew versus did not know when ratings were accurate. Independent sample t-tests indicate when ratings were accurate, those that knew this achieved a higher quality score and when ratings were inaccurate, those that did not know this achieved a higher quality score. With respect to time taken on the task, in all cases those that did not know their rating accuracy level took more time than those that did know their rating accuracy level, however, this difference is statistically insignificant. Also, regression results indicate those correctly knowing how well they performed and knowing the actual rating accuracy level actually performed better than those that did not know how well they performed or the actual rating accuracy level. This means those performing badly who knew it, performed better than those who did not know how badly they performed.

Table 5.18 Knowing Rating Accuracy and Decision Performance
Mean (standard deviation)

Panel A: Independent Samples t-tests Between Knowing/Not Knowing[11]			
Rating Accuracy	**Knew/Didn't Know**	**Quality Score**	**Time in Mins.**
All Subjects	Knew	17.3 (11.9)	29.8 (10.4)
	Didn't Know	15.7 (10.0)	31.6 (10.1)
	t-test	t=1.312, p=.190	t=1.560, p=.120
Accurate	Knew	24.9 (8.7)	29.8 (11.4)
	Didn't Know	21.8 (8.1)	30.2 (9.1)
	t-test	t=2.022, p=.045**	t=.251, p=.802
Inaccurate	Knew	6.7 (6.4)	29.9 (8.8)
	Didn't Know	12.6 (9.4)	32.3 (10.6)
	t-test	t=5.009, p=.000**	t=1.630, p=.105
Panel B: Regressing Decision Performance on Knowing/Not Knowing			
Dependent Variable	**Knew/Didn't Know Variable**	**t-statistic**	
Quality	Rating Condit'n Cal.	t=12.93, p=.00**	
	Decision Qual. Cal.	t=2.43, p=.00**	
Time	Rating Condit'n Cal.	t=-.37, p=.71	
	Decision Qual. Cal.	t=-13, p=.90	

Key: ** p<.05.

[11] Results reported for Rating Condition Calibration calculated as a dichotomous value: Calculated as = 1 if in accurate (inaccurate) rating condition and selected a value of <= 4 (>= 7) on the Manipulation Check for Rating below. Otherwise = 0.

It was expected that inaccurate ratings would trigger subjects to use credibility indicators or content recommendations and with low credibility indicators filter sophistication this should suggest inaccurate ratings. Unexpectedly, subjects with low credibility indicators or filter sophistication appear to know their rating condition least. Thus, inaccurate ratings may not be triggering the use of additional rating information, as expected, and future research is needed to explain this finding.

5.6.3 Information Search Process Measures

Information search measures were also dynamically collected reflecting behaviors subjects followed regarding the selection and use of search result items. Information search measures have been widely used as a process tracing technique (Payne 1976; Svenson 1979). The measures come from two sources consistent with these techniques: the actual usage of search results in the work plan answer created and the click streams each subject followed while performing the task.

5.6.3.1 Work Plan Answer Measures

As expected, examining the source of the lines used to create work plan answers, subjects with accurate ratings expend less effort choosing to build a task answer out of fewer work plans. Further examination of the items included in work plan answers indicates in all cases, subjects with accurate ratings expend less effort choosing to build a task answer more often from the first work plan opened and used more high rated content than those with inaccurate ratings. This suggests subjects in the accurate ratings condition opened the highest rated work plans first and used it in their answer more often that subjects in the inaccurate ratings condition.

Interestingly, there is a significant difference for the percentage of lines in answer from work plans rated highest (i.e., 5) between those in the high versus low rater expertise treatments. Consistent with predictions, subjects with a high rater expertise chose to include more lines in their answer from work plans rated highest than those with low rater expertise. This indicates raters expertise may influence whether individuals include highly rated content in their answer. Further evidence indicates this finding does not hold when data from treatments with high and low rater sample size or filter sophistication is examined.

5.6.3.2 Click Stream Measures

As expected, investigating the total number of clicks as an indication for the amount of effort expended on the task, subjects with inaccurate ratings expend more effort by clicking on and looking at more work plan items than those with accurate ratings. Further examination of click stream patterns indicates, while not significantly different, but consistent with expectations, subjects with accurate ratings selected higher rated items more than those with inaccurate ratings.

Interestingly, there is a significant difference for the percentage of clicks on work plans rated high (i.e., 4 or 5) between those in the high versus low rater expertise conditions. Consistent with predictions, subjects with a high rater expertise selected more highly rated work plans than those with a low rater expertise. This indicates rater expertise may influence whether individuals select highly rated content to review. Meanwhile, this finding does not hold when data from treatments with high and low rater sample size or filter sophistication is examined.

Finally, as expected, subjects with accurate ratings expended less effort by selecting fewer work plans than those with inaccurate ratings. In summary, the information search measures analyzed above suggest those in the accurate ratings condition used higher rated work plan items more and expend less effort than those in the inaccurate ratings condition. Also, the analysis suggests rater expertise may influence whether individuals select for review and include highly rated content in their answer, while rater sample size or filter sophistication do not.

5.6.3.3 Correlations Between Click Stream and Work Plan Answer Measures

Many of the associations between click stream and work plan answer measures are as expected (e.g., when ratings accurately or inaccurately reflected content quality, the more work plans opened is positively associated with more total clicks on work plans). The associations suggest subjects selected and used high rated work plans when ratings were accurate but selected then did not use them when ratings were inaccurate. Also, when ratings were inaccurate, subjects demonstrating more effort were able to achieve a higher quality decision (i.e., task answer).

5.6.4 Initial Information Search Strategy

The information search process of each subject was objectively coded using click stream data (i.e., pattern of clicks used to open work plans). The coding reflects whether the first click of their click stream was following highest rated items first or following a more sequential or random strategy. As expected, based on correlations between strategy and performance, when ratings were accurate, reviewing highly (non-highly) rated items first is associated with improved (worse) decision performance. Unexpectedly, when ratings were inaccurate, no strategy is associated with decision performance.

Individuals should not have an indication of whether ratings were accurate or not until opening and reviewing a work plan, thus predictions suggest subjects should always open the highest rated item first. Consistent with expectations, most subjects in the accurate ratings condition did open the highest rated item first, however, surprisingly those in the inaccurate ratings condition opened the highly rated and non-highly rated work plan first equally often.

As expected, in almost all treatment conditions, subjects chose to review the highest rated work plan first. Unexpectedly, subjects did not choose to review highly rated work plans first in three conditions: the accurate ratings baseline, accurate ratings and low rater sample size, and accurate ratings and low filter sophistication. This finding may indicate subjects thought the low rater sample size or filter sophistication suggested a lack of rating credibility and ratings were discounted during initial work plan selection.

As expected, the most popular search strategy was for subjects to choose to review the highest rated work plan first, while the second most popular was to select the first work plan listed. ANOVA results indicate no differences across decision time for any treatment condition in all four experiments for either initial search strategy measure. ANOVA results also indicate no differences across decision quality for any treatment condition in all four experiment for subjects following an initial search strategy of reviewing non-highly rated work plans first. However, ANOVA results do indicate those reviewing highly rated work plans first do better when ratings were accurate than when ratings were inaccurate.

Finally, decision quality was regressed on initial search strategy controlling for treatment condition. Results suggest only when ratings were accurate does reviewing highly rated work plans first improve decision quality when rater sample size and when rater expertise is provided.

5.6.5 Post Hoc Analysis Summary

In summary, post hoc analysis suggest individuals typically select the highest rated content to review first, may understand when ratings were inaccurate, but may not be able to overcome this inaccuracy unless rater expertise is low suggesting ratings should be discounted.

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CHAPTER 6

6. DISCUSSION OF RESULTS

The questions addressed by this research examine the influence of credibility indicators and content recommendations on the usage of content ratings supplied by other users in decisions regarding the use of knowledge system content. The decision making model described the moderating influence of credibility indicators and content recommendations on the persuasion of ratings on content usage decisions. Two research questions were addressed in this study: 1. How can credibility indicators help people determine the level of accuracy in ratings of knowledge system content? and 2. How can content recommendations help people level of accuracy in ratings of knowledge system content?

Expectations from the developed model posited that credibility indicators and content recommendations would influence content rating usage based on cognitive psychology and decision theory. This influence was expected to be greater when ratings inaccurately rather than accurately reflected actual content quality. Inaccurate ratings were expected to trigger the use of credibility indicators and content recommendations more than accurate ratings. Hypotheses were derived from the research model and were tested using four inter-related laboratory experiments. The next section interprets the results presented in Chapter 5 and is followed by a discussion of the implications of the findings for both theory and practice.

6.1 Interpretation of the Research Results

The findings based on the statistical analyses performed in Chapter 5, including supporting post hoc statistical analyses of information search data, are integrated and discussed in this section. First, the influence of content ratings directly on task performance is presented. Second, the influence of the credibility indicators and content recommendations (i.e., sample size, source expertise, and filter sophistication) on rating usage is considered.

6.1.1 Influence of Content Ratings on Task Performance

The baseline condition suggested a direct influence of content ratings on task performance. Statistical analyses illustrated a strong main effect of the degree of content rating accuracy on decision performance for not only the baseline condition, but also the other three experiments. Individuals use content ratings to decide what knowledge system content to use in their task solution.

Hypothesized predictions were based on individuals selecting and reviewing the highest rated content first, however post hoc analyses of information search data suggest this did not always happen. The following individuals, as a majority, did not select and review high rated content first: those in the baseline, either high or low filter sophistication conditions and low number of raters with a high degree of rating accuracy. Thus, something is causing individuals to not follow ratings before they could possibly assess the degree of accuracy between ratings and content quality, which could only happen after reviewing content.

Additional post hoc analysis examined how well individuals knew the degree of rating accuracy for their given treatment condition. On average, across all experiments, subjects knew when the degree of accuracy was high, but they did not know as well when the degree of accuracy was low. Thus, people appear to better at determining when ratings are helpful than when they are not. Decision theory suggests people form a hypothesis about information they receive (e.g., an a prior belief that ratings are helpful), i

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and then additional data is evaluated as either confirming, disconfirming, or noncontributory, with disconfirming evidence under weighted or ignored (Wallsten 1980). In this study, it may be the case that individuals under weigh low credibility indicators or filter sophistication especially when ratings are not helpful.

Post hoc analyses of information search data also suggest when individuals could recognize a low degree of rating accuracy exists; they suffered from a lack of improvement in task performance meaning they could not overcome those misleading ratings. With accurate ratings, users can efficiently and effectively utilize the ratings and associated content to solve the task. To overcome inaccurate ratings, users must rely on their own judgment and persistence in finding the highest quality content to solve the task (Feather 1962; Sandelands, Brockner and Glynn 1988). Individuals may see task success as the result of effort devoted to the task (i.e., persistence) or as the result of sudden insights into the task (Sandelands, Brockner and Glynn 1988). Future research is needed to better understand how the tradeoff between misleading content ratings and the level of content quality influences persistence behaviors in task performance. Meanwhile, evidence indicates that certain credibility indicators (i.e., source expertise) may help users overcome misleading ratings, which is discussed in the next sections.

6.1.2 Moderating Influence of Credibility Indicators and Content Recommendations

Rater sample size, source expertise, and content recommendations were examined and are discussed separately below.

6.1.1.1 Rater Sample Size

Hypotheses H1a-c examined the influence of sample size on the use of content ratings in decision performance. Decision theory was the basis for these hypotheses offering normative models that larger sample sizes indicate higher credibility. While several studies suggest individuals do not use sample size in decisions (Tversky and Kahneman 1974), other studies suggest aspects of the decision setting trigger its use (Sedlmeier and Gigerenzer 2000). In this study, inaccurate ratings were predicted to trigger the use of sample size information. However, statistical analyses illustrated that individuals did not use sample size information when making decisions about whether to rely on or discount content ratings.

Post hoc analyses suggest sample size values did not influence what content was used in work plan answers, but it did influence search patterns. For those with low sample size values, the majority of individuals used an initial search strategy that did not including selecting the highest rated items to review first.

Post-task questions revealed individuals thought the number of raters was not an objectively derived value but based on subjective sources. This could mean they believed rater sample size was prone to manipulation and not based on an objective criterion separate from ratings. If individuals believe rater sample size is prone to manipulation, then they may discount the information and not use it as a credibility indicator of rating trustworthiness.

Individuals may not have used sample size information in determining rating credibility since they were novices. As novices, they may believe other consultants who have been at the firm long enough to enter ratings must be more expert than themselves. Thus, to novices, a low number of other consultants entering ratings (i.e., low sample size) might suggest ratings are more credible even when it should not. Having a low number of raters is better than no raters since novices may assume any raters are more ex

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expert than themselves. Novices appear to assign the same level of credibility to ratings whether there are a high or low number of raters (i.e., sample size). In knowledge system rating schemes, the expertise level of raters may matter more than the number of raters according to this study.

6.1.1.2 Source Expertise

Hypotheses H2a-c examined the influence of source expertise on the use of content ratings in decision performance. Cognitive psychology theory on source credibility was the basis for these hypotheses offering normative models that greater source expertise indicates higher perceived credibility. Studies suggest individuals use perceived expertise to evaluate a source (Ilgen, Fisher and Taylor 1979), even changing their own beliefs to agree with the source (Rhine and Kaplan 1972). Once again, inaccurate ratings were predicted to trigger the use of source expertise information. Low source expertise was expected to cause individuals to discount ratings more when ratings were inaccurate than when ratings were accurate. Statistical analyses support these predictions and illustrate that individuals did use source expertise information when making decisions about whether to rely on or discount content ratings. Additional evidence from post hoc analyses indicate those with a low rater expertise used ratings less, included less lines in their answer from highly rated work plans, and selected less highly rated work plan to review.

Post-task questions revealed individuals thought rater expertise was not an objectively derived value but based on subjective sources. This could mean they believed rater expertise was based on subjective criterion such as from the correctness of ratings and not based on an objective criterion separate from ratings. If individuals believe rater expertise is not separate from ratings, then they may rely on the information more and use it as a credibility indicator of rating trustworthiness.

Individuals may realize, even as novices, their own judgment of quality is better than relying on ratings when the source of those ratings are not experts in the topic domain (i.e., has low expertise). Post hoc information search data indicates with high source expertise, higher rated content was reviewed first more often than with low source expertise present. Thus, individuals may believe low source expertise may be associated with low rating credibility. This low rating credibility helped individuals overcome inaccurate ratings by suggesting to them to use their own judgment of content quality.

6.1.1.3 Content Recommendations

Hypotheses H3a-c examined the influence of content recommendations on the use of content ratings in decision performance. Exploratory arguments on content recommendation usage were the basis for these hypotheses indicating higher filter sophistication in recommendation algorithms may suggest higher perceived credibility in ratings. Once again, inaccurate ratings were predicted to trigger the use of content recommendation information. Low filter sophistication was expected to cause individuals to discount ratings more when ratings were inaccurate than when they were accurate. However, statistical analyses illustrated that individuals did not use filter sophistication information when making decisions about whether to rely on or discount content ratings.

Surprisingly, additional post hoc analyses provide little new insights into the behavioral impacts of providing collaborative filter information to knowledge system users. As this system feature of providing collaborative filter recommendations grows in popularity and is increasingly adopted by knowledge systems, it becomes even more important for future research to determine the influences of this information on decision-making. Given the exploratory nature of this experiment and lack of significant statistical results, future research is needed to better understand how people use content recommendations along with ratings to use system content.

6.2 Overall Conclusions from the Research Study

In general, this study demonstrated ratings have a strong influence on how individuals use knowledge system content even when the ratings are misleading. When content ratings are inaccurate, this study indicated that individuals might realize this is happening but lack the ability to overcome the influence of ratings. Even providing individuals with indicators of rating credibility does not always help. Disclosing the number of raters or level of filter sophistication in content recommendations does not influence decisions to use or discount ratings. However, disclosing the level of source expertise in ratings does influence decisions to use or discount ratings, which helps determine knowledge system content usage. This study illustrated individuals believed rating credibility was low when source expertise was low which may have helped them overcome ratings inaccuracy.

6.3 Implications of the Research Results

The results of the four inter-related experiments have important implications for both theory and practice.

6.3.1 Theory

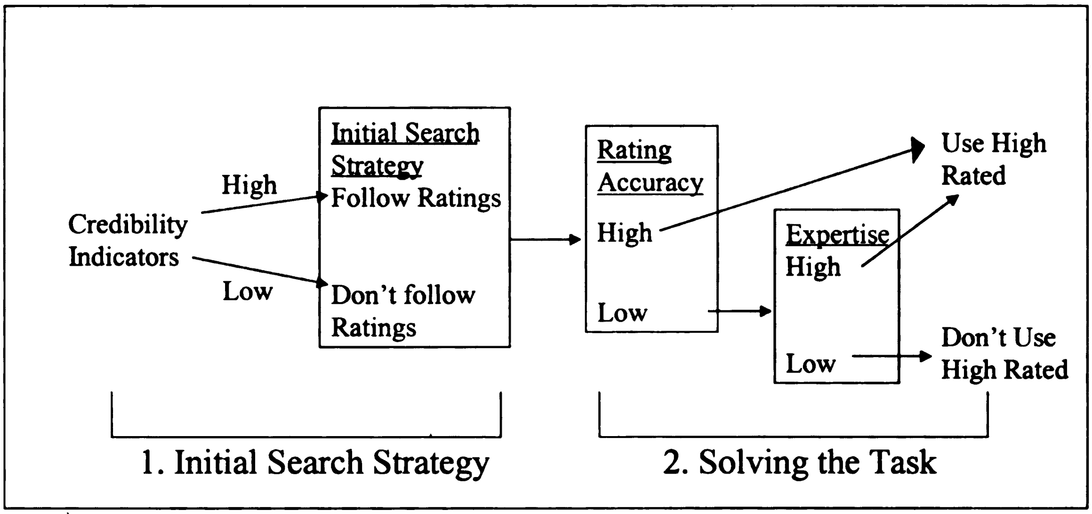
Previous research examining individual decision-making has paid limited attention to the influences of subjectively sourced information rating schemes. This research has demonstrated the importance of including indicators of rating credibility in order to help decision makers in their task performance. Also demonstrated is the importance of selecting an influential indicator of rating credibility, since indicators vary in their level of influence on decisions. The research results suggest that source expertise generally influences the decision performance on intellective tasks. Another result of this study is the extension of the theoretical understanding of the influence of content ratings, credibility indicators and decision performance.

The next section considers improvements to the theoretical model. First is a discussion of the deficiencies of the previous model. Next is an explanation of the new and improved decision-making model of the understanding of knowledge system content usage. Finally, search pattern data is used to provide initial support for the new model.

6.3.1.1 Modified Theoretical Model

Subjects do not appear to be using inaccurate ratings as a trigger that prompts the use of additional information about the credibility of ratings as predicted. Also, due to the exploratory nature and the lack of significant results, content recommendations' influence on knowledge system usage is not included in the model. Thus, modifications of the theoretical model are appropriate (see Figure 6.1).

Figure 6.1 Modified Decision Model



The original model predicted by the study did not incorporate a role for credibility indicators in the initial search strategy, nor did it include the concept of checking the level of source expertise for ratings when solving the task. The following section first discusses then provides evidence to support the two phases of the updated model: 1) the initial search strategy and 2) solving the task.

6.3.1.1.1 Initial Search Strategy

The model predicts that high credibility indicators will cause users to select high rated items first, while low credibility indicators will cause users to select items without regard for ratings first. Counts of initial search strategy followed by treatment condition illustrate more subjects in the high credibility indicator condition choose to follow ratings (63% for number of raters and 73% for percentage raters experts) while those in the low credibility indicator condition choose a more random strategy (50% for number of raters and 50% for percentage raters experts). As further support of the model, the filter recommendation experiment, which does not contain credibility indicators, does not follow the same pattern (see Table 6.1 for counts of initial search strategy).

Table 6.1 Counts of Initial Search Strategy by Credibility Indicator

Expmt	Number of Raters		% Raters Experts		Filter Sophistication	
	Low	High	Low	High	Low	High
1st 4 Listed & Rating is 5	23 (50%)	26 (63%)	20 (50%)	33 (73%)	22 (49%)	18 (45%)
Random & 1st Work Plan	23 (50%)	15 (37%)	19 (50%)	12 (27%)	22 (51%)	22 (55%)
Total	46	41	39	45	44	40

Figures 6.2, 6.3, and 6.4 illustrate the mean strategy followed by those in the high versus low credibility indicator conditions. The main effect of credibility indicators is not significant for number of raters (F=1.741, p = .191) or filter recommendations (F=.322, p=.572), but it is significant for percentage raters who are experts (F=4.631, p=.034). Also, opposite of expectations, in the filer recommendations experiment, those in the high treatment condition appear to not follow ratings compared to those in the low treatment condition.

Figure 6.2 Initial Search Strategy Mean Plots for the Raters Sample Size Experiment

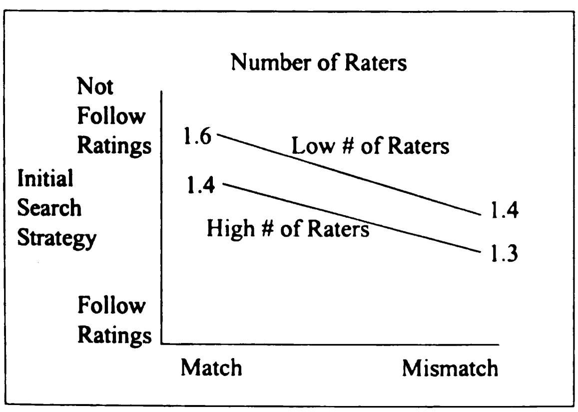


Figure 6.3 Initial Search Strategy Mean Plots for the Rater Expertise Experiment

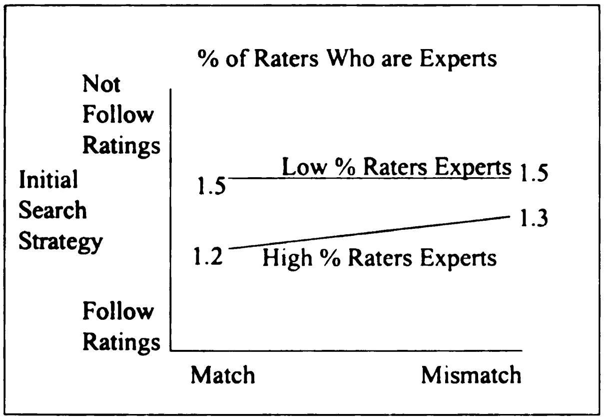
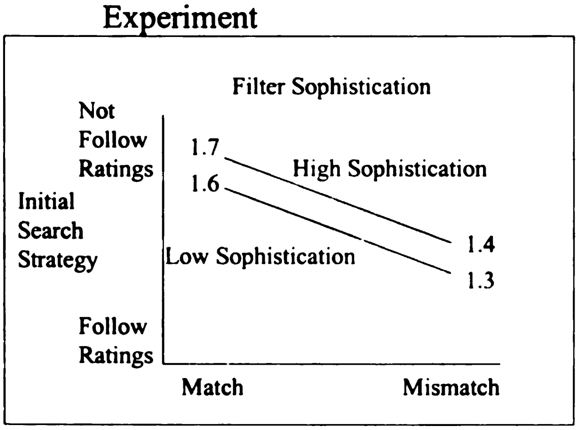


Figure 6.4 Initial Search Strategy Mean Plots for the Collaborative Filter Experiment



6.3.1.1.2 Solving the Task

The model predicts that once users have begun the initial search process, they will review content and will decide if it is either helpful or wrong for the task. They could do this by using an additive linear search strategy where work plans would be traded off against each other or an elimination-by-aspects search strategy where the projects steps of each work plan would be traded off against each other (Payne 1976). To make this decision, users will use the rating, but first check whether the level of expertise of those providing input to the rating was higher than their own expertise. In the case of the *sample size*, users, being novices, may assume average raters are more expert than themselves. In the case of the *source expertise*, users may realize high (low) expertise suggests the rating source is more (less) expert than their own expertise.

To examine this process, ANOVA tests were performed with dependent variables of percentage clicks on items rated high (i.e., 4 or 5) and percentage lines in answer from items rated high (i.e., 4 or 5). For means and ANOVA results see Table I.6 Percentage of Clicks on Work Plans Rated High (4 or 5) and Table I.4 Percentage of Lines in Answer from Work Plans Rated High (4 or 5).

In support of the modified model of Figure 6.1, Table I.6 in Appendix I illustrates that between high and low for the sample size (F=1.108, p=.295) and content recommendation (F=.007, p=.934), there is no differences in the percentage of clicks on work plans rated high (i.e., 4 or 5). Thus, sample size and content recommendations appear not to influence the decision to click on high rated work plans. Meanwhile, a significant difference is found between high and low source expertise (F=3.334, p=.071). Perhaps, highly rated content is selected more often when the source expertise of those providing the ratings is higher than the users' own expertise.

However, in Table I.4 in Appendix I, the same differences were not significant for percentage of lines used in the answer from high rated work plans (i.e., 4 or 5) for any of the experiments. But mean comparisons indicate those with high source expertise (97% with accurate ratings and 79% with inaccurate ratings) included more lines from high rated work plans than those with low source expertise (88% with accurate ratings and 77% with inaccurate ratings) on average. Meanwhile, those with high sample size (27% with accurate ratings and 26% with inaccurate ratings) did not always include more lines from high rated work plans than those with low sample size (5% with accurate ratings and 30% with inaccurate ratings) on average. Also, for content recommendations those with high filter sophistication (15% with accurate ratings and 41% with inaccurate ratings) did not always include more lines from high rated work plans than those with low filer sophistication (18% with accurate ratings and 35% with inaccurate ratings) on average. This suggests subjects use ratings more to decide what work plans to use in their answer when the level of expertise of those providing the ratings is higher than their own expertise level.

6.3.1.2 Contribution to Decision Theory

Findings of this study illustrate support for decision theory that a trigger in the decision setting may exist for using information in decision-making regarding solving the task (Sedlmeier and Gigerenzer 1997, 2000; Ilgen, Fisher and Taylor 1979). However, this trigger causes a specific need to know the level of expertise in the source of information (i.e., rater expertise). A low degree of ratings accuracy can trigger the use of source expertise information to help determine whether to use or ignore rating values in decisions regarding solving the task. Additionally, the outcome of this study provides a new setting indicting the importance of source credibility in rating information (Ilgen, Fisher and Taylor 1979).

Given novices are involved, the type of information conveyed by credibility indicators may matter more than statistically valid credibility indicators like rater sample size. Novices may be more interested in a sources expertise than the number of sources providing input on solving the task. Finally, content recommendation analysis does not provide additional contributions to decision theory and more research is needed to understand its use in decision settings.

6.3.2 Practice

Practitioners struggle with how to sort, screen, and select items from the long lists of system content comprising search results. While much attention has been paid to developing better search algorithms to find more relevant and high quality system content, little attention has been paid to what information will help users select from a list of search results (Ansari, Essegaier and Kohli 2000; Blabanovic and Shoham 1997). The knowledge task, search results list, ratings and credibility indicators examined in this study are consistent with the knowledge systems and tasks performed by novice employees in consulting firms. Not all ratings, credibility indicators, or content recommendations help users to effective utilize knowledge systems.

Managers, knowledge systems trainers, and consultants need to be made aware of the negative influence of inaccurate ratings and influence of credibility indicators and content recommendations. Understanding this, consultants can better manage their own search processes when trying to locate and re-use knowledge within the knowledge system (Orlikowski 1993, 2000). Additionally, managers may be more aware of the need to direct novice consultants to higher quality content knowing misleading ratings could impede their success.

Knowing that ratings inaccurately reflect content quality is difficult to overcome, firms may decide to allocate more resources to ensuring ratings accurately reflect content quality when ratings are submitted to the system. Firms have been struggling to decide the best strategy for maintaining knowledge repositories that only include high quality content (Davenport and Hansen 1999). This study suggests maintaining correct ratings is more important than disclosing credibility indicators or filter sophistication since rating correctness always impacts user behaviors and system usage outcomes. Only experts could be allowed to rate knowledge system content or experts could verify submitted ratings before being published on the system.

Finally, system designers can learn from this research to find better ways to incorporate more useful metrics into search result feedback and ratings schemes. By knowing which credibility indicators and content recommendations influence decisions, system resources could be focused on counting, storing and accumulating the information that matters most to decision makers. Since not every metric can be reported, system designers can use the limited space on search results screens to disclose only the most useful information to users and help them overcome inaccuracies in rating schemes. This study examined only a few of the many characteristics of ratings information that could be built into system features. More research is needed to determine how the strength and scale type of content ratings as well as text explanations and consistency of credibility indicators influence rating usage in decision-making.

6.4 Chapter Summary

The results of the statistical analyses presented in Chapter 5 were interpreted in this chapter. This interpretation consisted of the task performance measures, which were of primary interest in this study, as well as the information search data measures to elaborate on apparent relationships in the data. Source expertise, and not sample size or content recommendations, was found to influence decision performance. The research model was modified to reflect the lessons learned from the theory discussed and data analyzed.

CHAPTER 7

7. LIMITATIONS AND FUTURE DIRECTIONS

The strengths and important limitations of interpreting the research results are discussed in this chapter. The chapter concludes with directions for future research.

7.1 Strengths and Limitations

In order to insure internal validity, the experimental design emphasized strong controls, which were a trade-off against external validity. The use of a controlled laboratory experiment was a strength of this research as it controlled for intervening influences, which threaten the experimental manipulation or provide an alternative explanation of the results. Possible influential factors that were controlled include use of a single source for research subjects, a single technology, a common physical environment, structured instrumentation, transparent collection of decision time and information search data, scripted experimental instructions, and a single researcher conducing the experimental sessions (see Appendix F for administrative documents of the experiment).

Student subjects, a controlled knowledge system simulation built for the experiment, a limited set of tasks, and the operationalization of the credibility indicators and content recommendations all reduced direct generalizability of results. This is, however, necessary to guarantee a valid test of theories. Learning during task performance is another potential problem, which was minimized by assigning subjects to only one treatment condition. Many of the control variables used are measured with multi-item self-reported measures.

