Designing A Business Reengineering Information System with Performance Support Concepts:

A Description of the System Analysis Process

by

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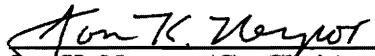in partial fulfillment of the requirements for the degree of
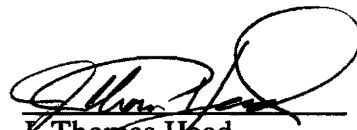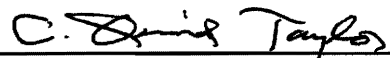
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(ABSTRACT)

This naturalistic case study investigated a business reengineering project at a large company located in the Northeast. Because the Human Resources (HR) department had downsized, decision makers within HR began investigating the feasibility of customizing a purchased HR Information System. To ensure that the new HR information system was usable by all employees, project leaders wanted to include performance support concepts into the customization of the system. The main focus of my research was investigating the major issues associated with incorporating performance support principles into a system development life-cycle model.

The analysis of these data included a qualitative approach where I described the critical events relating to performance support system development that occurred on the project. In addition, I used the diffusion of innovation theory to analyze and interpret the data. Results indicated that there were major inconsistencies with the term "performance support" and the need for implementing performance support solutions on the project. Some Information Technology team members realized the importance of incorporating performance support into the system development life-cycle. However, because of the tight time frame for customizing the software with performance support concepts, several members of the Information Technology team believed that incorporating performance support for the initial release was unreasonable. For the initial release of the new HR

information system the role of the Performance Support team shifted from seeking performance support solutions towards pursuing traditional training solutions for teaching employees how to use the HR information system.

Acknowledgments

I began the journey to my final defense not knowing exactly what path I would take to get there. When I met Dr. Moore my first day at Va. Tech, he exhibited enthusiasm and support for me completing my degree. I found Dr. Moore's support to be unwavering and I would like to thank him for being not only a fantastic Co-Chairman but also a good friend. Additionally, an outstanding committee- Dr. Jan Nespor, Dr. John Burton, Dr. David Taylor, and Dr. Tom Head- provided me with guidance during my research and writing. I would like to offer a special thank-you to Terry Stevers and Frieda Bostian for their invaluable assistance in editing the dissertation as well as for their encouraging words and friendship too.

In search for information on performance support, I am grateful to the following people for taking the time to discuss performance support issues: Dr. Stan Malcom at Performance Vision; Dr. Dolph Santello at Microsoft Crop.; Lori Gillespie at Instructional Communications; Bonniebeth Rogers at Rogers Consulting; Dr. Steward Winstein at Unisys Corp.; Dr. Kim Ryule at Plus Delta Performance; George Stevens at Integrated Performance Designs; Catherine Witt at RWD, Vince DeCarlo; Pam Zimper at Florida State University; and a special thank-you to Gary Dickelman at Bureau of National Affairs for his encouragement and making the necessary arrangements for me to gain entry into the field-site.

A journey can not be traveled well without insight from those who have gone before you. I also appreciate Va. Tech alumni, Drs. Ruberg and Abel, for sharing their expertise, knowledge, and friendship. Your strategies for how to travel the journey were invaluable. To those graduate students who traveled the path with me, I am forever grateful for your words of hope and our unforgettable meetings at the coffee shop. Barbara Lockee and Tina Bavaro, your friendship has also been invaluable; thank you for all of the laughs and discussions on constructivism.

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Introduction

<u>Overview</u>

I was introduced to the concepts of performance support when I worked for the Department of Defense and was faced with solving a major training problem. The Special Processing Lab within the Microelectronic's department was moving from one shift to three. Our goal was to leverage the expertise (which was minimal) over the three shifts. This was a difficult task given the nature of the Lab and the fact that the department could not afford to make any errors. The training staff wanted a software application package that provided employees with a system that :

1. was easy to use;

2. designed to prevent employees from making errors and;

3. supported the employees with information at the time they needed it in order for them to do their job.

This software application could be embedded into the current information system. This system was used to produce integrated circuits. I found it a complex challenge to design and develop this type of system, which was called a performance support system. I left the Department of Defense (DoD) to start my doctoral program before I could complete the project. However the investigations into performance support systems that I began while working at the DoD have remained with me and have become the focus of the dissertation.

Since the acknowledgment of performance support systems by various members of the training and system development profession, the terms associated with the concept have varied. Appendix A documents some of the acronyms used for performance support systems. Generally, performance support systems have been placed in three categories:

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- Intrinsic: embedded within a software application, provides inherent support;

- Extrinsic: resides within the system but not within the application but is integrated with the interface;

- External: external to the system and invoked by the performer (Gery, 1995a).

Even though various types of performance support systems exist, the common characteristic found in each performance support system design was the ability of the system to provide the employee with access to on-demand information, advice, or learning modules (Milheim, 1992; Raybould, 1995a). The greater challenge for the developer of performance support systems was influencing the decision makers, especially system developers, of the importance of incorporating performance support solutions into the traditional system development life-cycle (Brusca & Campbell, 1995).

During the early 1980's, I was completing my undergraduate degree in Computer Science. I was trained to develop software applications in several different programming languages, to understand various data structures and to know about computer hardware like the Intel 8088 chip. In terms of computer hardware and software, the technology has progressed very rapidly. However, it has taken longer for the mindset of some computer professionals to adopt the importance of developing training and user support, not as an afterthought, but as part of the system development life-cycle (SDLC). Many times my classmates would joke about how it was the "stupid user's fault" or an "operator's error" if there was a problem with the software application. The usability and usefulness of the software were never an issue. However, to stay competitive companies are realizing that computer users are becoming more experienced with using software applications and as a result are more demanding with insisting on software that is usable. With advocates from the field of Human Computer Interface (HCI) design and Instructional Technology, more and more software developers recognize the importance of the user aspect (training, user support, HCI design and usability) of software development. But some software

developers are still not comfortable with incorporating the user aspects of the information systems development during the entire phases of the SDLC for it is seen as "fluff" or simply not important. The user aspect is nothing less than placing the focus of information systems development on the user first and the technology second. In addition, computer hardware and software have evolved to a place where it is easier to support software developers in developing user friendly and useful software. This concept is not new. Mumford (1981) has written on the topic of socio-technical design where the main focus is taking into greater consideration, during system development process, the users of the system, their work environment, and the work that needs to be done. Mumford promotes a system design methodology called ETHICS, which stands for "Effective Technical Human Implementation of Computer-based systems; where the future users of computer systems at all organizational levels play a major part in the design of the system" (p. 1).

The business client, users, and information systems developers will need to be made aware and influenced as to the importance of the user aspect to information systems development. For it is the client who will need to sponsor the project financially and request requirements that reflect the various user aspects of the SDLC. In short, the formal adoption of performance support principles will have to come from the client or business representative and informally from the information systems development group. Mumford argues that many system designers do not appear to recognize that the conventional approach to information system design generally promotes designing only particular systems that focus on the technology. In order to develop a holistic system that includes the technological aspects as well as the humanistic aspects a different approach to information systems development is suggested.

Statement of the Problem

One of the goals for the HR Business Reengineering project was investigating and implementing performance support concepts as a solution for supporting employees, company-wide, with using Trinity, the new information system. In addition, the Trinity software application was designed to support employees with human resources matters, such as:

- making name and address changes,

- selecting and updating health benefit information,

- selecting and updating employees' schedule.

Furthermore, this software application was not developed by The Company but purchased from an outside vendor. The software application, in its generic form, was designed to be used by a person who specializes in human resources management. However, because The Company wanted any employee to be able to use portions of the software application, changes to the software were required. In fact, because the customization of this software application would tie together human resources management areas such as payroll, benefits, and compensation, The Company identified this software application as their new human resources information system. The name of this new human resources information system was Trinity.

Significance of the Study

Although there are several system development models available for performance support development (Dickelman, 1995; Hanssen & Katz, McGraw, 1994; Raybould, 1995a) many developers of performance support systems still struggle with issues such as:

- acceptance of performance support developers by the information system group,
- gaining and keeping members of the system development project team aware of performance support concepts,
- inconsistent perceptions and definitions of the term performance support (Brusca & Campbell, 1995; Hanssen and Katz, 1995).

In fact, the working relationships between advocates of performance support and the information systems department is one area of concern that was described by Brusca and Campbell (1995).

This study is important because there is a need for understanding issues that emerge when advocates of performance support try to incorporate performance support concepts into a system development project. Furthermore, it is important not only to understand the technical issues but also the non-technical issues such as team work, communications and change management (Hanssen & Katz, 1995) when implementing a performance support effort.

Research Questions

For my study, I was extremely interested in uncovering the issues associated with incorporating performance support principles into a conventional systems development life-cycle model. To rigorously investigate this area of inquiry, I conducted a naturalistic case study of a system development project. The aspect of the system development project that related to my study was investigating the viability of using performance support solutions. For the purpose of this study, any references to the field-site will be called "The Company" and pseudonyms will be used to address any references to company documents or individuals working at The Company.

The main research question was what were the major issues associated with successfully incorporating the principles of performance support into a system development life-cycle model? To investigate this line of inquiry, six additional questions were used. They were as follows:

- What were the current practices and procedures used to create a performance support system?

- How was the system development process model used to incorporate management and user participation?

- How was the system development life-cycle model used to create a performance support system different or the same as system development life-cycle models previously used in other projects?

- How familiar were system analyst and business representatives with the concepts of performance support?

- What strategies were available to influence system analysts and business representatives of the importance of incorporating performance support into the traditional system development life-cycle model?

Organization of this Thesis

This chapter has provided an overview of this thesis. This study is organized in six major chapters; the remaining sections of this thesis are organized as follows:

- Chapter 2-*The Literature Review*: This chapter provides a literature review on how the workplace has changed and as a result some on-the-job training strategies have evolved into performance support. In addition, this Chapter describes examples of performance support systems developed and used at The Company.

- Chapter 3-*Methodology:* This chapter provides background information on the research methods used for selecting The Company and participants for the study. Also,

the details of the research questions and the interview guide used for collecting the data are discussed.

- Chapter 4-*Description of the Analysis Phase of the Project:* This chapter describes a narrative of my experiences while working on the Performance Support team at The Company during the analysis phase of their Human Resources (HR) Business Reengineering project.

- Chapter 5-*Analysis and Interpretations:* In this chapter I analyze the findings from the study by using theory from the diffusion of innovations as a framework.

- Chapter 6-*Conclusions:* This chapter brings together all the data and presents implications for performance support development for information systems and performance support developers as well as areas for future research.

Definition of Terms

Since the performance support concept is still fairly new, the clarification of terms associated with the idea is needed. In addition, several different definitions may exist for various terms in this study. As a result, the following definitions of terms will be used throughout this document in order to prevent any confusion with the terminology.

Electronic performance support or performance support: For the purposes of this study these terms will be synonymous to mean the concept associated with providing an individual with "just-in-time" assistance that is integrated within the workflow of an information system.

EPSS Expert: An individual who has either created or been a part of the software development process for creating an EPSS. This individual may have also written an article on EPSS or was familiar in general with the software life-cycle and instructional system development process.

Expert System: An interactive computer program that uses knowledge obtained from experts to give advice about problems in a relatively narrow area of expertise (Townsend, 1987 cited in Swan, 1990)

Methodology: An approach on how to navigate through each phase of the system development process and how to represent the steps of each phase.

Model : An abstract description or simplified representation of a complex system; a portion of the more complex real world (Yeh 1993). A representation of reality, often in a simplified way that provides structure and order (Bagdonis and Salisbury, 1994).

On-the-job Training: The supervision and supplemental instruction furnished to a learner while he or she is employed as a beginner or trainee in the regular duties of a position or job. (AECT Task Force, 1977, p. 340).

Performance Support System: A computer-based system that improves worker productivity by providing information, software guidance and tools available at the employee's time of need to provide comprehensive and continuous support for a given task or group of tasks.

Systems Development Methodology: The formal documentation for the phases of the system development cycle. It defines the precise objectives for each phase and the results required from a phase before the next one can begin. It may include specialized forms for preparing the documentation describing each phase. (Freedman, p. 386, 1995).

Trinity HR Information System: The name for the new Human Resources information system that was purchased and was customized by the HR Business Reengineering team.

Prototype: An original model, type, form, or instance that serves as a model by which later stages are based or judged (Swan, 1990). Prototyping is essential for clarifying information requirements.

Chapter 2
Literature Review

<u>The Evolution of OJT into Performance Support Systems</u>

Three major historical events- the changes in society, technological advancements with computer hardware and software, and organizational changes in the workplace are the driving forces behind the advancements of on-the-job training (OJT) and employee support.

According to Porat (1977) our society has progressed through three major paradigm shifts: the agricultural age, the industrial age, and the information age (see Figure 1). The progression of OJT methods, as they relate to changes in society, can be found in Table 1. During each paradigm shift, a key ingredient for adapting to change was the necessity to maintain a highly skilled workforce for the country's economic security. On-the-job training, which is "the supervision and other supplemental instruction furnished to a learner while he or she is employed as a beginner or trainee in the regular duties of a position or job" (AECT Task Force, 1977, p. 340), began with apprenticeship programs. Historically, apprenticeships, which are a combination of training on-the-job and related technical instruction where workers learn the practical and theoretical aspects of work, were the first structured form of training on-the-job (Shanahan, 1983). For example, before the industrial revolution, practically everything was taught by apprenticeships: growing crops, running trades, and administering governments (Collins, 1991). This type of training was the most common means of learning (Collins, Brown, & Newman, 1989). Furthermore, the earliest apprenticeship system embedded the learning of knowledge and skills within a realistic working environment.

However, as society moved from a primarily agricultural era into the industrial era, some apprenticeship programs evolved into skill training while working in various
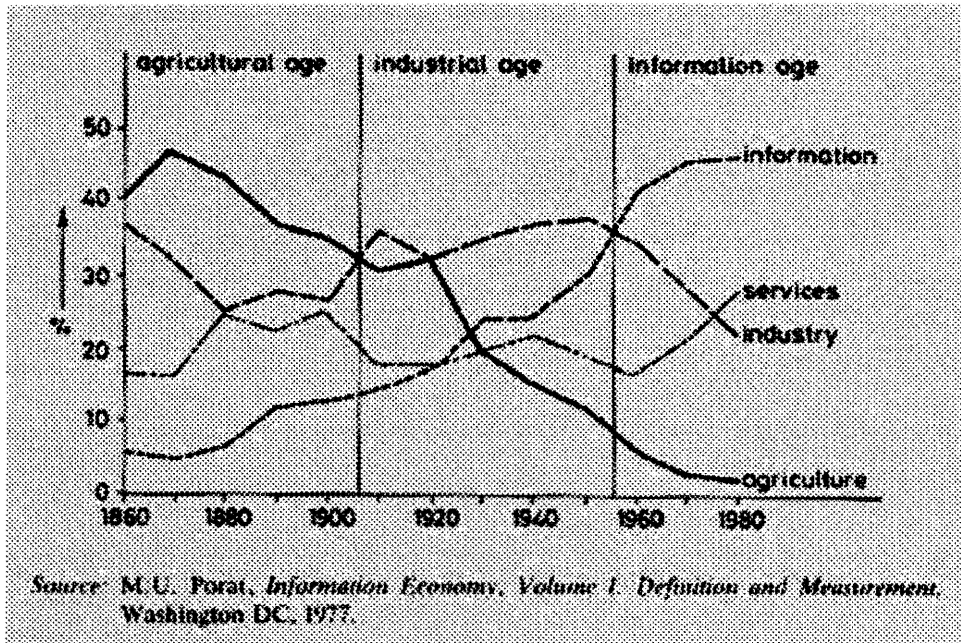
Figure 1. The Information Age

Table 1: *Historical Perspective of On-the-job Training Information Obtained From Reigeluth (1992)*

Year	Age	Society	OJT Progression	Management
1860 - 1900	Agricultural	Transportation: Horse Family Extended family Business Family Owned Education One-room school house	Apprenticeship	Self Management Craft Type Production
1910 - 1955	Industrial	Transportation: Train Family Nuclear family Business Bureaucracy Education Factory model desks placed in rows	(a combination of the following) Apprenticeship to One to One	Fred Taylor Scientific Management
1955 to Present	Information	Transportation: Plane & Car Family Diverse families Business Team Education Collaborative desks placed in groups *current model*	(a combination of the following) Apprenticeship to One to One to Group or team to Computer Mediated to Performance Support System	Deming Lewin Participatory Management Senge Learning Organizations

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industries and factories (Shanahan, 1983). In addition, OJT became more important for creating and maintaining a skilled workforce (Spenner, 1983).

The next major advancement in developing formal OJT occurred during World War II. During this era, war-related industries expanded rapidly and there was a requirement for companies to train thousands of new employees (Gold, 1981; Heinich, Molenda & Russel, 1989). Therefore, the government sought leading educators to investigate how to structure OJT to accommodate training a large number of people. Job instruction training emerged as a new systematic approach for creating OJT as a result of researchers conducting government-sponsored investigations. Job instruction training consisted of the following four steps: Prepare, Present, Try out, and Follow up (Gold, 1981). In addition, this approach to OJT encouraged the supervisor to structure OJT around "what motivates people to learn; the learner's needs; the importance of participation and feedback; and how the application of knowledge completes the learning process" (Gold, 1981, p. 29).

Furthermore, the advancements in instructional systems design were complemented by the advancements in instructional technology which Lavi (1993) defines as "a dynamic framework that utilized methodological skills for integrating learning strategies with learning tactics, methods, and media in order to facilitate efficient and effective two-way communication in the learning environment" (p. 171). Saettler (1968) argues that as a result of World War II, instructional technology came of age. This was mainly because of the following reasons:

- A large number of people needed to be quickly trained,
- Training was supported by official military policy,
- A substantial amount of funding was available.

With financial support from the National Defense Educational Act and the Ford Foundation, the "government purchased over 55,000 film projectors and produced 457

training films at a cost of over a billion dollars" (Heinich et al., 1989, p. 34). Other instructional media acquired included overhead projectors, and graphics such as charts, graphs, and posters, just to name a few. Figure 2 displays the growth of instructional technology from 1930 until 1960. This growth chart also corresponds to the progression of the information age, which was the next turning point for OJT.
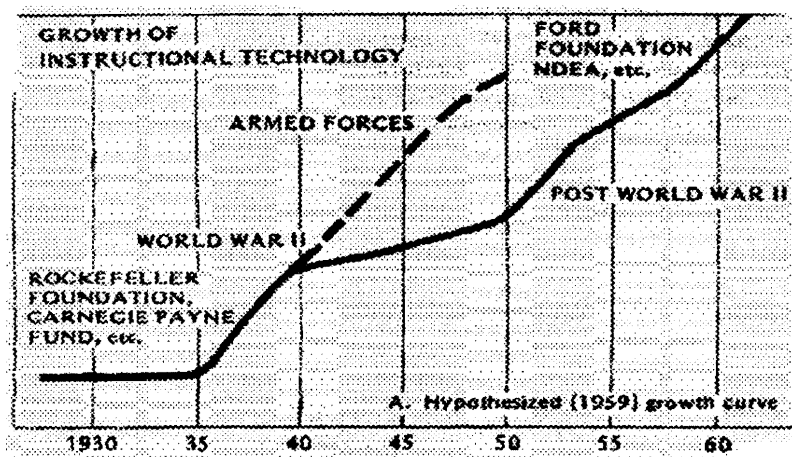
Figure 2. Growth of Instructional Technology (Finn, 1961)

Huppes (1987) argues that during the late 1950s the country entered the information age, the point at which the information sector surpassed the industry sector (see Figure 1).

Technological advancements

The introduction of microelectronics sparked technological change during the period of 1950-1976. This movement accounted for approximately 80% of the productivity growth in the United States and can also be attributed to the major technological advancements in our society (Huppes, 1987). The age of technology also brought about systematic thinking. According to Saettler (1968), around the 1960s the phrase "total systems approach" described a systematic process used to create instruction as well as software.

The instructional systems design (ISD) concept added learning theory and a systematic structure to the instructional development process. Even though some OJT developers used either the job instruction training approach or some variation of the generic five-step process (analysis, design, develop, implement, and evaluate) proposed by ISD, several OJT programs reflected a haphazardly and poorly implemented design (Sullivan & Miklas, 1985). When the 1970s ended, employees entered the new decade faced with using the computer and other technological innovations.

In fact, during the early 1980s the main focus for workplace training in companies such as insurance agencies or consulting firms was providing training on learning the functional aspects of computer hardware and software applications. For example, some companies started their own in-house training programs that included computer courses like computer literacy, including introduction to DOS, Wordstar, and Lotus. These courses focused mainly on the learning of commands in order to solve a problem, and trainers generally conducted courses on-the-job but away from the actual work site. In addition, companies began introducing computer-mediated training such as computer-based training applications designed with software programs like PLATO and QUEST. Hypermedia tools such as Hypercard, Toolbook, Authorware, and QuickTime began to emerge as computer hardware and software evolved during the late 1980s and early 1990s. Many of the development tools of the 1990s allow the developer to integrate other applications into the hypermedia environment. In fact, software application links to expert systems and to relational or multimedia databases are available to the developer of applications designed to support an employee in learning and performance.

Movement from Mainframe to Client-Server Architecture

Companies are now downsizing their computer systems. Baker (1992) reports the following:

> Early in 1991, a survey sponsored by PC Week found that 57% of the nation's largest PC sites had done one of two things: either they had shifted applications from mainframes or minis to LANs within the previous 18 months, or they planned to do so within the next 18 months. The survey covered more than 200 corporations, institutions, and government agencies, each having at least 250 PCs (p. 3).

Computer downsizing, which is the process of converting strategic applications from a mainframe environment to a local area networked environment is one of several trends associated with organizational changes that have brought computing onto the employee's desktop (Baker, 1992). Corporations are looking towards information technology as a means to support the organizational change processes. According to Forrester Research, by 1996 there will be only half as many applications running on mainframes as there were in 1992 (Business Week, April 25, 1994). Watterson (1995) argues that for businesses "to survive and prosper companies must build adaptive information systems that can evolve and extend quickly and cost effectively to meet changing business requirements" (p. 1).

The Changing Workplace

Today, individuals are living and working in the midst of the information era (Porat, 1977). Employers are seeking personnel who have technical and communication skills that are compatible with the company's needs or who have interest in retraining. No longer can employees believe in job security or hope that a college degree alone (without constantly upgrading their skills) will propel them in the workplace (Knowdell, Branstead, & Moravec; 1994). Continuous employment for many people, currently and in the future,

requires a commitment to accepting change and life-long learning. According to Packer (1988), "an estimated 25 million American workers will need to upgrade their skills during the 1990's if the U. S. economy is to stay competitive" (p. 2). To accommodate this demand for employee training, businesses are interested in OJT with employee support that is accessible when the employee needs the information from his or her desktop computer (Gery, 1991; Stevens & Stevens, 1994; Swan, 1990).

Organizational Change: Business Reengineering

Decision makers from government and industries began a serious reorganization effort during the late 1980s. IBM and Westinghouse laid off thousand of employees in order to "right-size" their companies for the new global labor market. Government agencies were offering early retirement plans and in some cases initiating a reduction in force. Ray and Mickelson (cited in Levitain & Shapiro, 1987) state that "the U.S. Department of Labor estimated that from 1980 to 1985, 11 million workers lost their jobs through plant closing and massive layoffs" (p. 8). Knowdell, Branstead, and Moravec (1994) states that "A 1991 survey of the 4,500 largest companies in the United States, conducted by Fortune magazine and the Wyatt Company consulting firm, revealed that 86 percent of these organizations had downsized in the previous five years and most of them expected to have to do it again" (p. 3). Nasbitt and Aburdene (1985) argue that the structure of most organizations in the future will be much flatter and less hierarchical in their organizational structure. In addition, the nature of management will change from a direct supervisory role to a participatory management style where the supervisor is an information provider, coach, and coordinator (Kearsley, 1990). Brethower and Springer (1992) argue that these changes have tended to shift the daily control of decision making from upper management to the front-line workers. With these changes occurring in

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organizations, some decision makers are becoming more receptive to finding new ways to assist the employees in "doing more with less."