Student subjects typically differ from the target population (i.e., business professionals) in two ways: 1) their experience with the task domain and 2) their motivation for decision performance. In this study, steps were taken to minimize the difference between student subjects and knowledge system users. First, the student had experience using web-based applications to accomplish tasks. Second, the subjects were attending an undergraduate information systems class and had covered the domain of data modeling and database design. Third, a ten-minute instructional tutorial was verbally administered at the beginning of each experimental session. Also, instructional screens were added to the introduction material to refresh subjects' memories of the domain and to explain how work plans are built and combined from knowledge system content. Finally, students were provided an incentive to participate in the study and post experimental interviews indicated that subjects found the experiment to be interesting and informative about the consulting job experience. Based on the decision performance, student subjects proved to be adequate decision makers to investigate the research questions, however prior to generalizing the results to other populations, possible differences between the decision-making abilities of business students and junior consultants should be considered.

The task involved selecting line items from work plan examples provided to build a new work plan answer. The generalizabiltiy of these findings may be limited to comparable tasks. However, in general, when selecting from search results, users are free to use entire items or parts of items when creating new documents of any kind. The information processing required by this task is comparable to tasks across a range of domains where old documents are re-used to build new ones, which is consistent with knowledge system usage behaviors.

Mentioned previously, another limitation involves examining content recommendations and the level of filter sophistication in the context of finding reliable or high quality system content. One of the main purposes of content recommendations is to help users find additional *relevant* system content and not necessarily help find the highest *quality* content; which is the focus of this study. However, in an exploratory nature, it was predicted that content recommendation and filter sophistication levels might have some influence on the judgment of ratings and content quality. Future research is needed to determine more specifically how content recommendations influence system content selection and use judgments.

Although the operationalizations of the credibility indicators and content recommendations were considered a strength due to the tight controls used, the between-subject design meant credibility indicators were always high or always low for any one subject. This is consistent with scenarios of between firm or between unit comparisons where some content domains are highly used and rated and others are not. However, the lack of variance of credibility indicator or content recommendations within a treatment condition may result in reduced generalizability to search results where this variance is high.

A final limitation of this research is the one-time nature of the experimental session. Possibly, experience, both in processing similar tasks and in processing similar information, would change the effects of the content ratings and interactions in these results.

7.2 Future Research Directions

The results of this research suggest that ratings influence decision-making performance and the source expertise of those ratings matters. The findings from these experiments provide an initial understanding of the relationship between content ratings and intellective tasks. Additional research effort should examine a broader range of credibility indicators and focus mostly on how to help individuals overcome misleading ratings.

First, inaccurate ratings did not appear to be a strong trigger of the use of rating credibility indicators. Researchers should examine more salient and motivating factors in the decision process to see if they prompt attention to credibility indicators and content recommendations. Additional research would be needed to determine what these salient and motivating factors are in the knowledge system environment.

Second, future research is needed to determine why credibility indicators do not always affect decisions about whether to rely or not on ratings. The Elaboration Likelihood Model (ELM) suggests content itself and rating could be part of the "central route" to the knowledge system user judging the content's quality level. However, ELM also suggests credibility indicators and content recommendations could be part of the "central route" if they are actively attended to and have an effect on decisions or "peripheral route" if they are available but not consciously included in decisions of rating credibility and content quality (Petty and Cacioppo 1981; Stiff 1994). If credibility indicators and content recommendations are processed as part of the "peripheral route", studies have shown they are probably used to rationalize decisions instead of influence them as in the "central route" (Areni, Ferrell and Wilcox 2000).

In conjunction with ELM, research needs to determine whether individuals believe content ratings are "group opinions" or just a quality metric. If users think of ratings as "group opinions" then ELM may imply the use of the heuristic consensus implies correctness. More studies are needed to determine the exact nature of what people think of rating values.

Another reason credibility indicators may not always influence knowledge system users' decisions is that processing all the information is costly (i.e., takes time and attention to consider all factors in determining whether ratings are credible). Research has shown humans under-use helpful information in decision tasks (Connolly and Thorn 1987), because of the declining payoff of looking at one more piece of information and the complexity in combining all the information reviewed (Connolly and Thorn 1987). Thus, knowledge system users may not be able to trade off the costs of using all the information provided (content itself, content ratings, and credibility indicators or content recommendations) with the benefits of reducing uncertainty about rating credibility and content quality. Future research should examine the tradeoff between ratings, credibility indicators, effort and persistence on solving the task.

Also, knowledge system users may miscalibrate how well they are doing in the decision task and think they are performing well without using the credibility indicator and content recommendation information (Phillips 1973; Yates 1990). While calibration was used to analyze decision performance, it was not the focus of this study. This study indicates those who know ratings were helpful or not or knew their performance level were able to perform more effectively but not faster or slower. Future research should determine how miscalibration influences the lack of persistence in overcoming misleading content ratings.

Based on the information search strategy literature, the results of this study indicate systematic patterns of search could be associated with different rating information. More research is needed to determine what types of information systems and rating information are associated with additive linear, additive difference, conjunctive and elimination-by-aspects patterns of searching (Payne 1976). Since there is a connection between search patterns and use of information, determining how information searches takes place could inform what credibility indicators and content recommendations information to make available to system users.

Post hoc analyses on search pattern data suggested individuals do not always look at the highest rated items first in a list of search results as a prior expected. Prior research suggests people do not scan beyond the first page of search results (Jansen, Spink and Saracevic 2000). The modified decision model of this study suggests rating credibility indicators may have a role. However, little is known about how users manage using a long list of search results and future research is needed to explain how people determine what to select and review in this context.

Future research is needed to provide insights regarding the use of collaborative filter recommendations. As collaborative filter algorithms become more widely used in knowledge systems, and other systems (i.e., Internet shopping), understanding the influence of this information on decision-making becomes more important. Future work is needed to understand whether and how recommendations influence beliefs about rating correctness or content quality. People may discount recommendations immediately because algorithm assumptions or degree of fit with others' preferences are not disclosed. However, people may rely on and use recommendations believing system generated information is better than other information.

Given low task experience and high uncertainty involved with judging what content is high quality, knowledge system users could be using credibility indicators and content recommendations as self-monitoring feedback. High self-monitors seek and use information from others (i.e., credibility indicators and content recommendations) to manage their behavior, while low self-monitors are not so concerned and do not pay attention to the information from others (Snyder 1974, 1987). While this was captured as a control variable, future research should examine this and other individual differences and how they influence the use of information in the knowledge system content usage environment.

Based on Table 3.1, the characteristics of content ratings, credibility indicators and content recommendations, studies are needed to determine how rating strength or scale type as well as text explanations and rating consistency influence rating usage. Understanding how different types of information about rating influence whether individuals use or discount ratings will better prepare users and system designers in ways to improve the effective usage of knowledge system content.

Finally, while the context of this study was knowledge system repositories usage, the use of rating information extends to other contexts such as Internet shopping or bulletin board information sharing. The theoretical discussions of this study could apply to these other contexts where individuals' a prior belief structures may vary based on context. Shopping for a book on the Internet is different than using old work products from a repository to create new work products. When shopping on the Internet, people may belief a priori that ratings involve a higher degree of intentional inaccuracies and be more skeptical of rating values than when using a knowledge repository. Future work is needed to understand how the results of this study change based on different system contexts.

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APPENDIX

9. APPENDIX

Appendix A: Experimental Cells

Providing Content Ratings (baseline condition)

Rating Level and Content Quality	Accurate	1
	Inaccurate	2

Providing Rater Sample Size

		Rater Sample Size (number of raters)	
		Low	High
Rating Level and Content Quality	Accurate	3	5
	Inaccurate	4	6

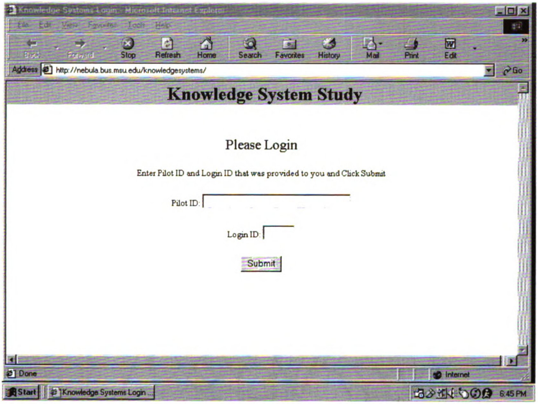
Providing Rater Expertise

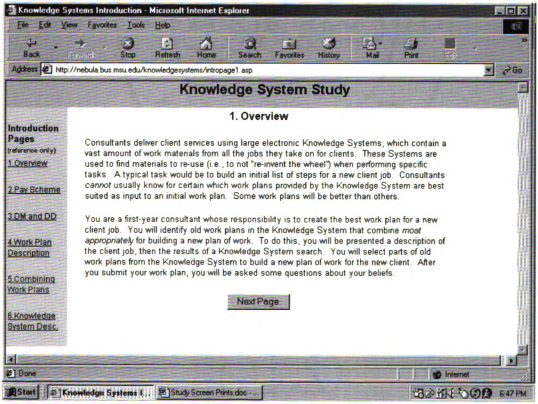
		Rater Expertise (% Raters Who are Experts)	
		Low	High
Rating Level and Content Quality	Accurate	7	9
	Inaccurate	8	10

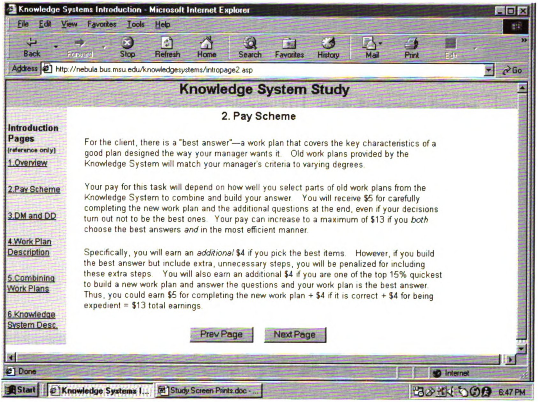
Providing Collaborative Filtering

		Collaborative Filtering (degree of sophistication)	
		Low	High
Rating Level and Content Quality	Accurate	11	13
	Inaccurate	12	14

Appendix B: Screen Prints Of Experimental Materials







Knowledge Systems Introduction - Microsoft Internet Explorer

http://nebula.bus.msu.edu/knowledgesystems/intropage2.asp

Knowledge System Study

2. Pay Scheme

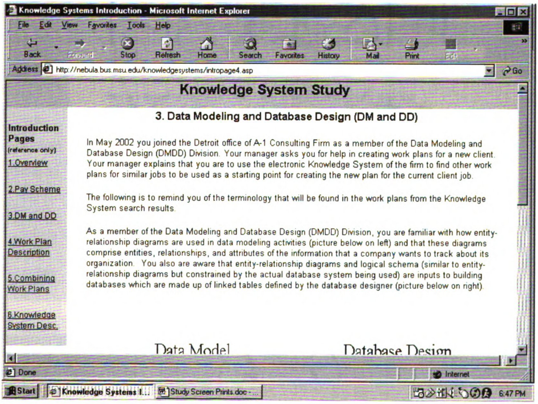
Introduction Pages (reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

For the client, there is a "best answer"—a work plan that covers the key characteristics of a good plan designed the way your manager wants it. Old work plans provided by the Knowledge System will match your manager's criteria to varying degrees.

Your pay for this task will depend on how well you select parts of old work plans from the Knowledge System to combine and build your answer. You will receive $5 for carefully completing the new work plan and the additional questions at the end, even if your decisions turn out not to be the best ones. Your pay can increase to a maximum of $13 if you *both* choose the best answers *and* in the most efficient manner.

Specifically, you will earn an *additional* $4 if you pick the best items. However, if you build the best answer but include extra, unnecessary steps, you will be penalized for including these extra steps. You will also earn an additional $4 if you are one of the top 15% quickest to build a new work plan and answer the questions and your work plan is the best answer. Thus, you could earn $5 for completing the new work plan + $4 if it is correct + $4 for being expedient = $13 total earnings.

Prev Page | Next Page



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Knowledge System Study

3. Data Modeling and Database Design (DM and DD)

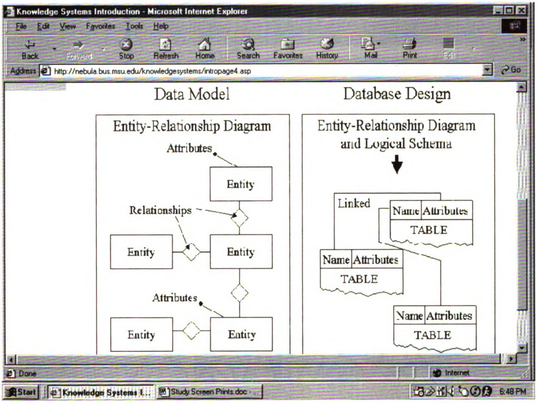
Introduction Pages (reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

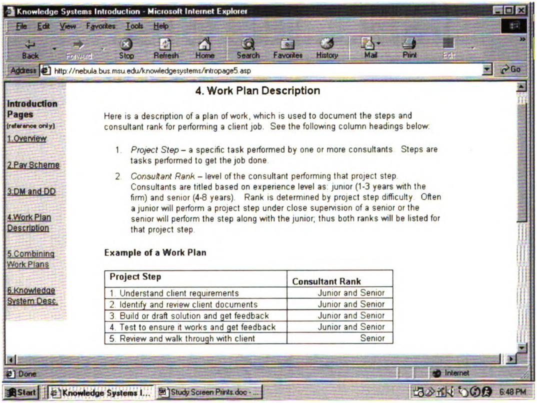
In May 2002 you joined the Detroit office of A-1 Consulting Firm as a member of the Data Modeling and Database Design (DMDD) Division. Your manager asks you for help in creating work plans for a new client. Your manager explains that you are to use the electronic Knowledge System of the firm to find other work plans for similar jobs to be used as a starting point for creating the new plan for the current client job.

The following is to remind you of the terminology that will be found in the work plans from the Knowledge System search results.

As a member of the Data Modeling and Database Design (DMDD) Division, you are familiar with how entity-relationship diagrams are used in data modeling activities (picture below on left) and that these diagrams comprise entities, relationships, and attributes of the information that a company wants to track about its organization. You also are aware that entity-relationship diagrams and logical schema (similar to entity-relationship diagrams but constrained by the actual database system being used) are inputs to building databases which are made up of linked tables defined by the database designer (picture below on right).

Data Model | Database Design





Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

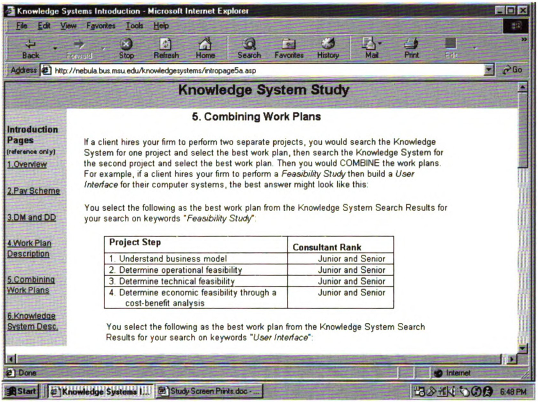
4. Work Plan Description

Here is a description of a plan of work, which is used to document the steps and consultant rank for performing a client job. See the following column headings below:

1. *Project Step* – a specific task performed by one or more consultants. Steps are tasks performed to get the job done.
2. *Consultant Rank* – level of the consultant performing that project step. Consultants are titled based on experience level as: junior (1-3 years with the firm) and senior (4-8 years). Rank is determined by project step difficulty. Often a junior will perform a project step under close supervision of a senior or the senior will perform the step along with the junior; thus both ranks will be listed for that project step.

Example of a Work Plan

Project Step	Consultant Rank
1. Understand client requirements	Junior and Senior
2. Identify and review client documents	Junior and Senior
3. Build or draft solution and get feedback	Junior and Senior
4. Test to ensure it works and get feedback	Junior and Senior
5. Review and walk through with client	Senior



Knowledge System Study

5. Combining Work Plans

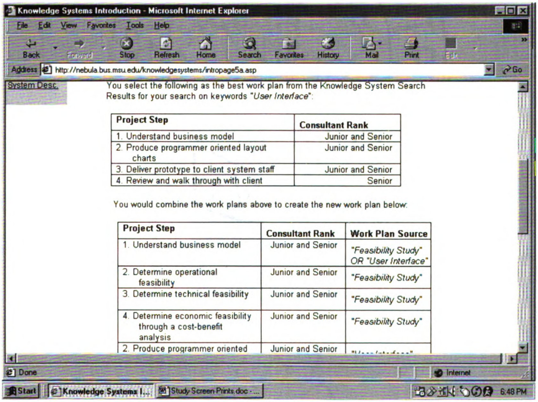
Introduction Pages (reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

If a client hires your firm to perform two separate projects, you would search the Knowledge System for one project and select the best work plan, then search the Knowledge System for the second project and select the best work plan. Then you would COMBINE the work plans. For example, if a client hires your firm to perform a *Feasibility Study* then build a *User Interface* for their computer systems, the best answer might look like this:

You select the following as the best work plan from the Knowledge System Search Results for your search on keywords "*Feasibility Study*":

Project Step	Consultant Rank
1. Understand business model	Junior and Senior
2. Determine operational feasibility	Junior and Senior
3. Determine technical feasibility	Junior and Senior
4. Determine economic feasibility through a cost-benefit analysis	Junior and Senior

You select the following as the best work plan from the Knowledge System Search Results for your search on keywords "*User Interface*":

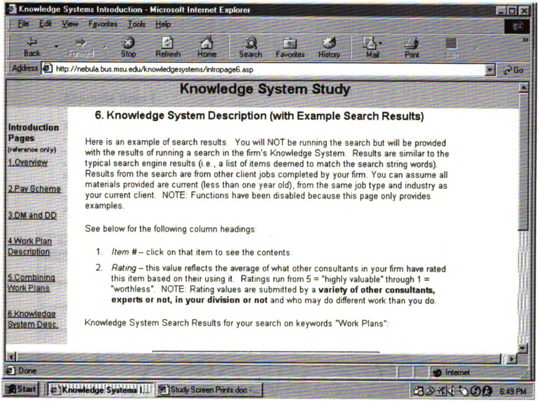


You select the following as the best work plan from the Knowledge System Search Results for your search on keywords "*User Interface*":

Project Step	Consultant Rank
1. Understand business model	Junior and Senior
2. Produce programmer oriented layout charts	Junior and Senior
3. Deliver prototype to client system staff	Junior and Senior
4. Review and walk through with client	Senior

You would combine the work plans above to create the new work plan below:

Project Step	Consultant Rank	Work Plan Source
1. Understand business model	Junior and Senior	*"Feasibility Study" OR "User Interface"*
2. Determine operational feasibility	Junior and Senior	*"Feasibility Study"*
3. Determine technical feasibility	Junior and Senior	*"Feasibility Study"*
4. Determine economic feasibility through a cost-benefit analysis	Junior and Senior	*"Feasibility Study"*
2. Produce programmer oriented	Junior and Senior	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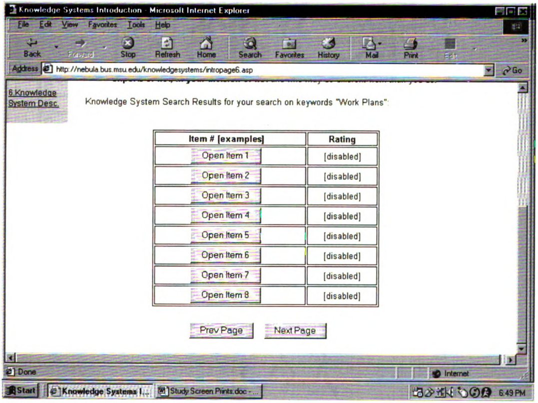
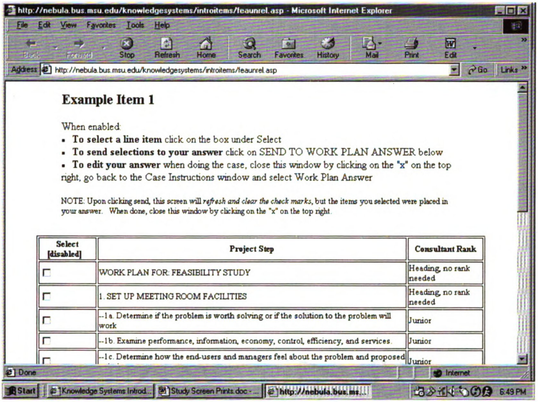
Go
Knowledge System Study
Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
6. Knowledge System Description (with Example Search Results)
Here is an example of search results. You will NOT be running the search but will be provided with the results of running a search in the firm's Knowledge System. Results are similar to the typical search engine results (i.e., a list of items deemed to match the search string words). Results from the search are from other client jobs completed by your firm. You can assume all materials provided are current (less than one year old), from the same job type and industry as your current client. NOTE: Functions have been disabled because this page only provides examples.
See below for the following column headings:
1. Item # – click on that item to see the contents.
2. Rating – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless". NOTE: Rating values are submitted by a variety of other consultants, experts or not, in your division or not and who may do different work than you do.
Knowledge System Search Results for your search on keywords "Work Plans":
Done
Internet
Start
Knowledge Systems I...
Study Screen Prints.doc - ...
6:49 PM


Knowledge Systems Introduction - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit
Address http://nebula.bus.msu.edu/knowledgesystems/intropage6.asp
Go
6.Knowledge System Desc.
Knowledge System Search Results for your search on keywords "Work Plans":
Item # [examples]
Rating
Open Item 1
[disabled]
Open Item 2
[disabled]
Open Item 3
[disabled]
Open Item 4
[disabled]
Open Item 5
[disabled]
Open Item 6
[disabled]
Open Item 7
[disabled]
Open Item 8
[disabled]
Prev Page
Next Page
Done
Internet
Start
Knowledge Systems I...
Study Screen Prints.doc - ...
6:49 PM



http://nebula.bus.msu.edu/knowledgesystems/introitems/feaunrel.asp - Microsoft Internet Explorer

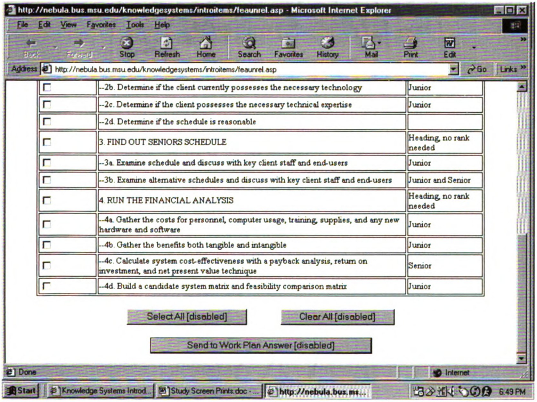
Example Item 1

When enabled:

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** when doing the case, close this window by clicking on the "x" on the top right, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window by clicking on the "x" on the top right.

Select [disabled]	Project Step	Consultant Rank
☐	WORK PLAN FOR: FEASIBILITY STUDY	Heading, no rank needed
☐	1. SET UP MEETING ROOM FACILITIES	Heading, no rank needed
☐	--1a. Determine if the problem is worth solving or if the solution to the problem will work	Junior
☐	--1b. Examine performance, information, economy, control, efficiency, and services.	Junior
☐	--1c. Determine how the end-users and managers feel about the problem and proposed	Junior

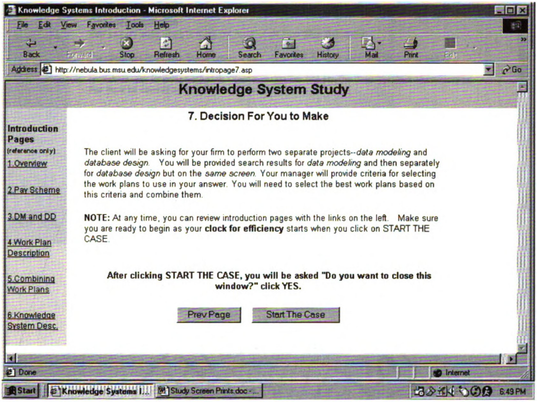


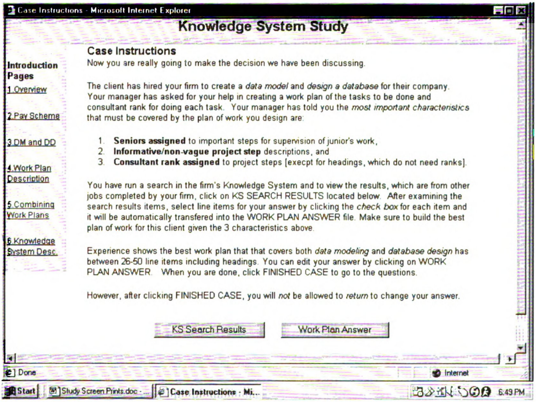
http://nebula.bus.msu.edu/knowledgesystems/introitems/feaunrel.asp - Microsoft Internet Explorer

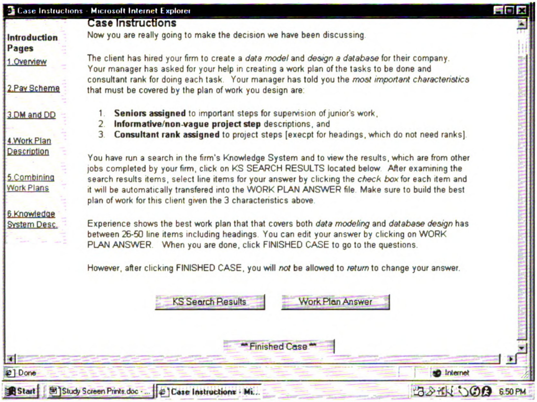
☐	--2b. Determine if the client currently possesses the necessary technology	Junior
☐	--2c. Determine if the client possesses the necessary technical expertise	Junior
☐	--2d. Determine if the schedule is reasonable	
☐	3. FIND OUT SENIORS SCHEDULE	Heading, no rank needed
☐	--3a. Examine schedule and discuss with key client staff and end-users	Junior
☐	--3b. Examine alternative schedules and discuss with key client staff and end-users	Junior and Senior
☐	4. RUN THE FINANCIAL ANALYSIS	Heading, no rank needed
☐	--4a. Gather the costs for personnel, computer usage, training, supplies, and any new hardware and software	Junior
☐	--4b. Gather the benefits both tangible and intangible	Junior
☐	--4c. Calculate system cost-effectiveness with a payback analysis, return on investment, and net present value technique	Senior
☐	--4d. Build a candidate system matrix and feasibility comparison matrix	Junior

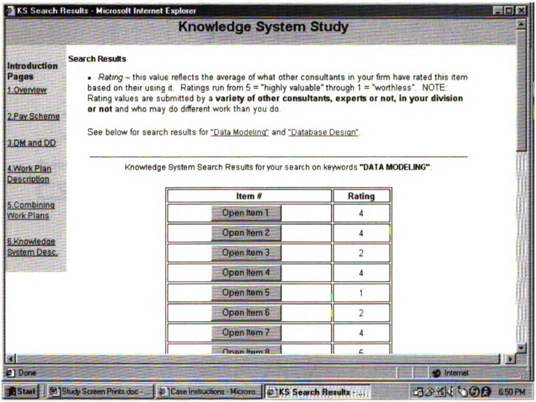
Select All [disabled] Clear All [disabled]

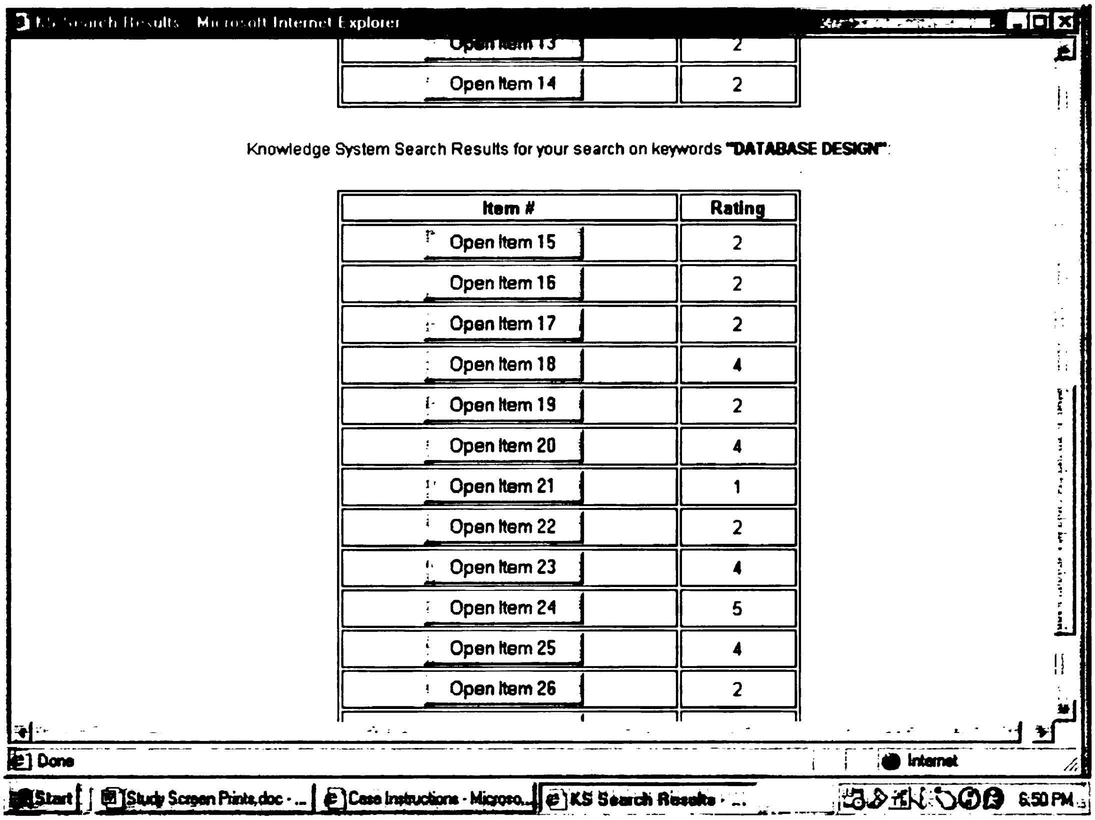
Send to Work Plan Answer [disabled]

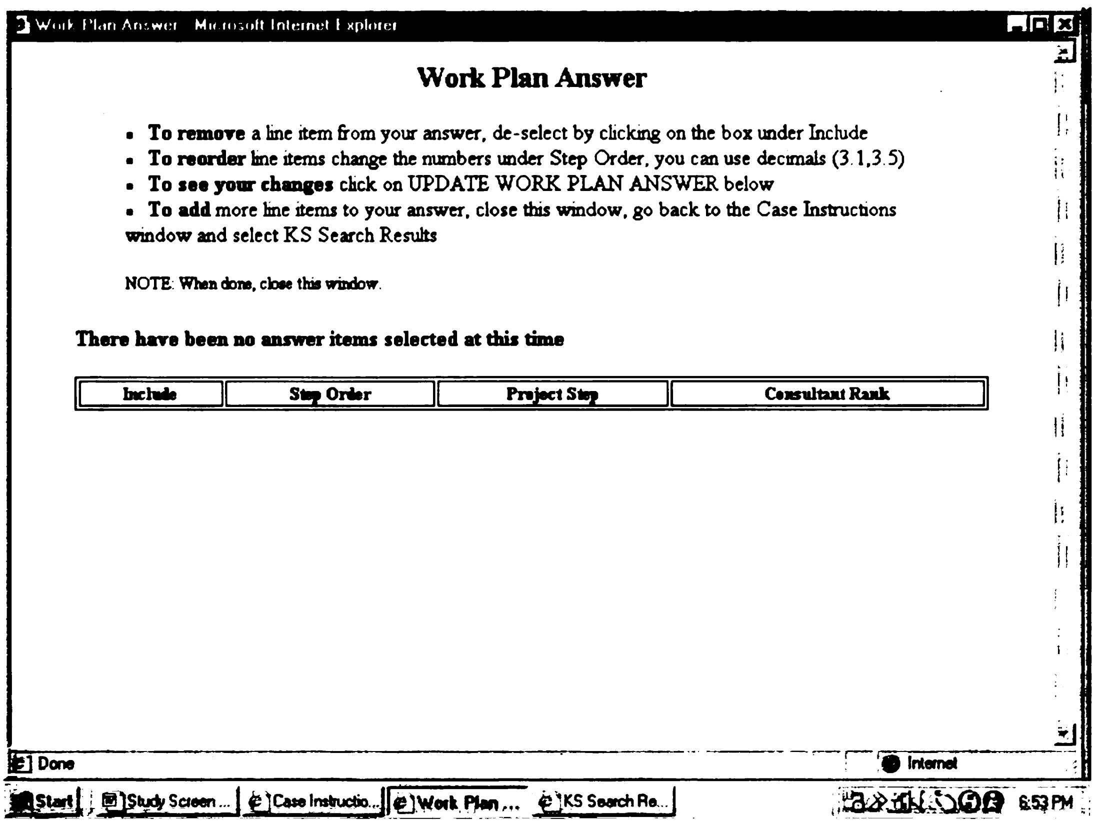

Knowledge Systems Introduction - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print Edit
Address http://nebula.bus.msu.edu/knowledgesystems/intropage7.asp
Go
Knowledge System Study
7. Decision For You to Make
Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
The client will be asking for your firm to perform two separate projects--data modeling and database design. You will be provided search results for data modeling and then separately for database design but on the same screen. Your manager will provide criteria for selecting the work plans to use in your answer. You will need to select the best work plans based on this criteria and combine them.
NOTE: At any time, you can review introduction pages with the links on the left. Make sure you are ready to begin as your clock for efficiency starts when you click on START THE CASE.
After clicking START THE CASE, you will be asked "Do you want to close this window?" click YES.
Prev Page
Start The Case
Done
Internet
Start
Knowledge Systems I...
Study Screen Prints.doc - ...
6:49 PM


Case Instructions - Microsoft Internet Explorer
Knowledge System Study
Case Instructions
Introduction Pages
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
Now you are really going to make the decision we have been discussing.
The client has hired your firm to create a data model and design a database for their company. Your manager has asked for your help in creating a work plan of the tasks to be done and consultant rank for doing each task. Your manager has told you the most important characteristics that must be covered by the plan of work you design are:
1. Seniors assigned to important steps for supervision of junior's work,
2. Informative/non-vague project step descriptions, and
3. Consultant rank assigned to project steps [execpt for headings, which do not need ranks].
You have run a search in the firm's Knowledge System and to view the results, which are from other jobs completed by your firm, click on KS SEARCH RESULTS located below. After examining the search results items, select line items for your answer by clicking the check box for each item and it will be automatically transfered into the WORK PLAN ANSWER file. Make sure to build the best plan of work for this client given the 3 characteristics above.
Experience shows the best work plan that that covers both data modeling and database design has between 26-50 line items including headings. You can edit your answer by clicking on WORK PLAN ANSWER. When you are done, click FINISHED CASE to go to the questions.
However, after clicking FINISHED CASE, you will not be allowed to return to change your answer.
KS Search Results
Work Plan Answer
Done
Internet
Start
Study Screen Prints.doc - ...
Case Instructions - Mi...
6:49 PM


Case Instructions - Microsoft Internet Explorer
Case Instructions
Introduction Pages
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
Now you are really going to make the decision we have been discussing.
The client has hired your firm to create a data model and design a database for their company. Your manager has asked for your help in creating a work plan of the tasks to be done and consultant rank for doing each task. Your manager has told you the most important characteristics that must be covered by the plan of work you design are:
1. Seniors assigned to important steps for supervision of junior's work,
2. Informative/non-vague project step descriptions, and
3. Consultant rank assigned to project steps [execpt for headings, which do not need ranks].
You have run a search in the firm's Knowledge System and to view the results, which are from other jobs completed by your firm, click on KS SEARCH RESULTS located below. After examining the search results items, select line items for your answer by clicking the check box for each item and it will be automatically transfered into the WORK PLAN ANSWER file. Make sure to build the best plan of work for this client given the 3 characteristics above.
Experience shows the best work plan that that covers both data modeling and database design has between 26-50 line items including headings. You can edit your answer by clicking on WORK PLAN ANSWER. When you are done, click FINISHED CASE to go to the questions.
However, after clicking FINISHED CASE, you will not be allowed to return to change your answer.
KS Search Results
Work Plan Answer
** Finished Case **
Done
Internet
Start
Study Screen Prints.doc - ...
Case Instructions - Mi...
6:50 PM


KS Search Results - Microsoft Internet Explorer
Knowledge System Study
Introduction Pages
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
Search Results
• Rating – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless". NOTE: Rating values are submitted by a variety of other consultants, experts or not, in your division or not and who may do different work than you do.
See below for search results for "Data Modeling" and "Database Design".
Knowledge System Search Results for your search on keywords "DATA MODELING":
Item #
Rating
Open Item 1
4
Open Item 2
4
Open Item 3
2
Open Item 4
4
Open Item 5
1
Open Item 6
2
Open Item 7
4
Done
Internet
Start
Study Screen Prints.doc - ...
Case Instructions - Microso...
KS Search Results - ...
6:50 PM


KS Search Results - Microsoft Internet Explorer
Open Item 13
2
Open Item 14
2
Knowledge System Search Results for your search on keywords "DATABASE DESIGN":
Item #
Rating
Open Item 15
2
Open Item 16
2
Open Item 17
2
Open Item 18
4
Open Item 19
2
Open Item 20
4
Open Item 21
1
Open Item 22
2
Open Item 23
4
Open Item 24
5
Open Item 25
4
Open Item 26
2
Done
Internet
Start
Study Screen Prints.doc - ...
Case Instructions - Microso...
KS Search Results - ...
6:50 PM


Work Plan Answer - Microsoft Internet Explorer
Work Plan Answer
• To remove a line item from your answer, de-select by clicking on the box under Include
• To reorder line items change the numbers under Step Order, you can use decimals (3.1,3.5)
• To see your changes click on UPDATE WORK PLAN ANSWER below
• To add more line items to your answer, close this window, go back to the Case Instructions window and select KS Search Results
NOTE: When done, close this window.
There have been no answer items selected at this time
Include
Step Order
Project Step
Consultant Rank
Done
Internet
Start
Study Screen ...
Case Instructio...
Work Plan ...
KS Search Re...
6:53 PM

Work Plan Answer - Microsoft Internet Explorer

Work Plan Answer

- **To remove** a line item from your answer, de-select by clicking on the box under Include
- **To reorder** line items change the numbers under Step Order, you can use decimals (3.1,3.5)
- **To see your changes** click on UPDATE WORK PLAN ANSWER below
- **To add** more line items to your answer, close this window, go back to the Case Instructions window and select KS Search Results

NOTE: **When done, close this window.**

Include	Step Order	Project Step	Consultant Rank
☑	1	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☑	2	1. IDENTIFY ENTITIES	Heading, no rank needed
☑	3	--1a. Look for items to capture, store, and produce information for the client given their business	Junior and Senior
☑	4	--1b. Study the forms and files	Junior
☑	5	--1c. Review program data, file, and database structures	Junior and Senior
☑	6	--1d. Check on entities that are a part of the system	Junior
☑	7	--1e. Define identifiers that are a part of the system	Junior and Senior
☑	8	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☑	9	--2a. Brainstorm with project team	Junior and Senior

Done | Internet

Start | Study Screen... | Case Instructio... | Work Plan ... | KS Search Re... | 6:53 PM

Knowledge Systems Case - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages (reference only)

1.Overview

2.Pay Scheme

3.DM and DD

4.Work Plan Description

5.Combining Work Plans

6.Knowledge System Desc.

Case - Questions

1. I would like to run another search to look at more work plans, then possibly revise the work plan I submitted.

Strongly agree ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10 Strongly disagree ○N

2. I do not want to give the plan of work that I submitted to my manager.

Strongly agree ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10 Strongly disagree ○N

3. There are better answers than the one I submitted.

Strongly agree ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10 Strongly disagree ○N

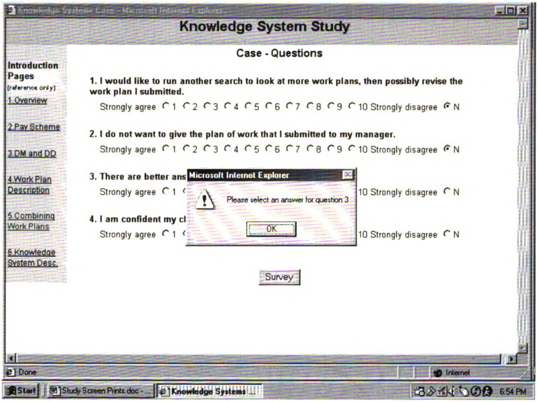
4. I am confident my choices were the best ones possible.

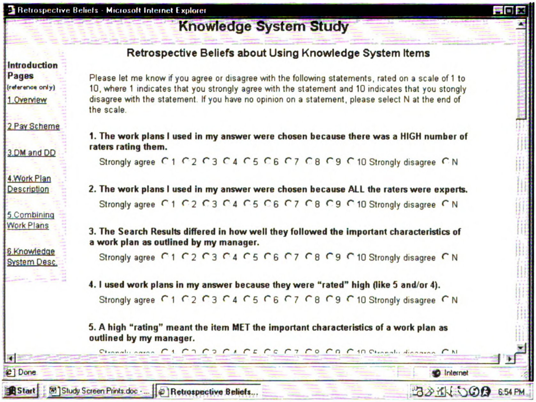
Strongly agree ○1 ○2 ○3 ○4 ○5 ○6 ○7 ○8 ○9 ○10 Strongly disagree ○N

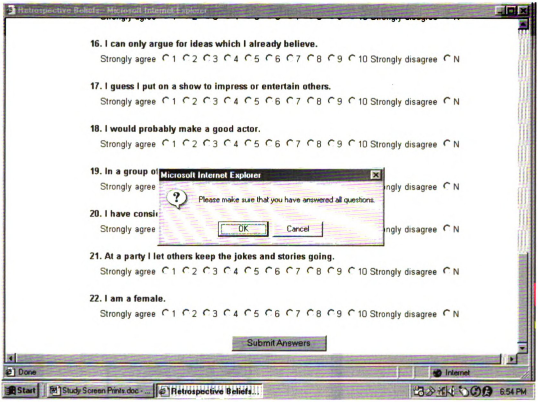
Survey

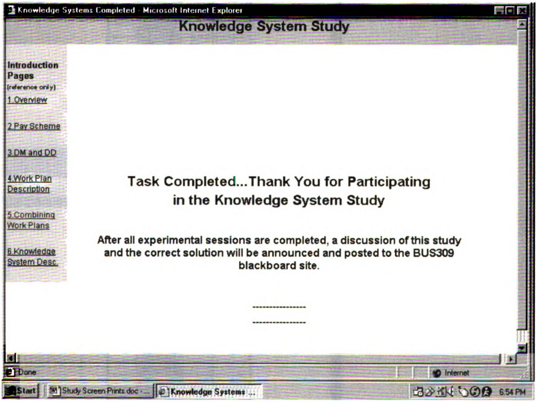
Done | Internet

Start | Study Screen Prints.doc - ... | Knowledge Systems ... | 6:54 PM

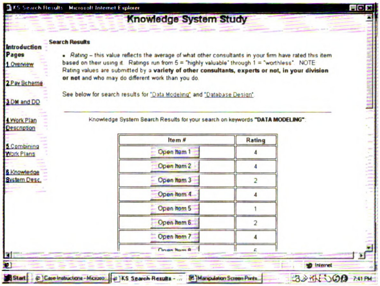

Knowledge Systems Case - Microsoft Internet Explorer
Knowledge System Study
Case - Questions
Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
1. I would like to run another search to look at more work plans, then possibly revise the work plan I submitted.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
2. I do not want to give the plan of work that I submitted to my manager.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
3. There are better ans
Strongly agree 1
10 Strongly disagree N
4. I am confident my cl
Strongly agree 1
10 Strongly disagree N
Microsoft Internet Explorer
Please select an answer for question 3
OK
Survey
Done
Internet
Start
Study Screen Prints.doc - ...
Knowledge Systems ...
6:54 PM

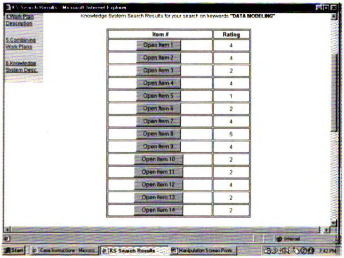

Retrospective Beliefs - Microsoft Internet Explorer
Knowledge System Study
Retrospective Beliefs about Using Knowledge System Items
Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
Please let me know if you agree or disagree with the following statements, rated on a scale of 1 to 10, where 1 indicates that you strongly agree with the statement and 10 indicates that you stongly disagree with the statement. If you have no opinion on a statement, please select N at the end of the scale.
1. The work plans I used in my answer were chosen because there was a HIGH number of raters rating them.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
2. The work plans I used in my answer were chosen because ALL the raters were experts.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
3. The Search Results differed in how well they followed the important characteristics of a work plan as outlined by my manager.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
4. I used work plans in my answer because they were "rated" high (like 5 and/or 4).
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
5. A high "rating" meant the item MET the important characteristics of a work plan as outlined by my manager.
Done
Internet
Start
Study Screen Prints.doc - ...
Retrospective Beliefs...
6:54 PM

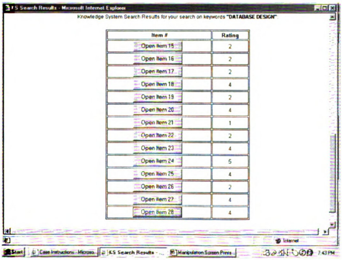

Retrospective Beliefs - Microsoft Internet Explorer
16. I can only argue for ideas which I already believe.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
17. I guess I put on a show to impress or entertain others.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
18. I would probably make a good actor.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
19. In a group of
Strongly agree
20. I have consi
Strongly agree
Microsoft Internet Explorer
Please make sure that you have answered all questions.
OK
Cancel
21. At a party I let others keep the jokes and stories going.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
22. I am a female.
Strongly agree 1 2 3 4 5 6 7 8 9 10 Strongly disagree N
Submit Answers
Done
Internet
Start
Study Screen Prints.doc - ...
Retrospective Beliefs...
6:54 PM

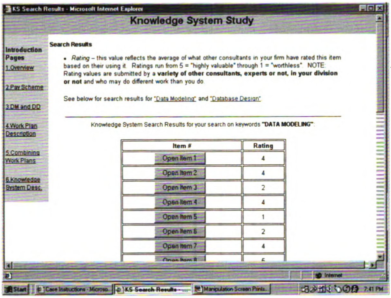

Knowledge Systems Completed - Microsoft Internet Explorer
Knowledge System Study
Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
Task Completed...Thank You for Participating in the Knowledge System Study
After all experimental sessions are completed, a discussion of this study and the correct solution will be announced and posted to the BUS309 blackboard site.
Done
Internet
Start
Study Screen Prints.doc - ...
Knowledge Systems ...
6:54 PM

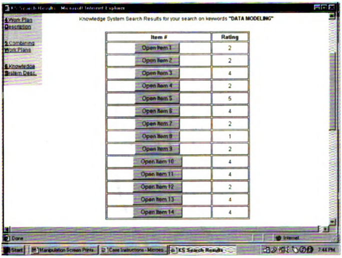
Appendix C: Manipulation Screens

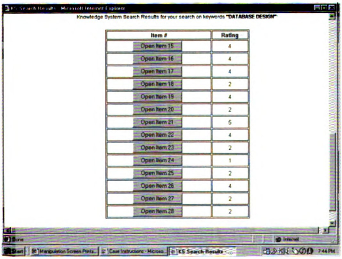


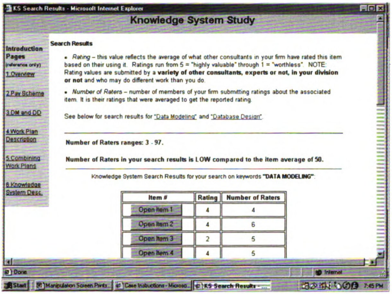





KS Search Results - Microsoft Internet Explorer
Knowledge System Study
Introduction Pages
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
Search Results
• Rating – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless". NOTE: Rating values are submitted by a variety of other consultants, experts or not, in your division or not and who may do different work than you do.
See below for search results for "Data Modeling" and "Database Design"
Knowledge System Search Results for your search on keywords "DATA MODELING":
Item # Rating
Open Item 1 4
Open Item 2 4
Open Item 3 2
Open Item 4 4
Open Item 5 1
Open Item 6 2
Open Item 7 4
Internet
Start
Case Instructions - Microso...
KS Search Results - ...
Manipulation Screen Prints...
7:41 PM


KS Search Results - Microsoft Internet Explorer
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
Knowledge System Search Results for your search on keywords "DATA MODELING"
Item # Rating
Open Item 1 2
Open Item 2 2
Open Item 3 4
Open Item 4 2
Open Item 5 5
Open Item 6 4
Open Item 7 2
Open Item 8 1
Open Item 9 2
Open Item 10 4
Open Item 11 4
Open Item 12 2
Open Item 13 4
Open Item 14 4
Done
Internet
Start
Manipulation Screen Prints...
Case Instructions - Microso...
KS Search Results
7:44 PM


KS Search Results - Microsoft Internet Explorer
Knowledge System Search Results for your search on keywords "DATABASE DESIGN"
Item # Rating
Open Item 15 4
Open Item 16 4
Open Item 17 4
Open Item 18 2
Open Item 19 4
Open Item 20 2
Open Item 21 5
Open Item 22 4
Open Item 23 2
Open Item 24 1
Open Item 25 2
Open Item 26 4
Open Item 27 2
Open Item 28 2
Done
Internet
Start
Manipulation Screen Prints...
Case Instructions - Microso...
KS Search Results
7:44 PM


KS Search Results - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages (reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

Search Results

- *Rating* – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless". NOTE: Rating values are submitted by a **variety of other consultants, experts or not, in your division or not** and who may do different work than you do.
- *Number of Raters* – number of members of your firm submitting ratings about the associated item. It is their ratings that were averaged to get the reported rating.

See below for search results for "Data Modeling" and "Database Design".

Number of Raters ranges: 3 - 97.

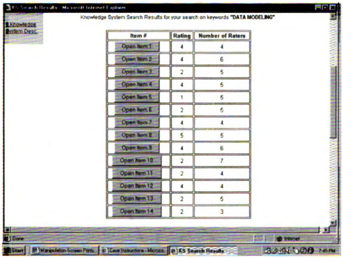
Number of Raters in your search results is LOW compared to the item average of 50.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

Item #	Rating	Number of Raters
Open Item 1	4	4
Open Item 2	4	6
Open Item 3	2	5
Open Item 4	4	5

Done | Internet

Start | Manipulation Screen Prints | Case Instructions - Microso... | KS Search Results - ... | 7:45 PM


KS Search Results - Microsoft Internet Explorer

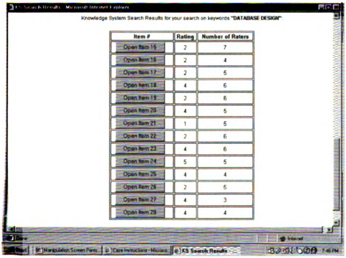
6.Knowledge System Desc.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

Item #	Rating	Number of Raters
Open Item 1	4	4
Open Item 2	4	6
Open Item 3	2	5
Open Item 4	4	5
Open Item 5	1	5
Open Item 6	2	5
Open Item 7	4	4
Open Item 8	5	5
Open Item 9	4	6
Open Item 10	2	7
Open Item 11	2	4
Open Item 12	4	4
Open Item 13	2	5
Open Item 14	2	3

Done | Internet

Start | Manipulation Screen Prints | Case Instructions - Microso... | KS Search Results | 7:45 PM

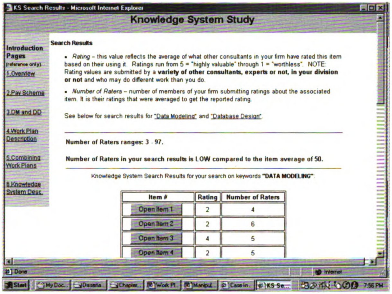

KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATABASE DESIGN"**:

Item #	Rating	Number of Raters
Open Item 15	2	7
Open Item 16	2	4
Open Item 17	2	5
Open Item 18	4	6
Open Item 19	2	6
Open Item 20	4	5
Open Item 21	1	5
Open Item 22	2	6
Open Item 23	4	6
Open Item 24	5	5
Open Item 25	4	4
Open Item 26	2	5
Open Item 27	4	3
Open Item 28	4	4

Done | Internet

Start | Manipulation Screen Prints | Case Instructions - Microso... | KS Search Results | 7:46 PM



Knowledge System Study

Introduction Pages (reference only)

1.Overview

2.Pay Scheme

3.DM and DD

4.Work Plan Description

5.Combining Work Plans

6.Knowledge System Desc.

Search Results

- *Rating* – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless". NOTE: Rating values are submitted by a **variety of other consultants, experts or not, in your division or not** and who may do different work than you do.
- *Number of Raters* – number of members of your firm submitting ratings about the associated item. It is their ratings that were averaged to get the reported rating.

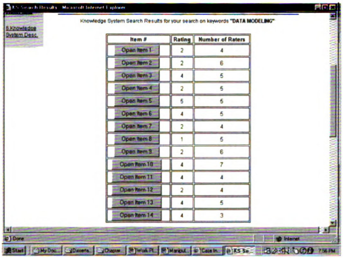
See below for search results for "Data Modeling" and "Database Design".

Number of Raters ranges: 3 - 97.

Number of Raters in your search results is LOW compared to the item average of 50.

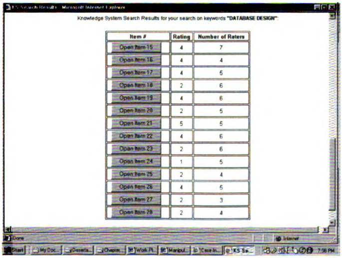
Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

Item #	Rating	Number of Raters
Open Item 1	2	4
Open Item 2	2	6
Open Item 3	4	5
Open Item 4	2	5



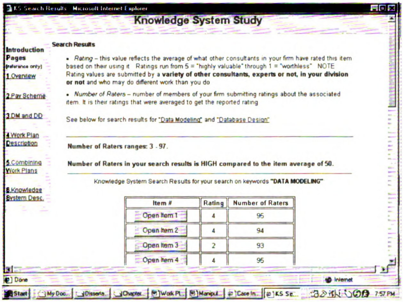
Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

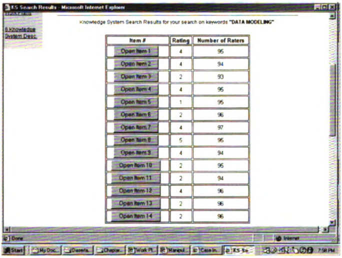
Item #	Rating	Number of Raters
Open Item 1	2	4
Open Item 2	2	6
Open Item 3	4	5
Open Item 4	2	5
Open Item 5	5	5
Open Item 6	4	5
Open Item 7	2	4
Open Item 8	1	5
Open Item 9	2	6
Open Item 10	4	7
Open Item 11	4	4
Open Item 12	2	4
Open Item 13	4	5
Open Item 14	4	3

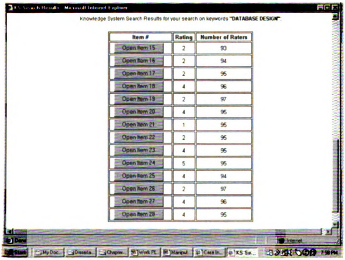


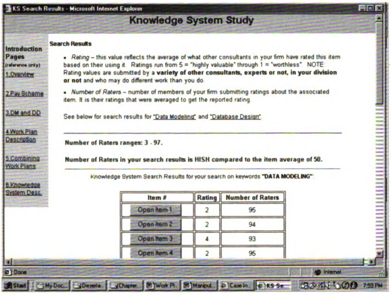
Knowledge System Search Results for your search on keywords **"DATABASE DESIGN"**:

Item #	Rating	Number of Raters
Open Item 15	4	7
Open Item 16	4	4
Open Item 17	4	5
Open Item 18	2	6
Open Item 19	4	6
Open Item 20	2	5
Open Item 21	5	5
Open Item 22	4	6
Open Item 23	2	6
Open Item 24	1	5
Open Item 25	2	4
Open Item 26	4	5
Open Item 27	2	3
Open Item 28	2	4


KS Search Results - Microsoft Internet Explorer
Knowledge System Study
Introduction Pages (reference only)
1 Overview
2 Pay Scheme
3 DM and DD
4 Work Plan Description
5 Combining Work Plans
6 Knowledge System Desc.
Search Results
• Rating – this value reflects the average of what other consultants in your firm have rated this item based on their using it Ratings run from 5 = "highly valuable" through 1 = "worthless" NOTE Rating values are submitted by a variety of other consultants, experts or not, in your division or not and who may do different work than you do
• Number of Raters – number of members of your firm submitting ratings about the associated item. It is their ratings that were averaged to get the reported rating
See below for search results for "Data Modeling" and "Database Design"
Number of Raters ranges: 3 - 97.
Number of Raters in your search results is HIGH compared to the item average of 50.
Knowledge System Search Results for your search on keywords "DATA MODELING"
Item # | Rating | Number of Raters
Open Item 1 | 4 | 95
Open Item 2 | 4 | 94
Open Item 3 | 2 | 93
Open Item 4 | 4 | 95
Done
Internet
Start
7:57 PM


KS Search Results - Microsoft Internet Explorer
6 Knowledge System Desc.
Knowledge System Search Results for your search on keywords "DATA MODELING"
Item # | Rating | Number of Raters
Open Item 1 | 4 | 95
Open Item 2 | 4 | 94
Open Item 3 | 2 | 93
Open Item 4 | 4 | 95
Open Item 5 | 1 | 95
Open Item 6 | 2 | 96
Open Item 7 | 4 | 97
Open Item 8 | 5 | 95
Open Item 9 | 4 | 94
Open Item 10 | 2 | 95
Open Item 11 | 2 | 94
Open Item 12 | 4 | 96
Open Item 13 | 2 | 96
Open Item 14 | 2 | 96
Done
Internet
Start


Knowledge System Search Results for your search on keywords "DATABASE DESIGN"
Item # | Rating | Number of Raters
Open Item 15 | 2 | 93
Open Item 16 | 2 | 94
Open Item 17 | 2 | 95
Open Item 18 | 4 | 96
Open Item 19 | 2 | 97
Open Item 20 | 4 | 95
Open Item 21 | 1 | 95
Open Item 22 | 2 | 95
Open Item 23 | 4 | 95
Open Item 24 | 5 | 95
Open Item 25 | 4 | 94
Open Item 26 | 2 | 97
Open Item 27 | 4 | 96
Open Item 28 | 4 | 95
Internet
Start



KS Search Results - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

Search Results

- *Rating* – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless". NOTE: Rating values are submitted by a **variety of other consultants, experts or not, in your division or not** and who may do different work than you do.
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See below for search results for "Data Modeling" and "Database Design".

Number of Raters ranges: 3 - 97.

Number of Raters in your search results is HISH compared to the item average of 50.

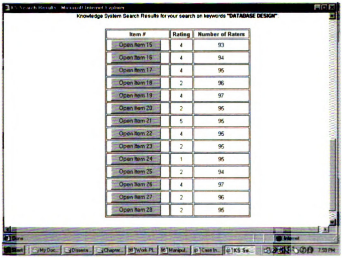
Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

Item #	Rating	Number of Raters
Open Item 1	2	95
Open Item 2	2	94
Open Item 3	4	93
Open Item 4	2	95

KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

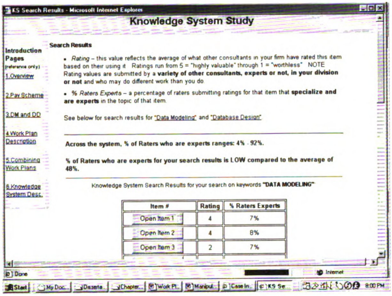
Item #	Rating	Number of Raters
Open Item 1	2	95
Open Item 2	2	94
Open Item 3	4	93
Open Item 4	2	95
Open Item 5	5	95
Open Item 6	4	96
Open Item 7	2	97
Open Item 8	1	95
Open Item 9	2	94
Open Item 10	4	95
Open Item 11	4	94
Open Item 12	2	96
Open Item 13	4	96
Open Item 14	4	96



KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords "DATABASE DESIGN":

Item #	Rating	Number of Raters
Open Item 15	4	93
Open Item 16	4	94
Open Item 17	4	95
Open Item 18	2	96
Open Item 19	4	97
Open Item 20	2	95
Open Item 21	5	95
Open Item 22	4	95
Open Item 23	2	95
Open Item 24	1	95
Open Item 25	2	94
Open Item 26	4	97
Open Item 27	2	96
Open Item 28	2	95



KS Search Results - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

Search Results

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- *% Raters Experts* – a percentage of raters submitting ratings for that item that **specialize and are experts** in the topic of that item.