According to Hammer and Champy (1993) redefining the organizational structure will only provide part of the solution. More specifically, they argue that problems facing companies also stem from needing new work process structures. A business process, as defined by Hammer and Champy (1993), is a collection of activities that takes one or more kinds of input and creates an output that is of value to the customer. Hammer and Champy (1993) compare changing the organizational structure without changing the business processes to the process of pouring soured wine into new bottles. In essence if the business processes are ineffective, no matter how you reorganize, inefficiency will be present. Davenport and Stoddard (1994) argue that overall concepts found in business reengineering are not new. What is new, according to Davenport and Stoddard (1994), is how following the five primary concepts that make up reengineering are combined in a new synthesis. The concepts are as follows:

1. A clean slate or "starting over" approach to organizational design and change.

2. An orientation to broad, cross-functional business processes, or how work is done.

3. Identifying the need for, and possibility of, radical change in process performance.

4. Using information technology as an enabler for changing how work is done.

5. Recognizing that changes in organizational and human arrangements accompany changes in technology.

Business reengineering is the process of undergoing the radical change of a company's business processes in order to achieve dramatic performance improvements (Hammer & Champy, 1993). In addition, Chang (1994) argues that reengineering focuses on achieving massive improvement by radically redesigning the way a process operates without regard to how things were done previously. This method of organizational change

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significantly affects the worker and the nature of how work is completed within the organization.

The Nature of Work and the Worker in the Future

As a result of the information age and the introduction of technological inventions, jobs are becoming more specialized and dynamic. According to Brethower and Springer (1992), "the skills and abilities required for these new kinds of jobs are intellectually and emotionally much more complex and much more dependent on internal motivation and resourcefulness than the older kinds of jobs" (p. 716).

Decision makers are competing in local as well as global markets (Bailey, 1990), while employees are competing in a job market where success is tied to how well they are supported to access, retrieve, and manipulate digital information in a timely manner. Furthermore, Milheim (1992) argues that the complexity of many jobs today requires employees to train in several different content areas with overlapping job responsibilities. Brandenburg and Binder (1992) argue that because jobs will require constant adaptation to new information and task requirements, the worker of the 1990s will increasingly participate with training solutions that integrate directly (in real time) with the employee's work tasks. In addition, Brandenburg and Binder's (1992) report the results of an Internal Revenue Service (IRS) study that looked at the future training needs of IRS auditors. A survey of managers' expectations of work environments in the future provided these results:

- There will be a one-to-one correspondence of workstations to employees which will allow employees immediate access to answers on technical or procedural questions, to taxpayer's account information or to documentation.

- The location where a person works and temporal concerns on how to structure the work day will be more flexible for the worker.

- Most employees will have their workstations connected to a network of data as well as have access to expert systems. These applications will enable the employee to organize and display only the information that is relevant to the worker in order to solve immediate problems. As a result of employees using these applications, management hopes that employees will be more efficient and productive (p.130).

In order to accommodate the demands placed upon the employee of the 1990s, decision makers are investigating new ways to provide OJT and employee support. Hammer and Champy (1993) argue that employees can be supported in improving their productivity by completing complex tasks when they are supported by an easy-to-use computer system that provides access to all the data and tools these specialists will use.

Salomon, Perkins, and Globerson (1991) describe technologies that either replace or require partnership with human cognition as intelligent technologies. Because a performance support system can undertake the cognitive processing of simple mundane or routine tasks for an employee, they fit Salomon et al.'s definition of an intelligent tool. In analyzing an employee's intellectual partnership with automation, Salomon et al. (1991) suggest that the employee will work "smarter" as a result of using these tools. However, Clark (1992) argues that continuous reliance on intelligent tools such as a performance support system has the potential to de-skill the employee. Swan (1990) argues that the proportion of worker duties supported by the performance tool may be related to the de-skilling of workers. Some researchers argue that allowing an intelligent tool to automate routine tasks is good so that the worker can concentrate on more sophisticated problems or solutions. A. Cohen (personal communications, October 20, 1994) argues that is not necessarily what the tool does for the employee; rather, it is how the tool is used in the workplace by decision makers.

Since the introduction of the pencil and writing, critical thinkers have asked the question-- does the introduction of new technology raise or lower the worker's skills?

According to Rosenberg (1992), there are three views emerging on the deskilling of workers:

- Technological change leads to the upgrading of skills, making for better jobs but also requiring more training or education, so that less-skilled people may have trouble finding jobs;

- Or, on the contrary, that advanced technology deskills jobs, making them narrower, more repetitious and perfunctory, and leaving workers as nothing but machine-tenders at relatively low pay;

- Technological changes increase the quality and number of some higher level jobs while eliminating or downgrading middle-level positions, thus creating a skills gap between lower and higher level jobs (p. 245).

Rosenberg (1992) also cites a 1987 study, which was conducted and published by the Panel on Technology and Employment. These researchers conducted a comprehensive review of the literature to evaluate the impact of technological change on employment opportunities, productivity, and the quality of work life. Basic skills, as described by the study, are skills which workers have generally acquired before entering the labor force versus job-related skills, which are typically provided by the employer and required for the worker to perform the job. The Panel on Technology and Employment found that over the last 50 years, studies on the deskilling of workers are surprisingly inconclusive (Rosenberg, 1992). Some results of the study are as follows:

- Flynn (cited in Rosenberg, 1992) reported that process innovations in skill-intensive manufacturing processes often eliminated high-skill jobs and generated low-skill jobs. The opposite was true, however, for the adoption of data and word-processing technologies in offices, which eliminated low-skill jobs and created high-skill jobs. (Rosenberg, 1992, pp. 245-246).

In addition, according to Spenner (1985), there is no evidence to support claims of significant upgrading or down-grading in aggregate skill requirements as a result of technological change. In creating new applications with emerging technology, developers must not lose sight of how the technology relates to social aspects of the organization.

Many software developers are recognizing a need for a more holistic view of technology that takes into account not only the new ways of applying science to solve a practical problem but also the potential impact of the solution on the employees as well as on the organization.

As a result of the changes in society, technological changes and organizational changes, the workplace environment is ready to investigate, develop and implement technological innovations designed to assist the employee in increasing his or her productivity.

Conceptual Underpinnings

<u>Performance support defined</u>

Gery (1991) formally introduced the idea of electronic performance support when she wrote the book *Electronic Performance Support Systems*. This book paved the way for instructional designers and information systems developers to investigate new strategies for implementing OJT and employee support in the workplace. In addition, many instructional and software developers believe that performance support may be the spark for OJT reform (Bentley, 1990; Carr, 1992a; Collis & Verwijs, 1995; Davis, 1995; Gery, 1991; Gustafson, Jury, Laffey, & Reeves, 1994; Scales & Yang, 1993; Stevens & Stevens, 1994; Tynan, 1993; Witt & Wager, 1994).

Performance support is a concept that uses technologies for assisting employees in performing their jobs. According to Milheim (1992), a performance support system (PSS) is a recent innovation in instructional technology. Puterbaugh, Rosenberg, and Sofman (1989), argue that software designed to improve worker productivity by providing immediate, user-controlled access to integrated information, learning opportunities, and expert help can describe a PSS. In addition, Raybould (1990) argues that a PSS can help solve problems surrounding employees' managing and accessing increasing amounts of digital information. More specifically, Raybould (cited in Milheim, 1992) identifies

specific problems related to employee access to information within an organization. Several of the problem areas are:

- accessing only the information required to complete the task without being overloaded by non-relevant data;

- determining how to quickly find answers to specific questions;

- ensuring that users are accessing the most up-to-date information;

- allowing for different knowledge levels within users; and

- acquiring knowledge when needed, rather than in pre-scheduled training sessions (Milheim, 1992, p. 45).

Early attempts to describe and define performance support were provided by Gery (1991), Raybould (1990), and Puterbaugh et al. (1989). According to Gery (1991), the goal of a performance support system is "to provide whatever is necessary to generate performance and learning at the moment of need" (p. 34). In addition, developers of performance support systems such as Raybould (1990) argue that a performance support system is a computer-based system that improves worker productivity by providing on-the-job access to integrated information advice and learning experiences. Puterbaugh et. al (1989), view a performance support system as software designed to improve worker productivity by providing immediate, user-controlled access to integrated information, learning opportunities, and expert help.

However, the literature is moving from viewing a basic performance support system as a set of components consisting of a combination of certain features - the advisor (expert system), the instruction (computer-based training), and the information base (Carr, 1992b; Geber, 1991; Gery, 1991; Ladd, 1993; Raybould, 1990) - towards a broader view which attempts to identify the attributes, characteristics and principles associated with a performance support system design (Barker & Banerji, 1995; Bezanson, 1995; Gery, 1995a, 1995b; McGraw, 1995a; 1995b; Raybould, 1995a).

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Some advocates of performance support systems such as Mader (cited in McGraw, 1994) are also moving away from describing these systems with a detailed description of performance support components. Mader describes performance support as information, software guidance, and tools available at the time of need to provide comprehensive and continuous support for a given task or group of tasks. In addition Raybould (1995a) has expanded his view of performance support systems to encompass a broader, holistic system view. Raybould (1995a) defines a performance support system as follows:

> An electronic performance support system is the electronic infrastructure that captures, stores and distributes individual and corporate knowledge assets throughout an organization, to enable an individual to achieve a required level of performance in the fastest possible time and with the minimum of support from other people (p. 66).

Gery (1995b) has moved towards viewing electronic performance support in terms of good information system design. DiCarlo (1994), Gery (1995b), Hanssen and Katz (1995), and McGraw (1995a) advocate a performance-centered design approach for developing systems that support the user in his or her job performance. The goals of a performance-centered design as described by Gery (1995b) are to:

- Enable rapid, consistent and high level performance by all;
- Institutionalize the company's best practice;
- Foster a holistic computer-mediated work environment: integrate existing resources;
- Decrease development, training implementation and support costs;
- Make it impossible to do things wrong (p. 155).

According to Raybould (1995b), a performance-centered design approach merges design principles from performance support concepts and from user-centered design concepts. For the purpose of this study, a performance support system will be defined as a computer-

based system that improves worker productivity by providing comprehensive and continuous support for a given task or group of tasks through information, software guidance, and tools available at the employee's time of need.

This movement towards consistency on what constitutes a performance support system is a step in the right direction, but there is still a great deal of inconsistency on the names for these systems. Appendix A contains a list of the names to date for systems related to the performance support concept.

Examples of Performance Support Systems Developed at The Company

Leaders in the field continue to distinguish between a performance support systems and performance support tools. According to IRB Consulting (1995), who conducted survey research with leading companies on the status of implementing performance support systems, the main distinction between performance support tools and performance support systems is the degree of integration and scale.

A senior manager working for The Company describes the difference between performance support system and a performance support tool as follows:

A performance support system is a cohesive set of tools which enables, facilitates, and induces mastery-level performance, thus providing the means even for novices to perform a task competently with little or no prior training. Whereas performance support tools are smaller in scale and .. generally focus on a task versus a whole job". [More specifically he states] .. The [performance support] tool generally stands alone in software. It's not linked to large transactional mainstream business systems... There is also an order of magnitude difference in the resources necessary to create the performance support tool ... One to three, or four people involved in some capacity developing a tool over

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three to five months, let's say versus a performance support system which involves a seemingly cast of thousands, the whole Information Technology project resources behind it.. with lots and lots of disciplines involved, potentially over a period of years.

The characteristics of a performance support tool will typically exhibit features which would include context-sensitive, "just-enough" access to information, advice, and training. Ideally, but not necessarily, such features would be highly integrated within the workflow.

The Company developed a performance support tool called The Management Guide. Since managers did not complete management plans on a regular basis the performance support tool provided the managers with a computer application, which fundamental features included a coach, computer based training modules and templates to assist the manager in the decision-making and the business planning process. To complete the management plan, the manager did not require any prior training. The outcome from using the performance support tool was a nicely formatted document that explains the business plan for an organization.

An example of a performance support system at The Company was found in the Customer Service Center. The reasons for embarking on this project were to:

- Create a single point of focus for customers for all retirement-oriented products;
- Separate customer service from "data processing;
- Retain assets through increased customer service representative competency;
- Develop lifetime relationships with customers (Internal Document, 1995).

It was documented that this performance support system was very effective in supporting the employee. In addition the system was designed with an innovative graphical user interface; on-line reference, and customer profiles that worked very well together.

Gery (1991) provided ten examples of PSSs that illustrated performance solutions for a wide range of companies and situations. However, in describing any of the three types of electronic performance support, there are two major areas to consider: the content and the components of the system. To identify the contents of a PSS, Gery (1991) uses the term "infobase," which is the collection of information the employee will inquire against, access, or have presented to him or her when the learner accesses the PSS. For example, the information located in a text relational database, multimedia database, expert system or on-line reference is the type of data the employee could select from an infobase.

Specific component configurations are not mandatory for every PSS. The design of a PSS can include any configuration that is useful to someone trying to learn or perform (Gery, 1991). More recently, Gery (1995a, 1995b) has acknowledged that the component view of describing a PSS presented by the pioneers of the performance support concept was narrow. More specifically, she states:

> Recently, thinking has expanded to distinguish between types of support- and on defining and describing the attributes and behavior of performance centered systems [or PSS]. The underlying assumptions are that work is becoming increasingly computer-mediated in whole or in part; and that most resources will eventually be digitized and delivered electronically. These characteristics apply equally to both large and small scale applications and productivity tools and across types of tasks and constituencies. The language provides a basis for communication that is neutral across disciplines. In other words, it does not emphasize prior structures, such as instruction, documentation or interface, but rather it describes characteristics (p. 71).

According to Gery (1991), DiCarlo (1994), and Milheim (1992), some of the characteristics found in a PSS are as follows:

- A holistic computer-mediated work environment integrates currently independent resources: knowledge, tools, data and task structuring support,
- The system institutionalizes best practice procedures of an organization,
- The system provides access to the most up-to-date information,
- The system may provide different levels of knowledge within the target audience,
- The system seamlessly integrates resources through an easy-to-use interface and an interface designed as primary support for work,
- The system makes it impossible to do things wrong.

However, some developers are struggling with how to combine the conceptual aspects and system architecture aspects of a PSS to develop a well-designed system.

According to Yeh (1993), since the introduction of the training Test Consultant in 1989 by Richard Horn and his associates at Comware Inc., which is located in Cincinnati Ohio (Gery, 1991), the electronic performance support concept has captured the interest of many training professionals and organizations involved in large-scale training programs. Generally, the business case (Brusca & Campbell, 1995; Raybould, 1995a) used to support the development of a PSS embodies the following guidelines as describe by Carr (1992b):

- Skilled performers must spend significant amounts of time helping and correcting unskilled performers.
- A large amount of documentation exists, requiring employees to conduct extensive searches in order to find the right information.
- New workers must begin to perform effectively and training is either impractical or unavailable.

- Individual technicians, specialists, managers, or their performers need to be guided through a complex process.

- Teams of technicians, specialists, managers, or other performers need to be guided through a complex process. This is a level of magnitude more difficult than providing the same support to an individual (p. 37).

The underlying concepts for performance support are two-fold: first, to assist employees in performing better (performance technology), and second, to provide access to on-demand learning (instructional technology).

Regalbuto (1993) has identified performance technology as a "diagnostic or 'analytical' first step in the task of improving human performance on-the-job" (p. 30.5). A performance technologist differs from an instructional technologist in that his or her primary objective is to analyze and improve human performance in the workplace. On the other hand, an instructional technologist is mainly concerned with training problems related to skills and knowledge deficits. Since a performance support system may be designed with computer based training modules, where performance technology begins and instructional technology ends is a line that has been blurred.

Traditionally, performance technology is seen as the diagnosis of the causes of performance discrepancies; once these causes are identified, they are referred to an appropriate specialist(s) for resolution. The field of performance technology grew out of instructional technology (Regalbuto, 1993). Designers of instructional interventions discovered early on that many times the solution to a problem is not necessarily training but other types of interventions such as job redesign or worker motivation. Performance technology is evolving as a broad field which utilizes the system approach (analyze, design, develop, implement, and evaluate) to solve problems in the work place. When a performance technologist investigates problems in the workplace, training may be one type of intervention suggested.

Performance and Instructional Technology

To describe the relationship between performance technology and instructional technology, instructional technology is usually viewed as a subset of performance technology; that is, an instructional technology solution is one type of intervention that could be recommended as a way to solve a performance problem (Regalbuto, 1993; Thiagarajan, 1990). Regalbuto (1993) has identified the subcategories of differences between performance and instructional technologies (see Table 2).

Table 2: Subcategories of Differences Between Performance and Instructional Technologies *(Regalbuto, 1993, p. 30.2)*

Performance Technology	Instructional Technology
Focus on performance	Focus on skill and knowledge deficits
Focus on performance within a system or organizational influences	Focus on duties and tasks within the skill and knowledge deficit area
Focus on multiple sources of performance discrepancies	Focus on a single cause: lack of skill or knowledge

The development of a performance support system requires the developer to be familiar with performance technology, instructional technology and system development. Job aids such as checklists, flowcharts and decision tables are performance technology interventions used by the employees during the actual performance of their jobs. In addition, providing the employee with computer-based job aids, reference manuals, advice, and instruction at the specific moment of need may have a significant impact on work design and organizational structures (Rosenberg, Coscarelli, & Hutchison, 1992). Performance support systems as they relate to employee performance can be described as follows:

- Job performance is supported by a performance support system;

- The employee is measured on his or her competence in job task performance;

- The employee receives immediate feedback on job performance;

- The employee can quickly find answers to specific task-related questions;

- The employee can minimize the time spent away from work acquiring job information, skills and knowledge (DiCarlo & Cichelli, 1994).

The roots of performance and instructional technology evolved from behaviorism (Stolovitch & Keeps, 1992). Many of the pioneers in these fields point to B. F. Skinner's work in programmed instruction and to that of others from behavioral psychology as being a significant contribution to the systematic process found in performance technology and instructional technology (Stolovitch & Keeps, 1992). Bagdonis (1992) suggests that "Skinner provided the theoretical basis for development of procedural instruction and later for additional developments in the areas of computer-assisted instruction (CAI) and artificial intelligence (AI)" (p. 11).

Bagdonis (1992) further argues that task analysis, which is an initial step in performance analysis, is an important outcome from the behavioral frame of reference. In addition, task analysis has become a fundamental aspect of performance technology and instructional design projects (Rosenberg, Coscarelli, & Hutchison, 1992). According to Freda and Loolioan (1975), task analysis is "the systematic procedure of collecting, recording and analyzing data concerning what employees do when performing a single task or group of tasks [for a job or job function]" (p. 22). Task analysis is an initial step in systematic development for performance enhancement.

Currently employees may use a variety of informal methods, such as systematic problem solving, experimentation, and coaching from experienced employees, to learn on-the-job. According to Delaney (1993), "the fundamental reason a business wants its people to learn things is so they can perform, so the *company* can perform. No matter what

instruction takes place, no matter how elegantly it is carried out, instruction is done ultimately so employees can learn and thus perform" (p. 31.3).

Instructional technology is defined in the human resource development (HRD) field as "determining the activities in which employees or members of an organization must be engaged in order to develop on the job or in their activities" (Dickelman, 1993 p. 18.5). These activities may include tutorials and exercises related to many aspects of employee development as well as OJT and support. According to Dickelman (1993), the future of many new computer-based HRD systems will emerge from new developments within instruction. He further identifies increased usage in the following software systems and techniques:

- Electronic performance support systems and tools

- Hypertext and hypermedia systems

- Expert systems (Dickelman, 1993, p. 18.7).

Problems Associated with Traditional On-the-Job-Training

Whether for traditional OJT or computer mediated training, corporations have invested a great deal of money in in-house training programs. Davis (1995) states that "most of these educational programs were (and are) based on an information management structure, using technology to present information to individuals, followed by interaction through questions, answers, scenarios and tests (p. 31)". Some of the disadvantages found with unstructured OJT methods are:

- the preparation of trainers on how to provide OJT is inadequate;

- the senior employee lacks motivation for training;

- it's difficult to provide consistent information dissemination to the trainees;

- there is not enough time for the senior employee to train properly;

- the employee does not receive the training at the most appropriate time.

- the reduction in many training budgets is forcing corporations to investigate how to reduce the cost and time associated with training (IRB Consulting, 1995).

Rothwell and Kazanas (1990) conducted a research study on how informal learning takes place in the workplace. A survey questionnaire was distributed to 500 members of the American Society for Training and Development with questions focused on OJT and learning in the workplace. The researchers found that the majority of employees learned by advice provided by co-workers as well as by experience. In addition, Rothwell and Kazanas (1990) identified "methods that can improve the efficiency and effectiveness of OJT and methods that can improve a worker's ability to learn how to learn through informal on-the-job methods" (p. 35), as areas for future research. Watson's report (cited in Rothwell & Kazanas, 1990) states that "95 percent of all training, education and development occurs on the job and is largely informal in nature" (p. 35).

One of the major problems arising with traditional methods of OJT is that the complexity of many jobs makes traditional OJT impractical. Employees many times require additional support after training or they need to be productive immediately without extensive training. Furthermore, according to Swan (1990), "the volume and complexity of the information [today] make it highly unlikely that information and skills could be learned and stored so that back on the job, the 'trained' employee could recall the information or perform the skill when it was needed" (p. 4).

On-The-Job-Training and Productivity Improvement

Job training and employee support are areas that some managers recognize as ways to improve productivity (Davis, 1995; Swan, 1990). Currently, employees may receive their formal training off-the-job in instructor-led courses or by computer-mediated training (interactive video, computer-based training, or a combination of both). However, when employees return to their jobs, additional training may consist of human interaction, non-

centralized reference manuals, or company documentation. Problems arise when employees need specialized training but none is available until several weeks or months later. Problems also result when employees return to their job assignments and need specific support but receive either too much information, conflicting information or no information at all (Brechlin & Rossett, 1991). This type of employee support can be frustrating, non-productive and costly. Puterbaugh et al. (1989) argue that the estimated cost of informal learning methods, such as peer questioning, accessing manuals, or trying trial and error, have significantly exceeded the amount spent on formal training programs. Employers can no longer ignore training and user support as a method of increasing productivity. Decision makers are slowly realizing that reforming OJT and user support are factors in maximizing the productivity of their work force.

Technological advances in computer technology, instructional technology, and software development provide the foundation for developing OJT and employee support that are available from an employee's desktop computer. Decision makers are entertaining the idea of investing in PSSs (Bezanson, 1995; Gery, 1991; Miller, 1995; Stevens, 1989). In addition, with the introduction and advancements of tools such as relational and multimedia databases, computer-based training, expert systems, and on-line references, the foundation for developing PSSs is in place. Furthermore, Davis (1995) argues that the business world is moving from information presentation-based technology systems to systems that work with employees on-the-job when they need assistance.

Evolving System Development Life-Cycle Models

Incorporating principles of performance support into a systems development model is the result of evolving system development methodologies. The fundamental ideas of performance support are not new. Employees have been using OJT, job aids, help systems (whether electronic or manual) and advisors (the experienced employees) for years. The

major difference is that these solutions were primarily created either ancillary to or after the development of the information system, whereas performance support principles require those types of solutions to be developed in conjunction with the information system.

Traditional System Development Life-cycle Models

Various types of system development life-cycle (SDLC) models exist today. However, Royce (1970) argues that analysis and coding are the two essential steps common to all computer program developments regardless of size or complexity. More specifically, he states:

> This sort of very simple implementation concept is in fact all that is required
>
> if the [software development] effort is sufficiently small and if the final
>
> product is to be operated by those who built it -- as is typically done with
>
> computer programs for internal use. It is also the kind of development
>
> effort for which most customers are happy to pay, since both steps involve
>
> genuinely creative work which directly contributes to the usefulness of the
>
> final product (p. 1).

Since the Stagewise SDLC model appeared in the late 1950s and was adapted in 1970 when Winston Royce presented the Waterfall model (Royce, 1970), many SDLC models are in use today. Researchers such as Alexander and Davis (1995) and Berry (1994) acknowledge that the literature is full of different types of software process models. Furthermore, Trimby and Gentry (1987) argue that "the basic reasons for this [the proliferation of models] seem to be the same reasons why new models continue to be created--each person sees her or his situation as just enough different from other situations, or the desired emphasis as just enough different, that it seems to be necessary to revise or adapt an existing model, or to create a new one, to fit those situations and emphases" (p. 5). Furthermore, according to McDonald, Riddle, and Youngblut (1991), once models are

created they naturally evolve. Rubinstein (1975) argues that when models evolve "a new understanding is gained, with old models giving way to new ones that are more useful and productive in achieving the purpose for which they were constructed in the first place" (p. 196).

As a result of this evolution, several software process models are similar in their general features, characteristics, and approach. Also several SDLC models subscribe to a collaborative team approach to produce the information system however the team strategy is not traditionally apart of the model.

Models Defined

Rubinstein (1975) defines a model as an "abstract description of the real world; it is a simple representation of more complex forms, processes, and functions of physical phenomena or ideas" (p. 193). In addition, Silver (cited in AECT, 1977) describes a model as a "graphic analog representing a real-life situation either as it is or as it should be" (p. 168). Thus a model can be useful if it can realistically convey the process it is modeling.