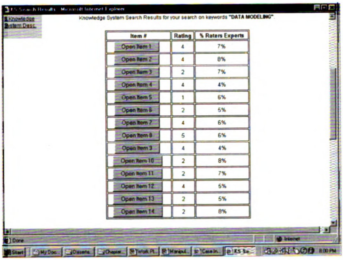
See below for search results for "Data Modeling" and "Database Design".

Across the system, % of Raters who are experts ranges: 4% - 92%.

% of Raters who are experts for your search results is LOW compared to the average of 48%.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**

Item #	Rating	% Raters Experts
Open Item 1	4	7%
Open Item 2	4	8%
Open Item 3	2	7%

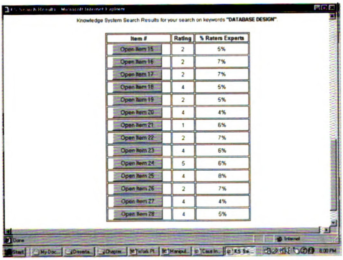


KS Search Results - Microsoft Internet Explorer

6.Knowledge System Desc.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**

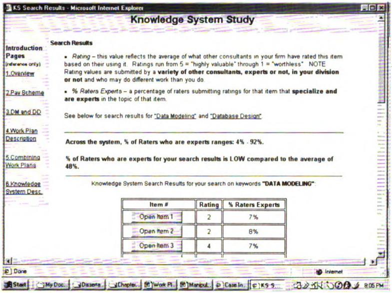
Item #	Rating	% Raters Experts
Open Item 1	4	7%
Open Item 2	4	8%
Open Item 3	2	7%
Open Item 4	4	4%
Open Item 5	1	6%
Open Item 6	2	5%
Open Item 7	4	6%
Open Item 8	5	6%
Open Item 9	4	4%
Open Item 10	2	8%
Open Item 11	2	7%
Open Item 12	4	5%
Open Item 13	2	5%
Open Item 14	2	8%



KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATABASE DESIGN"**

Item #	Rating	% Raters Experts
Open Item 15	2	5%
Open Item 16	2	7%
Open Item 17	2	7%
Open Item 18	4	5%
Open Item 19	2	5%
Open Item 20	4	4%
Open Item 21	1	6%
Open Item 22	2	7%
Open Item 23	4	6%
Open Item 24	5	6%
Open Item 25	4	8%
Open Item 26	2	7%
Open Item 27	4	4%
Open Item 28	4	5%



KS Search Results - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages (reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

Search Results

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Across the system, % of Raters who are experts ranges: 4% - 92%.

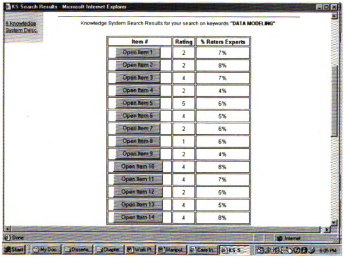
% of Raters who are experts for your search results is LOW compared to the average of 48%.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

Item #	Rating	% Raters Experts
Open Item 1	2	7%
Open Item 2	2	8%
Open Item 3	4	7%

Done | Internet

Start | My Doc... | Disserta... | Chapter... | Work Pl... | Manipul... | Case In... | KS S... | 8:05 PM



KS Search Results - Microsoft Internet Explorer

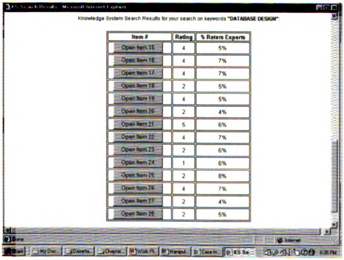
6.Knowledge System Desc.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

Item #	Rating	% Raters Experts
Open Item 1	2	7%
Open Item 2	2	8%
Open Item 3	4	7%
Open Item 4	2	4%
Open Item 5	5	6%
Open Item 6	4	5%
Open Item 7	2	6%
Open Item 8	1	6%
Open Item 9	2	4%
Open Item 10	4	8%
Open Item 11	4	7%
Open Item 12	2	5%
Open Item 13	4	5%
Open Item 14	4	8%

Done | Internet

Start | My Doc... | Disserta... | Chapter... | Work Pl... | Manipul... | Case In... | KS S... | 8:05 PM



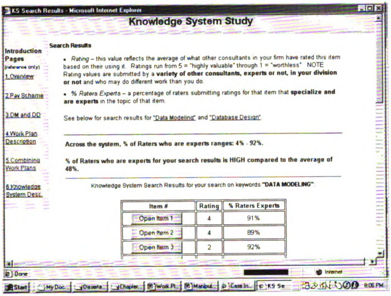
KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATABASE DESIGN"**:

Item #	Rating	% Raters Experts
Open Item 15	4	5%
Open Item 16	4	7%
Open Item 17	4	7%
Open Item 18	2	5%
Open Item 19	4	5%
Open Item 20	2	4%
Open Item 21	5	6%
Open Item 22	4	7%
Open Item 23	2	6%
Open Item 24	1	6%
Open Item 25	2	8%
Open Item 26	4	7%
Open Item 27	2	4%
Open Item 28	2	5%

Done | Internet

Start | My Doc... | Disserta... | Chapter... | Work Pl... | Manipul... | Case In... | KS Se... | 8:05 PM


KS Search Results - Microsoft Internet Explorer
Knowledge System Study
Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.
Search Results
• Rating – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless" NOTE Rating values are submitted by a variety of other consultants, experts or not, in your division or not and who may do different work than you do.
• % Raters Experts – a percentage of raters submitting ratings for that item that specialize and are experts in the topic of that item.
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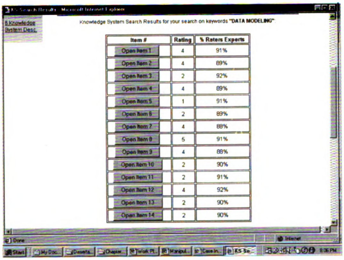
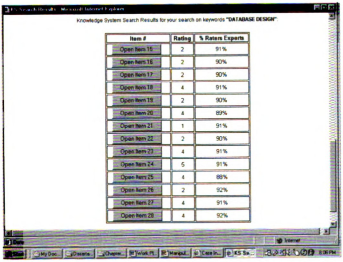
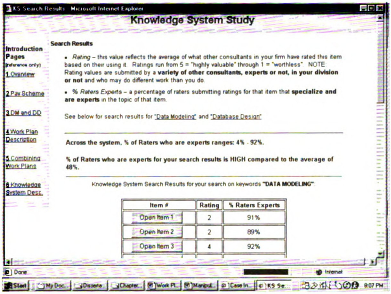
Across the system, % of Raters who are experts ranges: 4% - 92%.
% of Raters who are experts for your search results is HIGH compared to the average of 48%.
Knowledge System Search Results for your search on keywords "DATA MODELING".
Item # | Rating | % Raters Experts
Open Item 1 | 4 | 91%
Open Item 2 | 4 | 89%
Open Item 3 | 2 | 92%
Done
Internet
Start
8:06 PM


KS Search Results - Microsoft Internet Explorer
6.Knowledge System Desc.
Knowledge System Search Results for your search on keywords "DATA MODELING".
Item # | Rating | % Raters Experts
Open Item 1 | 4 | 91%
Open Item 2 | 4 | 89%
Open Item 3 | 2 | 92%
Open Item 4 | 4 | 89%
Open Item 5 | 1 | 91%
Open Item 6 | 2 | 89%
Open Item 7 | 4 | 88%
Open Item 8 | 5 | 91%
Open Item 9 | 4 | 88%
Open Item 10 | 2 | 90%
Open Item 11 | 2 | 91%
Open Item 12 | 4 | 92%
Open Item 13 | 2 | 90%
Open Item 14 | 2 | 90%
Done
Internet


KS Search Results - Microsoft Internet Explorer
Knowledge System Search Results for your search on keywords "DATABASE DESIGN".
Item # | Rating | % Raters Experts
Open Item 15 | 2 | 91%
Open Item 16 | 2 | 90%
Open Item 17 | 2 | 90%
Open Item 18 | 4 | 91%
Open Item 19 | 2 | 90%
Open Item 20 | 4 | 89%
Open Item 21 | 1 | 91%
Open Item 22 | 2 | 90%
Open Item 23 | 4 | 91%
Open Item 24 | 5 | 91%
Open Item 25 | 4 | 88%
Open Item 26 | 2 | 92%
Open Item 27 | 4 | 91%
Open Item 28 | 4 | 92%
Internet


KS Search Results - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages
(reference only)
1 Overview
2 Pay Scheme
3 DM and DD
4 Work Plan Description
5 Combining Work Plans
6 Knowledge System Desc.

Search Results

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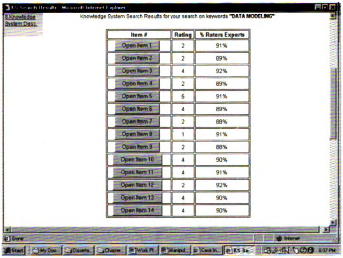
% of Raters who are experts for your search results is HIGH compared to the average of 48%.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

Item #	Rating	% Raters Experts
Open Item 1	2	91%
Open Item 2	2	89%
Open Item 3	4	92%

Done   Internet

Start | My Doc... | Disserta... | Chapter... | Work Pl... | Manipul... | Case In... | KS Se...   9:07 PM


KS Search Results - Microsoft Internet Explorer

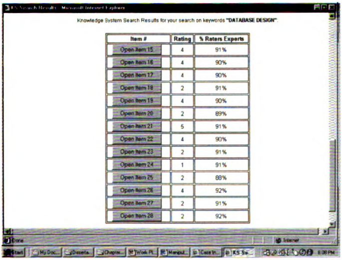
6 Knowledge System Desc.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

Item #	Rating	% Raters Experts
Open Item 1	2	91%
Open Item 2	2	89%
Open Item 3	4	92%
Open Item 4	2	89%
Open Item 5	5	91%
Open Item 6	4	89%
Open Item 7	2	88%
Open Item 8	1	91%
Open Item 9	2	88%
Open Item 10	4	90%
Open Item 11	4	91%
Open Item 12	2	92%
Open Item 13	4	90%
Open Item 14	4	90%

Done   Internet

Start | My Doc... | Disserta... | Chapter... | Work Pl... | Manipul... | Case In... | KS Se...   8:07 PM

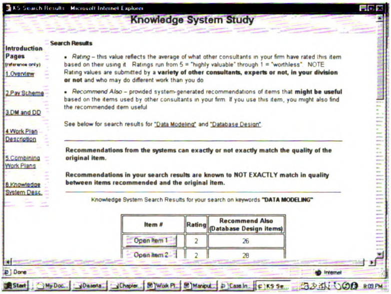

KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATABASE DESIGN"**:

Item #	Rating	% Raters Experts
Open Item 15	4	91%
Open Item 16	4	90%
Open Item 17	4	90%
Open Item 18	2	91%
Open Item 19	4	90%
Open Item 20	2	89%
Open Item 21	5	91%
Open Item 22	4	90%
Open Item 23	2	91%
Open Item 24	1	91%
Open Item 25	2	88%
Open Item 26	4	92%
Open Item 27	2	91%
Open Item 28	2	92%

Done   Internet

Start | My Doc... | Disserta... | Chapter... | Work Pl... | Manipul... | Case In... | KS Se...   8:08 PM



KS Search Results - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages (reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

Search Results

- *Rating* – this value reflects the average of what other consultants in your firm have rated this item based on their using it Ratings run from 5 = "highly valuable" through 1 = "worthless". NOTE Rating values are submitted by a **variety of other consultants, experts or not, in your division or not** and who may do different work than you do
- *Recommend Also* – provided system-generated recommendations of items that **might be useful** based on the items used by other consultants in your firm If you use this item, you might also find the recommended item useful

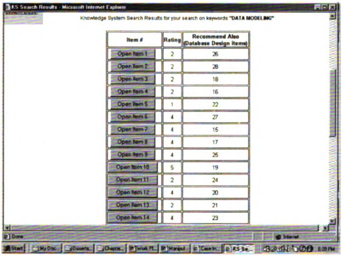
See below for search results for "Data Modeling" and "Database Design".

Recommendations from the systems can exactly or not exactly match the quality of the original item.

Recommendations in your search results are known to NOT EXACTLY match in quality between items recommended and the original item.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**

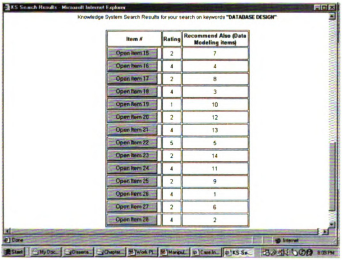
Item #	Rating	Recommend Also (Database Design items)
Open Item 1	2	26
Open Item 2	2	28



KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATA MODELING"**

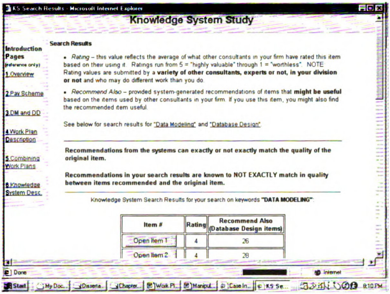
Item #	Rating	Recommend Also (Database Design items)
Open Item 1	2	26
Open Item 2	2	28
Open Item 3	2	18
Open Item 4	2	16
Open Item 5	1	22
Open Item 6	4	27
Open Item 7	4	15
Open Item 8	4	17
Open Item 9	4	25
Open Item 10	5	19
Open Item 11	2	24
Open Item 12	4	20
Open Item 13	2	21
Open Item 14	4	23



KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATABASE DESIGN"**

Item #	Rating	Recommend Also (Data Modeling items)
Open Item 15	2	7
Open Item 16	4	4
Open Item 17	2	8
Open Item 18	4	3
Open Item 19	1	10
Open Item 20	2	12
Open Item 21	4	13
Open Item 22	5	5
Open Item 23	2	14
Open Item 24	4	11
Open Item 25	2	9
Open Item 26	4	1
Open Item 27	2	6
Open Item 28	4	2



KS Search Results - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages (reference only)
1 Overview
2 Pay Scheme
3 DM and DD
4 Work Plan Description
5 Combining Work Plans
6 Knowledge System Desc.

Search Results

- *Rating* – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless". NOTE: Rating values are submitted by a **variety of other consultants, experts or not, in your division or not** and who may do different work than you do.
- *Recommend Also* – provided system-generated recommendations of items that **might be useful** based on the items used by other consultants in your firm. If you use this item, you might also find the recommended item useful.

See below for search results for "Data Modeling" and "Database Design".

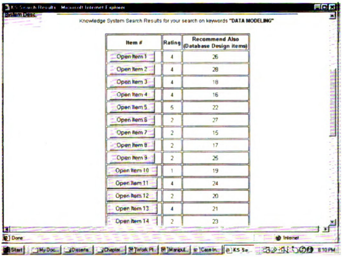
Recommendations from the systems can exactly or not exactly match the quality of the original item.

Recommendations in your search results are known to NOT EXACTLY match in quality between items recommended and the original item.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

Item #	Rating	Recommend Also (Database Design items)
Open Item 1	4	26
Open Item 2	4	28

Done | Internet

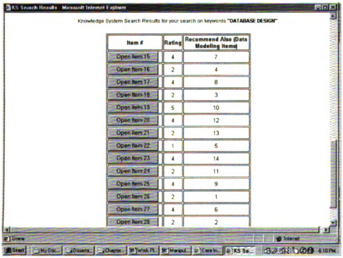


KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATA MODELING"**

Item #	Rating	Recommend Also (Database Design items)
Open Item 1	4	26
Open Item 2	4	28
Open Item 3	4	18
Open Item 4	4	16
Open Item 5	5	22
Open Item 6	2	27
Open Item 7	2	15
Open Item 8	2	17
Open Item 9	2	25
Open Item 10	1	19
Open Item 11	4	24
Open Item 12	2	20
Open Item 13	4	21
Open Item 14	2	23

Done | Internet

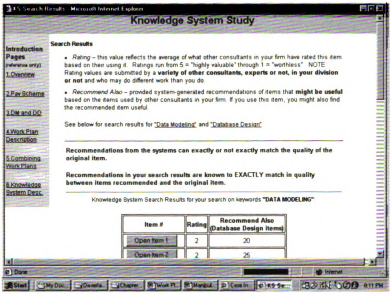


KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATABASE DESIGN"**

Item #	Rating	Recommend Also (Data Modeling items)
Open Item 15	4	7
Open Item 16	2	4
Open Item 17	4	8
Open Item 18	2	3
Open Item 19	5	10
Open Item 20	4	12
Open Item 21	2	13
Open Item 22	1	5
Open Item 23	4	14
Open Item 24	2	11
Open Item 25	4	9
Open Item 26	2	1
Open Item 27	4	6
Open Item 28	2	2

Done | Internet



KS Search Results - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages (reference only)

1.Overview

2.Pay Scheme

3.DM and DD

4.Work Plan Description

5.Combining Work Plans

6.Knowledge System Desc.

Search Results

- *Rating* – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless" NOTE: Rating values are submitted by a **variety of other consultants, experts or not, in your division or not** and who may do different work than you do.
- *Recommend Also* – provided system-generated recommendations of items that **might be useful** based on the items used by other consultants in your firm. If you use this item, you might also find the recommended item useful.

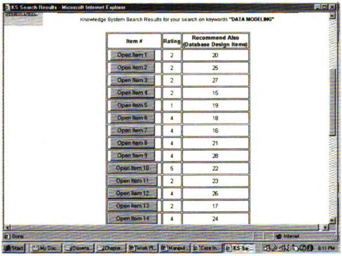
See below for search results for "Data Modeling" and "Database Design"

Recommendations from the systems can exactly or not exactly match the quality of the original item.

Recommendations in your search results are known to EXACTLY match in quality between items recommended and the original item.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

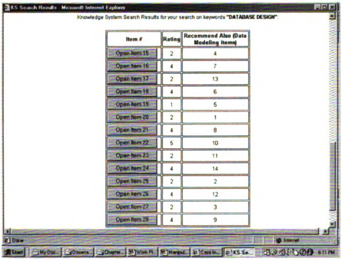
Item #	Rating	Recommend Also (Database Design items)
Open Item 1	2	20
Open Item 2	2	25



KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATA MODELING"**:

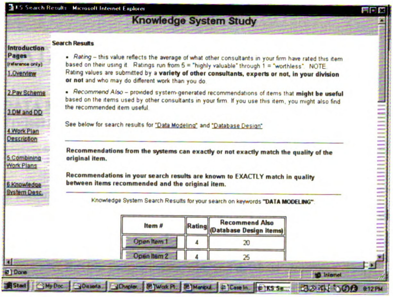
Item #	Rating	Recommend Also (Database Design items)
Open Item 1	2	20
Open Item 2	2	25
Open Item 3	2	27
Open Item 4	2	15
Open Item 5	1	19
Open Item 6	4	18
Open Item 7	4	16
Open Item 8	4	21
Open Item 9	4	28
Open Item 10	5	22
Open Item 11	2	23
Open Item 12	4	26
Open Item 13	2	17
Open Item 14	4	24



KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATABASE DESIGN"**:

Item #	Rating	Recommend Also (Data Modeling items)
Open Item 15	2	4
Open Item 16	4	7
Open Item 17	2	13
Open Item 18	4	6
Open Item 19	1	5
Open Item 20	2	1
Open Item 21	4	8
Open Item 22	5	10
Open Item 23	2	11
Open Item 24	4	14
Open Item 25	2	2
Open Item 26	4	12
Open Item 27	2	3
Open Item 28	4	9



KS Search Results - Microsoft Internet Explorer

Knowledge System Study

Introduction Pages
(reference only)
1.Overview
2.Pay Scheme
3.DM and DD
4.Work Plan Description
5.Combining Work Plans
6.Knowledge System Desc.

Search Results

- *Rating* – this value reflects the average of what other consultants in your firm have rated this item based on their using it. Ratings run from 5 = "highly valuable" through 1 = "worthless". NOTE. Rating values are submitted by a **variety of other consultants, experts or not, in your division or not** and who may do different work than you do.
- *Recommend Also* – provided system-generated recommendations of items that **might be useful** based on the items used by other consultants in your firm. If you use this item, you might also find the recommended item useful.

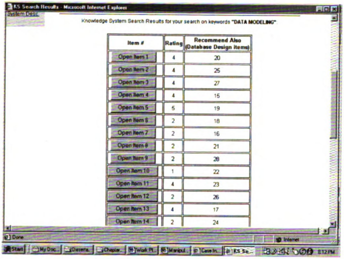
See below for search results for "Data Modeling" and "Database Design"

Recommendations from the systems can exactly or not exactly match the quality of the original item.

Recommendations in your search results are known to EXACTLY match in quality between items recommended and the original item.

Knowledge System Search Results for your search on keywords **"DATA MODELING"**.

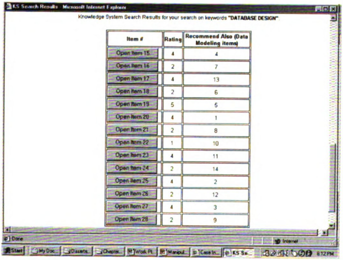
Item #	Rating	Recommend Also (Database Design items)
Open Item 1	4	20
Open Item 2	4	25



KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATA MODELING"**.

Item #	Rating	Recommend Also (Database Design items)
Open Item 1	4	20
Open Item 2	4	25
Open Item 3	4	27
Open Item 4	4	15
Open Item 5	5	19
Open Item 6	2	18
Open Item 7	2	16
Open Item 8	2	21
Open Item 9	2	28
Open Item 10	1	22
Open Item 11	4	23
Open Item 12	2	26
Open Item 13	4	17
Open Item 14	2	24



KS Search Results - Microsoft Internet Explorer

Knowledge System Search Results for your search on keywords **"DATABASE DESIGN"**.

Item #	Rating	Recommend Also (Data Modeling items)
Open Item 15	4	4
Open Item 16	2	7
Open Item 17	4	13
Open Item 18	2	6
Open Item 19	5	5
Open Item 20	4	1
Open Item 21	2	8
Open Item 22	1	10
Open Item 23	4	11
Open Item 24	2	14
Open Item 25	4	2
Open Item 26	2	12
Open Item 27	4	3
Open Item 28	2	9

Appendix D: 100% Quality Work Plans

DATA MODELING PROJECT

DATA MODELING PROJECT

Project Step	**Consultant Rank**
1. Understand business model	Junior and Senior
2. Identify entities a. Interview system owners and users to identify things they would like to capture, store, and produce information	Junior and Senior
b. Study the forms and files	Junior
c. Review program data, file, and database structures	Junior and Senior
d. Check that entities have many occurrences and name them	Junior
e. Define unique identifiers for each entity	Junior and Senior
3. Draw a rough draft of entity relationship diagram a. Brainstorm relationships between entities	Junior and Senior
b. Normalize to minimize redundancy and maximize flexibility	Junior and Senior
c. Draw entity relationship diagram	Junior and Senior
4. Identify data attributes a. Brainstorm on characteristics describing each entity	Junior and Senior
b. Review forms, documents, printouts of stored data	Junior and Senior
c. Circle each unique item on the form	Junior and Senior
d. Exclude items that are extraneous or are constant	Senior
e. Name attributes and verify attributes with end-users	Junior and Senior
5. Map data attributes to entities a. For each entity, find forms, file printouts, reports, etc. whose data describes the entity and record the attributes	Junior and Senior
b. Interview end-users to identify data attributes	Senior
6. Partner review and walk through with client	Junior, Senior, Partner

DATABASE DESIGN PROJECT

DATABASE DESIGN PROJECT

Project Step	**Consultant Rank**
1. Understand business model	Junior and Senior
2. Review database requirements a. Review the entity relationship diagram	Junior and Senior
b. Identify the entities to be designed	Junior and Senior
c. Identify associations to be designed	Junior and Senior
d. Determine data distribution and access rights for employees	Junior
3. Design the logical schema for the database a. Review the logical schema which reflects the database management system chosen	Junior and Senior
b. With the client's database administrator and staff update the schema design based on the specific technology chosen	Junior and Senior
c. With the client's database administrator and staff update the repository specifications based on the specific technology chosen for implementation	Junior and Senior
4. Build physical database structures a. Convert each entity in entity relationship diagram as a relational table	Junior and Senior
b. Convert each relationship in entity relationship diagram as a link between relational tables	Junior and Senior
5. Prototype the database a. Gather and load with test data	Junior and Senior
b. Test outputs, inputs, screens and other components	Senior
c. Adjust database based on testing results and re-run tests	Senior
d. With the client's database administrator and staff review test results	Junior and Senior
6. Partner review and walk through with client	Junior, Senior, Partner

Appendix E: Screen Prints of All Work Plans

DMSRVL2 - Microsoft Internet Explorer

Item 1

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Look for items to capture, store, and produce information for the client given their business	Junior and Senior
☐	--1b. Study the forms and files	Junior
☐	--1c. Review program data, file, and database structures	Junior and Senior
☐	--1d. Check on entities that are a part of the system	Junior
☐	--1e. Define identifiers that are a part of the system	Junior and Senior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	Junior and Senior
☐	--2b. Normalize items to fit the model	Junior and Senior

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMSRVL2 - Micr... | 7:11 PM

DMSRVL2 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--1d. Check on entities that are a part of the system	Junior
☐	--1e. Define identifiers that are a part of the system	Junior and Senior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	Junior and Senior
☐	--2b. Normalize items to fit the model	Junior and Senior
☐	--2c. Make drawings on paper	Junior and Senior
☐	3. BRING IN SENIOR TO GET WORK DONE	Heading, no rank needed
☐	--3a. Brainstorm with project team	Junior and Senior
☐	--3b. Review forms, documents, printouts	Junior and Senior
☐	--3c. Circle items that are on the forms, documents, printouts	Junior and Senior
☐	--3d. Exclude items that are on the forms, documents, printouts	Senior
☐	--3e. Name attributes on the forms, documents, printouts	Junior and Senior
☐	4. BRING SENIOR BACK TO GET MORE WORK DONE	Heading, no rank needed
☐	--4a. For each entity record the attributes after talking to senior and getting input on how this is done	Junior and Senior
☐	--4b. Talk more to the client	Senior

Select All | Clear All

Send to Work Plan Answer

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMSRVL2 - Micr... | 7:11 PM

DMSRCN2 - Microsoft Internet Explorer

Item 2

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Interview system owners and users to identify things they would like to capture, store, and produce information	Junior and Senior
☐	--1b. Study the forms and files	
☐	--1c. Review program data, file, and database structures	Junior and Senior
☐	--1d. Check that entities have many occurrences and name them	
☐	--1e. Define unique identifiers for each entity	Junior and Senior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	
☐	--2b. Normalize to minimize redundancy and maximize flexibility	Junior and Senior
☐	--2c. Draw entity relationship diagram	
☐	3. IDENTIFY DATA ATTRIBUTES	Heading, no rank needed
☐	--3a. Brainstorm on characteristics describing each entity	Junior and Senior
☐	--3b. Review forms, documents, printouts of stored data	Junior and Senior
☐	--3c. Circle each unique item on the form	Junior and Senior
☐	--3d. Exclude items that are extraneous or are constant	
☐	--3e. Name attributes and verify attributes with end-users	
☐	4. MAP DATA ATTRIBUTES TO ENTITIES	Heading, no rank needed
☐	--4a. For each entity, find forms, file printouts, reports, etc. whose data describes the entity and record the attributes	Junior and Senior
☐	--4b. Interview end-users to identify data attributes	Senior

Select All   Clear All

Send to Work Plan Answer

Done   Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMSRCN2 - Mic... | 7:11 PM

DMMRCN1 - Microsoft Internet Explorer

Item 3

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Interview system owners and users to identify things they would like to capture, store, and produce information	Junior
☐	--1b. Study the forms and files	
☐	--1c. Review program data, file, and database structures	Junior
☐	--1d. Check that entities have many occurrences and name them	
☐	--1e. Define unique identifiers for each entity	Junior and Senior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMRCN1 - Mic... | 7:12 PM

DMMRCN1 - Microsoft Internet Explorer

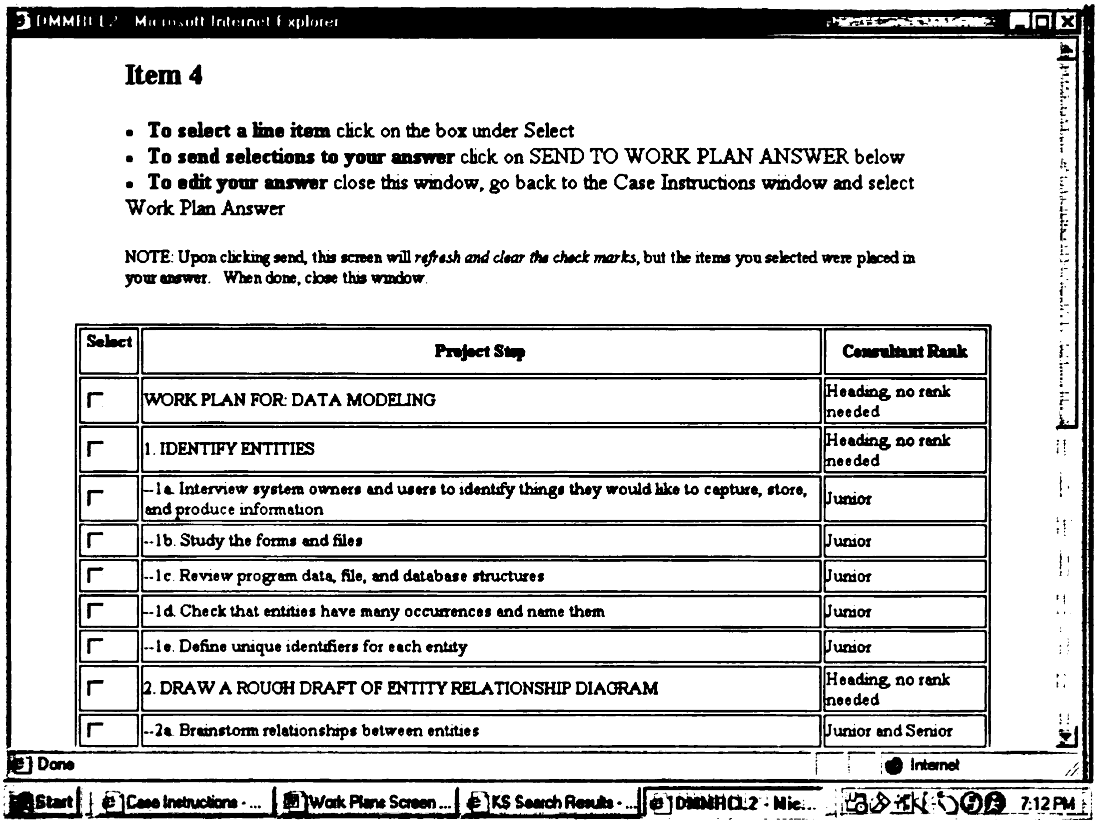
Select	Project Step	Consultant Rank
☐	--1d. Check that entities have many occurrences and name them	
☐	--1e. Define unique identifiers for each entity	Junior and Senior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	
☐	--2b. Normalize to minimize redundancy and maximize flexibility	Junior
☐	--2c. Draw entity relationship diagram	
☐	3. IDENTIFY DATA ATTRIBUTES	Heading, no rank needed
☐	--3a. Brainstorm on characteristics describing each entity	Junior
☐	--3b. Review forms, documents, printouts of stored data	Junior and Senior
☐	--3c. Circle each unique item on the form	Junior and Senior
☐	--3d. Exclude items that are extraneous or are constant	
☐	--3e. Name attributes and verify attributes with end-users	
☐	4. MAP DATA ATTRIBUTES TO ENTITIES	Heading, no rank needed
☐	--4a. For each entity, find forms, file printouts, reports, etc. whose data describes the entity and record the attributes	Junior
☐	--4b. Interview end-users to identify data attributes	Senior

[Select All] [Clear All]

[Send to Work Plan Answer]

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMRCN1 - Mic... | 7:12 PM

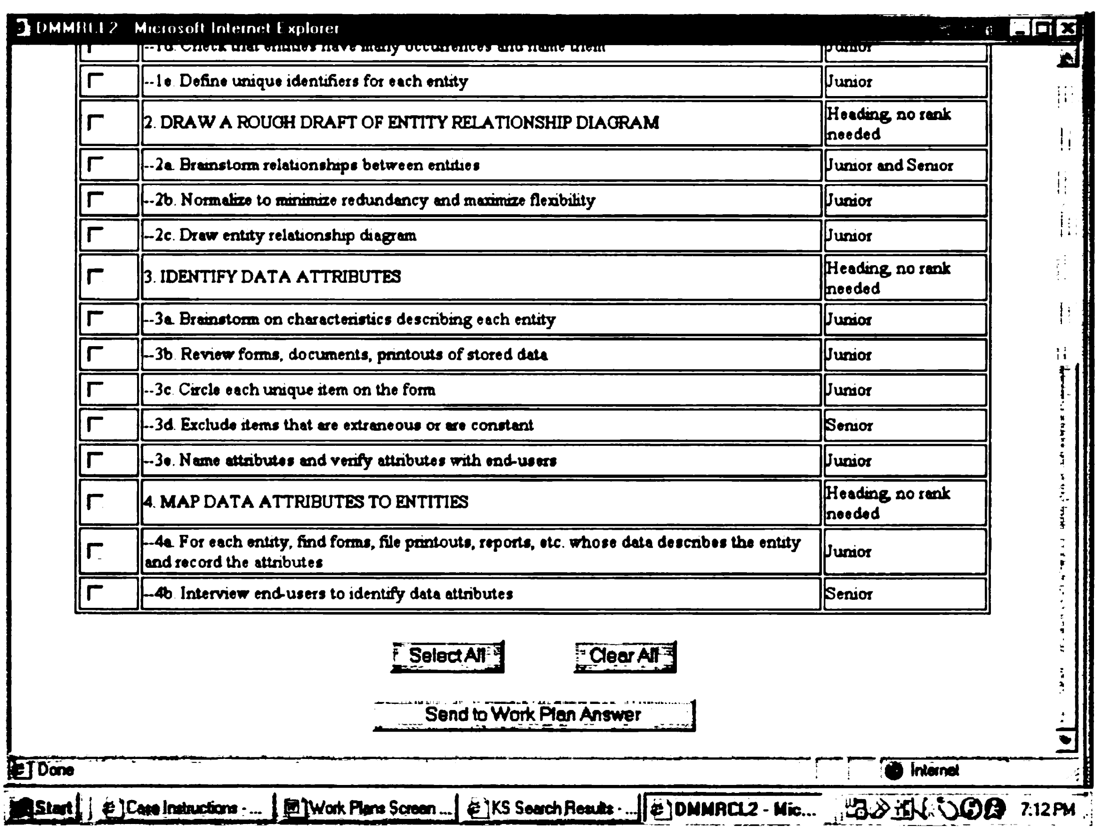


Item 4

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Interview system owners and users to identify things they would like to capture, store, and produce information	Junior
☐	--1b. Study the forms and files	Junior
☐	--1c. Review program data, file, and database structures	Junior
☐	--1d. Check that entities have many occurrences and name them	Junior
☐	--1e. Define unique identifiers for each entity	Junior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	Junior and Senior



Select	Project Step	Consultant Rank
☐	--1e. Define unique identifiers for each entity	Junior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	Junior and Senior
☐	--2b. Normalize to minimize redundancy and maximize flexibility	Junior
☐	--2c. Draw entity relationship diagram	Junior
☐	3. IDENTIFY DATA ATTRIBUTES	Heading, no rank needed
☐	--3a. Brainstorm on characteristics describing each entity	Junior
☐	--3b. Review forms, documents, printouts of stored data	Junior
☐	--3c. Circle each unique item on the form	Junior
☐	--3d. Exclude items that are extraneous or are constant	Senior
☐	--3e. Name attributes and verify attributes with end-users	Junior
☐	4. MAP DATA ATTRIBUTES TO ENTITIES	Heading, no rank needed
☐	--4a. For each entity, find forms, file printouts, reports, etc. whose data describes the entity and record the attributes	Junior
☐	--4b. Interview end-users to identify data attributes	Senior

Select All | Clear All

Send to Work Plan Answer

DMMUVNU - Microsoft Internet Explorer

Item 5

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Look for items to capture, store, and produce information for the client given their business	Junior
☐	--1b. Study the forms and files	
☐	--1c. Review program data, file, and database structures	Junior
☐	--1d. Check on entities that are a part of the system	
☐	--1e. Define identifiers that are a part of the system	Junior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	Senior

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMUVNU - Mic... | 7:12 PM

DMMUVNU - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--1e. Define identifiers that are a part of the system	Junior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	Senior
☐	--2b. Normalize items to fit the model	Junior
☐	-- 2c. Make drawings on paper	
☐	3. BRING IN SENIOR TO GET WORK DONE	Heading, no rank needed
☐	--3a. Brainstorm with project team	Junior
☐	--3b. Review forms, documents, printouts	Junior
☐	--3c. Circle items that are on the forms, documents, printouts	Junior
☐	--3d. Exclude items that are on the forms, documents, printouts	Senior
☐	--3e. Name attributes on the forms, documents, printouts	
☐	4. BRING SENIOR BACK TO GET MORE WORK DONE	Heading, no rank needed
☐	--4a. For each entity record the attributes after talking to senior and getting input on how this is done	Junior
☐	--4b. Talk more to the client	Senior

[Select All] [Clear All]

[Send to Work Plan Answer]

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMUVNU - Mic... | 7:12 PM

DMMRVL1 - Microsoft Internet Explorer

Item 6

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Look for items to capture, store, and produce information for the client given their business	Junior
☐	--1b. Study the forms and files	Junior
☐	--1c. Review program data, file, and database structures	Junior
☐	--1d. Check on entities that are a part of the system	Junior
☐	--1e. Define identifiers that are a part of the system	Junior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	Junior and Senior

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMRVL1 - Mic... | 7:13 PM

DMMRVL1 - Microsoft Internet Explorer

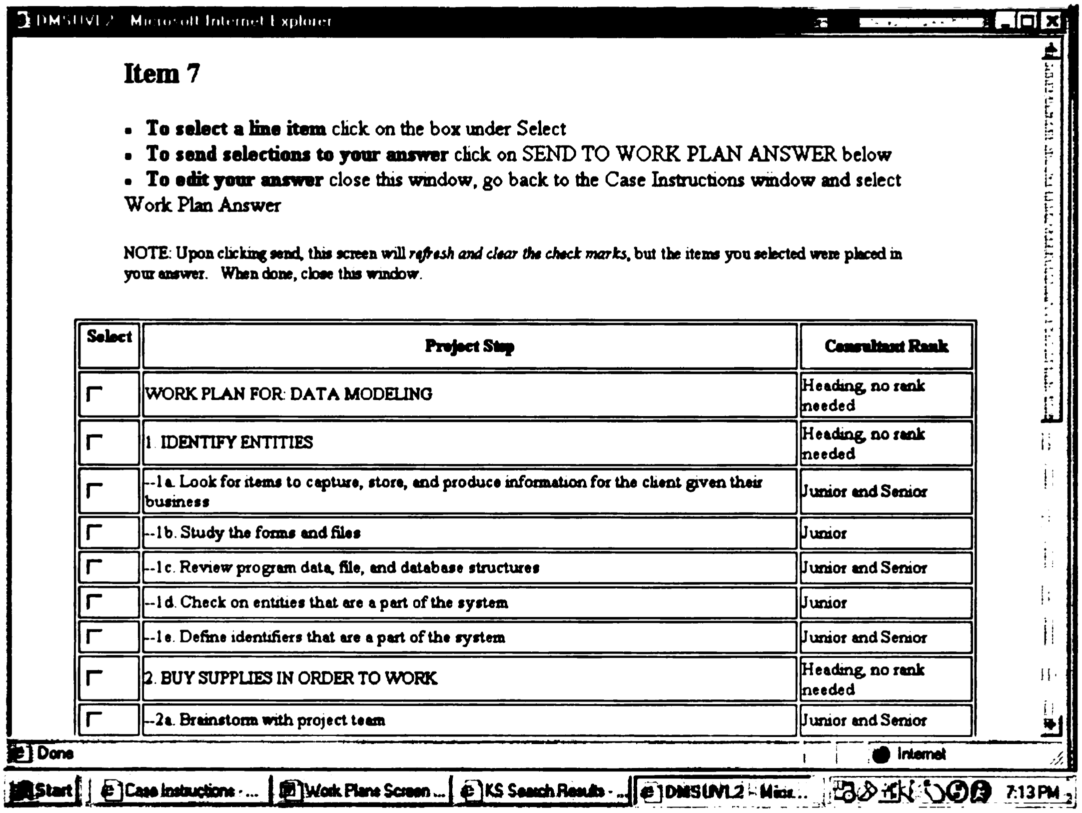
Select	Project Step	Consultant Rank
☐	--1d. Check on entities that are a part of the system	Junior
☐	--1e. Define identifiers that are a part of the system	Junior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	Junior and Senior
☐	--2b. Normalize items to fit the model	Junior
☐	--2c. Make drawings on paper	Junior
☐	3. BRING IN SENIOR TO GET WORK DONE	Heading, no rank needed
☐	--3a. Brainstorm with project team	Junior
☐	--3b. Review forms, documents, printouts	Junior
☐	--3c. Circle items that are on the forms, documents, printouts	Junior
☐	--3d. Exclude items that are on the forms, documents, printouts	Senior
☐	--3e. Name attributes on the forms, documents, printouts	Junior
☐	4. BRING SENIOR BACK TO GET MORE WORK DONE	Heading, no rank needed
☐	--4a. For each entity record the attributes after talking to senior and getting input on how this is done	Junior
☐	--4b. Talk more to the client	Senior

[Select All] [Clear All]

[Send to Work Plan Answer]

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMRVL1 - Mic... | 7:13 PM



DMSUVL2 - Microsoft Internet Explorer

Item 7

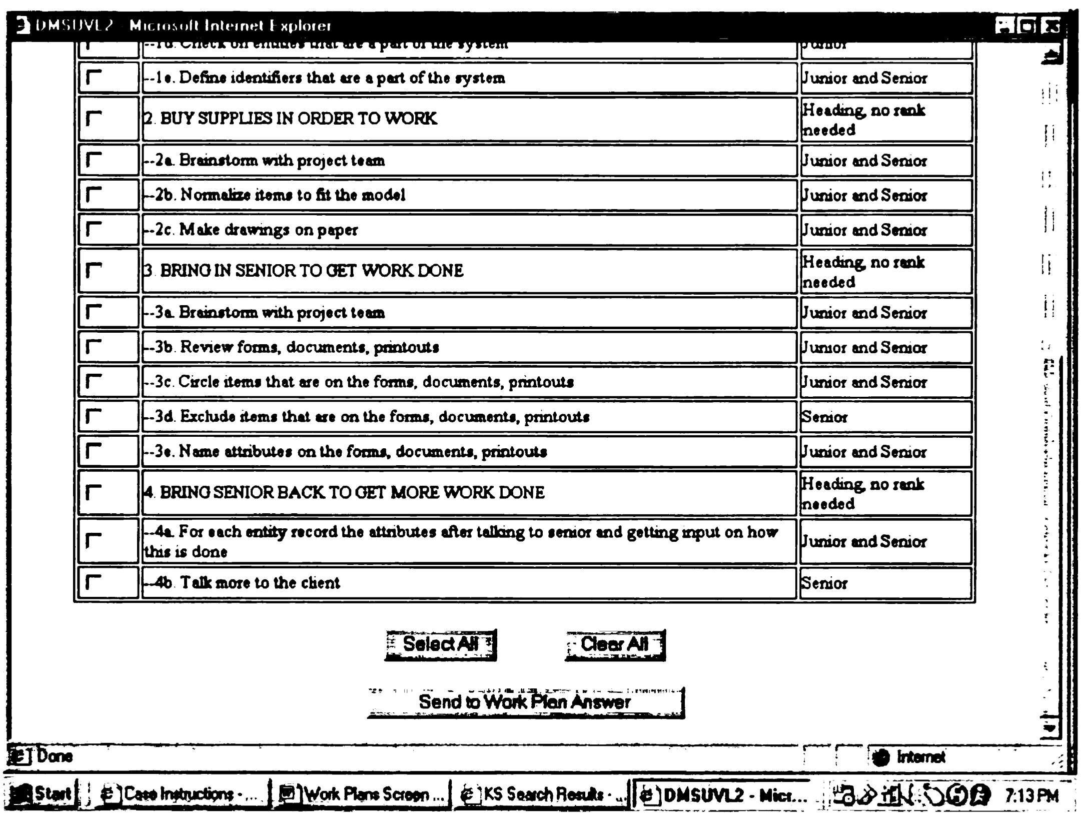
- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Look for items to capture, store, and produce information for the client given their business	Junior and Senior
☐	--1b. Study the forms and files	Junior
☐	--1c. Review program data, file, and database structures	Junior and Senior
☐	--1d. Check on entities that are a part of the system	Junior
☐	--1e. Define identifiers that are a part of the system	Junior and Senior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	Junior and Senior

Done   Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMSUVL2 - Micr... 7:13 PM



DMSUVL2 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--1d. Check on entities that are a part of the system	Junior
☐	--1e. Define identifiers that are a part of the system	Junior and Senior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	Junior and Senior
☐	--2b. Normalize items to fit the model	Junior and Senior
☐	--2c. Make drawings on paper	Junior and Senior
☐	3. BRING IN SENIOR TO GET WORK DONE	Heading, no rank needed
☐	--3a. Brainstorm with project team	Junior and Senior
☐	--3b. Review forms, documents, printouts	Junior and Senior
☐	--3c. Circle items that are on the forms, documents, printouts	Junior and Senior
☐	--3d. Exclude items that are on the forms, documents, printouts	Senior
☐	--3e. Name attributes on the forms, documents, printouts	Junior and Senior
☐	4. BRING SENIOR BACK TO GET MORE WORK DONE	Heading, no rank needed
☐	--4a. For each entity record the attributes after talking to senior and getting input on how this is done	Junior and Senior
☐	--4b. Talk more to the client	Senior

Select All   Clear All

Send to Work Plan Answer

Done   Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMSUVL2 - Micr... 7:13 PM

DMSRCL3 - Microsoft Internet Explorer

Item 8

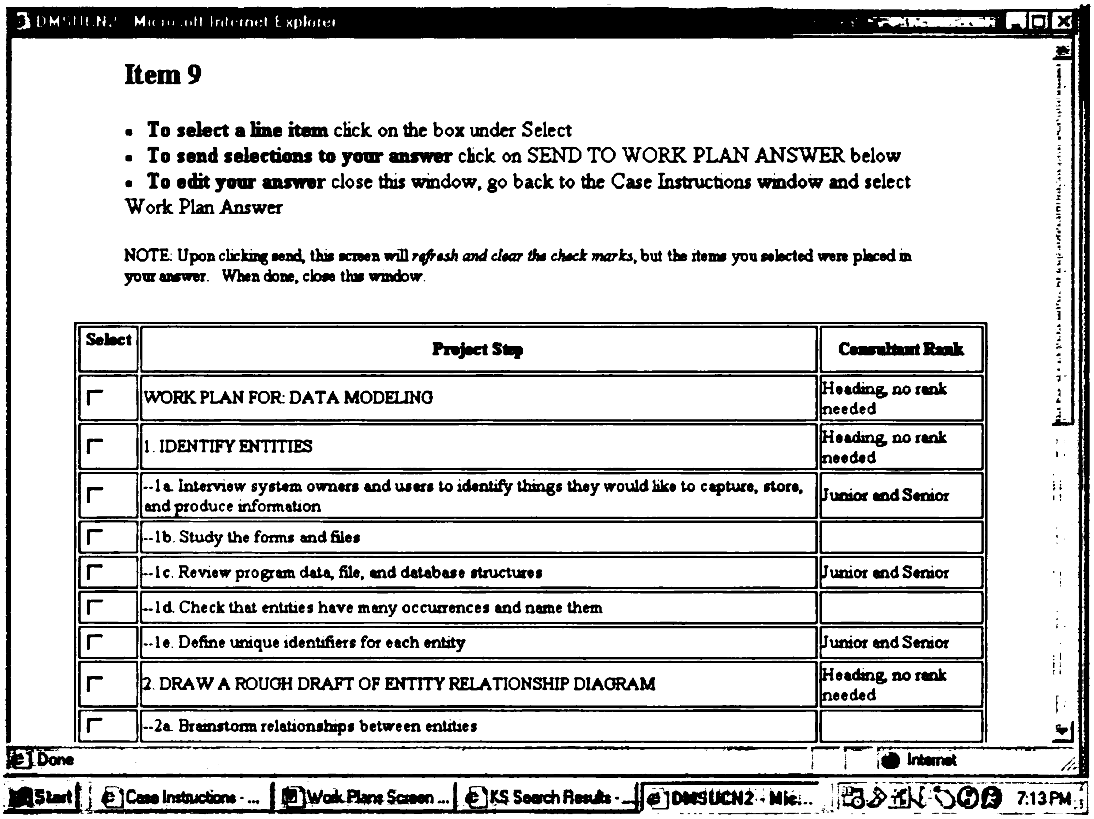
- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Interview system owners and users to identify things they would like to capture, store, and produce information	Junior and Senior
☐	--1b. Study the forms and files	Junior
☐	--1c. Review program data, file, and database structures	Junior and Senior
☐	--1d. Check that entities have many occurrences and name them	Junior
☐	--1e. Define unique identifiers for each entity	Junior and Senior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	Junior and Senior
☐	--2b. Normalize to minimize redundancy and maximize flexibility	Junior and Senior
☐	--2c. Draw entity relationship diagram	Junior and Senior
☐	3. IDENTIFY DATA ATTRIBUTES	Heading, no rank needed
☐	--3a. Brainstorm on characteristics describing each entity	Junior and Senior
☐	--3b. Review forms, documents, printouts of stored data	Junior and Senior
☐	--3c. Circle each unique item on the form	Junior and Senior
☐	--3d. Exclude items that are extraneous or are constant	Senior
☐	--3e. Name attributes and verify attributes with end-users	Junior and Senior
☐	4. MAP DATA ATTRIBUTES TO ENTITIES	Heading, no rank needed
☐	--4a. For each entity, find forms, file printouts, reports, etc. whose data describes the entity and record the attributes	Junior and Senior
☐	--4b. Interview end-users to identify data attributes	Senior

[Select All] [Clear All]

[Send to Work Plan Answer]

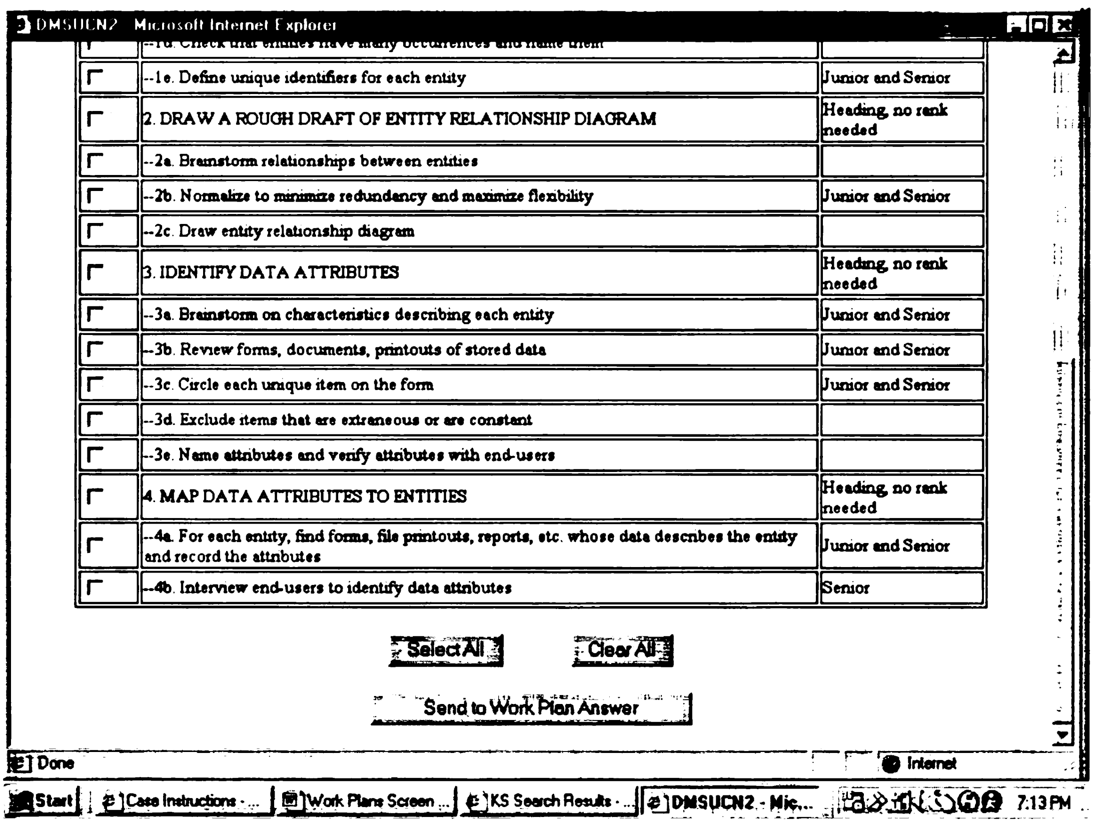


Item 9

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Interview system owners and users to identify things they would like to capture, store, and produce information	Junior and Senior
☐	--1b. Study the forms and files	
☐	--1c. Review program data, file, and database structures	Junior and Senior
☐	--1d. Check that entities have many occurrences and name them	
☐	--1e. Define unique identifiers for each entity	Junior and Senior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	



Select	Project Step	Consultant Rank
☐	--1e. Define unique identifiers for each entity	Junior and Senior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	
☐	--2b. Normalize to minimize redundancy and maximize flexibility	Junior and Senior
☐	--2c. Draw entity relationship diagram	
☐	3. IDENTIFY DATA ATTRIBUTES	Heading, no rank needed
☐	--3a. Brainstorm on characteristics describing each entity	Junior and Senior
☐	--3b. Review forms, documents, printouts of stored data	Junior and Senior
☐	--3c. Circle each unique item on the form	Junior and Senior
☐	--3d. Exclude items that are extraneous or are constant	
☐	--3e. Name attributes and verify attributes with end-users	
☐	4. MAP DATA ATTRIBUTES TO ENTITIES	Heading, no rank needed
☐	--4a. For each entity, find forms, file printouts, reports, etc. whose data describes the entity and record the attributes	Junior and Senior
☐	--4b. Interview end-users to identify data attributes	Senior

Select All   Clear All

Send to Work Plan Answer

DMSRVN1 - Microsoft Internet Explorer

Item 10

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Look for items to capture, store, and produce information for the client given their business	Junior and Senior
☐	--1b. Study the forms and files	
☐	--1c. Review program data, file, and database structures	Junior and Senior
☐	--1d. Check on entities that are a part of the system	
☐	--1e. Define identifiers that are a part of the system	Junior and Senior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	
☐	--2b. Normalize items to fit the model	Junior and Senior
☐	--2c. Make drawings on paper	
☐	3. BRING IN SENIOR TO GET WORK DONE	Heading, no rank needed
☐	--3a. Brainstorm with project team	Junior and Senior
☐	--3b. Review forms, documents, printouts	Junior and Senior
☐	--3c. Circle items that are on the forms, documents, printouts	Junior and Senior
☐	--3d. Exclude items that are on the forms, documents, printouts	
☐	--3e. Name attributes on the forms, documents, printouts	
☐	4. BRING SENIOR BACK TO GET MORE WORK DONE	Heading, no rank needed
☐	--4a. For each entity record the attributes after talking to senior and getting input on how this is done	Junior and Senior
☐	--4b. Talk more to the client	Senior

[Select All] [Clear All]

[Send to Work Plan Answer]

Done — Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMSRVN1 - Mic... 7:14 PM

DMMUCN1 - Microsoft Internet Explorer

Item 11

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Interview system owners and users to identify things they would like to capture, store, and produce information	Junior
☐	--1b. Study the forms and files	
☐	--1c. Review program data, file, and database structures	Junior
☐	--1d. Check that entities have many occurrences and name them	
☐	--1e. Define unique identifiers for each entity	Junior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	Senior

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMUCN1 - Mic... | 7:14 PM

DMMUCN1 - Microsoft Internet Explorer

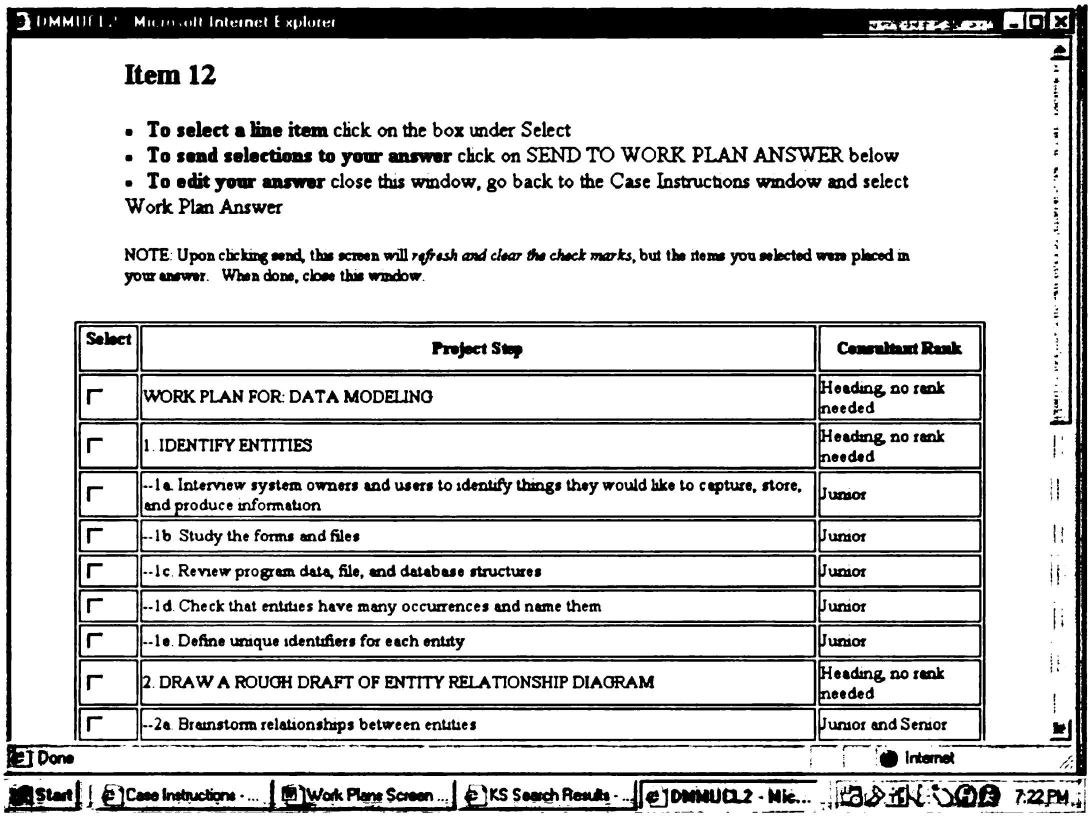
Select	Project Step	Consultant Rank
☐	--1d. Check that entities have many occurrences and name them	
☐	--1e. Define unique identifiers for each entity	Junior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	Senior
☐	--2b. Normalize to minimize redundancy and maximize flexibility	Junior
☐	--2c. Draw entity relationship diagram	
☐	3. IDENTIFY DATA ATTRIBUTES	Heading, no rank needed
☐	--3a. Brainstorm on characteristics describing each entity	Junior
☐	--3b. Review forms, documents, printouts of stored data	Junior
☐	--3c. Circle each unique item on the form	Junior
☐	--3d. Exclude items that are extraneous or are constant	Senior
☐	--3e. Name attributes and verify attributes with end-users	
☐	4. MAP DATA ATTRIBUTES TO ENTITIES	Heading, no rank needed
☐	--4a. For each entity, find forms, file printouts, reports, etc. whose data describes the entity and record the attributes	Junior
☐	--4b. Interview end-users to identify data attributes	Senior