Models are created for a variety of reasons. Rubinstein (1975) argues that people develop models in order to "facilitate understanding and enhance prediction" (p. 193). Finch and Crunkilton (1979) argue that a model developer assesses a model's usefulness depending upon how well the model communicates what is happening in the real world.

Problems with using Traditional Models

During the development of a PSS, project managers are recognizing that traditional SDLC models, such as the "Waterfall" or "Rapid-Prototyping" model, are not solely appropriate (Gery, 1995b; Schoenmaker, 1993; Witt & Wager, 1994). A new model that incorporates a combination of the rapid-prototyping model approach with other SDLC

models may be a step in the right direction (V. DiCarlo, personal communication, October 12, 1994). On the other hand, McGraw (1994) argues that developing a PSS requires a rapid prototyping methodology, with multiple iterations because of the increasing complexity of many systems.

According to Raybould (1995a), the development of a PSS is challenging because now the development team must include not only programmers, but a multidisciplined team that consists of instructional designers, human computer interface designers and organizational change agents, each with his or her own perspective on software development. McGraw (1994) also identified keeping a diverse team working together well as part of the challenge for developing a PSS. She also states the following:

> Each group [that comprises the PSS development team] understands and is experienced with a slightly different development methodology, specialized vocabulary, and tools. Additionally, the politics of which department or functional group "owns" PSS projects is often debatable because their development requires multiple disciplines (McGraw, 1994, p. 24).

Sommerville (1992) argues that, during the 1960s, software project managers began using various software process models as a means of making the development process more visible. A software process model is a term that describes the steps or processes software developers use to create software applications, according to Sommerville (1992). For the purposes of this study, I will modify Wileden & Dowson's (1986) software process definition and define a software process model as a purely descriptive representation of the entire system development process, which is also sometimes called a system development life-cycle (SDLC). In short, the system development process looks at the creation of the entire system and does not focus solely on the development of the code.

Developers of software applications use various SDLC models in an attempt to create cost-effective, maintainable, and usable software; according to Sommerville (1992), these models are useful for planning and reporting the system development process to management. Researchers and developers of software do realize that various models are only appropriate for some classes of software systems and are not a guarantee for creating cost-efficient and usable systems (Gunton, 1990; Sommerville, 1992). These conventional models presuppose that "a project has clear and stable objectives; that these objectives can readily be translated into a design system, appropriate for the planned computer equipment" Gunton, 1990, p. 228). Not all design projects fit into the conventional SDLC model. When designing information systems today, it is difficult to acquire stable requirements for the system development project.

Four major problems with traditional SDLC as they relate to the development of PSSs have surfaced in the literature. They are described below.

1. Traditional models do not address training and user support during the early stages of design. Historically the development of training and employee support documentation has not been an integrated component of the system development process. In the context of system development, there are two types of training: training on the functionality of the system and training for performing job related tasks with the system. Information system designers are looking towards the field of Human Computer Interface to reduce training on the functionality of the system and towards electronic performance support to increase job performance.

Whether the training is for functionality of the system itself or for performance of tasks, traditional published models generally do not address training and user support during the early stages of design. Howell (1992) provides a summary of six methods used for general software development projects. Of these six techniques, none addresses training and support as a component of the development process. Generally, once the

system has been fully developed, developers begin producing the training and user support documentation. Ledgard (1987) does suggest developing the user manual during the initial stages of software development and displays the process as a visual component of a prototype software development model. However, a training component is not a part of the model. Brusca and Campbell (1995) describe a case study about a performance support project that was initiated as a result of a business reengineering project. One of the lessons learned as a result of this project was to incorporate the performance support team at the beginning of the project. Because the team was formed late in this system methodology cycle, many of the recommended solutions by the performance support team could not be incorporated into the system. Consequently, Brusca and Campbell (1995) urge, "make sure you include performance support as part of the initial [development] effort" (p. 185).

2. Traditional models do not address how to integrate currently independent resources such as knowledge, tools, data, and task structuring support. Advances in computer hardware and software technology have made it possible to integrate embedded training and employee support within the software development process before the completion of the project. With this trend, designers of software cannot wait until the completion of the project to determine how to provide user support. Furthermore, a PSS development project is the perfect environment to promote a SDLC model that reflects the integration of systems such as a fully functional database or an expert system. Raimy (1994) argues that a PSS is not one type of technology but a combination of many types. For example, a PSS design could include an expert system, integrated database, or several computer-based training modules. When integrated systems are being created, Raimy (1994) says "the trick [to developing a PSS] is to orchestrate the pieces so that they form a seamless whole, with every one [of the individual technologies] instantly available at the employee's computer workstation" (p. 26). The challenge for a project manager is having

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access to a model or blueprint that guides him or her through the process of developing an integrated system such as a PSS.

3. The role of the performer and project team members needs clarification and identification. During the early years of the data-processing era, users played a passive or sometimes non-existent role in the process of designing and developing applications (Gunton, 1990). Today there are more design techniques that incorporate the user throughout the design process. For example, participatory design views the user as an active participant in the design process. More important, participant-design methods such as Effective Technical and Human Implementation of Computer-based Systems (ETHICS) are based on a socio-technical view of software development. The fundamental driving forces behind ETHICS is that "for a system to be effective, the technology must fit closely with social and organizational factors" (Gunton, 1990, p. 226). Also, participants are involved with the design and development of systems through human-computer-interface design methodologies.

The strength of these models is that they do get the users deeply involved in the process of designing the system and according Mumford (cited in Gunton 1990), the developer of the ETHICS model, involving the user works best where users have the freedom to redesign their own work system. On the other hand, the limitations of these models are that designing and developing systems is always a time-consuming process, and convincing management that the cost and disruption of diverting staff from their normal jobs is worthwhile is always a challenge.

According to Puterbaugh et al. (1989), PSS models will require expertise and a collaborative relationship from diverse organizations throughout a company. These relationships will include not only the information systems group, but the training and documentation organizations as well.

4. The metrics for a successful system is data-driven instead of user-performance driven. Traditionally the success of an information system surrounded measurements that did not include how well the user was able to perform as a result of using the system. According to Gery (1995b) the traditional definition of success of a business information system is the following:

- Bug free code,

- Satisfaction of expressed requirements,

- On-time and On-cost Delivery,

- Operational performance,

- Conformity to standards,

- Architectural compatibility.

In addition, information technology departments many times have had no accountability for implementation resources required, utilization, job performance results, or the impact of the system on the business (Gery, 1995b). Dickelman (1995) argues that new measures of success are required for the usefulness of information systems.

In contrast to these problematic assumptions, performance centered design is a concept that views user interface design in relationship to performance development and is seen as primarily to support work, thinking and user interaction in a holistic way (Gery, 1995b).

System Development Models Incorporate Performance-Centered Design Principles

Human computer interaction is concerned with what happens when a person and a computer system come together to perform tasks (Hartson & Hicks, 1993). Approaching user interface development from a user and task view instead of the programmer's view, where software is the primary focus, should result in higher usability of the system. According to McGraw (1995b), interface design is very challenging because of the

inherent, unavoidable conflict: what is best for a user is rarely easiest for a programmer . McGraw (1995a) further argues that not only is the design of the user interface important, but also the design should reflect how users can efficiently operate the human-computer interface to perform their jobs. McGraw (1995a) states that "performer-centric interface design requires the designer to go beyond the user's characteristics and the requirements users can verbalize. It must also include a thorough analysis of the mental model and work processes being performed including goals, job functions, tasks decisions, and motivational factors. The result is a human-computer interface that helps ensure more consistent, effective performance" (p. 21). A performance-centered interface design, according to McGraw (1995a), requires that the developer identify and analyze "not only performer characteristics, but also:

- optimal work process,

- prevalent mental model(s),

- tasks and decisions required to ensure effective work process,

- objects (and their attributes, methods, and actions) with which performers work" (p. 22).

Incorporating performance centered design principles into a traditional software process model requires change. The information systems community must be open to adapting the traditional SDLC models and working in multi-discipline groups during all phases of a system's development.

Framework

Scope of the study

This study is important because of the lack of research studies investigating SDLC models as they relate to the development of systems that incorporate principles of performance support (Gery, 1991; Milheim, 1992). As a result, this study will describe and document an analysis of a business reengineering project. More specifically, the study

will focus on the Information Systems and the Performance Support teams and their efforts in trying to incorporate performance support principles into an information systems development model that was used to customize a purchased software application.

Performance support systems have been designed primarily to enable employees to increase their performance as well as learn on the job. This study will only address how the system developers intended for employees to perform as a result of incorporating electronic performance support strategies into a new software application. How employees learn while performing their jobs is important and an area for future research, however those issues will not be investigated in this study. In addition, performance support solutions that are non-computer based, although important, will not be a focus of this study.

Furthermore the results of this study are not meant to be generalized as a technique that can be applied to meet the needs of every PSS project. However, they are a starting point for investigating a framework that may be transferable to similar social contexts in order to help create a well-designed PSS. This framework will represent one option available for completing the analysis phase for the development of a PSS.

The research approach used for this study is a naturalistic case study. In addition, this study will build upon the research conducted by Yeh (1993), who created a procedural model for forecasting the cost and benefits analysis of a PSS. He stated in his dissertation that his model would "not describe, prescribe or delimit methods to design, implement or maintain human performance support systems (HPSS)" (p. 22), whereas this study will describe the analysis process for designing a PSS.

Chapter 3

Methodology

<u>Research Questions and Approach</u>

The purpose of this study was to provide a thick-description of the events that occurred during the analysis phase of a HR Business Reengineering project. In addition, analyzing the issues associated with the information systems developers incorporating principles of performance support within the system development life-cycle (SDLC) model was also the focus of this study. The main focus of my research was investigating the following question:

> What were the major issues associated with successfully
> incorporating performance support principles into a system
> development life-cycle model?

Because the focus of my study emerged late into my internship at The Company, my research approach, as briefly discussed in chapter 2, provided an analysis and interpretation on how the performance support team members from The Company incorporated performance support principles into a SDLC model. The initial research questions that guided the naturalistic case study were as follows:

- What current practices and procedures were used to create a performance support system?

- How was the system development process model used to incorporate management and user participation?

- How was the system development life-cycle model used to create a performance support system different from or the same as system development process models previously used in other projects?

Evangelist and Pellegrin (1986) argue that understanding organizational problems within the work environment is essential to any attempt to implement a new software methodology. They further state,

> "radical" methodologies, based on a new understanding of software development, will not succeed unless a credible organizational structure--isomorphic, in some sense, to the [software process] methodology- is developed and persuasively advocated. Once again, this problem is often overlooked or confused with the methodology problem (p. 18).

The perspective of Evangelist and Pellegrin (1986) led me to add the next two questions to my study.

- How familiar were system analyst and business representatives with the concepts of performance support?

- What strategies were available to influence system analysts and business representatives of the importance of incorporating performance support into the traditional SDLC?

Upon entry into the field-site, I re-focused these questions when I prepared the interview guide which can be found in Appendix C. Again, the main focus of my research was investigating the question: What are the issues associated with incorporating performance support principles into a system development life-cycle model?

Rationale for Using Ethnographic Methods for Data Collection

According to Ruberg (1994), one of the strengths of using ethnographic methods, such as participant observations and interviews, is that the researcher can draw from multiple and varied data sources to describe and analyze the problem being observed. Erlandson et al. (1993) also argue that naturalistic inquiry is dependent upon the social context of the setting. Furthermore, Hammersley and Atkinson (1983) state that "according to naturalism, in order to understand people's behavior we must use an

approach that gives us access to the meanings that guide that behavior" (p.7). Researchers in the software development field such as Evangelist and Pellegrin (1986) recognize that researching the development of software methodologies outside of the context of the real environment may prove fruitless. They further argue:

> No observer of this process [of software development] could fail to note the dichotomy between the development methodologies advocated in the research community and those used in practice. Further, it is trivial to state that even the organizations claiming to follow a particular formal method often do so inefficiently or ineffectively. The research community exacerbates the problem, in our view, by not properly emphasizing long-term research designed to clarify the fundamental issues affecting software development (p. 17).

Selection Process

Purposive sampling was the strategy used to select the field site and participants in the study. According to Patton (1990), purposive sampling is described as a method to select information-rich cases whose study will bring to light the questions under study. More specifically, I used purposive sampling strategies because I agreed with Erlandson et al. (1993), who argue that purposive sampling maximizes our ability to identify emerging themes that take into account the contextual conditions and cultural norms within the study. Random or representative sampling was not preferred because my major concern was not to generalize the findings of the study to a broad population or universe but to maximize the discovery of the various patterns and problems that occurred on the HR Business Reengineering project.

Erlandson et al. (1993) point out that the researcher must make two basic decisions in purposive sampling.

> First he or she must select who and what to study; that is, the sources that will most help to answer the basic research questions and fit the basic purpose of the study. Second, the researcher must choose who and what not to investigate; that is there must be a process of elimination in order to narrow the pool of all possible sources (p. 83).

Patton (1990) describes several strategies for purposive sampling. Of his strategies, criterion and maximum variation sampling were the most appropriate for this study. Criterion sampling, which was used to select the field site, consists of selecting cases for study based upon some pre-selected criteria. Maximum variation sampling was used to select the interviewees, documents and type of meetings I observed. According to Patton (1990), maximum variation sampling is "the strategy for purposeful sampling aimed at capturing and describing the central themes or principal outcomes that cut across a great deal of participant or program variation" (p.172).

An in-depth description of the selection process used to select the field-site, and the project I participated on will be described in Chapter 4. Table 3 describes the sampling parameters used to select the participants for the interviews as well as the events to observe.

Table 3: Sampling Parameters

Sampling Parameters	Choice
Maximum Sampling Variation	
Setting: My job assignment was to work on the business reengineering project.	The HR Business Reengineering Team Project

Individuals	**Interviewee Selection**
	
	I selected six team leaders to interview as well as various participants on the teams.
	
	Information Technology Team Members.
	Since I was interested in how the information systems team members perceived electronic performance support concepts, I chose to interview members of the team who had an information systems background.
	
	Performance Support Team Members
	In addition, I interviewed all of the members on the performance support team and held more in-depth conversations on multiple occasions with the following members of the performance support team:
	
	    Thomas: Most experienced member on the performance support team with designing systems that included principles of performance support.
	    Anthony: Most technical member on the team with a background in computer science.
	    Ella: Instructional designer with a background in information mapping and instructional design. Was the initial contact for the performance support team leader
	
	Trinity Consultants. I also interviewed two representatives from the Trinity Corporation.

Events Observed	As part of my job, I was expected to attend the performance support and process mapping meetings.
	
	Meetings
	  Weekly performance support
	  Workflow Process Mapping
	  Project Status meetings
	  Kick off meetings

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Data Collection and Analysis

Each interviewee was asked to sign an Informed Consent form that was approved by The Company's legal department. This form can be found in Appendix B. Originally I intended to use a structured interview approach to gather my data. However, that strategy was quickly modified when I found that many of the interviewees could not answer the various interview questions. For example, the performance support team members were not knowledgeable about information systems and the information systems people were not familiar with information or knowledge relating to the performance support concepts. To ensure that I captured some data I asked the interviewees to respond to more open-ended semi-structured questions.

It was very difficult for me to obtain background information on the interviewees before the interview because I left Blacksburg to arrive at the field-site on very short notice. In addition, while I was at the field site, the work responsibilities of the project required me to be as efficient as possible when asking assistance for my project. I chose to only ask the participants to set aside one hour in order for me to interview them.

Data Collection Overview

A brief overview of the data collection procedures and tools can be found in Table 4.

Table 4: Summary of the Data Collection Procedures and Tools Used for the Study
Adapted from Ruberg (1994)

Data Source	Summary
Data Collected From the Field-Site	
Official Notice of Entry to the Field-site	I was notified on **2/23/95** that I had gained official entry into "The Company".
Non-participant Observation	I began observing my first day on the job **2/27/95** when I attended the "Kick-off" meeting for the Analysis phase of the project. This meeting was audio taped.
Participant Observations	I observed a total of eleven performance support team meetings. In addition to 2 "kick off" meetings and several work flow process meetings. The information from these meetings were recorded in my field notes.
Interviews with project members • project team members • system development team members • performance support team members	I collected a total of twenty-six interviews. The interviews took place between **3/20/95 and 5/11/95**. The audio tapes were transcribed after I left the field during the months of June and July.
Document review • Historical documentation on the performance support team • Documentation describing the Business Reengineering project • E-mail messages that were sent regarding the performance support team	Documents will provide access to a written log of the PSS design history Documents were collected all during the field assignment. **2/26 - 5/12/95**
Artifacts (*almost any type of physical evidence*)	There were not any artifacts collected while I was at the field site. The electronic performance support video was obtained after I left the field site on **9/8/95**.
Member Checking	
Critical Event Flow Chart	This chart documents the events that took place before and during my internship at The Company.

Field notes

When I arrived at the field site on February 26, 1995, I felt as if I had been dropped into a foreign setting without any preparation. In addition, I felt more pressure because I knew that I had a very limited amount of time in order to collect all of my data. I can truly say it is one thing to read about conducting research and it is another to actually experience conducting it.

Since I did not know what types of data I would have access to throughout my time at the field site, I tried to keep daily field notes. However, because I generally worked at least from 7 am until 7 pm during the first month in order to quickly learn my job responsibilities, it was very difficult for me to make daily entries. I generally tried to type my field notes after my work day ended, but I found that I was more able to type detailed summary field notes on the weekend.

Each participant in the study was advised that I would assign pseudonyms in the final write-up of my study. In addition, I informed the participants that I would ensure their confidentiality to the best of my ability. Because I was not able to analyze my data until I exited the field, I chose to keep the original names of the participants on all of the data I collected and to assign pseudonyms as I wrote my study.

Data Analysis

When I left the field I realized that the data I had collected was voluminous. When I read Patton's (1990) words, "I have found no way of preparing students for the sheer massive volume of information with which they will find themselves confronted when data collection has ended (p. 379)," I could immediately identify with the statement. I was not prepared for the hundreds of pages of paper from verbatim transcripts, corporate documents, and e-mail messages. However, I was able to organize the data by first placing the transcripts in digital form in specific computer folders with an appropriate label. Other

documents in digital form were organized according to the following topics: performance support team meetings, general business reengineering information and communication messages. My field notes were filed separately; however, the descriptions mainly concerned the performance support team meetings and the interaction of the team with other members on the HR Business reengineering project.

Next I made a printed copy of all of the digital documents. This provided me with a backup of my digital data on three different media: in print form, on my Macintosh hard disk and on a floppy disk. Because the data was also in printed form, I could easily read the data and make written comments and notes about the emerging themes and patterns in the margins of the documents.

Content Analysis

Patton (1990) described the purpose of qualitative inquiry was to produce findings by making sense out of massive amounts of data, reducing the volume of information, and identifying significant patterns from the data. I began reading through my various documents: field notes, transcripts and company reports focusing on themes, patterns, and categories of analysis related to how performance support principles were incorporated within the analysis process of the systems development life-cycle model. As I read throughout the documents I highlighted interviewees' comments and made notes in the margins about their comments. As I read the transcripts, company documents, and my field notes the issues that emerged surrounded the following topics:

- Multiple realities of the performance support concept
- Diffusion of an Innovation
- Sponsorship of the project

I will address these issues directly in the Analysis and Conclusion chapters of the study.

Trustworthiness

<u>Credibility / Internal Validity</u>

According to Erlandson et al. (1993), Miles and Huberman (1994), Patton (1990), credibility for a qualitative study can by gained by prolonged engagement, persistent observation, triangulation, peer debriefing, and member checks. I have tried to provide credibility for this study by ensuring that I spent enough time in the social context. By spending eleven weeks at The Company observing various meetings and the performance support team daily, I was able to understand the way that the members of the performance support team conducted the analysis phase of the project.

Patton (1990) suggests that an important way to strengthen a study's design is through the use of triangulation which is the process of using several kinds of methods or data. According to Patton, there are four types of triangulation:

- Data Triangulation: The use of a variety of data sources in a study,

- Investigator triangulation: The use of several different researchers or evaluators,

- Theory triangulation: The use of multiple perspectives to interpret a single set of data,

- Methodological triangulation: the use of multiple methods to study a single problem.

Of the four different types of triangulation, I used data triangulation, where I combined different data from semi-structured interviews, document analysis, and observations. In addition, I used methodological triangulation by using two types of purposeful sampling: criterion and maximum variation.

Time was also allocated for peer debriefing, which according to Erlandson et al. (1993) is an opportunity for the researcher to step out of the context being studied to review perceptions, insights, and analysis with professionals unfamiliar with the study. These

individuals should have enough experience and general background of the study in order to provide feedback. Peer debriefing was conducted with several Virginia Tech doctoral candidates and colleagues working in the field of Training and Development. In addition, I utilized member checking, which Erlandson et al. (1993) describe as verifying data and interpretations with individuals from the context of the study. I conducted member checking with Thomas, Joe and Ella while I was on site and once I left the field I continued member checking with several other employees from The Company.

The resultant credible description provides an account that makes sense, seems convincing or plausible and enables a "vicarious presence" for the reader. According to Erlandson et al. (1993), this type of description is an important aspect of qualitative research.

Transferability / External Validity

The thick-description provided in this study was generated in order for observers of other contexts to make tentative judgments about the applicability of certain observations for their social contexts (Erlandson et al., 1993). In a traditional study, the researcher is obligated to ensure that findings can be generalized to the population; however, in a naturalistic study the obligation for demonstrating transferability belongs to those who would apply it to the receiving context (Guba & Lincoln, 1989).

Dependability / Reliability

According to Erlandson et al. (1993) a researcher conducting naturalistic study must be able to provide a check on the dependability of the study. A dependability audit trail is an external check of the processes used to conduct the study. In this study, my keeping a document that contained my field notes provided this check. All paper documents were logged and categorized in four large three-ring binders.

<u>Confirmablity/ Objectivity</u>

According to Erlandson et al. (1993), "The naturalistic researcher does not attempt to ensure that observations are free from contamination by the researcher but rather to trust in the 'confirmability' of the data themselves (p. 34). More specifically this means that the audit trail that was used to asses the dependability of the study can be also used to enable an external reviewer to make judgments about the interpretations, conclusions and recommendations of the study. A naturalistic study cannot be transferable to other social contexts if the credibility is lacking.

<u>Researcher's Stance</u>

By having a background in system development as well as instructional development, I was able to understand the language and terminology from both groups on the project. I worked for the Department of Defense as a computer analyst for seven years, and for four of those years I developed and implemented an on-the-job training program for the microelectronics department. During those years working as a computer analyst, I noticed that the strategies for incorporating training and user support were always presented as an afterthought for many of the programmers. However, this attitude was being challenged and was changing towards the last year of my employment with the government. In addition, my masters degree was in Human Resources Development, with a concentration on technical training. This background provided me with fundamental skills that I was able to draw from in order to fulfill my job responsibilities at the field site on the Human Resources Business Reengineering project.

I found it extremely difficult to balance my role as a researcher with my role as an employee on the project, especially since I was being paid to perform eight hours worth of work each day. However, I never felt any pressure from any of the employees to present

my findings of The Company or the project in a specific light. My role as a researcher can

be summarized in Table 5.

Table 5: The Role of the Researcher

Five Primary Dimensions used to describe the variation in approaches to research observations (Patton, 1990)	Descriptions
Role of the Researcher	My role on the project was to be a full participant on the HR Business Reengineering team. In addition, I was being paid to work on the performance support team.
Portrayal of the Researcher to Others	Before each meeting during my first week of work, I was introduced as a doctoral candidate from Va. Tech. However after the first few weeks I was no longer introduced.

By not introducing myself after the first few weeks presented a small problem for some members on the HR reengineering team.

This problem existed because sometimes there were one or two new people attending the meetings who were not familiar with me or my research.

Once this situation was pointed out to me, I made sure that I introduced myself to all new people attending the meetings. |
| **Portrayal of the Purpose of the Evaluation to Others** | A full explanation of the real purpose of my study was disclosed to everyone. |
| **Duration of the Research** | My stay at the company began February 27, 1995 and ended May 12, 1995 for a total of eleven weeks. |
| **Focus of the Observations** | When looking at the focus of my investigation being on a continuum of a narrow focus (single element or component in the program observed) to Broad focus (holistic view of the entire program and all of its element), my observations falls primarily in the middle of the continuum.

I focused my observations primary of the performance support team and the team's relationship with members on the Information Technology team. |

To prepare for my job assignment the weekend after my arrival to The Company I purchased and read two books: *Process Innovation: Reengineering Work through Information Technology* by Thomas H. Davenport and *Reengineering the Corporation* by Michael Hammer and Champy. I also read as much information about the HR Business Reengineering project. This information provide me with a starting point for understanding the terminology and the goals of the larger project.

Chapter 4

Incorporating Performance Support Principles into the HR Business Reengineering Project

This chapter will describe how information technology was used to support the reengineering outcome of the human resource organization. In addition, this description will focus on the steps and procedures used by the Performance Support team to incorporate performance support principles into the customization of a new HR information system.

Finding a Field Site

It was not an easy task finding a field site that was open to my conducting an in-depth analysis of their system development processes. I began by compiling a list of contacts involved with electronic performance support development. The initial points of contact began with six colleagues currently working with performance support systems either as systems developers or as writers about performance support. Next, peer recommendations from these colleagues provided access to additional names of individuals and companies. I contacted these companies by phone to gauge their willingness to participate in the study as well as to gather additional contacts. I followed-up with each contact by sending them a thank you letter and if the person was interested in my study, I mailed him or her a short summary of the proposal.

Of the companies recorded on the point of contact list, the final field site was chosen by using a criterion sampling strategy. According to Patton (1990), criterion sampling consists of picking all cases that meet some pre-established criteria. The field site for this study was selected based upon the following criteria:

- the company had prior experience in developing a performance support system or performance support tool;

- the company was working on a project that was using an electronic performance support design strategy;

- individuals from the companies emerged from the literature as an author on electronic performance support concepts;

- the person from the company expressed a general interest in and willingness to participate in the study during the initial conversation.

Several small consulting companies met these criteria and were interested in my study but the point of contact was not sure how much time the company could commit to my being on site- if at all. It was a very frustrating process. After five months of compiling the list of contacts, I began to receive repeat names of individuals and organizations.

This five-month process of finding a site ended when I contacted an employee of a large company. I obtained his name from the literature and he was also referred to me by a peer recommendation. To preserve the anonymity of the field-site and its employees, any names used in this study will be pseudonyms and all italicized text represents quotes from transcripts. In addition, the field-site will be referred to as The Company, and any reference to or quotes from The Company's annual reports will not be cited.

Gaining Entry to the Field-Site

Thomas was instrumental in my gaining entry to The Company and was my only real lead to a long-term field-site. Because of this situation, I had to place a tremendous amount of trust in someone I had not met. At this stage with my research, the window of opportunity for finding a field-site was closing rapidly. In essence, I had to be a "risk taker." I did not know this then but "trust" and "risk taking" were two major issues that emerged while I was at the field site.

The final arrangements for my entry were made in January when Thomas and I met on January 21, 1994 for a meeting to discuss my research. This was the first time that Thomas and I met in person and because of that I consider this meeting extremely important; it was at this meeting where our official negotiation for entry into the field-site began. During this meeting, I presented Thomas with a package that contained my research proposal, relevant articles and a one page summary of my research. He presented me with the prospect of selecting one of two projects that were related to performance support and was very positive that a "win-win" situation could be created. In addition, Thomas was confident that I could began my research in mid to late February. I was beginning to become extremely nervous when Thomas was not able to confirm my entry date to The Company by mid February. However he did send me various electronic mail on the project so that I could began reading about it. Finally, on February 23, 1994, Thomas called and said that he was able to negotiate my entry to The Company for eleven weeks as a paid intern. In addition, Thomas told me that I could start working for The Company as early as the following Monday. The only things I knew, at that time, about my specific role and responsibilities on the project were the following:

1. I was hired to investigate performance support solutions for a major project in the Human Resources (HR) department.

2. I would be living and working at the Corporate Education Center.

3. There would not be a problem for me to audio tape meetings and interview team members for use in my study.

Furthermore, I was told by Thomas that once I arrived at the Corporate Education Center, I would receive further instructions. These instructions and some reading material, for the meeting on the afternoon of my first day, would be left for me at the Corporate Education Center's hotel front desk. As I began to focus more on the specifics of my study, I was extremely concerned with whether or not I would be able to complete my

research with the data collected from the field-site. Again, my main research focus was on the aspects of how performance support concepts were incorporated into the traditional system development life-cycle model (SDLC).

After I arrived at The Company, that night I read the documents Thomas provided me with. These documents described a summary of the HR Business Reengineering project. Next, I sketched out a tentative organizational plan for my research. Before I started collecting data, I knew I needed a better understanding of the political environment, organizational culture, and social aspects of The Company. So, I made the following notes or reminders to myself:

- Attend as many meetings early on as possible to determine how I should focus my time;
- Gather as much information about the project by informally talking with people i.e., go to lunch with as many different people as possible;
- Collect as many written documents on the HR Business Reengineering project as possible and sort through them latter;
- Listen more and don't control or dominate the conversations.

The following sections will describe The Company, the HR Business Reengineering Project, the new HR Information System and how the Performance Support team was formed. Each of the sections are described according to Internal Documents and interviews. All of these events occurred before my arrival at The Company. All references to direct quotes from the transcripts will be placed in italics.

Description of The Company and the HR Business Reengineering Project

The Company selected for this research study is located on the East coast. As a result of trying to stay competitive, over the last five years, The Company has been making massive changes. In fact, The Company's 1992 annual report describes The Company's financial results as being completely unsatisfactory. In order to revitalize The Company, the President proposed a strategy that consisted of the following four elements:

1. Focus on the core business,

2. Disciplined financial programs to improve earnings and reduce expenses,

3. Reengineering to radically improve "The Company's" business process and,

4. Target programs to give "The Company's" people the tools, training and support they need to succeed (Annual Report, 1992).

The 1992 corporate annual report also described how the role of manager was being redefined from an authoritarian "boss" to an innovative leader. The President of The Company explained that The Company needed leaders who were proactive, creative and innovative and equally important encourage and reward that behavior in others (Annual Report, 1992). In addition, the President acknowledged that the organizational structure would need to be flatter, with the duplication of efforts eliminated and processes streamlined. To accomplish this goal the President viewed reengineering as the key to this effort. The President stated that "the reengineering programs launched in the past two years are delivering on the promises to achieve lower cost, greater efficiency, and better service" (Annual Report, 1992). The commitment to reengineering the business processes continued throughout 1993. The President stated in the 1993 corporate annual report that The Company

must continually refine the way we run our business. Our method of choice is reengineering- the radical redesign of work processes to achieve significant improvement in performance. Our goal is twofold. We want to provide quicker, better service to customers and at the same time we need to lower our cost structure (Annual Report, 1993).

Finally the President acknowledged that refining The Company included not only changes in the organizational and work processes but also changes in the corporate culture- the values, expectation and behaviors that characterize how people completed their job assignment.

Corporate Culture of The Company

Culture-- the system of norms, assumptions, and behaviors developed over time by an organization's members-- is conveyed in unsystematic ways by the words people use, the stories they tell, the activities that are valued (Bancroft, 1992). Each of the mindsets found in the Information Technology group and Performance Support group grew out of the organizational culture. Not only was there the overriding corporate culture, each team on the project had their own separate culture.

The Company was experiencing organizational structure and culture changes from a corporate level. I spoke with one woman from the Corporate Education Center and she explained to me that their company had experienced significant downsizing and it was a wake up call for employees that Mother (meaning The Company) could no longer take care of them (the employees). Traditionally, once a person began working for The Company, he or she believed they had a secure job. However during the early 1990s, for the first time in The Company's history a major reduction in force was initiated.

The President of The Company wanted to create a new corporate culture called "The New Destination." The New Destination was established to move the employees towards new corporate values and behaviors. On April 25, 1995, I was able to attend a "town meeting", held at The Company by the President, and I asked the President the following question: With my being new to The Company, how does The New Destination approach apply to me? The President responded to my question by saying that The New Destination was a movement in The Company that was initiated approximately one year ago and is designed to create the following:

1. A set of behaviors to help move The Company into the future.

2. An opportunity to acknowledge and welcome differences.

3. An opportunity to think and act like a business owner.

4. One step to help ensure that The Company stay financially strong.

In addition, the President suggested that the hardest part of change was getting people to know that they have to change. This statement applied to my research since I was interested in how the concepts of performance Support would be accepted by the Information Technology group.

One of the established behaviors within The Company was the behavior associated with the term "Acting Nice" (this term has been slightly changed in order to provide anonymity to The Company). Acting Nice was a term used to describe a group norm or behavior in meetings. During my first few weeks of working for The Company, I heard the term Acting Nice and thought it was associated with a positive behavior. I learned otherwise when I specifically asked a team member after a meeting what the term Acting Nice meant. The team member looked at me and then chuckled slightly when she said that "the term Acting Nice is not a positive term." She further explained that the words Acting Nice expressed how people may participate in a meeting and agree with all of the decisions made during the meeting but once they leave the group setting and arrive in the company of

people they feel comfortable with, they express their dissatisfaction with the decisions made earlier in the group meeting. In fact, a manager who was asking for feedback on a draft of the performance support strategy included the following note within the document in order to encourage healthy discussion and feedback. "Please be challenging and candid with your feedback Acting-Nice is not expected nor needed. Thanks (Internal Document, 1995)"! According to a HR manager Acting Nice is:

You never lay your cards on the table because you might hurt someone's feelings. So you know, we'll all sit in the meetings and we'll all shake our heads and we walk out of the meeting and there will be 30 people who will say I'm not doing that. I mean we've seen it time and time and time again...

When I asked the manager how do you get beyond that norm [Acting Nice]? She replied:

Well, the HR Business Reengineering project leader has no tolerance for that [Acting Nice in meetings]. So my guess is that her folks are probably beginning to work from that. And they might do it here but once they get out in the real world where there are other people that might not [accept that behavior], they're not going to be able to get away with that. Um, I don't have an answer to that. I just don't, I mean [I think] you set it by example. And yet, you know that kind [of has] to start at the top and filter down. And if that's not the way we are doing business at the top then you won't change that. Because people would be afraid of reprisal. So you just won't see it.

Acting Nice was part of the old organization culture. This organizational norm could dismantle any new innovation effort if it is not recognized and understood. If people were not honest about their feelings towards performance support solutions, there was the potential of the Performance Support team

"spinning their wheels" and not accomplishing anything. The above quote signified the importance of the senior management encouraging honest and open dialog at meetings in order to move beyond the Acting Nice organizational cultural norm.

Restructuring and Reengineering the HR Department

In 1992, HR managers from The Company found that their HR organization and its business process, though current in some areas, were not designed to assist The Company in moving into the future. Because The Company had downsized their HR department, employees who specialized in HR formed an internal consulting team. This team recommended that the HR department reorganize from a centralized organizational structure to a decentralized one where managers and employees would take on more of the responsibility for various HR functions.

According to the Vice President of HR, there was a need to reengineer how the work was completed in HR. One of the goals for reengineering HR was to streamline the work process and eliminate unnecessary steps and procedures. In addition, the Vice President of HR saw a need for the independent HR information systems, such as the payroll and purchasing system to be replaced by an integrated HR information system. The Company's new vision for providing HR services to organizations was twofold:

> First, to capture data at its source, provide all levels of "The Company's" managers with the information they need to lead and manage people effectively, dramatically improve workflows, and improve access and delivery of products and services to employees.
>
> Second, the vision also include the challenge for HR to ensure that the information, tools, processes, products and services are simple, comprehensive, cost-effective, flexible, and linked to business strategy, while providing integrated HR solutions with the appropriate levels of

controls for ensuring compliance with laws, regulations, and management decisions. (Internal Document, 1993).

To meet this new challenge the Vice President of HR initiated the HR Business Reengineering project. The official mission for the this project was to develop and implement cost effective, simplified HR processes, products and services, utilizing newly acquired integrated HR software and supporting technologies that would:

- Allow most HR transactions to be handled at the source without paper,

- Serve as the primary distribution method for HR products and services (e.g., policies, guidelines, candidate pools, etc.),

- Facilitate compliance with laws and regulations,

- Provide flexibility in meeting business needs,

- Provide consistent levels and quality of service to The Company's managers and other employees (home office and field),

- Provide timely, direct access to HR solutions (Internal Document, 1995).

In addition, according to the project leader of the HR Business Reengineering team, one of the critical factors in implementing the HR reengineering project was for the new system to create a compatible technical environment company-wide, so that everyone could have access to the system and support in completing various job tasks. For example, once an employee fills out his name and address the new information system would captured the data once and placed in all of the necessary databases for payroll, personnel, and compensation. In essence, all of the HR information systems would be integrated. Instead of calling a person who works in HR to submit a change of address paper form, the employee could make that change him or herself. The Company's idea was that this reengineering effort would save them money by eliminating redundancy; preventing compliance errors; and assisting managers and employees in becoming self reliant as it related to conducting HR tasks.

In fact, the hope for this new HR information system, as described by the leaders for the reengineering effort, was that "the new, integrated HR system would support the new HR vision and facilitate realization of all associated benefits including significant expense reductions and improved compliance with government regulations" (Internal Document, 1993).

However, in developing a communication and marketing strategy for the new HR information system, the HR reengineering leaders expressed concerns about the credibility of the HR Business Reengineering project because employees have been hearing about major changes in HR since 1991 but have not seen any tangible results. It was important to have the support of the employees because they would have been expected to use the system. The HR reengineering leaders believed that if employees had a negative opinion of the system before it was released it would be extremely difficult to change that opinion of the system. More specifically, the HR reengineering leaders included the following statement in their communication and marketing plan for the new HR information system.

Many of the HR employees have been hearing about reengineering since 1991. So far they haven't seen anything tangible and they won't until 1996. (Even though we have reengineered some parts of our business and reaped significant savings). Currently the credibility [of the HR reengineering team leaders completing the project] within the HR community is low and exceptions are mixed to the HR Business Reengineering project therefore project leaders need to carefully manage communications about the project and rebuild HR employees' interest and support for making the reengineered information systems and business processes work (Internal Document, 1993).

This opinion was also the driving force behind the push for the members of the HR Business Reengineering project to meet the July 1996 date for releasing the new HR information system. If the HR reengineering team failed to make the July 1996 date they

feared that the employees of The Company would not take them seriously in the Reengineering effort.

Background on the HR Business Reengineering Project

To address the needs of the changing HR organization, the HR Business Reengineering Project was formed in 1992. The initial HR Business Reengineering team began analyzing the HR organization with three core teams:

- Payroll,
- Compensation,
- HR Information Technology.

These groups were structured according to core functional responsibilities of HR personnel.

While I participated on the project, the HR Business Reengineering team was organized to include four teams. Table 6 describes the four HR Business Reengineering teams and its current makeup as of April 21, 1995.

Table 6. Members of The HR Business Reengineering Project

Team	Total number of participants
HR Business representatives: These team members were very familiar with how HR functions. They were experts in compensations, benefits, staffing etc. They were subject matter experts and responsible for ensuring that the correct information was provided during the meetings.	The HR Business Reengineering Project Leader 1 HR Business Representatives 20
Information Technology representatives: This group was responsible for developing the customization of the Trinity software and ensuring that the legacy systems could interface with the new system and devising a plan for access the old data on the current HR information systems.	The Information Technology team was further broken down into the following groups: Information Technology leaders 7 Payroll Team 8 Trinity Team (customization) 5 Data Model Team 6 Conversion Team 3
Audit Team Members: Their job was to insure that Trinity was in compliance with federal rules and regulations.	4
Performance Support team	These representatives come from the following areas: Performance Support Team Co-Leaders 2 Corporate Education 5 Human Factors Engineering Usability representatives 2 Performance Support representatives 2 Note: I participated on this team, normally the team membership would be three. Performance Support Consultants 3 Note: After the initial kickoff meeting the performance support consultants did some work but they were not on the project when I arrived 2/27/95.
Trinity Consultants *consultants who represented the HR Information System: Trinity*	3
	Approximate number of members 71

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To ensure that the HR Business Reengineering team was moving in the right directions for corporate restructuring, a small group of HR business representatives were tasked with analyzing the organizational structure of the HR departments. The output of this task was a detailed Strategic Assessment Plan. This document confirmed that decentralizing HR was the right decision (personal communication, October 6, 1995, HR manager) and the team continued on their path to implement the new HR policies and information system.

The Selection of the New HR Information System: Trinity

In 1993, a small subset of the HR Business Reengineering project was formed. This group consisted of HR business representatives and representatives from the HR Information Technology support group. Their main task was to acquire an HR software product that would be flexible enough to support a specialist working in HR as well as a local or regional manager in completing various HR functions. For example, a manager could be supported by the Trinity HR Information System in completing various staffing tasks that were normally conducted by an HR specialist. Or, the Trinity HR Information System would support an employee in making changes to his or her health benefits. By July 1996, the HR Reengineered Business process and the new HR Information System, Trinity, will have to be implemented throughout The Company. This date is fixed and not movable.

Description of the Trinity HR Information System

The Trinity HR Information System, a windows based software package, was designed to support a HR consultant in managing and completing tasks such as hiring, compensation, benefits, and payroll. In addition, the Trinity software supported the HR consultant in managing and changing personnel data. The software was designed for the

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HR consultant who was a specialist in HR. The Company wanted to customize the software so that managers and employees could easily use the software. In fact, The Company was in support of an employee having the ability to update his or her name, address, and phone number as well as to make limited changes to his or her benefits selections. This system was to be use in a windows based client/server mainframe architecture.

The Criteria for Selection the New HR Information System

The two main criteria for selecting the new software product were 1) how well the product matched the core HR functions and 2) the flexibility of the product to be used by an employee from a desktop computer. In addition, the selection team viewed minimal customization as a priority in the selection process. During Fall of 1994, the group narrowed the selection down to two products. The final product, which will be called Trinity for the purposes of this study, was selected. The release of the Trinity HR information system would be the first of its kind at The Company. More specifically, Trinity, which is a windows-based, client-server / mainframe hybrid architecture, would be placed within all of the departments at The Company. For a project of this nature there were few internal experiences leaders could learn from. For the most part, the HR Business Reengineering project was charting completely new territory mainly because of the complexity associated with customizing the system. The Performance Support team was faced with managing the customization of the on-line forms, screens, navigation, and on-line user support. As stated in an internal document (1995) there is a trade off between "simplicity (plain vanilla) and complexity (Tutti Fruity)" of the customization of the product in relation to time. In a March Internal Document, the composers of the document provided the following statement:

We must strive to implement the product we purchased with as few changes as possible, and be willing to "push back" and challenge our business customers [internal employees who would use the system] on how their requirements are met. However, the final decision on whether or not something is changed will be based on all relevant factors ...

The original goal of the HR Business Reengineering team was to purchase an HR information system and make as few changes as possible to the system. However, the requirements requested, by the HR representatives, were primarily for the system to be usable and easy to use. Because many of the performance support changes required some customization to the Trinity software the Performance Support team was always called upon to overly justify their recommendations.

Customizing the Trinity Software

In addition, when I asked a senior Information Technology team member who had 25 years of experience in the Information Technology field why The Company chose to purchase a system and then customize it versus building their own he replied:

I have a feeling that more and more we won't be developing our own systems, instead we'll be purchasing software that's more generic in nature and modifying it to the area of our needs because it's simply so expensive to develop new systems. It's really very expensive, so that leaves us two things. If we do develop new software, somehow we have to figure out how to integrate performance support with that. If we purchase software packages like we did with the system we're implementing right now, we need to figure out how to make it easier to use and provide those same types of facilities...

Another Information Technology team member with almost two decades of experience with system development views the customization of software in this way:

I think a lot of corporations have large, information system budgets or expenses. In the past two years I've looked at ways to reduce those expenses. Some of the ways and some of the things that have helped reduced expenses is to buy off the shelf software and not reinvent wheel ... build your own stuff. [Historically the system developer], was pretty much building everything on their own ... and even if they brought in a vendor package they customized it, to the point where it just .. [was so] specific and [it] didn't allow maintenance to be handled very easily. So I think there may be more emphasis on buying software that, from a generic standpoint, that is, is useful and it can be marketed by vendors because it satisfies a common need than a certain set of business functionality like HR systems.

We bought a package that handles HR, (human resource) functionality because it is pretty common and consistent regardless of which corporation you're in. You still have to identify people. You have to pay them. You usually have benefits programs that people can enroll in for help, the benefits features and, and functions depend upon the corporation, but fundamentally they're a set of benefit that most corporations provide to their employees. So this is very common functionality where a vendor package can suit, ah, the ... needs very easily. ... I would think these kind of things would be more [common], corporations will be more likely to go out and buy them rather than try to build their own. The vendors are getting smarter, .. in their designs

by, you know, understanding and knowing that not all corporations are going to run exactly the way their systems are designed.

So this is what we've seen with [the customization of Trinity], .. isn't new. There are different ways of affecting it depending upon how recent the technology is. So we have that [aspect] with the current Trinity technology. But their core system is still there. We haven't gone in and modified their fundamental basics [of the system].

According to an HR manager, many of the customization problems that the HR Business Reengineering project encountered were because of the charge, from the Vice President of HR, to make Trinity as easy to use as an ATM was in direct conflict with the goal of implementing the Trinity HR information system with limited changes to the software.

Ensuring Usability

A user interface as described by Freedman (1995) is "the combination of menus, screen design, keyboard commands, common language and help screens, which create the way a user interacts with a computer" (p 417). According to Hix and Hartson (1993) developers of user interfaces do not intentionally set out to produce poor user interfaces. However, many user interfaces are not easy to use and this was also the situation with the Trinity HR Information System. The navigation within the Trinity system was difficult to use and it was also difficult to correlate how the HR work was done at The Company with the Trinity system. For the customization of the Trinity HR Information System, ensuring usability of the interface and of the product required attention to two main components:

• *User Interface design:* This aspect of the design was important because the users of the system needed to easily navigate through the screens along with following other usability guidelines and goals.

- *Performance Support design*: In addition, it was important that the user interface for the Trinity information system correlated with the reengineered work processes. Also for performance support solutions it was important for information to be available from the Trinity information system at the time the employee required it in order for the employee to complete his or her work assignment.

The Performance Support team leader hired three people from the Human Factors Engineering group who specialized in usability to participate on the project as part of the HR Business Reengineering project. I did not fully understand The Company's fee for service process. However when I asked several employees about the terms the general response was as follows: The Company had established an internal fee for service program as a way for managers to justify their existence by selling their business services to internal and external clients.

The user interface design was an integral part of the performance support design. The Performance Support team members held this view, which was expressed in an Internal Document, of the Human Factors Engineering process.

> The human factors process can't be 'tacked onto' a system after its done [completely developed]. To ensure your system is usable- that it lets people do their jobs without [the information system] getting in the way- you need to plan to achieve usability by utilizing the human factors process just as you would plan to achieve any other system goal (Internal Document).

Usability of the Trinity Software

There were different perceptions on the role of usability testing during the selection process for the Trinity information system. For example the Performance Support team's views on usability that were described above were not embraced by the group that selected

the Trinity system. Instead of being apart of the team that selected the Trinity system, the Performance Support team was called into the process late and a usability study was conducted after a commitment was made to purchase the Trinity information system. In addition there were varied perceptions on the definition and importance of usability issues. How the Information Technology team perceived usability issues would impacted the need for whether or not the Performance Support team would gain informal support from the Information Technology group for customizing Trinity system. For example the Performance Support team leader believed that usability testing was not a part of the selection criteria, whereas the an Information Technology Team Leader who had previous experience with customizing a purchased product believed the following:

...We were buying a package and ... and we felt usability [along with] certain things were important. Business requirements [were] crossed [with] technology vendor support and under [the] technology and business requirements there's usability. Those things are so important in both projects that I have them in here [this project] that those people were involved and influenced as well as the project team were influenced by what package they bought. I mean it was so [much] a part of the business requirements that [if] we couldn't use it and [if] it wasn't [or did not include] performance support and it wasn't [or did not include] help we wouldn't have picked it [The Trinity Software] . [Usability and performance support] influenced what packages we selected.

An HR manager with an information technology background provided another view:

Consideration for not only what the business functions are, but how they are going to get done by the end user should have been part of the original analysis and it wasn't. All that the original evaluation team did was say

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that "Well, we want a windows based system because windows based
systems are usable." ... You know, windows based systems have all the
features. I mean they've got help, you know, they've got icons, they've got
windows. Well .. that must mean they're good.

He goes on to say:

> *And so no consideration, no considerable thought was put into*
> *the fact that usability and support for good performance needed*
> *to be analyzed and evaluated as part of the whole process of*
> *selecting a system and implementing a system. ... That just*
> *simply wasn't recognized.*

On this project, the selection committee, made up of business representatives and representatives of the Information Technology team, wanted to purchase a product that was usable. The commitment to selecting a usable product fell short in that a person with experience in usability issues was not a part of the selection team and the usability study was not conducted as part of the product selection process.