Select All | Clear All

Send to Work Plan Answer

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMUCN1 - Mic... | 7:14 PM


DMMUCL2 - Microsoft Internet Explorer

Item 12

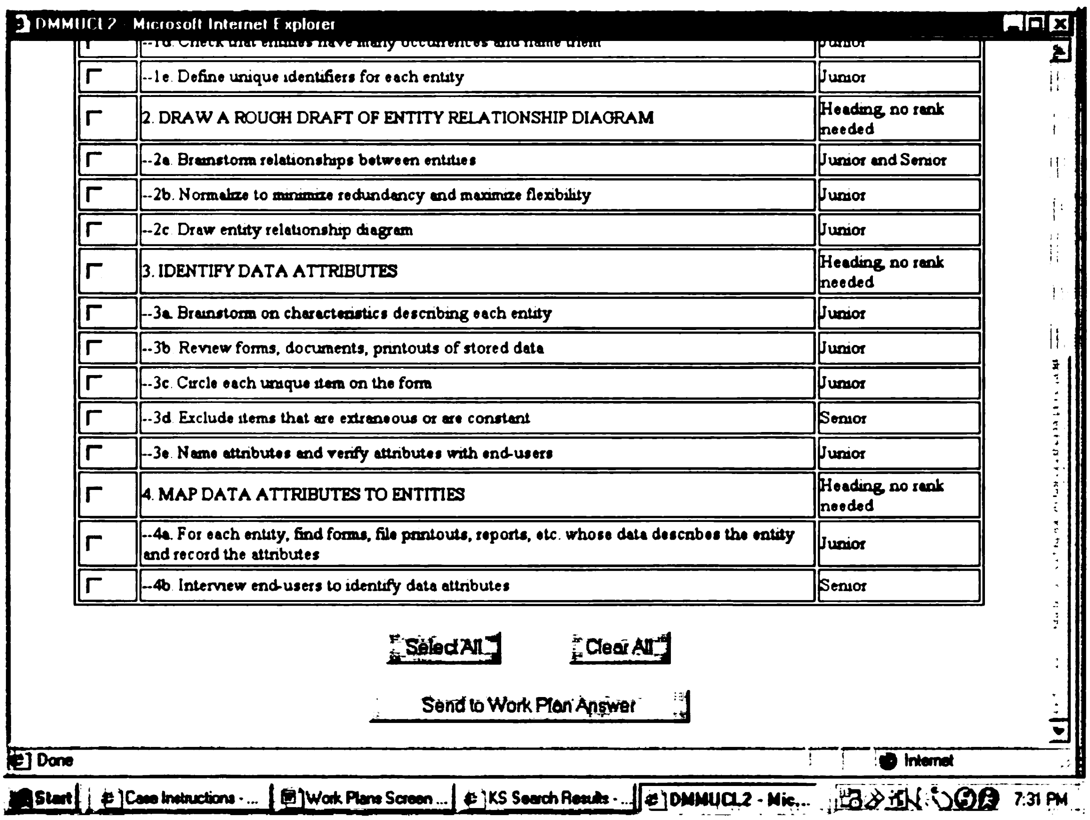
- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Interview system owners and users to identify things they would like to capture, store, and produce information	Junior
☐	--1b. Study the forms and files	Junior
☐	--1c. Review program data, file, and database structures	Junior
☐	--1d. Check that entities have many occurrences and name them	Junior
☐	--1e. Define unique identifiers for each entity	Junior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	Junior and Senior

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMUCL2 - Mic... | 7:22 PM


DMMUCL2 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--1d. Check that entities have many occurrences and name them	Junior
☐	--1e. Define unique identifiers for each entity	Junior
☐	2. DRAW A ROUGH DRAFT OF ENTITY RELATIONSHIP DIAGRAM	Heading, no rank needed
☐	--2a. Brainstorm relationships between entities	Junior and Senior
☐	--2b. Normalize to minimize redundancy and maximize flexibility	Junior
☐	--2c. Draw entity relationship diagram	Junior
☐	3. IDENTIFY DATA ATTRIBUTES	Heading, no rank needed
☐	--3a. Brainstorm on characteristics describing each entity	Junior
☐	--3b. Review forms, documents, printouts of stored data	Junior
☐	--3c. Circle each unique item on the form	Junior
☐	--3d. Exclude items that are extraneous or are constant	Senior
☐	--3e. Name attributes and verify attributes with end-users	Junior
☐	4. MAP DATA ATTRIBUTES TO ENTITIES	Heading, no rank needed
☐	--4a. For each entity, find forms, file printouts, reports, etc. whose data describes the entity and record the attributes	Junior
☐	--4b. Interview end-users to identify data attributes	Senior

Select All | Clear All

Send to Work Plan Answer

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMMUCL2 - Mic... | 7:31 PM

Item 13

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1 IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Look for items to capture, store, and produce information for the client given their business	Junior
☐	--1b. Study the forms and files	Junior
☐	--1c. Review program data, file, and database structures	Junior
☐	--1d. Check on entities that are a part of the system	Junior
☐	--1e. Define identifiers that are a part of the system	Junior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	Junior and Senior
☐	--2b. Normalize items to fit the model	Junior
☐	--2c. Make drawings on paper	Junior
☐	3. BRING IN SENIOR TO GET WORK DONE	Heading, no rank needed
☐	--3a. Brainstorm with project team	Junior
☐	--3b. Review forms, documents, printouts	Junior
☐	--3c. Circle items that are on the forms, documents, printouts	Junior
☐	--3d. Exclude items that are on the forms, documents, printouts	Senior
☐	--3e. Name attributes on the forms, documents, printouts	Junior
☐	4. BRING SENIOR BACK TO GET MORE WORK DONE	Heading, no rank needed
☐	--4a. For each entity record the attributes after talking to senior and getting input on how this is done	Junior
☐	--4b. Talk more to the client	Senior

Select All   Clear All

Send to Work Plan Answer

DMSUVN1 - Microsoft Internet Explorer

Item 14

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATA MODELING	Heading, no rank needed
☐	1. IDENTIFY ENTITIES	Heading, no rank needed
☐	--1a. Look for items to capture, store, and produce information for the client given their business	Junior
☐	--1b. Study the forms and files	
☐	--1c. Review program data, file, and database structures	Junior and Senior
☐	--1d. Check on entities that are a part of the system	
☐	--1e. Define identifiers that are a part of the system	Junior and Senior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMSUVN1 - Mic... | 7:34 PM

DMSUVN1 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--1e. Define identifiers that are a part of the system	Junior and Senior
☐	2. BUY SUPPLIES IN ORDER TO WORK	Heading, no rank needed
☐	--2a. Brainstorm with project team	

Select	Project Step	Consultant Rank
☐	--2b. Normalize items to fit the model	Junior and Senior
☐	--2c. Make drawings on paper	
☐	3. BRING IN SENIOR TO GET WORK DONE	Heading, no rank needed
☐	--3a. Brainstorm with project team	Junior and Senior
☐	--3b. Review forms, documents, printouts	Junior and Senior
☐	--3c. Circle items that are on the forms, documents, printouts	Junior and Senior
☐	--3d. Exclude items that are on the forms, documents, printouts	
☐	--3e. Name attributes on the forms, documents, printouts	
☐	4. BRING SENIOR BACK TO GET MORE WORK DONE	Heading, no rank needed
☐	--4a. For each entity record the attributes after talking to senior and getting input on how this is done	Junior and Senior
☐	--4b. Talk more to the client	Senior

[Select All] [Clear All]

[Send to Work Plan Answer]

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DMSUVN1 - Mic... | 7:34 PM

DBSRVN1 - Microsoft Internet Explorer

Item 15

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. MEET WITH CLIENT TO GO OVER PROJECT	Heading, no rank needed
☐	--5a. Go to the library and research the client's employees	Junior and Senior
☐	--5b. Identify the entities of the client	
☐	--5c. Identify associations of the client	Junior and Senior
☐	--5d. Determine which employees to include in the database	
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the	

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBSRVN1 - Micr... | 7:34 PM

DBSRVN1 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5d. Determine which employees to include in the database	
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the client's needs	
☐	--6c. With the client update repository aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	7. BRING SENIOR IN TO BUILD PROJECT	Heading, no rank needed
☐	--7a. Convert diagrams and tables for the database being built for the client as long as needed	Junior and Senior
☐	--7b. Ask senior about work progress	Junior and Senior
☐	8. ASSEMBLE PIECES OF THE PROJECT	Heading, no rank needed
☐	--8a. Gather and load with data	Junior and Senior
☐	--8b. Test all the components of the database	
☐	--8c. Adjust the project to ensure it works	
☐	--8d. Make sure all the project pieces are assembled	

[Select All] [Clear All]

[Send to Work Plan Answer]

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBSRVN1 - Micr... | 7:35 PM

DBMRCN1 - Microsoft Internet Explorer

Item 16

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. REVIEW DATABASE REQUIREMENTS	Heading, no rank needed
☐	--5a. Review the entity relationship diagram	Junior
☐	--5b. Identify the entities to be designed	
☐	--5c. Identify associations to be designed	Junior
☐	--5d. Determine data distribution and access rights for employees	
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBMRCN1 - Mic... 7:35 PM

DBMRCN1 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5c. Identify associations to be designed	Junior
☐	--5d. Determine data distribution and access rights for employees	
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	
☐	--6c. With the client's database administrator and staff update the repository specifications based on the specific technology chosen for implementation	Junior
☐	7. BUILD PHYSICAL DATABASE STRUCTURES	Heading, no rank needed
☐	--7a. Convert each entity in entity relationship diagram as a relational table	Junior
☐	--7b. Convert each relationship in entity relationship diagram as a link between relational tables	Junior
☐	8. PROTOTYPE THE DATABASE	Heading, no rank needed
☐	--8a. Gather and load with test data	Junior and Senior
☐	--8b. Test outputs, inputs, screens and other components	
☐	--8c. Adjust database based on testing results and re-run tests	
☐	--8d. With the client's database administrator and staff review test results	

Select All | Clear All

Send to Work Plan Answer

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBMRCN1 - Mic... 7:35 PM

DBMUCN1 - Microsoft Internet Explorer

Item 17

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. REVIEW DATABASE REQUIREMENTS	Heading, no rank needed
☐	--5a. Review the entity relationship diagram	Junior
☐	--5b. Identify the entities to be designed	
☐	--5c. Identify associations to be designed	Junior
☐	--5d. Determine data distribution and access rights for employees	
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBMUCN1 - Mic... | 7:35 PM

DBMUCN1 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5c. Identify associations to be designed	Junior
☐	--5d. Determine data distribution and access rights for employees	
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	
☐	--6c. With the client's database administrator and staff update the repository specifications based on the specific technology chosen for implementation	Junior
☐	7. BUILD PHYSICAL DATABASE STRUCTURES	Heading, no rank needed
☐	--7a. Convert each entity in entity relationship diagram as a relational table	Junior
☐	--7b. Convert each relationship in entity relationship diagram as a link between relational tables	Junior
☐	8. PROTOTYPE THE DATABASE	Heading, no rank needed
☐	--8a. Gather and load with test data	Junior and Senior
☐	--8b. Test outputs, inputs, screens and other components	
☐	--8c. Adjust database based on testing results and re-run tests	
☐	--8d. With the client's database administrator and staff review test results	

Select All | Clear All

Send to Work Plan Answer

Done | Internet

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DBSRCN2 - Microsoft Internet Explorer

Item 18

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. REVIEW DATABASE REQUIREMENTS	Heading, no rank needed
☐	--5a. Review the entity relationship diagram	Junior and Senior
☐	--5b. Identify the entities to be designed	
☐	--5c. Identify associations to be designed	Junior and Senior
☐	--5d. Determine data distribution and access rights for employees	
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	

Done | Internet

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DBSRCN2 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5c. Identify associations to be designed	Junior and Senior
☐	--5d. Determine data distribution and access rights for employees	
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	
☐	--6c. With the client's database administrator and staff update the repository specifications based on the specific technology chosen for implementation	Junior and Senior
☐	7. BUILD PHYSICAL DATABASE STRUCTURES	Heading, no rank needed
☐	--7a. Convert each entity in entity relationship diagram as a relational table	Junior and Senior
☐	--7b. Convert each relationship in entity relationship diagram as a link between relational tables	Junior and Senior
☐	8. PROTOTYPE THE DATABASE	Heading, no rank needed
☐	--8a. Gather and load with test data	Junior and Senior
☐	--8b. Test outputs, inputs, screens and other components	
☐	--8c. Adjust database based on testing results and re-run tests	
☐	--8d. With the client's database administrator and staff review test results	

Select All | Clear All

Send to Work Plan Answer

Done | Internet

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DBMUVL1 - Microsoft Internet Explorer

Item 19

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5 MEET WITH CLIENT TO GO OVER PROJECT	Heading, no rank needed
☐	--5a. Go to the library and research the client's employees	Junior
☐	--5b. Identify the entities of the client	Junior
☐	--5c. Identify associations of the client	Junior
☐	--5d. Determine which employees to include in the database	Junior
☐	6 PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the	Junior

Done | Internet

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DBMUVL1 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5d. Determine which employees to include in the database	Junior
☐	6 PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the client's needs	Junior
☐	--6c. With the client update repository aspects of the database to ensure it will work for the client's needs	Junior
☐	7 BRING SENIOR IN TO BUILD PROJECT	Heading, no rank needed
☐	--7a. Convert diagrams and tables for the database being built for the client as long as needed	Junior
☐	--7b. Ask senior about work progress	Junior
☐	8 ASSEMBLE PIECES OF THE PROJECT	Heading, no rank needed
☐	--8a. Gather and load with data	Junior and Senior
☐	--8b. Test all the components of the database	Senior
☐	--8c. Adjust the project to ensure it works	Senior
☐	--8d. Make sure all the project pieces are assembled	Junior

[Select All] [Clear All]

[Send to Work Plan Answer]

Done | Internet

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DBMRCL2 - Microsoft Internet Explorer

Item 20

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. REVIEW DATABASE REQUIREMENTS	Heading, no rank needed
☐	--5a. Review the entity relationship diagram	Junior
☐	--5b. Identify the entities to be designed	Junior
☐	--5c. Identify associations to be designed	Junior
☐	--5d. Determine data distribution and access rights for employees	Junior
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	Junior

Done | Internet

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☐	--5c. Identify associations to be designed	Junior
☐	--5d. Determine data distribution and access rights for employees	Junior
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	Junior
☐	--6c. With the client's database administrator and staff update the repository specifications based on the specific technology chosen for implementation	Junior
☐	7. BUILD PHYSICAL DATABASE STRUCTURES	Heading, no rank needed
☐	--7a. Convert each entity in entity relationship diagram as a relational table	Junior
☐	--7b. Convert each relationship in entity relationship diagram as a link between relational tables	Junior
☐	8. PROTOTYPES THE DATABASE	Heading, no rank needed
☐	--8a. Gather and load with test data	Junior and Senior
☐	--8b. Test outputs, inputs, screens and other components	Senior
☐	--8c. Adjust database based on testing results and re-run tests	Senior
☐	--8d. With the client's database administrator and staff review test results	Junior

Select All | Clear All

Send to Work Plan Answer

Done | Internet

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DBMUVN0 - Microsoft Internet Explorer

Item 21

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. MEET WITH CLIENT TO GO OVER PROJECT	Heading, no rank needed
☐	--5a. Go to the library and research the client's employees	Junior
☐	--5b. Identify the entities of the client	
☐	--5c. Identify associations of the client	Junior
☐	--5d. Determine which employees to include in the database	
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the client's needs	

Done | Internet

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Select	Project Step	Consultant Rank
☐	--5d. Determine which employees to include in the database	
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the client's needs	
☐	--6c. With the client update repository aspects of the database to ensure it will work for the client's needs	Junior
☐	7. BRING SENIOR IN TO BUILD PROJECT	Heading, no rank needed
☐	--7a. Convert diagrams and tables for the database being built for the client as long as needed	Junior
☐	--7b. Ask senior about work progress	Junior
☐	8. ASSEMBLE PIECES OF THE PROJECT	Heading, no rank needed
☐	--8a. Gather and load with data	Junior and Senior
☐	--8b. Test all the components of the database	
☐	--8c. Adjust the project to ensure it works	
☐	--8d. Make sure all the project pieces are assembled	

Select All | Clear All

Send to Work Plan Answer

Done | Internet

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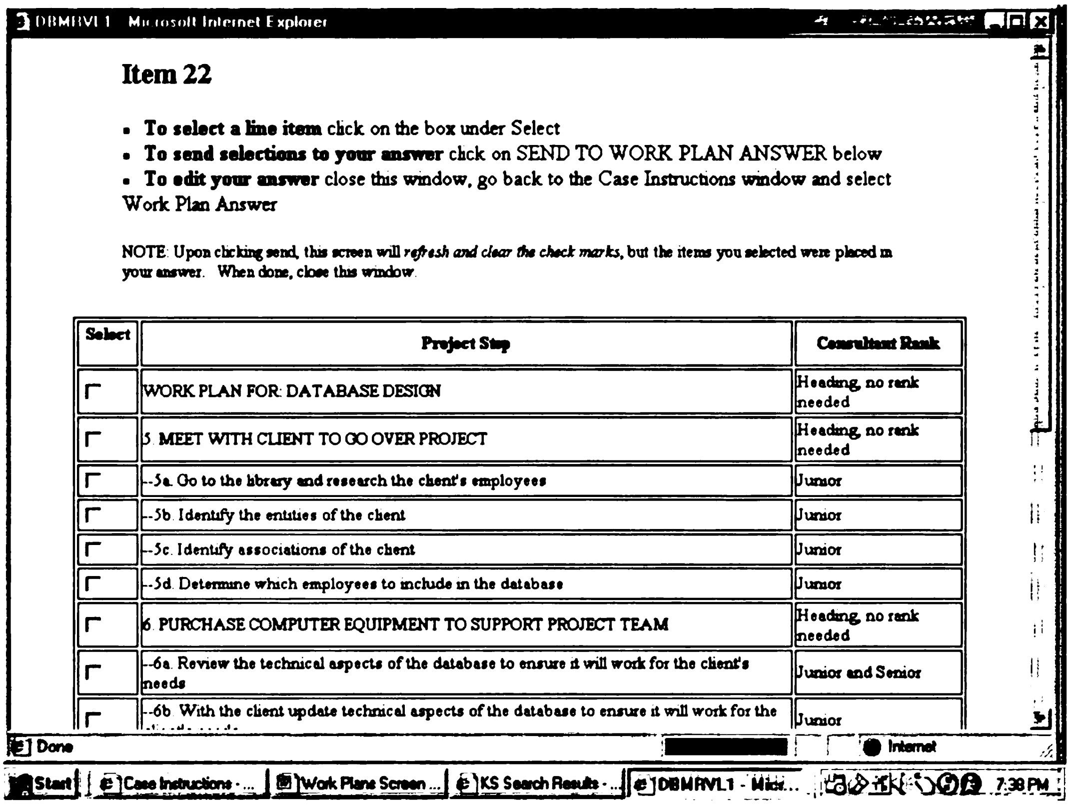

DBMRVL1 - Microsoft Internet Explorer

Item 22

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. MEET WITH CLIENT TO GO OVER PROJECT	Heading, no rank needed
☐	--5a. Go to the library and research the client's employees	Junior
☐	--5b. Identify the entities of the client	Junior
☐	--5c. Identify associations of the client	Junior
☐	--5d. Determine which employees to include in the database	Junior
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the ...	Junior

Done | Internet

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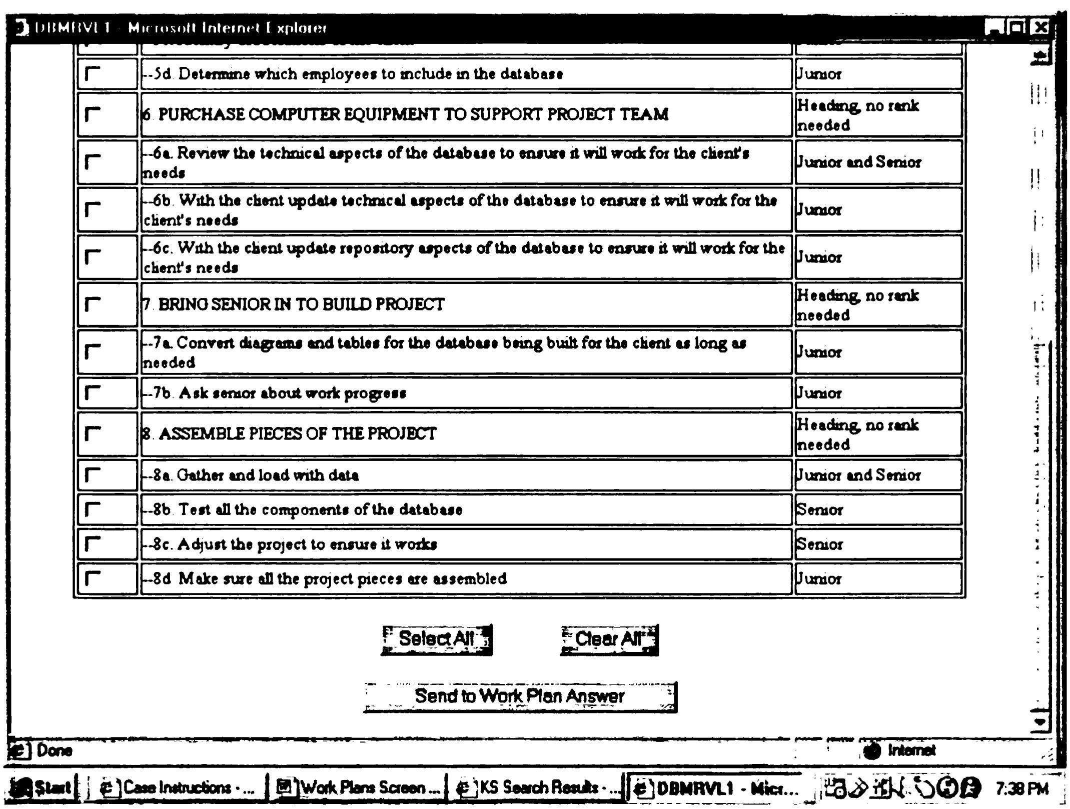

DBMRVL1 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5d. Determine which employees to include in the database	Junior
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the client's needs	Junior
☐	--6c. With the client update repository aspects of the database to ensure it will work for the client's needs	Junior
☐	7. BRING SENIOR IN TO BUILD PROJECT	Heading, no rank needed
☐	--7a. Convert diagrams and tables for the database being built for the client as long as needed	Junior
☐	--7b. Ask senior about work progress	Junior
☐	8. ASSEMBLE PIECES OF THE PROJECT	Heading, no rank needed
☐	--8a. Gather and load with data	Junior and Senior
☐	--8b. Test all the components of the database	Senior
☐	--8c. Adjust the project to ensure it works	Senior
☐	--8d. Make sure all the project pieces are assembled	Junior

Select All | Clear All

Send to Work Plan Answer

Done | Internet

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DBSRVL2 - Microsoft Internet Explorer

Item 23

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. MEET WITH CLIENT TO GO OVER PROJECT	Heading, no rank needed
☐	--5a. Go to the library and research the client's employees	Junior and Senior
☐	--5b. Identify the entities of the client	Junior and Senior
☐	--5c. Identify associations of the client	Junior and Senior
☐	--5d. Determine which employees to include in the database	Junior
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the client's needs	Junior and Senior

Done | Internet

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DBSRVL2 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5d. Determine which employees to include in the database	Junior
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6c. With the client update repository aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	7. BRING SENIOR IN TO BUILD PROJECT	Heading, no rank needed
☐	--7a. Convert diagrams and tables for the database being built for the client as long as needed	Junior and Senior
☐	--7b. Ask senior about work progress	Junior and Senior
☐	8. ASSEMBLE PIECES OF THE PROJECT	Heading, no rank needed
☐	--8a. Gather and load with data	Junior and Senior
☐	--8b. Test all the components of the database	Senior
☐	--8c. Adjust the project to ensure it works	Senior
☐	--8d. Make sure all the project pieces are assembled	Junior and Senior

[Select All] [Clear All]

[Send to Work Plan Answer]

Done | Internet

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DBSRCL3 - Microsoft Internet Explorer

Item 24

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. REVIEW DATABASE REQUIREMENTS	Heading, no rank needed
☐	--5a. Review the entity relationship diagram	Junior and Senior
☐	--5b. Identify the entities to be designed	Junior and Senior
☐	--5c. Identify associations to be designed	Junior and Senior
☐	--5d. Determine data distribution and access rights for employees	Junior
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	Junior and Senior

Done Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBSRCL3 - Micr... 7:39 PM

DBSRCL3 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5c. Identify associations to be designed	Junior and Senior
☐	--5d. Determine data distribution and access rights for employees	Junior
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	Junior and Senior
☐	--6c. With the client's database administrator and staff update the repository specifications based on the specific technology chosen for implementation	Junior and Senior
☐	7. BUILD PHYSICAL DATABASE STRUCTURES	Heading, no rank needed
☐	--7a. Convert each entity in entity relationship diagram as a relational table	Junior and Senior
☐	--7b. Convert each relationship in entity relationship diagram as a link between relational tables	Junior and Senior
☐	8. PROTOTYPE THE DATABASE	Heading, no rank needed
☐	--8a. Gather and load with test data	Junior and Senior
☐	--8b. Test outputs, inputs, screens and other components	Senior
☐	--8c. Adjust database based on testing results and re-run tests	Senior
☐	--8d. With the client's database administrator and staff review test results	Junior and Senior

Select All Clear All

Send to Work Plan Answer

Done Internet

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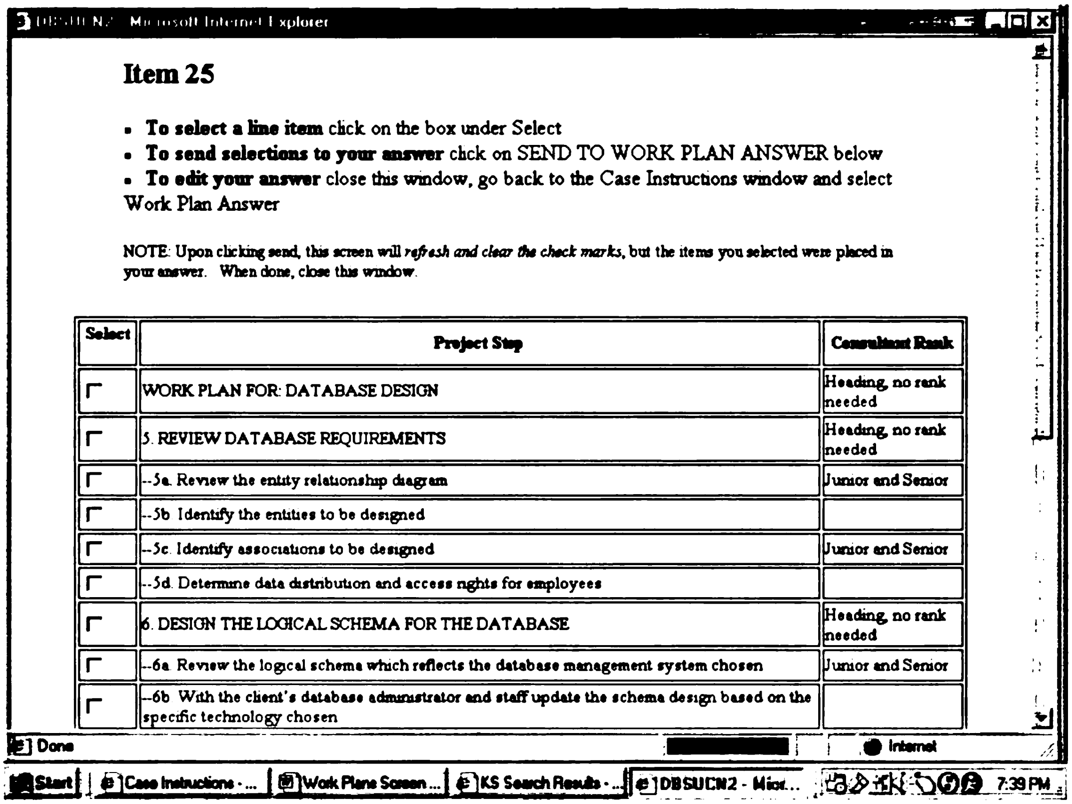


DBSUCN2 - Microsoft Internet Explorer

Item 25

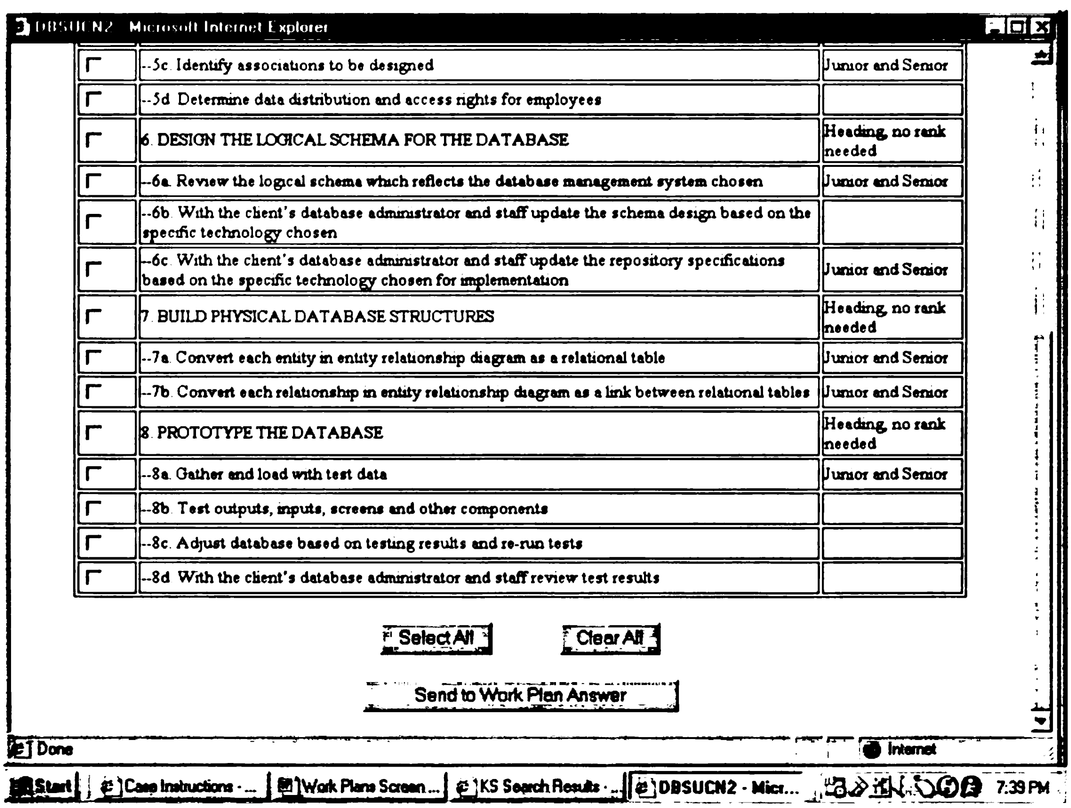
- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. REVIEW DATABASE REQUIREMENTS	Heading, no rank needed
☐	--5a. Review the entity relationship diagram	Junior and Senior
☐	--5b. Identify the entities to be designed	
☐	--5c. Identify associations to be designed	Junior and Senior
☐	--5d. Determine data distribution and access rights for employees	
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	

Done | Internet

Start | Case Instructions - ... | Work Plans Screen... | KS Search Results - ... | DBSUCN2 - Micr... | 7:39 PM



DBSUCN2 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5c. Identify associations to be designed	Junior and Senior
☐	--5d. Determine data distribution and access rights for employees	
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	
☐	--6c. With the client's database administrator and staff update the repository specifications based on the specific technology chosen for implementation	Junior and Senior
☐	7. BUILD PHYSICAL DATABASE STRUCTURES	Heading, no rank needed
☐	--7a. Convert each entity in entity relationship diagram as a relational table	Junior and Senior
☐	--7b. Convert each relationship in entity relationship diagram as a link between relational tables	Junior and Senior
☐	8. PROTOTYPE THE DATABASE	Heading, no rank needed
☐	--8a. Gather and load with test data	Junior and Senior
☐	--8b. Test outputs, inputs, screens and other components	
☐	--8c. Adjust database based on testing results and re-run tests	
☐	--8d. With the client's database administrator and staff review test results	

Select All | Clear All

Send to Work Plan Answer

Done | Internet

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DBSUVN1 - Microsoft Internet Explorer

Item 26

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. MEET WITH CLIENT TO GO OVER PROJECT	Heading, no rank needed
☐	--5a. Go to the library and research the client's employees	Junior and Senior
☐	--5b. Identify the entities of the client	
☐	--5c. Identify associations of the client	Junior and Senior
☐	--5d. Determine which employees to include in the database	
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the ...	