A usability evaluation of the Trinity software was completed by two members of the Performance Support team. This evaluation investigated how easy the Trinity software was to use as well as whether or not the software helped the user to perform his or her job as it related to HR tasks. At the end of the evaluation, several suggestions and recommendations on the usability of the Trinity software were made by the two Performance Support team members to the HR Business Reengineering selection team.

A Performance Support team member described how the results of the usability recommendation were received by the HR Business Reengineering selection team.

> *Then we looked at the RFP's for this particular application and the*
> *[Trinity software] application which is what they bought versus*

another one and I also recommend that they buy the other one and they bought this one [The Trinity software]. .... To say the least there are many, many, many [usability] problems with this... package that they brought.

In addition, an Information Technology team leader had a different perception as it relates to usability and the acceptance of the Trinity product. This person stated:

I don't believe it's [usability] new [I believe] that people understand that a system has to be usable or you fail. I just don't think that that's a new concept. Now there's better tools and more technology... I believe, on this project, that, that the user support team [or the Performance Support team] didn't acknowledge the fact and give credit to the fact that the entire team wanted Trinity because it is the, one of the best on the market because of user support [or its usability]. It was a major. . . . .major thing.

However, according to the Performance Support Co-team leader it may have been a consensus by the selection team to purchase the product but the ramifications of the usability aspect were not fully understood. More specifically, the difference in opinion on the usability of the Trinity software stemmed from the varied perceptions on how to support a person in using a software application. For some people it was sufficient to simply provide a system where the functionality of the system was easy to use. For example if the user could easily turn the system on and maneuver from one screen to another in a windows environment the system was usable. On the other hand, usability for other HR Business Reengineering team members meant providing a system that was not only easy to use but a system that also provided useful information without having to formally train the user on the system. The Performance Support Co-team leader goes on to say:

all along on this project we've said we wanted to deliver something that we don't have to go out and train people for: But the depth of what that meant was never understood by anyone because nobody ever thought about that [the complexity of the issue at that time].

To meet the goal of releasing a usable and useful HR information system, the Performance Support team was formed and began their quest to ensure that the Trinity software supported the employee in completing various HR tasks. This aspect of the project was very important. Since many of the mangers would be required to perform new HR tasks, the Trinity software was looked upon to leverage the additional work load managers might have incurred as a result of the HR restructuring. The HR Business Reengineering team members recognized that in order to meet their non movable deadline, July 1996, for releasing the new HR information system, there would be some trade off for customizing to ensure simplicity versus minimal to no customization in order to save production time. At this point it was up to the Performance Support team to make the business case as to the importance of customizing the software in order to provide ease of use to the employees using the system. In essence the Performance Support team's dilemma surrounded how the Performance Support team would justify the performance support customization solutions in relationship to the meeting the release date.

The Trinity software was designed for a specialist working in HR. In the native form of the software a non HR employee would be overwhelmed with using the Trinity system. The non-customized version of the Trinity software would not support a manager or an employee in quickly completing an HR function such as hiring an employee, or changing an employee's personnel information or the department's work schedule. In addition, The Company's approach to HR was slightly different from the HR functions

expressed in the Trinity software. In short, the software in its original form did not map to how a person conducted HR tasks after the work process had been reengineered. Again, the goals for the Performance Support team were:

1.   To enable end-users to use the reengineered HR systems and related processes (including interim processes which might be required before they receive access at their desk-top).

2.   To ensure the end-user perspective, more specifically that the reengineered HR systems and related processes are simple and easy to use similar to an ATM. No training required- no user manuals required. Control mechanisms (not people) are in place to prevent compliance- related errors (Internal Document, 1995).

In terms of my research focus, I was interested in the major issues associated with incorporating performance support principles into the system development life-cycle model. To incorporate performance support principles into the system development process, business representatives as well as from the system developers must be open to change. The quest for including performance support into the HR Business Reengineering project began with the forming of the Performance Support team.

The Forming of the Performance Support Team

The Performance Support team was formed as a result of HR managers seeking to implement Trinity, the new HR information system, which could be easily used by any employee from a desktop computer. The Performance Support team was originally called the Delivery Team because the team's primary goal, at that time, was to ensure that when the Trinity HR Information System was delivered to the employees of The Company , they would be ready and able to use the system. Throughout the time I was working on the

project, the Delivery team progressed through several name changes. For the purpose of this study, the team will be called the Performance Support team.

This team was charge with investigating all aspects involved with implementing and using a new information system. The project leader was selected primarily for her experience with working in the HR business as well as for her experience with The Company's Corporate Education Center. The project leader's role was primarily to represent the business perspective and the user perspective so that as the team designed and developed new work processes, the technology solutions they developed would also reflect how the users did their work.

In the fall of 1994, the Performance Support team leader began organizing a group of people to address the strategies geared towards preparing managers, supervisors, employees, HR professionals, and other Corporate Center staff to be ready and able to use the reengineered HR processes and systems as they were implemented. This group evolved into the Performance Support team. The events associated with forming the Performance Support team can be found in Appendix D. The project leader was not initially familiar with PS concepts and as a result, I was interested in what led her to investigate performance support solutions for this project.

Performance Support Team Leader's Perspective on Performance Support

During my interview with the Performance Support team leader, she explained that her previous position in The Company's corporate educational center allowed her to see the research and development being done with various educational technologies. The Performance Support team leader described how she decided to pursue performance support solutions for the HR Business Reengineering project.

I think a lot of it has to do with my background. The fact that I was telling you earlier, I was in The Company's education department for a long time. What was never well executed is clearly linking with the business issues and the business problems from which these [technology] could be worthwhile solutions. So when I got involved on this project I knew the following issues around:

- *The HR processes that we were being reengineered*

- *The business environment in which they would have to implement the new processes.*

- *The general kinds of people and their experiences and knowledge around HR*

What that said to me was that we could not afford to do the following:

- *to take people off line for training and user support*

- *provide employees with paper based reference manuals*

- *provide employees with help line calls or*

- *provide employees with classroom training that they would get one day and then maybe six months later they would have a need to use that information.*

Based upon all my experiences in education and in HR, I knew fairly quickly that what we had to provide for lack of a better term was just in time information in references so that people were able to do their work along with the additional HR responsibilities. They got what they needed when they needed it. And that's really as simple as it is stated. And I think I knew that because of the background I had in Education because I knew where classroom training works and where it doesn't

work, where paper based documentation works and where it doesn't work. Or a lot of these other external tools can help and where they can't help. And that was critical for this project's success. What was also critical was to have all of that [those types of solutions] embedded within the [Trinity] tool.

The trick though was how to make that happen. And the way I knew we had to make that happen was to get what's being called performance support More broadly I would look at it as totally user support integrated into the project right at the beginning at the time the business requirements were being specified. And that again came from [my] background in education and training and knowing about consulting and that the best place to make a difference is at the beginning when you were helping to define the problem that business people are having. So that was a critical need to get a team of people together who knew this stuff, who knew this stuff really well. Who knew the detail of these analyses, could design and could ultimately do development to be right at the beginning working side by side with the HR business and the IT development people to make sure that we fully understand all the business requirements, because in addition to the processes and the functions and the business rules that have to be achieved and the constraints that we're facing on the technology side there's also a critical set of requirements associated with how people do this work. That had to be defined right at the beginning. So getting a team of people who had the expertise on performance support working with the HR and the IT folks at the beginning of the project to define

the business requirements that much I knew was critical. So that
integrated right from the beginning and not something we are looking to
do after the fact (Performance Support team Leader).

The Performance Support team was to provide the following alternative for closing gaps found with customizing the Trinity product, such as modifying screen designs as a means of making the product more usable, creating forms and on-line reports as a way to provide the employee with form templates and on-line support with how use them. A plan for providing tradition OJT solutions, such as classroom training, would also be developed by the Performance Support team (Internal Document, 1993).

Selecting the Performance Support Team Members

I arrived at The Company, in February, during the analysis phase of the HR Business Reengineering project. At that time, I was not able to find any documents that described how the team members were selected or what the major roles and responsibilities were for the Performance Support team. However, when I informally inquired about the Team's roles and responsibilities people consistently responded with some variety of: The team is responsible for identifying and providing the end-user support for the new HR information system. Being new to The Company, I was not familiar with the background of the project and I still needed more clarity on not only what the goals of the Performance Support team were but also how my skills and abilities would help the group. Time was always an issue for me because I was expected to not only do a job for The Company but to also collect data for my research. I wanted to do both jobs well. My first task was to understand how the PS Team was formed.

I went to Ella (pseudonyms will be give in this section primarily for clarity of the description), an instructional designer on the team to ask for assistance in helping me

understand the background of the team. Because Ella was a very organized person and a part of the initial team, she was able to provide me with a historical set of written materials that documented the team's activities since the Fall of 1994. The initial team consisted of the project leader, one Information Technology representative, one HR business representative, and one Corporate Education representative. The Performance Support team leader began expanding the team by looking for expertise from within the Human Factors Engineering (HFE) group. A member of the Performance Support team who specialized in usability of software applications described how she and another Performance Support team member began working with the HR Business Reengineering project.

> *We started working closely last fall, last September [1994]. We had a*
> *couple discussions in August and September [and] we were asked to be*
> *part of the delivery [performance support] team. When this was agreed*
> *upon, I was asked to do a proposal for the project life cycle where I*
> *thought we [the usability group] could benefit the project.*

A brief description of how representatives from the HFE group would participate on the Performance Support team was outlined in an internal document. This document was a proposal or internal contract between the Performance Support team and the HFE group. Two members of the HFE organization were contracted to participate on the Performance Support team during the following four phases as described in an internal document:

> *Step 1:* The HFE representatives will assist in the development and on going
> refinement of the customer and end user profile for each customer.

> *Step 2:* The HFE representatives will assist in the development and on going
> refinement of the product profile and planned deliverables.

Step 3: HFE representatives will, along with user group input, develop measurable usability goals to ensure that the user interface(s) will provide ease in learning, ease of use, minimal support and receive a rating of "useful" by all user groups.

Step 4: Usability testing will be conducted and may take the form of prototype testing, full usability testing , coordination of focus group sessions, planning, interpretation of results, reports and recommendations. This usability testing may involve travel to field offices. If this is necessary, the customer will pay all travel related cost. HFE will design usability test that measure the product (s) against (above)usability goals and

- identify and document gaps,

- identify options to close those gaps (Internal Document, 1994).

Thomas was also brought onto the project, part-time, as a result of a new Performance Support team member trying to understand the concept of performance support. The team member stated:

> *I said something [to the Performance Support team leader] like may[we] bring [Thomas] into the project to consult on performance support. Karen [a usability team member] and I talked and ... we knew there were a multitude of usability problems with the system [The purchased HR information system]. We knew they [the HR project team] purchased this system and what that equates to [is that] it's a done deal. You know they weren't going to, you know [be open to changes], so I just kind of stuck that little snippet in there [about performance support] and lo and behold, she [the Performance Support team leader] said to me one day, "What is performance support?" and Karen and I started talking [about how we could inform her about the*

topic]. We brought [Thomas] in [to talk with the performance support team leader]. We introduced Thomas and then it just kind of, you know, exploded into [a movement towards incorporating performance support into the project].

The Evolution of the Performance Support Team

The critical material that emerged from my research explicitly documents how the team moved from being called the Delivery Team to the Performance Support team. Much of this material was composed and disseminated before my arrival at The Company. Table 7 provides a chronological description of the events that document how the Performance Support team was formed.

Table 7. The Formation of the Performance Support Team

Date	Document Title	Critical event	Team name
10/26/94	A working document	Project proposal initiated for the HFE team to join the Performance Support team. This is a recognition that skills of usability testing were needed	Delivery team
11/7/94	Roundtable on Performance Support (PS) Follow Up	Developed a Performance Support strategy	Delivery Team
11/18/94	PS strategy requirements for PS development	Established a PS team	Delivery Team
12/8/94	PS strategy : Preliminary project plan draft	Identified the PS team Members Organization No. or Rep. Project leader 1 Co-Project leader 1 Corp. Education 4 Human Factors Eng. 3 HR reengineering 2	PS Strategy
12/19/94	Strategy and Design Kick off Meeting for User Performance Support	Vendor contracted to provide performance support for the project presents a preliminary project plan	User PS

<u>The Development of the Performance Support Team's Strategy</u>

In late October 1994, the Performance Support team began developing a strategy for incorporating performance support concepts within the customization of the Trinity information system. A focus group was held with various managers to develop the requirements for creating a performance support strategy. In fact, a November 7, 1994, internal document acknowledges that the performance support strategy would be an evolving strategy and that the team needed to link with the various types of human resource work or tasks that would be conducted during the following months. More specifically the Performance Support team would be involved during all phases of the software customization, including business functional requirements, design, and coding of the new HR information system. This document acknowledge the need for including the Performance Support team in all aspect of customizing the Trinity product. This document also implied that these two teams, which were evolving separately, would eventually have to work together. The distribution of the memo also did not include any decision-makers from the Information Technology team. This was an important event since the Performance Support team would be responsible for influencing the Information Technology team on the importance of incorporating performance support strategies into the system development cycle. The importance of their involvement at this stage was not necessarily for formal approval but for developing the informal relationships and the understanding of the goals and mission of the Performance Support team with decision-makers of the Information Technology team.

The November 18, 1994, document describes how the Performance Support team was working on defining a common understanding and direction regarding performance support. In addition, the Performance Support team prepared an attached document that addressed the following issues:

1. The Performance Support team's Underlying Belief re: Performance Support for HR Business Reengineering;

2. What the Performance Support Strategy should tell the Performance Support team for Phase 1 and latter phases of the HR Business Reengineering project;

3. What needs to be done to develop the strategy;

4. Identifying an estimated time assessment for completing the performance support recommendations for the project.

This document was one of the first drafts to establish formal recommendations that included a performance support strategy as part of the HR Business Reengineering project. Gery (1993) discusses the components for a performance support strategy. She further suggest that a successful performance support strategy should contain:

- Clear, achievable results or outcomes in the business, educational, technological, political, or psychological arenas (e.g., solving business problems, creating technological architecture, building commitment levels)

- Alternative general approaches to achieving these results or outcomes (e.g.,. educating, developing commitment levels, creating a technological architecture) and the determination of whether the strategy will be to "start small" and build incrementally or "start big" and address a broad range of development in a consistent and in-depth manner.

- Identification of key sponsors whose political, logistical, or economic support is necessary to legitimize and institutionalize the activities throughout the organization.

- Specific tactical plans for activities to achieve strategic goals (e.g., conducting an in-house EPSS [electronic performance support system] conference to establish a broad base of understanding of the concept and

its implementation; identifying three priority business problems that EPSS can solve better that current practice or traditional training; funding an EPSS pilot project)

- Clear definition of roles, players, and responsibilities (of sponsors, facilitators, "doers," managers, vendors, and consultants)

- Identification of possible resistance sources in the organization; development of strategies to manage that resistance (Gery, 1993, p. 271).

Gery (1993) goes on to argue:

For an organization unsure of how actively or whether to pursue performance support system, a simpler plan would be more appropriate. The strategy must fit the nature and magnitude of the goals- and defining specific goals is where you start. The strategy must also fit the organizational culture to be successfully implemented and integrated into the business operations. These are necessary conditions for success (p. 272).

The Performance Support team did have a performance support strategy. One major issue was how well the strategy was communicated throughout the Performance Support team and to people working on the HR Business Reengineering project in general. In addition, the principles of performance support that were created by the Performance Support team can be found in Table 8.

Table 8: Principles of Performance Support

Performance Support System Principles

I. Design for learning by doing, NOT doing by training;

II. Keep focus on HR needs for business performance; solve performance problems with performance strategies and designs, not with technology;

III. Develop with the performer in mind: continuously evaluate designs as they are developed and test with real users against measurable HR performance goals;

IV. Design competency into the system- DO NOT assume that the performer has the HR knowledge or will be able to learn it in time to apply it;

V. Design and implement data bases and infobases which support the business tasks (not the other way around);

VI. Measure implementation success according to how quickly people become competent in completing HR tasks-without training;

VII. Continuously monitor, embed new HR rules, test usability, and implement improvement.(Internal Document, November 18, 1994)

By having identified seven performance support principles, the team was able to generate a document that expressed a common understanding for how performance support would be used on this project. The Performance Support team leader believed that additional resources were required for the project and as a result hired an outside consultant who specialized in designing performance support systems. The company was retained for approximately four months. On December 18, 1994, the outside consultants conducted a meeting to present a strategy for incorporating performance support on the HR Business Reengineering project. However, this consulting firm's idea of performance support, according to several Performance Support team members, was more in line with traditional

computer based training solutions. A Performance Support team member describes the events surrounding the performance support consultants as follows:

Let me back up a minute. I forgot one important step. She [the Performance Support team leader] also talked to outside people. . . about performance support. We went to a presentation, a [Performance Support team member] and I, [which was given by] an outside vendor who was also trying to [describe] performance support.

[After that] she [the Performance Support team leader] signed the proposal that we [the two usability representatives] presented to her. She, [further said], "I also want input from an outside vender," so she had an outside vendor come and do a presentation. [They] presented some documentation as far as what they had done with other companies. What she wanted, ideally what she [the performance support team leader wanted or] was looking for was an outside company who had provided performance support to an HR project of this size and scope and guess what? She couldn't find it. It didn't exist... No one had done it.

So she [the performance support team leader] signed a proposal with an outside company who had done performance support. What they call performance support... We saw some of their, project books... It was manuals. It, [was] what I call non-traditional [I] meant [non-electronic]... Like stand up classroom, but this came, this all came under their heading of performance support... The closest they got to it

[performance support] was, computer based education and it [what the consulting firm presented] was everything else [other than performance support it] was paper, classroom training, and computer base training, and all that came under performance support which we kind of, [disagreed with].

Documentation supports the performance support consulting firm being involved with the project during the month of December 1994. However, when I arrived on the project in late February the consultants were no longer assisting with the project.

The Analysis Phase of the HR Business Reengineering Project

Business Functional Requirements: A False Start

The analysis phase of the HR Business Reengineering project began with identifying the Business Functional Requirements. This process was started and completed before my arrival. The documentation I reviewed and the people I spoke with acknowledged that approaching the analysis phase by focusing on mapping the technology, or the functionality of the Trinity software to the HR procedures, was not the best way to approach the task of customizing the Trinity software. A decision was made, by leaders of the HR Business Reengineering team, to make a mid-course adjustment and change the analysis phase to incorporate business process mapping. According to Hammer and Champy (1993), business processes in a company correspond to natural business activities. They further argue "just as companies have organization charts, they can have process maps that give a picture of how work flows through the company (p. 118)." A clear picture of how work flowed throughout the HR organizations would help the Performance Support team in providing suggestions for the customization of the Trinity software.

Again, the previous descriptions were obtained primarily from internal documents from The Company and interviews.

My participant observations began on February 27, 1995. This was a key day for my observations to start because the people working on the HR Business Reengineering project were having their initial meeting for the business process modeling phase of the project.

My First Day

My first day began with my taking care of personnel business, getting my corporate ID, and filling out forms. I was also told by Thomas, the most experienced member on the Performance Support team, that I would be participating on the HR Business Reengineering project and working directly with the Performance Support team.

Thomas's supervisor Eugene who was the leader of the Human Factors Engineering group, met me in the Corporate Education Center after my morning session with personnel. This was the same building that housed office space, classrooms, a gym, and a cafeteria on the first and second floor. On the third through eighth floor there were hotel rooms for students who might have come from around the world for training sessions. My desk was on the second floor and my room was on the seventh floor. This arrangement placed me in this setting, some weeks, literally for twenty-four hours a day. The Corporate Headquarters was located across the street and that was where the majority of the people working on the HR Business Reengineering project were located along with the project leader and co-project leader for the Performance Support team, while the Performance Support team members were located in the Corporate Education Center.

The Corporate Education Center was about ten years old and was built to accommodate trainees who worked in all aspects of The Company and who also would come from around the world to the Corporate Education Center for training. This strategy

is changing, for many corporate training centers many training managers are looking towards creative solutions such as distance learning or performance support instead of bringing a huge number of trainees to the corporate training site.

The Human Factors Engineering group offices along with the Corporate Education offices were located adjacent to the cafeteria. Entering through the door to the office spaces, you passed by the Corporate Education cubicles where six of the Performance Support team members resided; continuing to walk, the next set of cubicles were in the Human Factors Engineering area. Four of the twelve Human Factors Engineering employees worked on the HR Business Reengineering project.

Eugene then proceeded to introduced me to the members of the Human Factors Engineering group and our last stop on the tour of the organization was my desk. I was given the use of an empty desk located in the Human Factors Engineering group near Thomas's desk. I also had access to their local area network, various drives on the server and a card key to the office spaces which I could use after normal business hours. At that time, I was still not sure who I would directly report to for my job assignment and I also was still not quite sure which organization was funding my research. Eventually, I was able to determine that my salary was being paid by the HR Business Reengineering project leader and the Performance Support team leader was responsible for signing my timecard. After I met the rest of the Human Factors Engineering group, Thomas arrived and greeted me. He informed me that there were two meetings that day. The first meeting was an informal meeting to discuss the importance of process modeling and business simulation. The second meeting was the "kickoff" meeting for the process mapping and workflow analysis phase of the project. I met with Thomas and several members of the Performance Support team. With this being my first day, I could barely follow the conversation because of the technical jargon. But what I sensed was that Thomas was trying to assess the various options available to convince the Performance Support team leader of the

importance of using a business modeling simulation technique during the process mapping and workflow analysis sessions.

The Kickoff Meeting for Process Mapping

The kickoff meeting for this phase of the project occurred on my first day at The Company on February 27, 1995. Thomas realized the importance of my observing this meeting for my research and he removed all the necessary barriers in order that I would be able to attend. Therefore, my first assignment was to attend the afternoon "kickoff" meeting for the analysis phase of the project. Such a meeting was an approach used to describe to all of the team members what to expect during that phase of the project. A kickoff meeting would last anywhere from two to eight hours. Kickoff meetings were very important because they set the tone for the type of work and how the work would be done during that phase of the project. There were approximately forty people in attendance of the HR Business Reengineering process modeling kickoff meeting. The facilitator of the meeting, who was also the Performance Support team leader, began the meeting by explaining to the group why process modeling was necessary.

Process Modeling Defined and its Relevance for this Project

The project leader of the Performance Support team led the meeting. I asked Thomas if it was OK to audio tape the meeting? and he said "yes, it would not be a problem." Later during my stay at The Company I would be asked not to continue audio taping the meetings. This came as a surprise to me since I had been audio taping meetings from the first day. This incident was clearly a case of what Patton refers to as having to constantly negotiate and re-negotiate entry and access at the field-site.

Within the next few minutes, I had my small audio tape recorder set up and the project leader, who was standing in the front of the room, began talking. She described the

need for embarking on the process mapping technique in order to gather detailed information on how work should be done in HR. In addition the Performance Support team leader stated that

> *the process mapping technique that was to be used on the HR project is more than workflow analysis and task analysis- it is really about identifying everything and anything that goes into how the work gets done in HR.[Human Resources] ...*

Furthermore, the Performance Support team leader asked the audience why should the team take this amount of time, six weeks, to participate activities of detailed analysis when we had already collected a great deal of information on customer profiles, all kinds of studies out there. A woman in the rear of the room spoke in response to the leader's question. I could barely hear her response. However after the woman responded, the leader stated that:

> *We really want to roll out [the release of the end-product to the users] an integrated HR systems and set of process so we can really understand all the points of the integrated set of HR processes and that's one of the things that process modeling will tell us. I think it is safe to say that without the process models and without the work we are going to embark on, now, we have no way of knowing if what we end up building and rolling out is going to meet the needs out there. The bottom line is that we have visions, mission, and goals [and] the activity over the next six weeks is to help us ensure for a successful implementation. We are trying to clear away the darkness to ensure that we know and make very clear what our targets are so we can build to it.*

During the process mapping activities, the Performance Support team members were charged with identifying HR process where performance support solutions could be applied. In addition, by identifying and analyzing the work processes in detail, the team members could search for ways to reengineer [or make radical changes to] the process. According to a senior manager in the Corporate Education Center, "performance support is the 'how' of reengineering." More specifically, he said:

The how is a performance support system where the breadth of knowledge is embedded in the system somewhere. Otherwise people couldn't possibly keep up. They couldn't learn it all, because there's too much to learn, and it changes too quickly. These systems are the cornerstones of reengineering generally, and those had better be performance support systems. You've got to do it with the systems, and systems [that] are the cornerstone of reengineering generally, are performance support systems.