Done | Internet

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DBSUVN1 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5d. Determine which employees to include in the database	
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the client's needs	
☐	--6c. With the client update repository aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	7. BRING SENIOR IN TO BUILD PROJECT	Heading, no rank needed
☐	--7a. Convert diagrams and tables for the database being built for the client as long as needed	Junior and Senior
☐	--7b. Ask senior about work progress	Junior and Senior
☐	8. ASSEMBLE PIECES OF THE PROJECT	Heading, no rank needed
☐	--8a. Gather and load with data	Junior and Senior
☐	--8b. Test all the components of the database	
☐	--8c. Adjust the project to ensure it works	
☐	--8d. Make sure all the project pieces are assembled	

Select All | Clear All

Send to Work Plan Answer

Done | Internet

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DBSUVL2 - Microsoft Internet Explorer

Item 27

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. MEET WITH CLIENT TO GO OVER PROJECT	Heading, no rank needed
☐	--5a. Go to the library and research the client's employees	Junior and Senior
☐	--5b. Identify the entities of the client	Junior and Senior
☐	--5c. Identify associations of the client	Junior and Senior
☐	--5d. Determine which employees to include in the database	Junior
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the ...	Junior and Senior

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBSUVL2 - Micr... | 7:40 PM

DBSUVL2 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5d. Determine which employees to include in the database	Junior
☐	6. PURCHASE COMPUTER EQUIPMENT TO SUPPORT PROJECT TEAM	Heading, no rank needed
☐	--6a. Review the technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6b. With the client update technical aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	--6c. With the client update repository aspects of the database to ensure it will work for the client's needs	Junior and Senior
☐	7. BRING SENIOR IN TO BUILD PROJECT	Heading, no rank needed
☐	--7a. Convert diagrams and tables for the database being built for the client as long as needed	Junior and Senior
☐	--7b. Ask senior about work progress	Junior and Senior
☐	8. ASSEMBLE PIECES OF THE PROJECT	Heading, no rank needed
☐	--8a. Gather and load with data	Junior and Senior
☐	--8b. Test all the components of the database	Senior
☐	--8c. Adjust the project to ensure it works	Senior
☐	--8d. Make sure all the project pieces are assembled	Junior and Senior

Select All | Clear All

Send to Work Plan Answer

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBSUVL2 - Micr... | 7:40 PM

DBMUCL2 - Microsoft Internet Explorer

Item 28

- **To select a line item** click on the box under Select
- **To send selections to your answer** click on SEND TO WORK PLAN ANSWER below
- **To edit your answer** close this window, go back to the Case Instructions window and select Work Plan Answer

NOTE: Upon clicking send, this screen will *refresh and clear the check marks*, but the items you selected were placed in your answer. When done, close this window.

Select	Project Step	Consultant Rank
☐	WORK PLAN FOR: DATABASE DESIGN	Heading, no rank needed
☐	5. REVIEW DATABASE REQUIREMENTS	Heading, no rank needed
☐	--5a. Review the entity relationship diagram	Junior
☐	--5b. Identify the entities to be designed	Junior
☐	--5c. Identify associations to be designed	Junior
☐	--5d. Determine data distribution and access rights for employees	Junior
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	Junior

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBMUCL2 - Micr... | 7:40 PM

DBMUCL2 - Microsoft Internet Explorer

Select	Project Step	Consultant Rank
☐	--5c. Identify associations to be designed	Junior
☐	--5d. Determine data distribution and access rights for employees	Junior
☐	6. DESIGN THE LOGICAL SCHEMA FOR THE DATABASE	Heading, no rank needed
☐	--6a. Review the logical schema which reflects the database management system chosen	Junior and Senior
☐	--6b. With the client's database administrator and staff update the schema design based on the specific technology chosen	Junior
☐	--6c. With the client's database administrator and staff update the repository specifications based on the specific technology chosen for implementation	Junior
☐	7. BUILD PHYSICAL DATABASE STRUCTURES	Heading, no rank needed
☐	--7a. Convert each entity in entity relationship diagram as a relational table	Junior
☐	--7b. Convert each relationship in entity relationship diagram as a link between relational tables	Junior
☐	8. PROTOTYPE THE DATABASE	Heading, no rank needed
☐	--8a. Gather and load with test data	Junior and Senior
☐	--8b. Test outputs, inputs, screens and other components	Senior
☐	--8c. Adjust database based on testing results and re-run tests	Senior
☐	--8d. With the client's database administrator and staff review test results	Junior

Select All | Clear All

Send to Work Plan Answer

Done | Internet

Start | Case Instructions - ... | Work Plans Screen ... | KS Search Results - ... | DBMUCL2 - Micr... | 7:40 PM

Appendix F: Administration Of Experiment Materials

F.1 List of Work Plans for each of the Four Work Plan Order Scenarios

ONE ORDER

Item	#	File name
Data Model KS Items		
Item	1	dmsrvl2
Item	2	dmsrcn2
Item	3	dmmrcn1
Item	4	dmmrcl2
Item	5	dmmuvn0
Item	6	dmmrvl1
Item	7	dmsuvl2
Item	8	**dmsrcl3**
Item	9	dmsucn2
Item	10	dmsrvn1
Item	11	dmmucn1
Item	12	dmmucl2
Item	13	dmmuvl1
Item	14	dmsuvn1
Database KS Items		
Item	15	dbsrvn1
Item	16	dbmrcn1
Item	17	dbmucn1
Item	18	dbsrcn2
Item	19	dbmuvl1
Item	20	dbmrcl2
Item	21	dbmuvn0
Item	22	dbmrvl1
Item	23	dbsrvl2
Item	24	**dbsrcl3**
Item	25	dbsucn2
Item	26	dbsuvn1
Item	27	dbsuvl2
Item	28	dbmucl2

TWO ORDER

Item	#	File name
Data Model KS Items		
Item	1	dmmuvl1
Item	2	dmmucn1
Item	3	dmsrvn1
Item	4	dmmrvl1
Item	5	dmmuvn0
Item	6	dmmucl2
Item	7	dmsucn2
Item	8	dmsuvl2
Item	9	dmsrvl2
Item	10	**dmsrcl3**
Item	11	dmsuvn1
Item	12	dmsrcn2
Item	13	dmmrcn1
Item	14	dmmrcl2
Database KS Items		
Item	15	dbmrvl1
Item	16	dbsucn2
Item	17	dbmrcn1
Item	18	dbmucl2
Item	19	dbmuvn0
Item	20	dbmuvl1
Item	21	dbsuvl2
Item	22	**dbsrcl3**
Item	23	dbsuvn1
Item	24	dbmrcl2
Item	25	dbmucn1
Item	26	dbsrcn2
Item	27	dbsrvn1
Item	28	dbsrvl2

THREE ORDER

Item	#	File name
Data Model KS Items		
Item	1	dmsuvn1
Item	2	dmmuvl1
Item	3	dmmucl2
Item	4	dmmucn1
Item	5	dmsrvn1
Item	6	dmsucn2
Item	7	**dmsrcl3**
Item	8	dmsuvl2
Item	9	dmmrvl1
Item	10	dmmuvn0
Item	11	dmmrcl2
Item	12	dmmrcn1
Item	13	dmsrcn2
Item	14	dmsrvl2
Database KS Items		
Item	15	dbmucl2
Item	16	dbsuvl2
Item	17	dbsuvn1
Item	18	dbsucn2
Item	19	**dbsrcl3**
Item	20	dbsrvl2
Item	21	dbmrvl1
Item	22	dbmuvn0
Item	23	dbmrcl2
Item	24	dbmuvl1
Item	25	dbsrcn2
Item	26	dbmucn1
Item	27	dbmrcn1
Item	28	dbsrvn1

FOUR ORDER

Item	#	File name
Data Model KS Items		
Item	1	dmmrcl2
Item	2	dmmrcn1
Item	3	dmsrcn2
Item	4	dmsuvn1
Item	5	**dmsrcl3**
Item	6	dmsrvl2
Item	7	dmsuvl2
Item	8	dmsucn2
Item	9	dmmucl2
Item	10	dmmuvn0
Item	11	dmmrvl1
Item	12	dmsrvn1
Item	13	dmmucn1
Item	14	dmmuvl1
Database KS Items		
Item	15	dbsrvl2
Item	16	dbsrvn1
Item	17	dbsrcn2
Item	18	dbmucn1
Item	19	dbmrcl2
Item	20	dbsuvn1
Item	21	**dbsrcl3**
Item	22	dbsuvl2
Item	23	dbmuvl1
Item	24	dbmuvn0
Item	25	dbmucl2
Item	26	dbmrcn1
Item	27	dbsucn2
Item	28	dbmrvl1

F.2 First Page of Sign Up Sheet for Study Participation

Study Participation Sign Up

This is to sign up for:

- The chance for extra credit in class (15 points),
- Earning a few bucks (a potential for $13 for about an hours time), and
- Learning about what it is like to be a management consultant.

All for participating in a research study on improving how people search knowledge management systems. The study will be held on computers in **Room 105 in the Epply Building in the Business School**. The study should last about 60-75 minutes.

Please print your name and email in the time slot that fits your schedule (max. 20 / slot):

WEDNESDAY (November 6)	**Email**		**Email**
10:15-11:45 a.m.		**1:00-2:30 p.m.**	
1. ______	____	1. ______	____
2. ______	____	2. ______	____
3. ______	____	3. ______	____
4. ______	____	4. ______	____
5. ______	____	5. ______	____
6. ______	____	6. ______	____
7. ______	____	7. ______	____
8. ______	____	8. ______	____
9. ______	____	9. ______	____
10. ______	____	10. ______	____
11. ______	____	11. ______	____
12. ______	____	12. ______	____
13. ______	____	13. ______	____
14. ______	____	14. ______	____
15. ______	____	15. ______	____
16. ______	____	16. ______	____
17. ______	____	17. ______	____
18. ______	____	18. ______	____
19. ______	____	19. ______	____
20. ______	____	20. ______	____
4:00-5:30 p.m.		**4:00-5:30 p.m. (con't.)**	
1. ______	____	11. ______	____
2. ______	____	12. ______	____
3. ______	____	13. ______	____
4. ______	____	14. ______	____

F.3 Tutorial Protocol

Knowledge System Study
Tutorial Protocol—N ovember 2002

Maximize the Screen

0. Login
    a. Use your *pilot ID*
    b. Use the *Login ID* that was given to you
1. Overview
    a. Left hand side—always available to return
    b. Reference only—means you cannot navigate to next/previous page
2. Pay Scheme
    a. Paid based on *quality* of your answer AND how *quick* you are
    b. *Clock* starts when you start the case
3. Data Modeling and Database Design – just a reminder of terms (ignore ???)
4. Work Plan Description
    a. You will be creating a work plan for a new client by *re-using old ones*
    b. A work plan consists of *Project Steps* and *Consultant Ranks*
5. Combining Work Plans
    a. You will need to *combine pieces or whole* work plans to create your new one
    b. *You decide* which and what to use
6. KS Description with Example Search Results (which are old Work Plans)
    a. Chance to look at/get familiar with work plans *without the clock running*
    b. Functionality has been *disabled* because this is just an example
7. Decision for you to Make
    a. This is where you will *start the case* (and start the clock)
    b. Click "YES" (there is a reminder message)

Maximize the Screen

8. Case Instructions
    a. You need to read in detail—there are 3 characteristics of a good work plan
    b. Search Results
        i. Have been run for you
        ii. Will get – Item and Rating
        iii. Will get one of the following -- # of raters, % raters experts or recommend also
        iv. Read what these are
    c. Will get *Data Modeling* work plans then *Database Design* work plans
    d. You will need to:
        i. Figure *which* one to open and Which line items to use or not
        ii. Go to see/edit *answer*
            1. *Re-order* (don't' worry about step order #'s)
            2. *Delete* (show a few, then all)
        iii. Go back to Search Results to select more
        iv. Go to see/edit *answer*
        v. Finished (are you sure?)
        vi. 4 questions
        vii. Belief questions (very important)
        viii. Thank you

F.4 Hand Out to Subjects with Login IDs

Hello and Welcome to the test of the Knowledge System Study

Thank you for agreeing to participate. To begin, just follow these instructions and the instructions on the screen. Have fun!

TO START THE PROGRAM:

1. Open Microsoft Explorer (do not use Netscape)
2. Enter the URL: http://nebula.bus.msu.edu/knowledgesystems/
3. Enter your last name spelled as: ______________________
4. Enter your ID: ______________________

TO GET YOUR MONEY:

If you completed the entire exercise including the survey questions at the end, you have earned money and extra credit points. To pick up your money, bring this sheet and stop by my office (Robin in N241 on 2nd floor of North Business Complex) one of the following times:

following times:	Monday, November 18	10 a.m. to 5 p.m.
	Thursday, November 21	10 a.m. to 1:30 p.m.

Or you can make an appointment by emailing me at postonr1@msu.edu. Thank you.

F.5 Session Control Log

Knowledge System Study Session Control Log—November 2002
Date: __________ Number of Participant: __________ Time: _________ Number of No Shows: __________ Computer Problems: Login ID Problems: Comments: Saved Data From Database: __________
Date: __________ Number of Participant: __________ Time: _________ Number of No Shows: __________ Computer Problems: Login ID Problems: Comments:

Appendix G: Counts of Subjects Characteristics per Treatment Condition

Key: Exprmt = Experiment, Treatmt = Treatment, Mat = Match, Mis = Mismatch, LRat = Low Number of Raters, HRat = High Number of Raters, LExp = Low Percentage Raters Who are Experts, HExp = High Percentage Raters Who are Experts, LSop = Low Degree of Sophistication, HSop = High Degree of Sophistication.

Table G.1

Counts of Subject Year in School by Treatment

Exprmt	Baseline		Number of Raters				% Raters Experts				Filter Sophistication				
Treatmt	Mat	Mis	Mat/ LRat	Mis/ LRat	Mat/ HRat	Mis/ HRat	Mat/ LExp	Mis/ LExp	Mat/ HExp	Mis/ HExp	Mat/ LSop	Mis/ LSop	Mat/ HSop	Mis/ HSop	Total
Senior	10	12	8	5	7	9	5	7	9	14	6	9	8	9	118
Junior	13	13	17	21	20	19	17	19	20	15	22	15	15	17	243
Other	1	2	0	1	1	0	1	0	0	1	0	1	0	1	8
Total	24	27	25	27	28	28	23	26	29	30	28	25	23	27	370

Table G.2

Counts of Subject Age by Treatment

Exprmt	Baseline		Number of Raters				% Raters Experts				Filter Sophistication				
Treatmt	Mat	Mis	Mat/ LRat	Mis/ LRat	Mat/ HRat	Mis/ HRat	Mat/ LExp	Mis/ LExp	Mat/ HExp	Mis/ HExp	Mat/ LSop	Mis/ Lsop	Mat/ HSop	Mis/ HSop	Total
19-20	7	8	6	14	11	9	6	13	10	7	10	8	7	10	126
21-22	15	18	17	11	17	18	17	13	17	21	17	15	14	14	224
23-24	2	1	2	2	0	1	0	0	1	2	0	0	2	2	15
Other	0	0	0	0	0	0	0	0	1	0	1	2	0	1	5
Total	24	27	25	27	28	28	23	26	29	30	28	25	23	27	370

Table G.3

Counts of Subject Gender by Treatment

Exprmt	Baseline		Number of Raters				% Raters Experts				Filter Sophistication				
Treatmt	Mat	Mis	Mat/ LRat	Mis/ LRat	Mat/ HRat	Mis/ HRat	Mat/ LExp	Mis/ LExp	Mat/ HExp	Mis/ HExp	Mat/ LSop	Mis/ LSop	Mat/ HSop	Mis/ Hsop	Total
Male	14	11	13	13	15	15	12	10	15	19	14	16	9	17	193
Female	10	16	10	13	13	10	11	15	14	11	14	9	12	8	166
Missing	0	0	2	1	0	3	0	1	0	0	0	0	2	2	11
Total	24	27	25	27	28	28	23	26	29	30	28	25	23	27	370

Table G.4

Counts of Subject Experience by Treatment

Exprmt	Baseline		Number of Raters				% Raters Experts				Filter Sophistication				
Treatmt	Mat	Mis	Mat/ LRat	Mis/ LRat	Mat/ HRat	Mis/ HRat	Mat/ LExp	Mis/ LExp	Mat/ HExp	Mis/ HExp	Mat/ LSop	Mis/ LSop	Mat/ HSop	Mis/ HSop	Total
Knows Nothing	3	4	1	5	2	3	1	2	7	1	5	4	3	2	43
Knows A Little	8	9	7	11	13	12	8	9	10	10	12	10	8	10	137
Knows Something	10	10	13	8	11	7	10	12	11	15	9	9	8	8	141
Knows A Lot	2	3	1	2	2	2	4	2	1	4	2	2	2	4	33
Is An Expert	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Missing	1	1	3	1	0	4	0	1	0	0	0	0	2	2	15
Total	24	27	25	27	28	28	23	26	29	30	28	25	23	27	370

Table G.5

Counts of Rating Condition Calibration by Treatment

Exprmt	Baseline		Number of Raters				% Raters Experts				Filter Sophistication				
Treatmt	Mat	Mis	Mat/ LRat	Mis/ LRat	Mat/ HRat	Mis/ HRat	Mat/ LExp	Mis/ LExp	Mat/ HExp	Mis/ HExp	Mat/ LSop	Mis/ LSop	Mat/ HSop	Mis/ HSop	Total
Knew ratings mis/ match	17	9	19	13	20	15	14	11	24	20	21	13	19	15	230
Did not know	6	17	6	14	8	13	9	13	5	7	6	11	3	12	130
Total	24	27	25	27	28	28	23	26	29	30	28	25	23	27	370

Table G.6

Counts of Quality Performance Calibration by Treatment

Exprmt	Baseline		Number of Raters				% Raters Experts				Filter Sophistication				
Treatmt	Mat	Mis	Mat/ LRat	Mis/ LRat	Mat/ HRat	Mis/ HRat	Mat/ LExp	Mis/ LExp	Mat/ HExp	Mis/ HExp	Mat/ LSop	Mis/ LSop	Mat/ HSop	Mis/ HSop	Total
Knew perform- Ance	3	6	6	5	6	4	3	6	5	4	6	7	2	3	66
Did not know	18	19	19	22	21	23	19	18	23	23	20	17	21	23	286
Missing	3	2	0	0	1	1	1	2	1	3	2	1	0	1	18
Total	24	27	25	27	28	28	23	26	29	30	28	25	23	27	370

Appendix H: Correlation Table

Table H.1

Bi-Variate Correlations among Co-variate Measures
[r = reverse coded, * = (p<.001), ** = (p<.05)]

Label	Conf1	Conf2	Conf3	Conf4r	Dist1	Dist2	Self1r	Self2	Self3	Self4r	Self5	Self6r
Conf1	1.000	.179**	.342**	.067	.009	.042	.046	.029	.037	.118*	.076	.003
Conf2		1.000	.465**	.322**	.000	.031	-.034	.145**	.059	.033	.094	.009
Conf3			1.000	.359**	.042	.082	-.008	.098	.023	.019	.038	.034
Conf4r				1.000	-.010	.063	-.079	.007	-.008	.111*	.016	.072
Dist1					1.000	.592**	-.023	-.037	.031	.006	-.036	-.035
Dist2						1.000	.057	.000	.077	.022	.011	.045
Self1r							1.000	-.145**	.034	.000	.054	.099
Self2								1.000	.463**	.304**	.415**	.197**
Self3									1.000	.345**	.613**	.289**
Self4r										1.000	.302**	.433**
Self5											1.000	.200**
Self6r												1.000

Appendix I: Work Plan Answer Mean Measures by Treatment Condition

Table I.1 Number of Work Plans Used in Answer
mean [standard deviation]

Number of Work Plans Used in Answer

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	6.7 [2.78]
	Mismatch	7.9 [3.86]
Match/Mismatch	F (p-value)	1.65 (.205)

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	4.6 [2.69]	5.4 [2.59]
	Mismatch	8.8 [3.25]	9.0 [3.85]
Match/Mismatch	F (p-value)	42.053 (.000)	
Rater Sample Size	F (p-value)	.707 (.402)	
Match * Rater Sample Size	F (p-value)	.225 (.636)	

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	6.6 [3.34]	4.9 [2.66]
	Mismatch	7.7 [4.82]	8.0 [3.76]
Match/Mismatch	F (p-value)	8.627 (.004)	
% Raters Who are Experts	F (p-value)	.803 (.372)	
Match * % Raters Experts	F (p-value)	2.027 (.158)	

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	5.0 [2.56]	5.2 [2.31]
	Mismatch	7.4 [4.17]	6.9 [5.07]
Match/Mismatch	F (p-value)	7.325 (.008)	
Filter Sophistication	F (p-value)	.038 (.845)	
Match * Filter Sophistication	F (p-value)	.195 (.659)	

Table I.2 Percentage of Lines in Answer From First Work Plan Accessed
mean [standard deviation]

% Lines in Answer From 1st Work Plan Accessed

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	37% [25%]
	Mismatch	23% [27%]
Match/Mismatch	F (p-value)	3.302 (.075)

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	44% [32%]	44% [32%]
	Mismatch	21% [21%]	22% [19%]
Match/Mismatch	F (p-value)	18.996 (.000)	
Rater Sample Size	F (p-value)	.021 (.885)	
Match * Rater Sample Size	F (p-value)	.019 (.889)	

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	48% [31%]	56% [35%]
	Mismatch	31% [25%]	28% [23%]
Match/Mismatch	F (p-value)	15.521 (.000)	
% Raters Who are Experts	F (p-value)	.260 (.611)	
Match * % Raters Experts	F (p-value)	1.099 (.297)	

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	40% [31%]	40% [35%]
	Mismatch	32% [27%]	26% [25%]
Match/Mismatch	F (p-value)	3.437 (.067)	
Filter Sophistication	F (p-value)	.241 (.624)	
Match * Filter Sophistication	F (p-value)	.242 (.624)	

Table I.3 Percentage of Lines in Answer From Work Plan Rated Highest (5) mean [standard deviation]

% Lines in Answer From Work Plan Rated 5

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	41% [33]
	Mismatch	14% [22%]
Match/Mismatch	F (p-value)	12.655 (.001)

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	71% [29%]	54% [33%]
	Mismatch	17% [19%]	26% [23%]
Match/Mismatch	F (p-value)	63.673 (.000)	
Rater Sample Size	F (p-value)	.630 (.429)	
Match * Rater Sample Size	F (p-value)	6.116 (.015)	

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	50% [36%]	64% [31%]
	Mismatch	10% [14%]	26% [28%]
Match/Mismatch	F (p-value)	49.319 (.000)	
% Raters Who are Experts	F (p-value)	7.763 (.006)	
Match * % Raters Experts	F (p-value)	.027 (.869)	

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	55% [32%]	58% [34%]
	Mismatch	20% [27%]	20% [30%]
Match/Mismatch	F (p-value)	37.208 (.000)	
Filter Sophistication	F (p-value)	.081 (.777)	
Match * Filter Sophistication	F (p-value)	.041 (.840)	

Table I.4 Percentage of Lines in Answer From Work Plan Rated High (4 or 5) mean [standard deviation]

% Lines in Answer From Work Plan Rated 4 or 5

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	85% [23%]
	Mismatch	68% [33%]
Match/Mismatch	F (p-value)	4.237 (.045)

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	98% [5%]	87% [27%]
	Mismatch	74% [30%]	73% [26%]
Match/Mismatch	F (p-value)	16.071 (.000)	
Rater Sample Size	F (p-value)	1.598 (.209)	
Match * Rater Sample Size	F (p-value)	1.170 (.282)	

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	88% [18%]	97% [8%]
	Mismatch	77% [29%]	79% [24%]
Match/Mismatch	F (p-value)	12.746 (.001)	
% Raters Who are Experts	F (p-value)	1.729 (.191)	
Match * % Raters Experts	F (p-value)	.683 (.410)	

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	89% [18%]	94% [15%]
	Mismatch	72% [35%]	65% [41%]
Match/Mismatch	F (p-value)	16.230 (.000)	
Filter Sophistication	F (p-value)	.032 (.859)	
Match * Filter Sophistication	F (p-value)	1.138 (.289)	

Table I.5 Number of Clicks
mean [standard deviation]

Number of Clicks

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	42 [30]
	Mismatch	48 [30]
Match/Mismatch	F (p-value)	.649 (.424)

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	30 [19]	45 [42]
	Mismatch	59 [39]	63 [49]
Match/Mismatch	F (p-value)	9.631 (.002)	
Rater Sample Size	F (p-value)	1.513 (.222)	
Match * Rater Sample Size	F (p-value)	.506 (.479)	

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	38 [21]	30 [22]
	Mismatch	44 [31]	56 [41]
Match/Mismatch	F (p-value)	7.280 (.008)	
% Raters Who are Experts	F (p-value)	.171 (.680)	
Match * % Raters Experts	F (p-value)	2.909 (.091)	

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	35 [24]	46 [32]
	Mismatch	58 [63]	48 [39]
Match/Mismatch	F (p-value)	2.512 (.116)	
Filter Sophistication	F (p-value)	.000 (.987)	
Match * Filter Sophistication	F (p-value)	1.614 (.207)	

Table I.6 Percentage of Clicks on Work Plans Rated High (4 or 5) mean [standard deviation]

% of Clicks on Work Plans Rated 4 or 5

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	78% [17%]
	Mismatch	74% [21%]
Match/Mismatch	F (p-value)	.484 (.490)

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	83% [12%]	78% [26%]
	Mismatch	76% [18%]	74% [18%]
Match/Mismatch	F (p-value)	2.428 (.122)	
Rater Sample Size	F (p-value)	1.108 (.295)	
Match * Rater Sample Size	F (p-value)	.139 (.710)	

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	76% [18%]	89% [12%]
	Mismatch	78% [19%]	77% [16%]
Match/Mismatch	F (p-value)	2.676 (.105)	
% Raters Who are Experts	F (p-value)	3.334 (.071)	
Match * % Raters Experts	F (p-value)	4.754 (.031)	

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	79% [17%]	77% [20%]
	Mismatch	73% [26%]	74% [22%]
Match/Mismatch	F (p-value)	.934 (.336)	
Filter Sophistication	F (p-value)	.007 (.934)	
Match * Filter Sophistication	F (p-value)	.170 (.681)	

Table I.7 Number of Work Plans Opened
mean [standard deviation]

Number of Work Plans Opened

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	14.8 [7.00]
	Mismatch	18.9 [7.79]
Match/Mismatch	F (p-value)	3.859 (.055)

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	12.6 [5.39]	14.8 [6.79]
	Mismatch	17.9 [6.64]	18.5 [6.13]
Match/Mismatch	F (p-value)	14.072 (.000)	
Rater Sample Size	F (p-value)	1.340 (.250)	
Match * Rater Sample Size	F (p-value)	.426 (.519)	

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	18.2 [15.49]	12.7 [6.62]
	Mismatch	16.4 [7.41]	16.9 [6.77]
Match/Mismatch	F (p-value)	.426 (.515)	
% Raters Who are Experts	F (p-value)	1.845 (.177)	
Match * % Raters Experts	F (p-value)	2.755 (.100)	

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	13.2 [5.29]	15.9 [7.52]
	Mismatch	16.3 [7.18]	17.6 [7.25]
Match/Mismatch	F (p-value)	3.099 (.081)	
Filter Sophistication	F (p-value)	2.127 (.148)	
Match * Filter Sophistication	F (p-value)	.294 (.589)	

Table I.8 Number of Work Plans Rated High (4 or 5) Opened
mean [standard deviation]

Number of Work Plans Rated 4 or 5 Opened

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	9.7 [3.78]
	Mismatch	12.0 [2.88]
Match/Mismatch	F (p-value)	6.031 (.018)

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	9.2 [3.30]	10.0 [3.95]
	Mismatch	11.4 [2.52]	11.8 [2.67]
Match/Mismatch	F (p-value)	11.132 (.001)	
Rater Sample Size	F (p-value)	.936 (.336)	
Match * Rater Sample Size	F (p-value)	.083 (.774)	

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	9.9 [3.31]	9.6 [3.34]
	Mismatch	11.0 [3.19]	11.0 [2.87]
Match/Mismatch	F (p-value)	16.071 (.000)	
% Raters Who are Experts	F (p-value)	1.298 (.209)	
Match * % Raters Experts	F (p-value)	1.170 (.282)	

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	9.1 [3.00]	10.2 [4.09]
	Mismatch	10.2 [3.35]	11.0 [2.87]
Match/Mismatch	F (p-value)	1.969 (.164)	
Filter Sophistication	F (p-value)	2.044 (.156)	
Match * Filter Sophistication	F (p-value)	.044 (.835)	

Appendix J: Discussion Of Post Hoc Analysis Details

J.1 Results of Post Hoc Statistical Analysis on Information Search Data

Additional post hoc analyses were performed to investigate search process behaviors of subjects' task performance. Post hoc analyses include 1) examining answers to post-task questions regarding beliefs, 2) investigating if subjects who knew their performance level is related to outcomes, 3) exploring information search processes based on both click stream and work plan answer data, and 4) studying initial search strategy effects on task performance. Each section contains a description of the data and a discussion of significant findings.

J.1.1 Answers to Post-Task Questions

After subjects completed the experimental task, they were asked several questions regarding their beliefs, control measures and manipulations checks. The computerized experimental web pages presented the appropriate questions based on the treatment condition to which each subject was assigned. Programming errors cause twenty-six out of four hundred ten subjects to receive questions related to manipulation they were not exposed to during the experiment. To correct this problem, answers to these questions were removed prior to analysis. However, every subject but one had entered the value of "not applicable" for these questions indicating subjects were conscientiously answering them. This section analyzes the questions regarding subject beliefs, lending insight to search behaviors (see Table J.1 for answer to post-task questions regarding beliefs).

Table J.1 Answers to Post-Task Questions Regarding Beliefs
(Following use a 10-point scale from 1 = Strongly agree to 10=Strongly disagree)

Experiment	**Post Task Questions (1=Strongly Agree and 10=Strongly Disagree)**	**Mean Answers by Treatment Condition**	**Comparison of Mean Answers**	**Compare to Hyp. And Normative Prediction***
Base-line	I used the ratings provided for each Search Result item to decide what items to look at.	Matched ratings (2.4) Mismatched ratings (3.6)	Subjects in matched ratings condition had stronger beliefs about using ratings as input in deciding which work plans *to look at* than those in the mismatched condition (t=4.800, p=.000).	As predicted.
	I used the ratings provided for each Search Result item to decide what to use in building my work plan answer.	Matched ratings (2.9) Mismatched ratings (4.1)	Subjects in matched ratings condition had stronger beliefs about using ratings as input in deciding which work plans to take line items from *to use* into their answer than those in the mismatched condition (t=4.674, p=.000).	As predicted.
	The ratings were based on the opinions of other consultants in the firm.	Matched ratings (3.0) Mismatched ratings (3.0)	Subjects in both the matched and mismatched ratings condition believed *ratings were opinions* of other and their was no difference in their beliefs (t=.108, p=.914).	As predicted.
Rater Sample Size	I used the ratings provided for each Search Result item to decide what items to look at.	Match–Low # Raters (1.88) Match–High # Raters (2.96) Mismatch–Low # Raters (3.69) Mismatch–High # Raters (3.96)	There was no difference between subjects in the low (1.9) versus high (4.0) number of raters conditions in their beliefs about *using the ratings* to select work plans to look at (t=2.655, p=.106).	Unexpected —those with low should not use ratings as much as those with a high # of raters.
	The number of raters value provided in my Search Results was based on the opinions of other consultants in the firm.	Match–Low # Raters (2.21) Match–High # Raters (3.19) Mismatch–Low # Raters (2.38) Mismatch–High # Raters (2.75)	There was no difference between subjects in the matched (5.7) versus mismatch (5.3) ratings conditions, they both believed the *number of raters was a subjectively* determined value (t=.620, p=.536).	Unexpected —number of raters should be considered an objective value by both groups.
Rater Exper-	I used the ratings provided for each Search	Match–Low % Experts (3.48)	There was no difference between subjects in the	As predicted,

ise	Result item to decide what items to look at.	Match–High % Experts (2.76) Mismatch–Low % Experts (3.77) Mismatch–High % Experts (3.53)	low (3.8) versus high (2.8) rater expertise conditions in their beliefs about *using the ratings* to select work plans to look at (t=1.146, p=.287).	but not significant.
	The level of rater expertise value provided in my Search Results was based on the opinions of other consultants in the firm.	Match–Low % Experts (3.59) Match–High % Experts (2.76) Mismatch–Low % Experts (3.54) Mismatch–High % Experts (3.39)	There was no difference between subjects in the matched (4.7) versus mismatched (5.0) ratings conditions, they both believed the *% of raters experts was a subjectively* determined value (t=.559, p=.578).	Unexpected —% raters experts should be considered an objective value by both groups.
Recom-mend Also	I used the ratings provided for each Search Result item to decide what items to look at.	Match–Low Sophist. (2.65) Match–High Sophist. (2.78) Mismatch–Low Sophist. (4.42) Mismatch–High Sophist. (3.48)	There was no difference between subjects in the low (2.7) versus high (4.7) filter sophistication conditions in their beliefs about *using the ratings* to select work plans to look at (t=.221, p=.639).	Unexpected —those with a low should not use ratings as much as those with a high filter sophisticatio n.
Trust Ratings	Relying on ratings of the Search Results items was risky.	Matched ratings (4.7) Mismatched ratings (4.2)	Subjects in mismatched ratings condition believed *relying on ratings was more risky* than those in the matched condition (t=2.117, p=.035).	As predicted.
	The ratings provided for Search Result items could not be trusted.	Matched ratings (5.7) Mismatched ratings (6.4)	Subjects in mismatched ratings condition believed *ratings could not be trusted* more than those in the matched condition (t=3.133, p=.002).	As predicted.
Ante-cedents to Ratings	If the ratings provided were inaccurate, it is because others in my firm were intentionally trying to mislead me.	Matched ratings (8.0) Mismatched ratings (7.8)	There was no difference between subjects in the matched versus mismatched ratings conditions, they both believed the if ratings were wrong, it was not because others in the company were *intentionally trying to be misleading* (t=.845, p=.399).	No prediction.
	If the ratings provided were inaccurate, it is because others in my firm	Matched ratings (6.9) Mismatched ratings	Subjects in the matched ratings condition believed if ratings were	No prediction.

	did not know what the true ratings should be.	(6.0)	wrong, it was not because others in the company *did not know what the true ratings* should be more than those in the mismatched ratings conditions (t=3.497, p=.001).	
	If the ratings provided were inaccurate, it is because others in my firm just do not know what Knowledge System items will be helpful to me.	Matched ratings (6.4) Mismatched ratings (5.7)	Subjects in the matched ratings condition believed if ratings were wrong, it was not because others in the company *did not know what items would be helpful to me* more than those in the mismatched ratings conditions (t=3.497, p=.001).	No prediction.

* See Chapter 4 for normative predictions leading to hypotheses.

While answers to questions about ratings were consistent with expectations, answers to questions about other information provided were not consistent. Unexpected answers to post-task questions reveal that subjects did not believe the rater sample size and rater expertise were from objective sources as they were intended to convey. This is evidence that subjects may not fully understand the intended source of information provided. Subjects may believe the rater sample size is prone to manipulation and rater expertise is based on a subjective (i.e., from the correctness of ratings) instead of objective criterion arrived at separately from ratings.

Additionally, mismatched ratings were expected to trigger the use of credibility indicators or content recommendations and when these are low, ratings should not be used, which does not appear to be the case. In fact, the opposite was found for the rater sample size and content recommendations experiments. Those in the matched ratings, low rate sample size or low filter sophistication conditions indicated they used ratings the most (mean = 1.88 and 2.65) while those in the mismatched ratings, high rater sample size or high filter sophistication conditions indicated they used ratings the least (3.96 and

4.70). These differences between indicated rating usage are not significant between low and high rater sample size or filter sophistication (t=2.655, p=.106 and t=.221, p=.639).

Meanwhile, rating usage does appear to be consistent with predictions in the rater expertise experiment. Those in the mismatched ratings, low rater expertise conditions indicated they used ratings the least (3.77) and those in the matched ratings, high rater expertise conditions indicated they used ratings the most (2.76). However, differences between indicated rating usage are not significant between low and high rater expertise (t=1.146, p=.287). This is evidence in support of the theory guiding hypotheses for rater expertise but may indicate the rater sample size and filter sophistication are overpowered by ratings values.

Finally, subjects in the matched and mismatched conditions differed on what the reason for a mismatch might be. Differences between subjects are not surprising, as subjects in the matched condition may not have occasion to think about why ratings might be wrong while those in the mismatched condition did because their ratings were mismatched.

J.2 Subjects Who Knew Their Performance Level

This section examines whether subjects who know how well or badly they did or how useful or unuseful ratings were do better than those who did not know. Subjects were asked whether their ratings matched content quality as well as how confident they were with their task answer. The following use a 10-point scale from 1=Strongly agree to 10=Strongly disagree (also found in Table 5.7 above):

- Self Calibration: I felt the "ratings" provided were actually consistent with the overall quality of their associated work plan.

- Confidence: I would like to run another search to look at more work plans, then possibly revise the work plan I submitted; I do not want to give the plan of work that I submitted to my manager; There are better answers than the one I submitted; I am confident my choices were the best ones possible (reverse coded).

Using this information and knowing subject treatment conditions and decision quality scores, the following two dummy variables were created:

- Rating Condition Calibration: Calculated as = 1 if in matched (mismatched) rating condition and selected a value of <= 4 (>= 7) on the Self Calibration scale above. Otherwise = 0.

- Quality Performance Calibration: Calculated as = 1 if in score >= 25 (= 36 * 70%) [score <= 11 (= 36 * 30%)] and selected a value of >= 7 (<=4) on the Confidence scale above. Otherwise = 0.

Rating Condition Calibration was positively correlated with decision quality (r = .407, p = .000). Quality Performance Calibration was marginally significantly correlated with decision quality (r = .101, p = .056). When subjects knew ratings were helpful or not or knew their performance level, they were able to perform more effectively but not faster or slower. Lack of correlation with time is not surprising as those in the matched ratings condition should have faster times offsetting those in the mismatched ratings condition who should have slower times. Counts by treatment for Rating Condition Calibration are found in Table G.5 and for Quality Performance Calibration in Table G.6 in Appendix G.

Chi-square tests were conducted on rating condition calibration and quality performance calibration to check for possible differences across treatments within each of the four inter-related experiments. As expected, the chi-square statistics for Ratings Condition Calibration indicate significant differences for all experiments, even marginally significant for the rater sample size experiment, suggesting manipulations may induce different uses of the information provided (for chi-square statistics in Table

J.2 and Table J.3). Also as expected, the chi-square statistics for Quality Performance Calibration indicate no significant differences for all experiments suggesting subjects knew when ratings were not matched with content quality even if they could not overcome it. Since differences between treatments for subjects who knew how well they performed were not significant, no further analysis of that data is presented.

Table J.2 Chi-Squared Statistics for Rating Condition Calibration by Treatment

Exprmt	Baseline	Rater Sample Size	Rater Expertise	Filter Sophistication
Chi-squared	7.567 (d.f.=1,p=.006)	6.182 (d.f. = 3,p = .103)	9.121 (d.f. = 3,p = .028)	8.628 (d.f. = 3,p = .035)

Table J.3 Chi-Squared Statistics for Quality Performance Calibration by Treatment

Exprmt	Baseline	Rater Sample Size	Rater Expertise	Filter Sophistication
Chi-squared	.684 (d.f.=1,p=.408)	.828 (d.f. = 3,p = .843)	1.274 (d.f. = 3,p = .735)	4.528 (d.f. = 3,p = .210)

Hypothesized predictions suggest high (low) credibility indicators and filter sophistication should inform subjects with ratings matched (mismatched) to content quality about the status of their rating. Thus, more subjects in these treatment conditions should have higher Rating Condition Calibration than those in other treatment conditions. The percentages of subjects who knew their correct ratings condition is shown in Table J.4. As expected, subjects with high credibility indicators and filter sophistication and rating matched with content quality exhibit the highest percentages of those who know their rating condition (i.e., for rater sample size 71%, rater expertise 83% and filter sophistication 83%). Surprisingly, subjects with low credibility indicators and filter sophistication appear to know their rating condition least (i.e., for rater sample size 48%, rater expertise 42% and filter sophistication 52%). Thus, while high credibility indicators and filter sophistication appear to be informing subjects of ratings matched with content quality, low credibility indicators and filter sophistication do not appear to be informing subjects of ratings mismatched with content quality.

Table J.4 Percentage of Subjects by Treatment Condition Who Knew their Rating Condition

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	71%
	Mismatch	33%

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	76%	71%
	Mismatch	48%	54%

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	61%	83%
	Mismatch	42%	67%

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	75%	83%
	Mismatch	52%	56%

J.3 Information Search Process Measures

Information search measures were also dynamically collected reflecting behaviors subjects followed regarding the selection and use of search result items. Information search measure have been widely used as a process tracing technique (Payne 1976; Svenson 1979). The measures come from two sources: the click streams each subject followed while performing the task and the actual usage of search results in the work plan answer created. The measures captured from each source are listed in Table J.5. Measures were also gathered and analyzed separately for the data modeling and database design portion of the task with similar results as measures analyzed for both portions combined. Accordingly, only the combined measures that reflect behavior processes across both portions of the task are analyzed.

Table J.5 Process Data Measures

Data Source	
Click Stream Measures	**Work Plan Answer Measures**
Total number of clicks made	Number of different work plans used in answer (maximum is 14)
Percentage of total number of clicks made on work plans rated a 4 or 5	Percentage of the lines in answer from the work plan first clicked on were
Number of the available work plans opened (maximum is 14)	Percentage of the lines in answer that were from the work plan rated a 5
Number of the available work plans rated a 4 or 5 opened (maximum is 7)	Percentage of the lines in answer that from work plans rated a 4 or 5
Additional Information:	
Number of position in list of first work plan clicked on	Total number of lines in answer
Strategy included clicked on 1. first work plan rated 4 in the list of work plans, 2. work plan rated 5, 3. first work plan in the list, 4. a random work plan.	

Hypothesized predictions in Chapter 4 were based on several expectations of human behavior including:

1. Regardless of treatment condition, knowledge seekers should select the *highest rated content first* then move to the next highest rated content.
2. *Higher rated content* should be used more in the task when ratings *matched* content quality than when ratings mismatched.
3. Those in the *mismatched* treatment condition should *expend more time and effort* indicated by selecting more work plans.

4. Finally, those with *low* credibility indicators or filter sophistication should *discount ratings and expend more time and effort* indicated by selecting more work plans.
5. Thus, those with *mismatched* ratings and *low* credibility indicators or filter sophistication should *expend the most time and effort* while those with *matched* ratings and *high* credibility indicators or recommendation sophistication should *expend the least.*

The next sections examine whether information search measures captured during experimental trials support these expected behaviors.

J.3.1 Work Plan Answer Measures

Examining the source of the lines used to create work plan answers, subjects in the matched ratings condition used fewer different work plan items in their answer than those in the mismatched ratings condition in all treatment conditions and this was statistically significant in all cases except for the baseline condition (see ANOVA F-statistics for the main effect of match/mismatch ratings in Appendix I Table I.1). Consistent with expectations, subjects with ratings matching content quality expend less effort choosing to build a task answer out of fewer work plans.

Further examination of the items included in work plan answers indicates in all cases subjects in the matched ratings condition used more lines in their answer coming from the first work plan they opened, from work plans rated highest (i.e, 5), and from work plans rated high (i.e., both 4 and 5) than subjects in the mismatched ratings condition. This difference was significant for all measures in all treatment conditions (see ANOVA F-statistics for the main effect of match/mismatch ratings in Appendix I Tables I.2, I.3, and I.4). Consistent with expectations, subjects with ratings matching content quality expend less effort choosing to build a task answer more often from the first work plan opened and used more high rated content than those with ratings mismatching quality. This also suggests subjects in the match condition opened the highest rated work plans first and used it in their answer. Thus, work plan answer measures provide evidence individuals may recognize but not overcome rating deficiencies.

Interestingly, there is a significant difference for the percentage of lines in answer from work plans rated highest (i.e., 5) between those in the high versus low rater expertise treatments. Consistent with predictions, subjects with a high rater expertise chose to include more lines in their answer from work plans rated highest than those with a low rater expertise. This indicates raters expertise may influence whether individuals include highly rated content in their answer. Meanwhile, this finding does not hold when high and low rater sample size or filter sophistication is provided.

J.3.2 Click Stream Measures

Investigating the total number of clicks as an indication for the amount of effort expended on the task, subjects in the matched ratings condition clicked on fewer work plan items than those in the mismatched ratings condition in all cases. This difference was significant for the number of raters and percentage of raters experts experiments (see ANOVA F-statistics for the main effect of match/mismatch ratings in Appendix I Table I.5). Consistent with expectations, subjects with ratings mismatching content quality expend more effort by clicking on and looking at more work plan items than those with ratings matching quality.

Further examination of click stream patterns indicates subjects in the matched ratings condition more often clicked on an item rated 4 or 5 than subjects in the mismatched ratings condition in all treatment conditions except when rater expertise was low which was not statistically different. However, this difference was not significant in any treatment condition (see ANOVA F-statistics for the main effect of match/mismatch ratings in Appendix I, Table I.6). While not significantly different, consistent with expectations, subjects with ratings matching content quality selected higher rated items more than those with ratings mismatching quality.

Interestingly, there is a significant difference for the percentage of clicks on work plans rated high (i.e., 4 or 5) between those in the high versus low rater expertise conditions. Consistent with predictions, subjects with a high rater expertise selected more highly rated work plans than those with a low rater expertise. This indicates raters expertise may influence whether individuals select highly rated content to review. Meanwhile, this finding does not hold when high and low rater sample size or filter sophistication is provided.

Finally, subjects in the matched ratings condition opened fewer work plans in total than subjects in the mismatched ratings condition in all cases except when rater expertise is low. This difference was significant in all but the rater expertise experiment. Also, subjects in the matched ratings condition opened fewer work plans rated high (i.e., 4 or 5) than subjects in the mismatched ratings condition in all cases. This difference was significant in all but the collaborative filter experiment (see ANOVA F-statistics for the main effect of match/mismatch ratings in Appendix I, Table I.7 and I.8). Consistent with expectations, subjects with ratings matching content quality expended less effort by selecting fewer work plans than those with ratings mismatching quality.

In summary, the information search measures analyzed above suggest those in the matched ratings condition used higher rated work plan items more and expend less effort than those in the mismatched ratings condition. Also, the measures suggest rater expertise may influence whether individuals select for review and include highly rated content in their answer, while rater sample size or filter sophistication do not. Thus, individuals may realize ratings are not accurate, but only with the help of rater expertise can they overcome the inappropriate ratings.

J.3.3 Correlations Between Click Stream and Work Plan Answer Measures

The correlations between information search measures are provided in Table J.6 separately for match and mismatch ratings. Many of the relationships between measures are as expected (e.g., when ratings are matched or mismatched with content quality, the more work plans opened is positively associated with more total clicks on work plans [r=.615 and .672]). Some of the more noteworthy associations are discussed below:

1. The percentage of lines in answers from work plans rated high (i.e., 4 or 5) is positively associated with the number of work plans opened that were rated high (i.e., 4 or 5) when ratings match and negatively associating when ratings mismatch content quality.
2. Percentage of lines from first work plan opened, percentage of lines from work plans rated highest (i.e., 5) and high (i.e., 5) used in answers are all positively associated with decision quality when ratings match content quality but negatively associated when ratings mismatch content quality.
3. Number of total clicks on work plans, number of work plans opened, and number of work plans opened rated high (i.e., 4 or 5) are all positively associated with decision quality when ratings mismatch content quality.

These associations suggest subjects selected and used high rated work plans when ratings matched but selected then did not use them when ratings mismatched content quality. Also, when ratings mismatched content quality, subjects demonstrating more effort were able to achieve a higher quality decision (i.e., task answer). In summary, subjects may realize ratings match or mismatch with content quality, but may have difficulty overcoming a mismatch.

Table J.6 Bi-Variate Correlations among Process Data Measures
[* = (p<.05), ** = (p<.001)]

Matched Ratings									
	Work Plan Answer					Click Stream			
	# Diff. WP	% Line from 1st	% Line from 5 Rated	% Line from 4/5 Rated	Total # Lines	# Clicks	% Clicks from 4/5 Rated	# WP Opened	# WP Opened from 4/5 Rated
# Different Work Plans	1.000	-.412**	-.614**	-.287**	.119	.576**	-.252**	.512**	.457**
% Line from 1st		1.000`	.488**	.128	.006	-.330**	.228**	-.317**	-.251**
% Line from 5 Rated			1.000	.529**	-.048	-.199**	.454**	-.265**	-.109
% Line from 4/5 Rated				1.000	-.026	.072	.739**	.054	.298**
Total # Lines					1.000	.059	-.029	.079	.138
# Clicks						1.000	-.114	.615**	.655**
% Clicks from 4/5 Rated							1.000	-.276**	.127*
# WP Opened								1.000	.669**
# WP Opened from 4/5 Rated									1.000
Task Quality	-.415**	.363**	.822**	.597**	.014	.023	.465**	-.141	.049
Task Time	.444**	-.306**	-.256**	-.134**	.125	.433**	-.191*	.369**	.398**

Mismatched Ratings									
	Work Plan Answer					Click Stream			
	# Diff. WP	% Line from 1st	% Line from 5 Rated	% Line from 4/5 Rated	Total # Lines	# Clicks	% Clicks from 4/5 Rated	# WP Opened	# WP Opened from 4/5 Rated
# Different Work Plans	1.000	-.264**	-.299**	-.213**	.291**	.551**	-.333**	.585**	.466**
% Line from 1st		1.000	.420**	.370**	-.063	-.358**	.239**	-.477**	-.508**
% Line from 5 Rated			1.000	.455**	-.087	-.304**	.392**	-.422**	-.332**
% Line from 4/5 Rated				1.000	-.104	-.313**	.813**	-.611**	-.277**
Total # Lines					1.000	.088	-.173*	.200**	.155**
# Clicks						1.000	-.289**	.672**	.578**
% Clicks from 4/5 Rated							1.000	-.629**	-.193**
# WP Opened								1.000	-.812**
# WP Opened from 4/5 Rated									1.000
Task Quality	.170*	-.397**	.464**	-.759**	-.145**	.350**	-.603**	.534**	.312**
Task Time	.478**	-.131	-.261**	-.235**	.009	.510**	-.242**	.419**	.344**

J.4 Measures for Initial Information Search Strategy

The information search process of each subject was objectively coded using click stream data (i.e., pattern of clicks used to open work plans). The coding reflects whether the first click of their click stream was: 1. on the first work plan rated 4 in the list provided, 2. on the one work plan rated 5, 3.on a random work plan from the list, or 4. on the first work plan listed. Also, the 1st 4 listed and ratings = 5 were combined since they involved following highest rated items first, while random and sequential strategies were combined since they did not. However, if the treatment condition called for a list of work plans where the order involved "the first work plan listed" also being "rated 4" and the subject selected to look at the first work plan, it is ambiguous whether the subject selected the work plan because it was "the first work plan rated 4 in the list provided" or because it was "the first work plan listed". Because of this situation, seventy-seven subjects could not be coded. The remaining subjects strategies are analyzed next. As expected, based on correlations shown in Table J.7, when ratings match content quality reviewing highly (non-highly) rated items first is associated with improved (worse) decision performance. Unexpectedly, however, when ratings mismatch content quality no initial search strategy followed is associated with decision performance.

Table J.7 Correlations of Strategy and Decision Quality and Decision Time

Strategy	1st Four Listed	Rating is Five	Random	1st Work Plan	1st Four Listed & Rating is Five	Random & 1st Work Plan
Matched Ratings						
Decision Quality	.022	.302**	-.031	-.297**	.309**	-.309**
Decision Time	-.051	-.072	-.126	.193*	-.099	.099
Mismatched Ratings						
Decision Quality	.027	-.083	-.023	.114	-.070	.070
Decision Time	.003	.112	-.099	-.043	.116	-.116

[* = (p<.05), ** = (p<.001)]

Chi-square tests indicate subjects followed different strategies across *match/mismatch ratings* conditions (Chi-square statistic = 15.759, d.f. = 3, p = .001), across *treatment conditions* (69.050, d.f. = 39, p = .002), but not across the *four experiments* (Chi-square statistic = 6.955, d.f. = 9, p = .642). Prior to opening work plans, subjects should not know whether ratings were matched or mismatched with content quality, thus predictions suggest they should always open the highest rated item first. Consistent with expectations, most subjects in the matched ratings condition did open the highest rated item first. Surprisingly, however, those in the mismatched ratings condition opened the highly rated and non-highly rated work plan first equally often. Counts of strategies by matched or mismatched ratings are shown in Table J.8.

Table J.8 Strategy Counts by Match/Mismatch Ratings Quality Condition

Strategy	**1st Four Listed**	**Rating is Five**	**Random**	**1st Work Plan**	**1st Four Listed & Rating is Five**	**Random & 1st Work Plan**
Match	10	71	27	23	81	50
Mismatch	13	66	23	60	79	83
Totals	23	137	50	83	160	133

Strategy counts by treatment condition are shown in Table J.9. As expected, in almost all treatment conditions, subjects chose to review the highest rated work plan first. However, unexpectedly, subjects did not chose to review highly rated work plans first in three conditions: the match ratings baseline, matched ratings and low rater sample size, and matched ratings and low filter sophistication. The low rater sample size or filter sophistication may have suggested to subjects a lack of rating credibility and ratings were discounted during initial work plan selection. Once again, subjects may have realized ratings were not accurate, but could not find a way to overcome the inaccuracy since decision performance did not improve. Strategy counts by experiment are shown in Table J.10. As expected, the most popular search strategy was for subjects to chose to review the highest rated work plan first, while the second most popular was to select the first work plan listed.

Table J.9 Strategy Counts by Treatment Condition

Strategy	1st Four Listed	Rating is Five	Random	1st Work Plan	1st Four Listed & Rating is Five	Random & 1st Work Plan
Match Baseline	1	6	5	8	7	13
Mismatch Baseline	1	10	1	6	11	7
Match and Low # Raters	1	8	3	10	9	13
Mismatch and Low # Raters	2	12	7	3	14	10
Match and High # Raters	3	10	3	6	13	9
Mismatch and High # Raters	1	12	3	3	13	6
Match and Low % Rater Expertise	0	11	2	8	11	10
Mismatch and Low % Rater Expertise	3	6	5	4	9	9
Match and High % Rater Expertise	5	15	5	1	20	6
Mismatch and High % Rater Expertise	1	12	1	5	13	6
Match and Low Filter Sophistication	2	9	2	15	11	17
Mismatch and Low Filter Sophistic'n	0	11	5	0	11	5
Match and High Filter Sophistication	1	7	3	12	8	15
Mismatch and High Filter Sophistic'n	2	8	5	2	10	7
Totals	23	137	50	83	160	133

Table J.10 Strategy Counts by Experiment

Strategy	1st Four Listed	Rating is Five	Random	1st Work Plan	1st Four Listed & Rating is Five	Random & 1st Work Plan
Baseline	2	16	7	14	18	20
Rater Sample Size	7	42	16	22	49	38
Rater Expertise	9	44	13	19	53	31
Collaborative Filter Sophistic'n	5	36	15	31	40	44
Totals	23	138	51	86	160	133

To better understand the effect of strategy on task performance, initial search strategy measures for the combined strategies of first found listed and rating is five (i.e., follow highly rated work plans) as well as random and first work plan listed (i.e., follow non-highly rated work plans) were analyzed. ANOVA results indicate no differences across decision time for any treatment condition in all four experiments for either initial search strategy measure, thus decision time will not be discussed further. ANOVA results also indicate no differences across decision quality for any treatment condition in all four experiment for subjects following an initial search strategy of reviewing non-highly rated work plans first. However, ANOVA results do indicate significant differences across decision quality for both the rater sample size (F=4.101, p=.049) and filter sophistication (F = 9.742, p=.003). As expected, those reviewing highly rated work plans first do better when ratings match than when ratings mismatch with content quality. The means of decision quality by treatment condition for initial strategy to review highly rated work plans first is found in Table J.11 and to review non-highly rated work plans first is found in Table J.12.

Table J.11 Mean Decision Quality by Treatment Condition for Initial Strategy to Review Highly Rated Work Plans
Mean [standard deviation] and n=sample size

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	23.3 [6.79] n=7
	Mismatch	10.7 [8.01] n=11

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	28.5 [8.14] n=9	28.4 [7.30] n=13
	Mismatch	8.6 [8.15] n=14	7.2 [6.67] n=13

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	28.3 [4.95] n=11	27.7 [6.46] n=20
	Mismatch	11.5 [10.85] n=9	6.5 [6.63] n=13

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	25.9 [9.02] n=11	26.3 [9.98] n=8
	Mismatch	7.5 [7.85] n=11	10.8 [8.84] n=10

Table J.12 Mean Decision Quality by Treatment Condition for Initial Strategy to Review Non-Highly Rated Work Plans
Mean [standard deviation] and n=sample size

Providing Content Ratings (baseline condition)		
Rating Level and Content Quality	Match	17.9 [10.32] n=13
	Mismatch	13.1 [9.98] n=7

Providing Rater Sample Size		**Rater Sample Size (number of raters)**	
		Low	High
Rating Level and Content Quality	Match	27.7 [5.21] n=13	16.6 [11.40] n=9
	Mismatch	9.0 [9.52] n=10	12.5 [10.99] n=6

Providing Rater Expertise		**Rater Expertise (% Raters Who are Experts)**	
		Low	High
Rating Level and Content Quality	Match	19.9 [9.23] n=10	23.7 [7.23] n=6
	Mismatch	9.14 [5.61] n=9	5.9 [2.95] n=6

Providing Collaborative Filtering		**Collaborative Filtering (degree of sophistication)**	
		Low	High
Rating Level and Content Quality	Match	21.1 [8.84] n=17	24.8 [7.44] n=15
	Mismatch	8.9 [6.79] n=5	11.2 [10.34] n=7

Next, decision quality was regressed on initial search strategy controlling for treatment condition. Results suggest only when ratings match content quality does reviewing highly rated work plans first improve decision quality when rater sample size is provided (t=2.73, p=.018) and when rater expertise is provided (t=2.870, p=.006).