By identifying and analyzing the work processes in detail the team members could search for ways to reengineer [or make radical changes to] the process. According to Hammer and Champy (1993) reengineering is "the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance, such as cost, quality, service, and speed". The reengineered vision or the "New World" was the target for the process mapping activities. Hammer and Champy (1993) also state:

that processes in a company correspond to natural business activities, but they are often fragmented and obscured by the organizational structures. ... Just as companies have organization charts, they can have process maps that give a picture of how work flows through the company. For example one way to get a better handle on the processes that make up a business is to

give them names that express their beginning and end states. Manufacturing, which sounds like a department name is better called the procurement-to shipment process (p. 118).

Some of the documentation that was used from the Business Functional Requirements process were the center of the facilitated sessions for process mapping and workflow analysis. Table 9 describes the documentation used during the process mapping sessions.

Table 9. Business Functional Requirement Documentation

Documentation used from the Business Functional Requirements Process during the Process Mapping Sessions
1.   The 1993 study on process mapping
2.   Reengineered process maps (from 1993 study)
3.   Strategic Assessment Plan (1994)
4.   Best Practice information (from 1993 study)
5. Customer Profiles
6. Business Functional Requirements work to date
7. Trinity process models/flows
8. Analysis that has been done so far on business issues

Implementing Process Mapping Activities

The process mapping activities were initiated as a result of the HR Business Reengineering project leader seeking to establish a new vision for conducting HR business. These activities were not intended to be the starting point for the development of the Trinity system requirements. More specifically, the process was intended to understand how the users would need support rather than being used as a driver for product development (Internal Document, 1993).

In order to provide consistency between all of the business requirements, each group followed guidelines, formats and templates designed especially to capture the information from the process mapping activities. To facilitate the process mapping session and the documentation of those sessions, a large consulting firm was contracted with to provide approximately six consultants to help. The consultants played the role of facilitators and were responsible for ensuring consistent quality and quantity of analysis for all business requirements. According to an Internal Document (1995) the presence of the consultants was to also ensure that the members of the process mapping teams would be able to fully participate in the analysis and resolution of issues, without having to worry about other administrative tasks.

The Group Assignments

The leader of the kickoff meeting explained that the four interdisciplinary groups would be formed from the following representatives for the HR Business Reengineering project: HR Business representatives, Information Technology, Trinity Consultants, and Performance Support team members-- all would participate in the process mapping sessions. These teams were named groups A - D respectively and the team members would be responsible for conducting an in-depth analysis of their respective business requirements. Each team would be assigned a team leader who was a representative from the HR Business community. I was assigned to work with Group A as a representative of the Performance Support team. The Performance Support team was responsible for completing a deliverable describing the performance support and usability requirements for each business requirement. The make-up of the team members as well as the business requirements we investigated can be found in Table 10. Two members of the Human Factors Engineering group specialized in quality and usability issues. They were also members of the Performance Support team and were responsible for floating from each of

the four groups A-D to set global and group specific usability goals. Group leaders assigned to each group were responsible for resolving issues that arose during the sessions. In addition, the group leaders worked extremely long hours with the consultants to make sure that all of the documentation was complete.

The step-by step approach to developing the process models consisted of ten step that progressed from collecting documentation, preparing the process maps and validating the maps with people from the HR business community. I participated heavily in the first two steps which were as follows:

Table 10. Group A Business Requirements

Group A *Team Members*	*Business Requirements* For each requirement only a portion of the specific requirement will be described in this Table.
Team Leader: 1 PS Team Member 4 Business Rep 6 Information Tech. 1 Trinity Consultants 2 12 **Usability members 2** **The usability team members** **floated between the four** **groups**	**Business Requirement 1.** Staffing: How would a manager or supervisor fill a position? Staffing tasks conducted by a manager or supervisor a. Define job positions within an organization b. Assign employees to positions c. Change employee positions through transfers, promotions, and other job changes
	Business Requirement 2 Maintain Full Time Equivalency (FTE) and headcount information a. Determine employee's FTE by using a specific equation b. Identify open positions authorized to be filled
	Business Requirement 3 Maintain employee's work schedule a. Set or change business unit schedule b. Change from full-time to part-time schedule and vice-versa
	Business Requirement 4 Maintain Full Time Equivalency (FTE) and headcount information a. Determine employee's FTE by using a specific equation b. Identify open positions authorized to be filled
One goal of the Performance Support team was to look for opportunities to apply performance support solutions and usability strategies.	

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Step 1: Collect and review all documentation: When I attended the process mapping meeting team members who participated in the Business Functional Requirements brought relevant documentation to the meetings. I must say that I learned a tremendous amount about the activities surrounding the staffing process. The team members that represented the business units for staffing were very knowledgeable and were very patient in helping me understand the process.

Step 2: Team session to build the process map for the Reengineered HR processes. This step was the actual sessions where the process maps were generated.

The kickoff meeting ended with the following major issues emerging:

1. The project leader in charge of the functional design phase wanted to know how we would know if we had truly reengineered? This question related to the overall purpose of the HR Business Reengineering project.

2. Thomas was asking questions during the meeting that may have been taken as challenging by the Performance Support team leader. In addition, Thomas's personal style of confronting issues directly and openly in meetings was not compatible with many participants on the HR Business Reengineering project. Thomas was the main leader for advancing the issues surrounding performance support. This issues will be discuss in depth during Chapter 5.

Description of the Business Process Mapping and Workflow Analysis Activities

The workflow analysis and process mapping procedures were facilitated by a large consulting firm. The representatives from the consulting firm facilitated all of the sessions. I was responsible for attending all of the business process mapping and workflow analysis meetings for Group A. During these meetings, the HR representatives from the business area would describe in detail how processes, tasks and steps involved with the staffing

business requirements.. It was explained at the initial processing mapping session that the ground rules for this process were to first envision how you would like staffing to work in the future regardless of any of the barriers that might currently exist. In addition, the Group was to not make any suggestions based upon the functionality of the purchased HR information system, Trinity. In short the process maps, once completed, would reflect the reengineered process or the new way to complete various work tasks as created and described by some of the team members.

During the meetings when the other team members would talk about the New World, I was really lost. I was not familiar with the jargon. It was not until a team member explained to me that this project was trying to expedite the process mapping procedure by recognizing the current way things are done in HR but concentrating during the process mapping sessions on the New World or rather on how one would want the redesigned work process in HR to flow without looking at any barriers. In essence the HR Business Reengineering project team members were ask to pretend or assume that if you could redesign the HR department, starting with a clean slate, what would the work process look like? In essence, the new 'HR' world.

As a Performance Support team member, my job was to look for ways that information technology and performance support solutions could be used as an enabler for implementing the new work process. It was also the job of team members to ensure that work processes were not haphazardly glossed over. Managers stated in an Internal Document (1993) that because HR had recently reorganized and some HR processes had already been moved out to managers and supervisors, some of our customers may view this project not as HR reengineering, but as HR *"Throwing work over the fence."*

I worked extremely hard to be able to participate in the process mapping workflow analysis meetings. I felt as if I was just dropped in an unfamiliar society and was required to be productive right away. For the first few weeks I was introduced as a doctoral

candidate from Va. Tech university by a team member and generally I would then say a few words about my study. After the meeting started I would began audio taping. Each evening I would listen to the tapes in order to quickly learn the jargon and the type of staffing work that was being conducted at The Company. It was also helpful for me that I had a MS degree in Human Resources. Without the assistance of the audio tapes and some background with Human Resources, I would not have been able to assimilate into the organization as quickly as I did.

When analyzing how the new staffing processes would be completed, The Performance Support team created templates to collect the data. One of my tasks was to assist with the collection of information related to the staffing business requirement. Information relating to performance support would be placed in the performance support / usability template. During the process mapping meetings many of the members of Group A were familiar with some aspects of concepts from performance support. An example of a performance support solution applied to the staffing process was the suggestion of having a data base hold the various types of employee work schedules. So when an employee wanted to change his or her schedule, the new HR information system would have the capability of modeling the effects of the change. Another performance support solution was to provide "intelligent forms" as well as "cue cards" that were designed to guide an employee through a procedural process.

The Performance Support team leader discouraged the Performance Support team from looking at the Trinity HR Information System during the process mapping sessions. The concern was that the team would provide reengineering solutions that were based primarily on the Trinity software. Also, we were always encouraged, during the processing mapping sessions to be creative and not to limit our thinking but to 'think out to the box'. More specifically, to think out of the box meant not to let any current knowledge about the HR work processes or the Trinity software influence putting forth new ideas.

Our goal was to change work process through the use of information technology, not to just automate a process.

Managers seeking returns on Information Technology investments, according to Davenport (1993), must strive to ensure that process changes are realized. In fact, if nothing changes about the way work is done then the role of Information Technology is simply to automate an existing process, and economic benefits are likely to be minimal. In addition, if the goals are not met for the project, many times the new idea, such as the performance support solutions, will likely be blamed for the project failure.

The Trinity HR Information System as an Enabler and Constraint of Process Innovation

Information Technology can have an important impact on supporting the business reengineering process. For this project, the Trinity HR Information System was one of the primary enablers for The Company making the reengineered changes. During the process mapping sessions, the Trinity software consultants were present during the sessions and they commented several times on the functionality of the Trinity software, but the team was always cautioned that the Trinity software was not a factor in generating the process maps. The team was to ignore the current information systems and reflect only on how they envisioned the process working in the future. This aspect of the process mapping sessions was never entirely clear to me because The Company had made a commitment to implement the new HR Information System, Trinity. During the process mapping sessions, someone from the team would periodically ask the question : Are we mapping the processes and work flows that represent how we do HR work today or are we mapping the processes and work flows for how we think the processes should work in the future? This question was even asked after the process mapping sessions were complete and the team was moving onto the next phase of the project: the functional development stage.

The HR Business Reengineering project leaders did want the process mapping sessions to be a way to generate innovate ideas for how to conduct the work in the HR throughout the company without focusing on the Information Systems. However Davenport (1993) argues this point:

> It is easy to suggest that firms ignore existing systems and technology infrastructures in designing a new process, but it is seldom realistic to do so. Existing systems are often too expensive, complex and embedded in an organization to simply assume them away. Instead of pretending to have a clean slate, firms should acknowledge the constraints existing systems impose on a new process, understand their implications and make the best of them.

Even though the process modeling team was not looking at the constraints of the Trinity HR Information System, the Information Technology team was. They were looking at the detailed technical issues of the software in parallel to the process modeling sessions. An issue that emerged with the detailed technical look at the Trinity software was that the Performance Support team needed to be involved with those activities too. According to Davenport (1993) opportunities for supporting process redesign with Information Technology can be found in several different categories. Table 11 describes several of the Information Technology strategies used to support business reengineering. The following Table has be adapted to include possible performance support solutions discussed during the HR Business Reengineering project.

Table 11: Types of Information System Design Solutions
Adapted from Davenport (1993)

Impact on Information Technology on the Process	Brief Explanation	Possible performance support solutions
Automation	A common benefit of information technology is the elimination of human labor from a process. It is extremely important that with having the managers performing these additional HR Task if the system could automate routine procedure, the system could potentially prevent the manager or employees form making costly mistakes.	This was an important aspect of customizing the Trinity software. Pre-filled out forms.
Informational	Capturing process information for purposes of understanding a process.	Policy and procedures were designed to be placed on-line.
Tracking	Closely monitoring processes status and objectives	This type of information technology solution was proposed to keep tack of the number of employees and Full Time Equivalency information. A database was also proposed to keep track of the various work and leave schedules provided available to an employee.
Analytical	Improving analysis of information and decision making	Decision support systems would be installed to guide a manager through processes that managers do not normally conduct.
Geographical	Coordinating processes across distances	There were slightly different process used by employees not working at the Corporate Headquarters. The system would make adjustments for the geographical location of an employee
Integrative	Coordination between tasks and processes for example employee data would be entered once and accessed by other processes	Once an employee filled out information during orientation, it would not have to be entered again during the benefits selection process.
Intellectual	To goal is to make expert knowledge available across an entire firm.	Not Addressed in the HR Business Reengineering project
Disintermediating	Eliminating intermediaries form a process	Eliminating steps from the process as well as any barriers One way was with scheduling the orientation process.

Meeting The Date: July 1996

July 1996 is an important month for the HR Business Reengineering project. It is the month that the HR information system, Trinity, is scheduled to be implemented company-wide. Meeting this date is important because the HR department did not want to lose credibility with the employees of The Company. Several HR team members identified time as the overriding driver for the project. Several HR managers describe the relationship in terms of time vs. resources vs. cost. According to one HR manager

> *Time is the driver there and the evidence of how strong the driver that is that we have ... practically no metrics on anything else... So you look at the triangle on time versus resources versus quality versus cost, well actually quality is supposed to be given in the middle. Time is the driver there.*
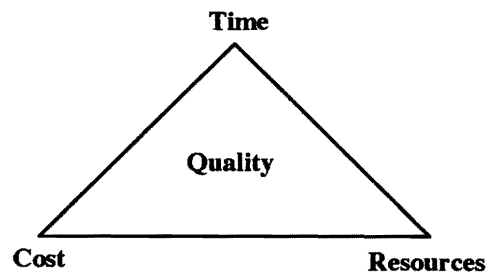
> *And the evidence of how strong a driver that is, is that we have no metrics. Practically no metrics on anything else. We have metrics around [Estimate Time for Arrival] ETAs. What's the plan, the plan of this project is ETA driven. Do you see any metrics in there? .. Do you see any measures in there about customer satisfaction? Do you see any measures in there about acceptance criteria? You don't see anything in there. You see time and date. And you're measured on time and date. So, until*

that changes [in] the culture,... if I am rewarded for doing
something by a certain time. You know, I'll try my darndest to
make it happen in a quality fashion but I'm going to be rewarded
on whether I meet the date.

An Information Technology manager views time in relationship to the functionality of the system, the resources required to developed the system and time. More specifically the Information Technology manager states:

Time

Functions   Resources

Maintain Quality
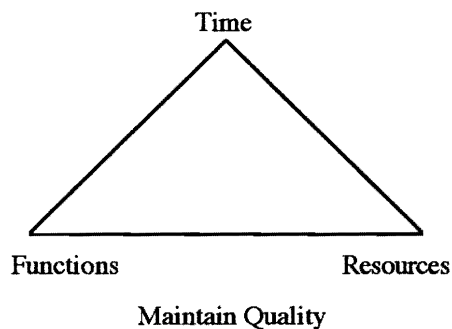
I'm aware of cost. I know what things cost. I know what our
daily rates are. I know how much time things take... I know
when people need things to hit the end date. ... I'm very much
based on, ... outcomes and deliverables.

There's a schedule... There's a date that you're shooting for...
There's functions that are involved, you know, what's your scope
and there's resources, and you have to balance that triangle.
Resources are, people, money, computers. If, if you want more
function, is [it] in scope, in line ... you either need more people
or you need to change the date... You can get more resources to a
certain point and [it will effect] what date you can make. After
a certain point you can't add more resources and get more

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productivity out of it.. Same thing with date. So when you

change [your] date you have to look at resources and functions.

If you change [your functions, you have to look at date and

resource... They all impact each other and you have to maintain

the quality. So usually you're given something up or adding

something on all three sides.

The difference between the two descriptions of explaining project management was with how quality was viewed in both descriptions. The first description placed more emphasis on time as it relates to quality whereas the later talked about quality in his description almost as an afterthought.

A member of the HR Business Reengineering project provided this view on how the reward system was designed to reinforce the importance of time and impacts quality.

... If the project leader is rewarded only on meeting the July 96 [he is

referring to the July '96 date] deadline then they are going to find a way

to do it. They are going to find a way to do it and it might not be the

right way.

The reward system in The Company will be discussed in more detail in Chapter 6. However, in both descriptions provided above as well as in many of the conversations held formally and informally the July 1996 date was the overriding factor for the customization of the Trinity HR Information System. To meet this date several HR Business Reengineering project team members saw the compromise being made primarily on sacrificing quality or the proposed performance support and usability recommendations of the system. One HR Business Reengineering project team member believed that because time was the primary driving focus on the project, decision makers did not feel it was

necessary to invest time in following a formal system development methodology. On the other hand, because the team members working on the HR Business Reengineering project were not developing the HR information from "the ground up" many traditional system development models did not apply. According to Davenport (1993) "there were no methodologies or formal approaches, or even structured list of ideas, for using Information Technology to bring about [business] process or procedure change". The team members working on the HR Business Reengineering project were forging new ground and to help the team meet their July 1996 date, a large software consulting firm was hired. Their main role was to assist the members of the HR Business Reengineering project team in following a plan. The content of this plan documented a strategy for completing the work on the project as well as the roles and responsibilities for each team on the project.

System Development Methodology vs. Framework

Many successful system development projects have a formal plan and some type of measure to ensure that the project was a success.   This consulting firm was known for their successful software development strategies. An HR Information Technology manager explains how the consulting firm was brought onto the project.

> *Because we had no methodology [no formal plan for guiding the team members through the system development process] whatsoever it really bothered me for a long time as I told you. ... back months ago, you know, the last project that I did we used a formal systems development methodology. ... [On this project] we needed to know more about methodology. We needed to have someone who was very familiar with methodologies and with large projects to help us and I kept pushing for Brandon [the consultant who worked for the firm]. ... I was able to have*

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him come in and meet the [HR Business Reengineering Project leader] and talk to them and, of course, he brought with him the [system development plan that we are following now] which is not a methodology. It is a framework [which] is looser than a methodology. A methodology is a cookbook approach. [This approach] is not a methodology. It doesn't give us the steps and we're still inventing steps as we go along. It recommends a certain teamwork structure. It recommends the way those teams ought to work together. It describes the deliverables the teams are responsible for. What it doesn't give you are the steps you need to follow to get the deliverables.... and that's why it's not a methodology. To adopt a methodology midstream, we might have to start over and we can't afford to start over..

In early March, the team leaders of the HR Business Reengineering project presented a status meeting on the project. Until this time, I had not seen a formal system development plan for the project. During this meeting, the framework for how the work would be done and the roles and responsibilities for each of the six groups were presented. I had a difficult time seeing the overall picture and how the work that I did with the Performance Support team fit into the plan. This project was different from other system development project that I was a part of because the team was not developing the system from "scratch" but were customizing a purchased product. The Performance Support team was now being called User Education / Performance Support during the meeting. When I saw the name change displayed from the overhead transparency, I did not know if that had any implications for the roles and responsibilities for the group.

Performance Support Team's Role During the Analysis Phase

In the fall of 1994, the leader of the Performance Support team and other members of The Company participated in a seminar with Gloria Gery via satellite. During this session, Ms. Gery spoke about viewing the different types of performance support solutions as Intrinsic, (performance support solutions developed in conjunction or internal to the computer application); Extrinsic (solutions are separate software applications developed to be invoked from the software application); and External (solutions require you to exit the software application in order to receive assistance). The concepts of performance support were new to the Performance Support team leader. However after listening to Ms. Gery talk about the three types of performance support designs, the Performance Support team leader was able to explain the general concepts of performance support in relationship to the terms Intrinsic, Extrinsic and External. The Performance Support team leader further explained how Gloria Gery enlightened her understanding of performance support concepts:

> *I had the light bulb go off for me when I was struggling with all of this [the performance support concepts] trying to figure out what all this meant. Last fall she [Gloria Gery] did a DBS that The Company tapped into and those were the terms that she used, they made a lot of sense to me. I had some subsequent discussions with a [senior Corporate Education Manager] and some of the [Performance Support team members] folks [here like] Thomas and others; [I also] read her book.*

In addition, Thomas distributed copies of Ms. Gery's book to other members of the HR Reengineering team. These activities were steps taken to provide awareness to individuals about the concepts of performance support. Because the concepts of performance support

were new, the perception of what the Performance Support team was about was varied on the Performance Support team as well as throughout the HR Business Reengineering project.

Performance Support Systems Defined by Individuals not Participating on the Project

There were many suggestions for describing the performance support concept. Some interviewees acknowledged that the fundamental concept of performance support was not new while providing a traditional description for user support in the definition. For example current and past employees have benefited from the assistance of paper-based job aids, instructor-led training, and help from co-workers for years   However, what makes a progressive or evolutionary definition of performance support different is the degree to which the assistance maps with the work and is integrated into the computer system.   Sylvia, who was a member of the Human Factors Engineering group, but not apart of the Performance Support team, provided me with her thoughts about the definition of performance support. Of all the people I interviewed, very few people specifically mention how the concepts of performance support would be able to support the knowledge worker- the worker of the future.   Sylvia provided the following description of performance support:

Well, I think in the broadest term it [performance support] is just a new way of thinking about working... I mean I am starting to think it's more that just cue cards and wizards. To me in the broader sense it's much, [bigger]. Cue cards and wizards help me understand how to use that tool. OK. It helps me understand how to use it and learn it quicker... But I think performance support is much bigger than that. I think it's a way to work and a way to look at [or] a different way to look at how we

should provide tools for the knowledge worker. [I think] a performance support tool ... it's one way to provide information or provide an application on-line to enhance people's performance... I think I have, .. I may have a very broad definition of what performance support is... I think performance support [starts with] individuals [who] have a job to do. Part of doing that job is learning about the business, learning about the job, learning about the tools they have. They may go to a class, you get some learning out of that but really how you learn is by doing- doing your job. So I think a performance support [system] is what I give to that person to help them learn more quickly. To help them enhance their performance you know, that's what I think as a performance support [system]... Today, we are dealing with the knowledge worker where we are helping them to make decisions and to process information.

A senior training manager of the Corporate Education Center also had a broad definition of performance support:

Okay. I've a really broad definition [for performance support], and it comes from the training perspective. I consider performance support as being the activities you do so that someone is able to perform their job or an experience that allows them to, be able to do something differently, but it's very experiential. It's, you know, people say it's learning and doing and, or doing and learning. You do first and then you learn as a, as a subset and the breadth of it ...

Of the people that I interviewed for this study, but who were not a part of the HR Business Reengineering project, were familiar with the concept of performance support but not necessarily with the specific terms.

Performance Support Team Members' Perception of Performance Support

The educational background of the Performance Support team is a reflection of how software development, in general, is moving towards a multidisciplinary group. The future of designing large software applications whether for computer based training or a business application, will require a multidisciplinary development group. Table 12 describes the background and expertise of the Performance Support team members.

Table 12 Performance Support Team Members' Expertise & Background

Performance Support Team Members		Expertise Background
Performance Support Team Leader 1		• Career within The Company • Experience working at The Corporate Education Center as well as experience with working with various HR businesses
The following Performance Support team members helped to provide credibility with the Information Systems group because of their extensive background with business information system development		
Performance Support Co-Team Leader	1	• MBA • Over twenty years in computer programming
Performance Support Advocate	1	• Mathematician/ System Analyst • Years of experience with Human Resources
Instructional Designer	1	• MS Degree in Instructional Design
Was placed in a liaison position where he was called upon to bridge the gap between the Performance Support team and the Information Technology team		• BS degree in Computer Science
The following six Performance Support team members influenced and provided awareness about performance support in meetings and one on one contact with individuals on the HR Business Reengineering project.		
Instructional Designer	3	• MS Degree in Instructional Design
Instructional Designer	1	• Graphic Artist / Computer-based training developer
Usability representatives	2	• Six - Eight years of on-the-job experience with working with usability issues

The leadership of the Performance Support team was required to push forward the performance support concept to the Information Technology team. It was imperative for the Performance Support team leader to not only understand the concept of performance support but to be able to articulate and debate the issue with senior Information Technology managers. The Performance Support team leader explained her view of performance support:

Performance support to me is really in large part what admission of what this team in reengineering is all about and that's enabling people to do what they have to do, when they have to do, in the business environment that they're doing their work in. That they don't loose time, they don't waste time, they don't make mistakes, they can get their HR work done in the context of the normal business day without distraction. On enabling people to do HR work in a seamless way, in a productive way, performance support to me is a vehicle and a tool to enable that to happen. So that they don't have to call people on the telephone and ask about how to do something, they don't have to go refer to a manual and lose production time, we don't run the risk of making mistakes and having to redo it or worse, having some type of compliance errors being made or fines being incurred. To me performance support is totally enabling someone to do what they have to do in the most productive, most efficient, the most effective way possible. To me it's all seamless. I guess to me the perfect best example of a performance support system is an ATM. I'm not a computer person. I have no computer savvy. I have very little computer savvy. I can

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go into ATM machine and I can do what I have to do in very little time

and get on with my business. And to me that is a perfectly 100%

performance supported system.

The performance support co-leader, who also had a background in information technology, was able to view the performance support concepts from both sides. He further explained:

In general I think the user support team's [or Performance Support

paradigm is performance support and as a group we tend to view the

world from that point of view and I guess you could say that's true for

each of the different teams and perhaps that's where a lot of the

problem arise is that each team has its own paradigm and because each

one is different and each focus is different that it's very difficult for

everyone to fully agree on everything

The Performance Support team members' educational and work experience background were varied. Team members did not have previous experience in working on a large scale system development project that looked to incorporate performance support principles. For that matter, there were very few people working for The Company who had developed systems similar to the Trinity project. With the definition of performance support being in a state of flux, employees from around The Company, as well as Performance Support team members embraced their own meaning of the performance support concepts. However many of the definitions of performance support fell somewhere on the continuum of non-electronic traditional user support solutions such as paper based job aids and classroom training to electronic solutions that are fully integrated with the software application.

Some Performance Support team members viewed the concept of performance support aligned more with on-the job training that is designed to help accomplish a task. The overwhelming sentiment from the Performance Support team members was that the primary goal of a performance support system was for an employee to perform a task and learning the task was secondary.

For instance one Performance Support team member states:

Here when you're implementing performance support, learning becomes secondary and performing is primary. Performance is key. Performance is number one. So you want to ensure that they can perform whatever task you want them to do. At least in the business environment. You don't care if they learn about it. Learning will come secondary. After you do it [the task] five or six times you'll start to learn how to do it. Again with performance support, learning's secondary, the task is primary.

Even though learning is not the primary focus of performance support, many still provided a definition that included the word training. On team member explained his view of performance support:

Performance support is more or less on-the-job training... you start doing a job and you get trained as you do the job [and] you've supposed to be competent or proficient, not to a high degree, but proficient enough to do the tasks that you need to do...

A fellow instructional designer echoes this sentiment:

It is simply, it's just in time, just enough, ah, I don't want to use the word training, but I mean it's exactly that. Support. It's, it's innate .. something that allows a person to get done what they need to do at the time they need to do it.

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Another team member, who has a background in graphic design added: *"that the focus is on the accomplishment of some task. If you learn something swell, if you don't that's OK too. That's how I would characterize the performance support system."*

A similar view was provided by a team member with a background in instructional design: *"Performance support means that I would not need any training for it [to complete a task on my job] It's going to help me do my job [so] I don't need to look in documentation for help."*

The Performance Support team leader held these views on the concept of performance support :

> *The Performance support concept means anything that the user needs to get their work done, whether it's a checklist, um, take the shape of paper. Ahhh, tutorial, um, CBT[Computer Based Training], um, just anything. Maybe even a manual. A small card. An eight and a half by eleven cheat sheet. You know that's how I .. . [define it].and maybe I'm wrong, but that's what I define it as you know.*

She further explained a performance support system as:

> *To me a system would be on line, like the project that we're working on how, um, I see different kinds of performance support tools for the interim process versus implementation of the system we were recommending, um, for the business requirements that we worked on. Um, we were recommending basically paper type things for the interim process versus ... on line type support. . .*

The performance support concept had various meanings for members of the Performance Support team. It was very important that the Performance Support team members have a good common definition of what performance support entailed because the

team was responsible for educating and influencing members of the HR Business Reengineering project on the importance of performance support.

In addition, the definitions of performance support that were provided by the Performance Support team were not too different from the several Information Technology team members. For many of the Information Technology team members the concept of performance support was new to them.

Information Technology Team Members' Perception of Performance Support

An experienced Information Technology manager who has been in the field since 1970 provides this explanation on the performance support concept:

Again performance support is new to me. . .. . .and so traditionally I have looked at systems in terms of their ability to help people understand what they're doing within the system and that's been tutorials. It's been documentation. It's been on-line, help. It's been meaningful error messages. . ., some navigation in terms of usability where you design the interaction with the end user so that, ah, you can direct them through a work flow. Okay. But it, it is primarily a system that does functionality and there is some aids within that system to help people understand what they're doing. It is not usually set up or designed to help people learn as they're working with the system. It's usually set up to give them information to help with the job. Not necessarily train them in how to do their work. That typically happens with special training. You train people. We bring them in and we put them on, on the system.

Another HR Information Technology manger, who had work experience with a large company who had implemented some performance support initiatives, provides a different account of performance support:

The concept of performance support is definitely not new.... The term performance support, um, I think you [the Performance Support team] had a lot of discussion at the beginning of the project because people at The Company had associated performance support totally, in my mind, when I start talking to people [about performance support]... it was the automated side of it. If it was performance support, it was on line access to something. . . .versus in addition on this project they defined it as performance support [which] includes that side as well as a paper document or a checklist or etc. That's the way I understand that you use. . .it here, which is the traditional training support. ....

The Information Technology manager goes on to provide an example at The Company that represents the characteristics of a performance support tool. Another manager, who came onto the project after my arrival to The Company, was not familiar with the term performance support and shares her views on performance support in this way:

No, I had not heard of that term, performance support. I must tell you though that I have heard of user support and I had management responsibilities at a usability lab for about a year.

I think that performance support [concept] has... like leaped ahead in that ... I've got to say Microsoft has probably pushed it, pushed it ... that is performance support really I think like cue cards and just in time stuff you need, not the formal training up front but just in time where you're into a process and you're stuck and you don't need to call on the

phone you need that help now. You know, it's seven o'clock at night and you're trying to get an Excel spreadsheet out the door for a budget and you're stuck .. you know, [performance support] its that just in time stuff... [However the words] performance support system means nothing to me... it just has, that has no connotation to me. I have... a problem separating, I think it's probably just better if I tell you what I think a system should include because with my background I always look at things in totality. So, when I think of a system, I don't only think of it in technical terms, I always think of it in terms of workflow, procedures, processes, down stream vocations, impacts outside of the system.

Another Information Technology team member, who had a background with developing expert systems, provided the following definitions for a performance support system:

It's real tough for me to describe it. I'd say it would be a combination of different things that would help the person using the system, in place, so that they wouldn't have to go for classroom training to help out, so they wouldn't have to reach for a manual to get some assistance as to how to do something, that the software itself would be relatively easy to use, and where it wasn't, there would be assistance built in ... It could be some built-in expert system support that would help them make some decisions. It could be a combination of different things, not any one thing, but in totality, that with the system would reduce the educational support needed to roll out a system and to maintain it as people turn over and new things occur. It's that kind of an assistant-type thing that would help a user better use their time, reduce training

requirements and allow them to do their job. A thorough, one-stop

process where they could sit down at the terminal that they used to

enter things and it would be the terminal that would train them how to

do things.

Because the Performance Support team members were also responsible for influencing and

educating people, especially the Information Technology team, about performance support,

it was imperative that the concept of performance support was presented consistently to the

HR Business Reengineering project members. Many times the window of opportunity for

explaining and influencing members of the Information Technology team was small.

The Culture of the Performance Support Team in Contrast to the Information Technology Team

As discussed previously, members of the Performance Support team were made up

of several different groups mainly from the Human Factors Engineering group and from

the Corporate Education Center whereas the Information Technology team was made up of

database specialists, people with mainframe experience as well as with experience working

with client/server technology . When describing the difference between the Information

Technology team and the Performance Support team, an Information Technology team

member provided the following comment:

... You know [Information Technology folks generally] tend to be, you know,

pragmatic, logical, you know sometimes pretty creative but, creative in a, ..

sense that requires some closure. . .they need, ... need, ... to have answers.

They want to have, you know, solutions. They want to understand .., in

most cases why they're doing something. But they, definitely need closure.

The HR people tend not to be. They tend to be much more perceptive,

much more open to possibilities [and] not as interested in closure. If you -

are you familiar with Myers-Briggs type scale? The IT[Information Technology] people tend all to be, you know, not all, they tend toward ISTJ personalities and the HR [Human Resources] people today ENFP.

Another Information Technology team leader provided this view:

They're thinkers and they're analytical and they're sensing and they're introverts. Most everyone in my organization is an introvert. [their] Focus is technology centered. . .Versus? organization and people centered. ... They're introverts. You know, they're, these are the letters [The team leader proceeds to talk about the Myers-Briggs letters ISTJ] They're introverts, sensing, thinking. . . Judging. ...Okay. and most of the people [Human Resources people] ... at some of those meetings are huge Ps [Which stands for Perceiving]. . .

The Myers-Briggs (1987) personality type indicator was a popular instrument being used at The Company. This test was used to generate understanding of personality and work differences of team members on the HR Business Reengineering project. I was not able to find documentation to support the Myers-Briggs test being given to the Information Technology team. The acronyms given in the previous quote are defined as follows: ISTJ stands for Introvert, Sensing, Thinking and Judging, whereas ENFP represents Extrovert, Intuitive, Feeling and Perceptive. In layman's terms the Information Technology team members were generally ready to "just do it" or to just complete the deliverables right away whereas the Human Resources folks were seen as generally more interested in the process. People on the project viewed the Performance Support team as being aligned with HR, because the team was charged with being an advocate for the users, which who the HR consultants and managers.

It is important to note that the Myers-Briggs tests are primarily used to promote understanding and provide clues as to how one can understand others, however many

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times, if not used correctly the Myers-Briggs test can be used to quickly label people. For the purposes of this study I am not advocating the validity of the Myers-Briggs personality test but solely describing how it was used and applied by managers at The Company.

Joe describes the culture of the Information Technology team vs. the Performance Support team as follows:

(Long pause) I think I, IT [Information Technology] people are, more concerned with delivering a product that meets the specifications as, as they've been developed and, so their, their whole existence, their jobs, their performance is all based around how well they do that and how well they. . .deliver a product that meets, ah, everyone's agreed upon conception of how it will work and, so that's their big challenge. Always to really flush out the, ... true design of the product and what's really needed as opposed to what they have heard, which is not always what, is needed... That is their culture to, flush that out [user requirements] and to, and to balance that, and deliver a quality product within the time frames.

He goes on to describe the performance support culture:

And I think that performance support folks probably don't have the same, perimeters around their goals. Their goals are on going. They're, they're throughout the life cycle of the product. And I think that, unless performance support issues were addressed during the design process, there will be an inherent conflict between the (unable to transcribe 24.6) performance support people after [the] design is completed and IT people because usually it will be a request from performance support people to the IT group that we need to change this[the requirement] because. . .

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He described an issue that could promote conflict between the two groups.

> *. . .You know, [if] we're having users that are stuck on,[or] in certain*
> *areas and the system doesn't properly prompt them to the next step for*
> *some reason. So that becomes a design flaw from a usability*
> *perspective. Although it may have completely met all of the criteria*
> *that the IT people needed to deliver [a working system]. So, you*
> *know, those, [issues] can cause conflict between the two, communities*
> *[performance support and information technology].*

He goes on to sum up the cultural aspect of the Performance Support team and the Information Technology team and goes on to predict that:

> *From a cultural perspective, if [the] performance support [team] is,*
> *completely separate from information technology, then, you definitely*
> *will get, cultures and paradigms that are unique to each organization*
> *which probably will cause them not to work as well together.*

Performance Support Team Meetings

While I was assigned to the project, the Performance Support team met every Thursday morning at 8:30 for one hour. The purpose of the weekly meetings was to determine and implement a strategy for how the Performance Support team would provide performance support solutions for customizing the Trinity software. These meetings sometimes "got off track" because the team did not have extensive experience with incorporating performance support solutions into a traditional system development process. Therefore the team meetings were used to plan our deliverables as well as debate the need for various tasks proposed by the team. These debates surrounded the need for conducting contextual interviews and the strategies for collecting data during the processing mapping sessions. It was extremely hard for me to participate in these meetings because my roles as

researcher (participant observer) and Performance Support team member was so intertwined. During the meetings, my two roles were in conflict. I found it difficult to observe the group, take notes, and generate creative ideas simultaneously.

As with any team, communication was an issue: communication between the project leader and the team members along with communication with the Performance Support team and the Information Technology Team.

As I listened to some of the Performance Support team members describe their relationship with various members of the Information Technology team, I was getting a sense that the Information Technology team was not familiar with or did not fully understand the mission of the Performance Support team. For example Anthony was constantly trying to gain an equal partnership with the Information Technology group and he was not admitted to the group until he proved his technical knowledge to members of the Information Technology group. Anthony believe that because information was now being shared equally, he was gaining acceptance within the Information Technology team. Since Anthony had an undergraduate degree in Computer Science and a MS degree in Instructional design he could easily float between both the Performance Support and Information Technology teams. His skills moved him into a new role where he was the liaison between the performance support group and the Information Technology group. The fact that Anthony was moved into a liaison role was a critical event for my study and will be discussed in detailed in Chapter 5.

Anthony primarily worked with the Information Technology team members who were responsible for the logistics and system development aspects of customizing the Trinity Software. Having Anthony in this role also helped me to identify and gain entry to the Information Technology team members in order to conduct several interviews. The Performance Support team was always looking for ways to influence and educate the Information Technology team on the importance of incorporating performance support

solutions into the project. Anthony was able to inform the Performance Support team when Information Technology project leaders views on performance support could have been a hindrance for the team. The following sentiment was expressed by the Performance Support team leader in an April 3, 1995, e-mail message:

Anthony shared the concerns he heard from an Information Technology project leader's views/concerns re: perf support [regarding performance support] and I'll [The Performance Support team leader] with the Information Technology team leader, this week, begin to resolve [this issue] Important Note: While we need to acknowledge the Information Technology team leader's (and other team member's) views/concerns re: perf support [regarding performance support] and how it contributes to the overall project, and try to foster/build understanding, BOTTOMLINE; If we have the business case to support our recommendations, the decision will be made on that- not on any individual's personal opinions or beliefs. That's how we got approval for the funding and approach... that's how we'll get approval in the future. Please try to keep this in mind, and don't let other views/opinions get you down. If the sponsors did not believe our role was critical to the project's success, we would not be here. Thanks to Anthony for passing on this info. I'll keep you all posted.

Lack of communication occurred between the project leader and the team members mainly when it came to identifying what the team was supposed to deliver. Because time was always an issue and the team members were new to this type of project, it was difficult to always know what you were responsible for completing. In addition, the team was always reminded of the importance of completing our performance support analysis and performance support suggestions that would reflect "the right 20% that will net 80% of the

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value" (Monday, April 3, 1995, E-mail message). That saying was common at The Company.

Performance Support Deliverables

The Performance Support team's role and deliverables were never stable. A deliverable was the tangible results the team was responsible for completing. In April a critical event occurred when the Performance Support team leader informed the team that our role was broader than she had originally expressed to us. An April 7, 1995 e-mail message to the Performance Support team members from the Performance Support team leader included the following FYI in her message:

We are still figuring out the details of this next stage [moving from the analysis stage to the functional specification stage] .. Performance Support will be included in both deliverables, since some of our solutions will be intrinsic to Trinity, and others will extrinsic or external Our team's role will also be much broader than performance support and usability, to include detailed design of all non-Trinity solutions; including: organization structure changes, job changes, procedures, paper-based forms, routing and distribution, etc. We'll talk more about this on Tuesday.

As the week progressed, an April 10, 1995 e-mail message acknowledge that the Performance Support team had experienced another name change. The performance support project leader provides the following explanation:

Please note that (for now) our team will be called: User Support, not User Ed or Performance Support. While PS [Performance Support] and Usability are 2 of our key deliverables, our team will be accountable for much more than that. We'll discuss at our planning session tomorrow. After that, if we can come up with a better name, let's do it.

After this announcement of the Performance Support team's new responsibilities, several of the team members were feeling overwhelmed about how to meet the team's broader obligations. As a result, the following mail message was sent to the project leader by a Performance Support team member:

> *Based on our meeting the other day, a number of us were feeling really overwhelmed by the scope of our task, the resources required to meet the needs, and the skills required by those resources. Personally, I don't have a good mental picture of these items and I am finding it hard to put everything in perspective. Others may feel similarly. To help give us better perspective, do you have this information in a landscape [Document], or some other representation. I know something like this would really help us.*

The Performance Support team leader responded to the above e-mail message but it was not until Anthony, another Performance Support team member, sent an e-mail message reiterating the sentiments in the first message that the Performance Support team leader agreed to met to clarify the team's role and responsibilities by calling a meeting. During this meeting on April, 28 1995, the Performance Support team leader outlined, in detail, what the team was responsible for and set the priority for each deliverable. To complete some of the deliverables expressed in Table 13 the Performance Support team leader would hire new employees from within The Company as well as outside contractors. After the meeting, Performance Support team members felt more comfortable having the written document that outlined their responsibilities.

Table 13: Performance Support Team Deliverables

Topic	Description	Responsible	Deadline
User Awareness / Change Readiness Activities *Supporting the end-user*			
Communication / Marketing	Goal: 1) To develop and maintain awareness, buy-in and demand within our end-user populations so that they are ready and willing to use the HR information systems and process when they get it 2) to develop and maintain understanding, buy-in and ownership within our IT support staffs, HR professionals, and other key stakeholders so that they endorse and advocate use of the reengineered systems and processes and share accountability for the project's success (Internal Document, 2/1/95)	External Consultant others TBD	5/95
Environmental Scan	Gathering information in order to understand the end-user's working environment.	Ella, Karen (Performance Support team members) others TBD	TBD
Change Readiness	• Identify major differences between today's process and procedures and 7/96 • Develop & implement strategy & approach to prepare people for change	TBD	TBD
Business Process Reengineering Activities			
Process Mapping	• Performance Support / Usability Goals • Detailed design specs for meeting those goals • Develop & produce performance support solutions • Support testing & roll-out	Entire Performance Support team	Currently involved in this task 4/28
Reengineered Business processes surrounding the Trinity Software	• Define Requirements • Develop detailed specifications • Develop / produce these components • Test and roll out the final product	Entire Performance Support Team	Currently involved in this task 4/28
Audit Control	• Detailed design Specification • Develop & Produce • Test and Roll-out	Audit Team	Currently involved in this task 4/28
New / restructured organizations and or jobs	• Define requirements • Develop detailed specifications • Develop / produce these components	TBD	Currently involved in this task 4/28

Implementing the use of the Trinity Software			
User Interface Design	Customize or redesign the Trinity User Interface. • High level design • Usability Goals • Detailed design specifications for meeting those goals • Usability testing and feedback	4 Performance Support team members	Currently involved in this task 4/28
Roll out Planning & Implementation	• Roll out strategy for Release 1, 2, etc. • User Identification & HW/SW costing •	Entire Performance Support Team	4/95 - 11/96
Desktop Problem resolution	• Needs analysis and strategy • Support procedures & reference • Test, Train, Roll-out	Anthony & Information Technology team members	7/95 - 6/96
Delivery Alternatives	For people who do not have computers • Define needs / Identify / Assess/ Recommend		
Support the Information Technology Staff			
Adjunct audience Support	This is support for Data Center, HR help line • Define requirements / goals • Detailed design specification • Develop / produce support components • Testing and roll-out	Entire Team	Currently involved in this task 4/28

With the role of the Performance Support team being broadened, many of the team members felt that it was only a matter of time before the recommended performance support solutions reflected traditional training and user support solutions: such as training manuals, instructor-led classes or computer-based training that is not integrated with the Trinity HR information system. In essence, the solutions would reflect the approach that the performance support consultants, who were no longer on the project, presented as an initial performance support strategy. In addition, it is easier, or people are more comfortable,

when the uncertainty of a new technology is removed and they are working more within their comfort zone and experience level, which for the Performance Support team leader, was traditional training.

The Performance Support team leader, during my time on the project, discouraged the team from spending time with the Trinity software. The Performance Support team leader felt that if the team had exposure to the Trinity software that it would influence our suggestions during the process mapping sessions. However, as the team was wrapping up the analysis phase of the project, the Performance Support team leader acknowledge that the team should have had access to the Trinity software early on into the project in order to assess its limitations as they related to implementing performance support solutions.

The HR Business Reengineering project was a very complicated project to describe. There were almost as many definitions for performance support as there were team members on this project. However what was consistent with all of the performance support definitions was recognition that the knowledge worker of the future will require a different way of accessing and using information on-the-job.

The critical events that occurred on the HR Business Reengineering project that impacted the Performance Support team are described in Table 14. In addition, Chapter 5 will provide a detailed analysis and interpretations of each critical event topic.

Table 14. Critical Events that Impacted the Performance Support Team

Critical Event Topics	Summary
The multiple realities of the performance support concepts and the Performance Support team's role	• There were varied descriptions or multiple realities of performance support concepts and the Performance Support team's role. • The organizational cultures of the Performance Support team and the Information Technology team evolving separately. • The expanded role to the Performance Support team included primarily solutions that did not include performance support solutions for the initial release of the Trinity information system.
Managing change and The diffusion of innovation: of the performance support ideas	• The Performance Support team leader did not express the need for a change management strategy to influence the Information Technology team on the importance of incorporating performance support solutions into the customization of the Trinity information system. • Placing Anthony in a liaison position working with the Information Technology team helped to provide consistency for describing performance support concepts and the Performance Support team's role. This concept, incorporating performance support solutions into the system development process was not looked upon as an innovation that needed to be managed.
Sponsorship for the Performance Support Team	• The importance of cultivating the informal relationships were just as important as the relationships with the sponsors and required some type of change management strategy.
Performance Support team leader's management style	• The Performance Support team leader's management style was very controlling when it came to making decisions related to performance support issues..

Chapter 5

Analysis and Interpretations

<u>Introduction</u>

Having the Information Technology team adopt the idea of incorporating principles of performance support into the system development life-cycle (SDLC) required the Information Technology team leaders to make a major paradigm shift. Fundamentally, on the HR Business Reengineering project many of the Information Technology team members were centered on the technology first and the users of the Trinity system second. Some members exhibited a technocratic mindset which is a belief that if you can get the technology to work the "rest" will fall in place. The rest refers to the helpful mechanisms designed to support the users with the software as well as the techniques used to ensure that a system is usable. Many of the Information Technology members believed that usability and performance support should be included with the SDLC model on a philosophical level, but the challenge for them was adopting the performance support principles into practice.

In contrast, the Performance Support team members' philosophy generally centered on the users first and the technology second. Many members held a belief that if you know the type of work users perform, the work environment, and attributes about the users, first then the technology and techniques can be applied to create not only a useful but easy to use system.

Regardless which paradigm some members of the HR Business Reengineering project subscribed to, the fact remained that the Information Technology team and the Performance Support team were all a part of one larger team, the HR Business Reengineering team. For a description of the HR Business Reengineering project teams, see Table 6. Several times the Information Technology team members and the

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Performance Support team members lost sight of the fact that both teams were working towards the same goal. Both teams were responsible for creating a useful and easy to use HR information by July 1996.

According to Rogers (1983), social change occurs when ideas are invented, diffused throughout a social setting, and either adopted or rejected. My research approach, as discussed in Chapter 3, provided an analysis and interpretation on how The Company incorporated performance support principles into a traditional system development life-cycle model. The research questions identified in Chapter 3 were expanded in the interview guide, which is found in Appendix C, and the following issues emerged from the analysis of the twenty-six transcripts and internal documents:

- There were multiple realities of the performance support concept and the Performance Support team's role.

- The process of incorporating performance support principles into the system development life-cycle was not viewed and managed as an innovation.

- Informal commitment and "buy-in" to the performance support principles from the technical leaders of the Information Technology team was not recongized by many of the Performance Support team members.

Multiple Realities of the Performance Support Concept and the Performance Support Team's Role

As described in Chapter 4 the concept of performance support and the role of the Performance Support team meant different things to different people. This was best explained by a member of the Performance Support team and a member of the Information Technology team who described their opinion of the role of the Performance Support team at a social event sponsored by the HR Business Reengineering project leader as a celebration for completing the process mapping (or the analysis) phase of the project.

Members on the HR Business Reengineering project, see Table 6 for a list of the team members, were invited; however several of the Performance Support team members did not receive an invitation. The day that the HR Business Reengineering team was to go bowling, the project leader asked me if I was going bowling with the group. I replied "No. I was not aware that everyone was going bowling." The HR Business Reengineering project leader apologized to me for not sending people on the Performance Support team an invitation.

However, one Performance Support team member did go bowling with the HR Business Reengineering group and he described his conversation with a member of the Information Technology team in this way.:

Because of my training, in my [Instructional Design] Masters program ,
I feel that, although I'm not nearly as advanced as the IT [Information
Technology] people are in terms of developing [software], I feel at
least I have, [or] I know a little bit about what they do, you know, I
know a little bit about their job, .. just enough to get me in trouble
probably. But I, I feel that, they[the Information Technology Team]
know very little about what we do.

He goes on to say:

... that proved true when they had a ... bowling get together about, three
weeks ago,[or] four weeks ago and it was for a lot of people that were
on the project, and there was a lot of IT [Information Technology]
people there and they asked me who I was and what group I was
working on and I told them user ed [one of the name changes that the
Performance Support team experienced]. And I said, [I was working
on] ... performance support issues and right away they thought, ah,
performance support, they thought well ... these are the people that are

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going to come and make sure, or to check [to see] how fast the Trinity software runs. They were thinking support of the performance ... .of the system. .... You know, I, of course I want it to run fast, but, hey, that, that has nothing to do with me. ... I don't know the interworkings of [the] Trinity [software]. I don't even know if it runs on a, .. database or what type of .., but ..., it doesn't matter. ... I don't really need to know that. ... But that's, that's what they thought we did and I'm like, "Oh, no. This is not good."

When I asked him how the communication could be improved between the two groups, he replied:

So first of all I'd say they [Information Technology team members] need to know what we [Performance Support team members], what we did and it really kind of scared me because I'm thinking, "Gees." I would have thought that they would have been clued in ahead of this... you know, even before they were really brought in very far in the project, they would have been really clued in on what we do so they don't see us as necessarily an enemy. I mean because the [person] I was talking to was kind of like, "Oh, yeah." She had her preconceived ideas as to what we were going to do and like, that we were going to be enemies because [she thought] we were going to try to push them to make the system faster. . .

During the interview with the Performance Support team member, he did not mention any names during our session so it was just by chance that I selected a person from the Information Technology team who was at the same bowling event and who also had

participated in the conversation with the Performance Support team member. He describes the discourse from that event as follows:

I first thought the Performance Support team were the people that monitored the CPU to see what was going on. What was boggin down things[on the computer] and that kind of stuff. But when I asked a member of the Performance Support team he explained that the Performance Support team was charged with helping to find solutions, not [to] develop anything and educate people on tools they could use. It sounded like a real ambiguous kind of thing and his position was just a BS kind of position...

When I proceeded to clarify the definition of the performance support concepts for him in further detail, he added the following comment:

But that's the thing, I mean it's a totally new concept. I mean they use to leave that kind of stuff up to the, the application people and of course, it never happened.

The discourse described above, combined with the perceptions of performance support concepts described in Chapter 4 acknowledges that the performance support concept is new and in order to promote this new idea throughout The Company a very tight, clear, and common definition of the performance support concept should have been provided and used consistently by each Performance Support team member.

When I asked another Information Technology team member, Joe, "if a client came to you and asked you to define the concept behind performance support solutions, how would you describe the concept to your client.", he responded:

Wow. That's that's a good question. I'm not going to, ... try and paint the picture that, I have a good solid understanding [of] what that [the performance support concept] might be... because if you look at most, ..

if not all, design methodologies, they rarely include performance support

discussions at all.

I intentionally included Joe's pseudonym because his perspective on integrating performance support principles will be expressed further in the diffusion of innovation discussion.

Several people on the HR Business Reengineering project (Business Representatives and Information Technology team members) did not know exactly what the Performance Support team was called to do on the HR Business Reengineering project, primarily because, as Joe pointed out in his above statement, performance support solutions are rarely included in system development methodologies. To include principles of performance support into a system development life-cycle model was a new idea at The Company and as a result a great deal of influencing and education on the performance support concepts, by the Performance Support team, was required.

Even though the performance support strategy was an evolving strategy, the team needed a definition of the team's role that could transcend project changes. In short, some consistency was necessary with the team's role. The team progressed from being called the Delivery team, the Performance Support / usability team, User Ed / Performance support, the Performance Support team and the User Support team, which was the final name change. As discussed in Chapter 3, the responsibilities of the team were never stable and often uncertain. According to Rogers, such uncertainty is common when someone is trying to promote change throughout an organization.

Diffusion and the Adoption or Rejection of the Innovation

Diffusion Defined

The operational definition of an innovation, according to Rogers, is "an idea, practice, or object that is perceived as new by an individual" (p. 5). When we talk about a new idea it does not matter if the idea is really new or not because the idea may have been around for a while but just was never accepted (Rogers, 1983). What is important is that the idea is perceived as new by the individuals you are trying to convince. The innovation for my study was the idea that performance support principles could be integrated into a system development life-cycle model.

Rogers, a leading researcher on the diffusion of innovations, argues that the diffusion of an innovation is "the process by which a new idea is communicated through certain channels over time among the members of a social system" (p. 5). Rogers goes on to say that because of the newness of the idea or innovation there is some degree of uncertainty involved with the process. Uncertainty, as defined by Rogers, implies a lack of predictability, of structure, and of information.

When the Performance Support team expressed the need for performance support solutions to the Information Technology team, there were concerns by both groups about how to program the performance support recommendations. Many of the performance support solutions were relying on a specific developmental software feature promised by representatives of the Trinity corporation. Also, several of the Information Technology project leaders and team members wanted to see working prototypes of performance support solutions manifested in a HR Information System before they committed to the performance support recommendations. Even though there were smaller examples of performance support available, several members of the Information Technology team

wanted to see actual screen designs, and functionality of the performance support principles embedded within the HR information system. In essence, the Information Technology team wanted more certainty that performance support for a Company-wide project of this magnitude was "do-able" and not just theory.

Diffusion is a kind of social change, where an idea is spread throughout a social environment. According to Rogers, "a social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members or units of a social system may be individuals, informal groups, organizations, and/or subsystems" (p. 24). On the HR Business Reengineering project, the project leaders were attempting social change on four levels. First, organizational change was initiated because the HR reengineering team was trying to reengineer the work processes and information systems. This change would require a different working relationship between the HR consultants, managers and non-managing employees working at the company. In essence the employees would be required to perform HR tasks that were formally done by the HR consultant.

Second, Information Technology team members were called to move from a primarily mainframe working environment to a client/server mainframe hybrid environment, which required the Information Technology team members to learn about new security issues and data exchange requirements for the client/server hardware environment. The years of experience many of the team members held in the mainframe environment would have to be applied differently on this project.

Third, the software designers were inventing a system development life-cycle model for the customization of software versus using a conventional system development life-cycle model for building a new system from "scratch." The Information Technology team did not have full control over the functionality of the Trinity software. This called for the Information Technology and Performance Support teams to influence and educate, as

well as to make a sound business case for software changes to the Trinity software. Therefore, changes made to the Trinity software fit into a specific boundary. This type of software development required a good working relationship with the Trinity consultants and the Information Technology employees.

Fourth, the Information Technology and Performance Support team members, and Trinity consultants were called upon to understand the relevance and business case for incorporating performance support solutions into the software changes made to the Trinity software. These four areas namely:

- organization change within the Company and the HR department

- hardware changes moving from a mainframe to a client/server environment

- customizing the software of a purchased product and

- system development life-cycle model changes i.e., incorporating performance support principles

were all major social change efforts in and of themselves. In essence, there were four major process innovation projects being attempted simultaneously.

When new ideas are invented, diffused, and subsequently adopted or rejected, social change occurs (Rogers, 1983). Because the HR Business Reengineering project leaders were attempting to diffuse four new ideas throughout the social environment to be adopted by July 1996, it would be difficult for each to succeed by the specified date. Each of the four social changes influenced my study. The sharing of the common objective to create a HR information system that was easy to use by all employees was marginally subscribed to by the HR Business Reengineering team members. The HR Business Reengineering team members became very polarized to achieve their specific innovation.

The performance support team's informal mission was to convince the Information Technology team that our performance support solutions were indeed "do-able" as well as point out where the performance support functional specifications fit into the overall system

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development plan. If the team was successful with diffusing our new idea, incorporating performance support principles into the SDLC throughout the organization, the Performance Support team would be well on its way to initiating social change at The Company.

In short when we look at how a new idea is accepted by the receivers the process contains four elements:

1. Proposal of the innovation

2. Communication of the idea throughout the organization

3. Time

4. Adoption or rejection of the innovation

In addition, Rogers suggested that it should not be assumed that all innovations should be diffused and adopted. The rest of this section will explain in detail how the four elements of diffusion were related to this study.

Element 1: The Innovation:

When Rogers describes how an innovation was not necessarily a new idea he states, "It matters little, so far as human behavior is concerned, whether or not an idea is 'objectively' new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation" (p.11). Therefore, even though one Information Technology manager believed performance support was not new in and of itself, the idea of incorporating performance support principles into the system development life-cycle was perceived as new.

Rogers also adds that the implication for a technological innovation is that for people who adopt the change, there will be some benefit or advantage. The problem according to Rogers is that the benefits or relative advantages are not always clear-cut to the

adopters of the innovations. Rogers further states, "They [the adopters] can seldom be very certain that an innovation represents a superior alternative to the previous practice that it might replace" (p. 13).

It was very difficult for Information Technology managers to see the relative advantage of the proposed performance support solutions because many of the Information Technology project leaders viewed the solutions as too new and the software development techniques unproved. It was one thing for the Information Technology managers to see wizards and cue cards in a spreadsheet to help the user easily create a pie chart, but it was hard for them to visualize how to implement that technique to help an HR manager inform his or her employees about health benefits. In addition, each team was always under a time pressure to complete the project.

Characteristics of Innovations

The characteristics of an innovation as applied to incorporating performance support principles into a system development life-cycle model were defined in five areas: relative advantage, compatibility, complexity, trialability and observability. Each of the characteristics will be explained as follows:

Relative Advantage: is the degree to which an innovation is perceived as better than the old way. Even though the sponsor of the HR Business Reengineering project approved the budget for the Performance Support team, the data does not support the Information Technology team members as accepting or acknowledging the advantages of adopting and implementing the principles of performance support on this project in relationship to meeting the completion date. Performance support was always looked upon as something "nice to do" if we had more time.

Compatibility: is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters

(Rogers, 1983). The principles of performance support that the Performance Support team were trying to implement were in direct conflict with the existing values and past experiences of many HR Business Reengineering team members. An original goal of the project was to customize the Trinity product so that it would be as easy as an ATM to use. In order to accomplish this task, a tremendous amount of customization would be necessary in order to embed performance support and usability solutions. The magnitude of the project was not realized prior to the Performance Support project leader's submitting the performance support business case to the sponsors. In addition, very few HR Business Reengineering team members had experience with implementing performance support solutions. An Information Technology member talked about how the experience level on the project affected decision making:

Really, I think that's fundamental here. I really think that's fundamental. You've got too many variables as it is to have the variable of inexperience driving the project. You need somebody in here that has done this multiple times, that can stand up and say this is exactly that. This is how we're going to do it, these are the templates, these are the teams, now we're going to start, do you have any questions, I will be at your meeting, we'll help you out, I'll walk you through it, ... I mean what you're in is reactionary and nobody understood process mapping, nobody knew .. going [in] what you wanted to get out of it what kinds of tools you'd need going down the line, how you were going to utilize this afterwards, so it wasn't like [the] known entity. This kinds of gets back to the no experience level on this project.

Complexity: is the degree to which an innovation is perceived as difficult to understand and use. Ideally and theoretically people on the HR Business Reengineering project "bought into" the principles of performance support. Fundamentally, members of the HR Business Reengineering project thought that support with a software application at the time you need assistance in order to complete a task was as a good idea. However given the constraints of the purchased software and the unchangeable completion date, the performance support ideas were perceived as "too" complex given the tight deadline for completing the project by some Information Technology team members. An Information Technology member, Sam, with years of experience in system development provided this view during on the topic:

> *My druthers is, I think it's important that we have something like in the area of performance support , that we make it easier for people to use. This is the type of system that we want to get on every manager's desk, so it better be well, be easy to use and ... So I think we need to get there. But my view of the initial implementation is that it's going to be in a centralized human resource support area. It's going to be for the specialist. It's not for the generalist. Much like the current system. The initial implementation of our software. Will not be on every manager's desk.*

He goes on to say:

> *It will be in a centralized operation much like payroll supports most of our human resource systems right now, they do all the data entry for us. And I see that happening with the initial implementation of our new [Human Resources] system, even though that's not the target. That is just the first step in the implementation. They are the*

specialists, they should probably not need a lot of training other than

things that we could provide them on a group basis.

According to Rogers, "some innovations are readily understood by most members of a social system; others are more complicated and will be adopted more slowly" (p.13). This was true with incorporating performance support principles into the system development life-cycle model. In addition, Sam saw that the adoption of incorporating principles of performance support solutions into the project would not be implemented in the first phase of the project but rather in a later release. Sam goes on and provided further opinion on the topic:

So I don't see EPSS as being an initial implementation issue. I think

we need to implement the software and get some experience with it.

As "plain vanilla" as possible. To get some understanding of where

there might be some performance[system performance] issues, where

there might be some network issues, where there might be some

usability issues that we didn't expect. And I'm sure all those things are

going to pop up.

Fortunately, doing a limited number of people in a centralized area, so I

don't see performance support as being something we need to provide

for initially, but once we start moving it out , once we hit those later

phases, which is after the middle of next year, and we start moving it

out to HR specialists, then we're going to have to provide some

additional support, and that's where I see EPSS [Electronic

Performance Support] coming in to support that initial roll out. But I

don't even view that as being the key part thing. I view the real need

for performance support is moving it out to the manager's desk.

Trialability: is the degree to which an innovation may be experimented with on a limited basis. The performance support concept was implemented on a smaller scale with a in-house product that was designed to assist any manager in completing a management plan. In addition this application provided the framework to ensure that all of the management plans for each organization were consistent. This example of a performance support application was looked upon as a small scale project and because it was developed solely by the Corporate Education Center, the project could not be an example of how to incorporate performance support principles into a system development life-cycle model.

Observability: is the degree to which the results of an innovation are visible to others. The easier it is for individuals to see the results of an innovation, the more likely they are to adopt. The Performance Support team was not able to produce the type of results that the Information Technology team leaders wanted in order to show them the capability of performance support solutions. Paper prototypes and applications from other projects that used performance support concepts were provided as examples. However, the Information Technology team leader many times wanted more concrete examples related to the HR Business Reengineering project.

Element 2: Communication Channels

Rogers suggested that "communication is a process in which participants create and share information with one another in order to reach a mutual understanding. This definition implied that communication is a process of convergence (or divergence) as two or more individuals exchange information in order to move toward each other (or apart) in the meanings that they ascribe to certain events" (p. 5).

<u>Communication Between the Performance Support & Information Technology</u>

<u>Team Members</u>

The communications between the Information Technology and Performance Support team members emerged as a huge issue. No one really understood the other team's viewpoint and because there was a tight deadline to complete the project there was not much time available to cultivate the relationships. Sam, a member of the Information Technology team, provided his opinion on the communications between the Information Technology and the Performance Support team members:

I think part of the problem is one of communications. We in systems [Information Technology Team] have really not dealt with performance support people before. We've dealt with the data base design people. We've dealt with the data center technical support people. We've dealt with the network people, so it's something new for us and I'm not sure we know how to do that or what we have to do. Some of the things that I've said previously were based upon my guesses, and I don't know because I've not actually talked to people who developed performance support systems. People like Thomas or some of the other people in that area. I think what we need to do is review what our real plans are for the [Human Resources] system, and the first step is going to be a centralized area and what do we need around that to support it. The next step is to roll it out this way.

The next step is to roll it out that way, and reach some agreement about where we can help each other out, or where we think there's some interconnection there, because again, initially, I don't want to do anything with performance support because I'm going to roll it out to

some experts in a very limited area, and I'll keep tight control over that because I want to know how the software we purchased works, and I want to make sure that I understand what the technical concerns are, what the performance limitations are, and that kind of stuff, and then we'll worry about some of the other things.

He further stated:

Thomas might have a very different perspective on that. so I think part of the problem is we haven't worked together in the past and we don't know how to work together, or how we want to communicate or where we need to touch each other and say, "Hey, did you consider this?" I almost see there is no communication right now. I think we in systems have some idea of what we need to do to get that system up -- to get the iron out the door, and we want to do that. I end up pushing that a lot, but I think at some point we're going to have to say, " Okay, we need to work together on this." How do we do that? What areas do we need to talk about? When is it important for us to start having those discussions? There are some areas as we're going through this process slow that you probably noticed that could use some support in that area to help out. ... but we need to sit down and say, "How do we work together? When are we going to do things together? What parts of it need this kind of support? What parts of it don't need this kind of support? And get a better understanding of how our two areas can work together. I'm not comfortable that we have that understanding at all.

When I asked Sam if he had any ideas of what we could do in order to increase communication between the two groups, he replied:

No, I don't. I really don't.

But Sam did discuss how the two teams could work together:

One of the things that's come through to me is I've sat in on some of the sessions where the business people were brought in to review the work we've done to date, and one of the things that keeps coming up is we want the system as soon as possible, and the other is, it better be easy to use.

They're [business representatives who will be expected to use the software] telling us right up front that if I have to know what the code is to do some of this stuff, I'm not going to use it. I'll find a way to get around it. So we need to stop paying attention to [them] ...

The following statement by Sam described his attempt to understand the perspective of the Performance Support team:

My initial direction is, "Let's get it out the door. We'll push it through. We'll move it out there, they'll learn to love it. It's not going to happen that way, I understand that much more clearly now, but I think we need the formula for where we think performance support can help out and when it needs to be part of the delivery package[final customization of the HR Information System].

Sam continued the discussion and described how he perceived incorporating performance support solutions into the customization of the Trinity product added additional complexity to the project.

We talked about change management before. We know we have in existence a very difficult change management issue.. right now the different versions of the software, the different operating environments we need to deal with. Now you throw performance support on top of that, it becomes even more complicated, we think. So we need to start opening these conversations. We need to have better understanding of the types of things we need to talk about. We need to have a better understanding of how we fit together, what's going to be impacted by this and when. If we have those types of things and we start opening dialogue, I think we'll be in much better shape for the future.

It almost seems like what's happening is that the systems [Information Technology] people are listening and talking to the business people in Human Resources, and the performance support people are listening and talking to the business people and we're not talking to each other. So I get information from the Performance Support project leader that some of the performance support people say this, that and the other thing, and I should have just said, "Hey, come on, let's talk about this a little bit." So I think we're getting a better realization that we need to work together more closely. The concern that I have is that we simply don't know when we have[time] to do it, ... If you do develop some kind of model like that, that would be very helpful to us, too.

Sam became a very important informant because he was a part of the Information Technology team. Furthermore, in our discussions Sam was able to articulate a clear understanding of issues relating to the concepts of performance as well as issues relating to the roles of the Performance Support and Information Technology teams.

Of the four innovations discussed earlier in this chapter, a communication plan was attempted for only the first innovation, which was to reengineer HR work processes and support the HR user community with a new HR information system. The mission for the HR Business Reengineering communication and marketing strategy was to:

1. Develop and maintain awareness, buy-in within our end-user populations, so that they are ready and willing to use the reengineered HR Information Systems and processes.

2. Develop and maintain understanding, buy-in and ownership within our Information Technology support staffs, HR professionals, and other key stakeholders, so that they endorse and advocate use of the reengineered systems and processes, and share accountability for the project's success (Internal Document, February, 1995).

In order for the Performance Support team to successfully incorporate performance support principles into the system development life-cycle model, formal and informal communication and marketing strategies were necessary for this innovation as well.

In a liaison role working with various members of the Information Technology team, Anthony, a member of the Performance Support team, was strategically placed to cultivate relationships with the Information Technology team members. Rogers suggests that pursuing interpersonal communication channels are more effective in persuading an individual to adopt a new idea, especially if the individuals are peers. On the bases of Anthony's technical knowledge, he was a peer with many of the Information Technology team members.

Also, Rogers pointed out that one of the most distinctive problems in the communication of innovations is that the participants are usually trying to communicate from two distinctively different perspectives. This was exhibited in the earlier discussion

between the Performance Support and Information Technology team member who attended the bowling event.

According to Rogers, a change agent has to be more technically competent or more knowledgeable about the innovation than his clients are. This difference frequently will lead to ineffective communication; the data reflected this point time and time again. Fundamental terms like performance support, information mapping, needs analysis, and contextual interviews caused miscommunication on several occasions. The teams simply did not talk the same language. Many times members of the Performance Support team did not talk the same language because their background and previous experiences were so varied.

Time: Element 3

In terms of the diffusion literature, *time* will be defined as the time between the first knowledge of the innovation to the adoption or rejection of the innovation. It took from fall of 1994 until the summer of 1995 for the idea of incorporating the principles of performance support into the customization of the Trinity software to be formally initiated and rejected for implementation during this phase of the project. I do not have data to support why the innovation- incorporating performance support principles into the customization of the Trinity software- was rejected. However, Chapter 6 discusses the barriers to incorporating principles of performance support into an information systems development model and draws major conclusions.

Element 4: The Social System

There are some information system developers who subscribe to a data-centered system development paradigm versus some system developers who subscribe to a user-centered or performance-centered system development paradigm. No longer can these

system development paradigms be separate. To create useful and usable software the data from this study supports that the two paradigms should merge. If kept separate, the two cultures will continuously develop into distinctively different cultures.

Integrating Performance Support Principles into the SDLC model

When asked about incorporating performance support principles into the system development life-cycle an Information Technology team member responded:

...because if you look at most, ah, (pause) most, if not all, design methodologies, um, they rarely include performance support, discussions at all. . .from, the planning stage all the way through the construction stage no matter what, .. methodology you're using. The methodology is designed to drive the production of a product with, little concern, as to how, users will actually use the system. I don't think there is a lot of thought given to, usability in general. There's no place for usability to be designed into most design methodologies. You know, .. planning .. analysis, programming and, testing is, .. pretty much the way most, design processes go. So for me to define what I [the person paused to think about the rest of his response], my concept of an electronic performance support [system] ... it would have to be a system that would be completely integrated into ... the functionality of the software. . . [I would use a]. . .cascade approach. Every phase would need to pay attention to performance support [concepts] as, as a design issue that's just as important as data base and data issues. So it would become an integral, so to speak, part of... of the methodology. . .

He goes on to describe how the system development model would be affected by incorporating performance support principles:

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It [incorporating performance support strategies] would become,
pervasive throughout the design process or throughout the entire
development methodology .. and it would also, probably increase the
person hours. Every phase of the project would be increased by the,
existence of new development and design issues that have never really
been incorporated ... in that [system development] process. . .So, the
methodology life-cycle would probably get fatter and increase a little bit
more.

When asked about the key player needed for integrating performance support principles and
quality assurance throughout the systems development process, an HR Business
Reengineering manager provided the following comment:

Oh, it's gotta be the project leaders. In this company it's got to be the
project leaders that establish those rules ... that we're going to do it this
way, we're going to follow a methodology and we're going to
incorporate these kinds of things [performance support and usability]
within the system and we're going to incorporate the users of the
project. That's the one piece of it and then the project leader really has
to be rewarded for that.

Another interviewee with deep experience in Information Technology described his
position:

I think if ... the performance support tools are going to be useful ... what
the performance support groups need to do is, is make sure that it
becomes part of the, the basic methodologies. ... [At The Company] ..
the biggest obstacle, to the success of [implementing] performance
support tools would be that they're[the performance support team] still

a very isolated group. You know.. [Instructional] technologies people

are. . .are not part of the normal [system] development teams. They're,

you know, sort of pop in here and there and they do it coming through

the user community typically not through the [Information Technology]

IT community.

This point was so critical as to why Anthony was the key to being placed in that liaison position because even though he worked with the Performance Support team, his background was also in Computer Science. Because of his skills in computer programming and knowledge of the client/server architecture, he could have easily work for the Information Technology Team. This was the first step in bringing the teams together in ideology as well as in physical location.

Physical Location of the Information Technology and Performance Support Teams

Not only was the Performance Support team separate from the Information Technology team in terms of their ideology for system development, the teams were physically separated in their work environment. The Performance Support team members were the only group located in the Corporate Education Center. The Information Technology team along with the rest of the HR Business Reengineering team including the Performance Support team leaders were located in the Corporate Headquarters building. It was extremely difficult for the Performance Support team members to develop relationships with the Information Technology team members because the only time we had any contact with them was in meetings. It was also suggested by several Information Technology team members that the Performance Support team members involved with the customization of the Trinity software should have been on the Information Technology team and reporting to

the same manager. This team member went on to say how the Performance Support team and the Information Technology teams should be integrated.

Integrated, I think means not only existing in the same physical location, but also reporting up through the same management. Different management just, I think, ah, causes cultural differences.

The Performance Support co-team leader expressed his opinion on the two teams:

If we had user support experts, you know performance support experts on the staffs in the [Information Technology] IT areas then you would have the expertise within the area. They would be a normal part of the environment and help the systems to normalize with user support and usability [we do not need two teams] That's right. Separateness does not work ... that's been true time and again throughout history whether it is race or whether it be user support it doesn't matter. It doesn't work.

An Information Technology manager describes the importance of building a good working relationship:

... If you [Performance Support] are going to be in the methodology, location is everything. But where you physically sit. . .makes a difference. Okay. I get along great. . . .with Tristian and Andre and I truly believe ... these guys because they sit like, you know, twenty feet from me. We laugh. We talk. [They are able to develop a working relationship]

Performance Support Must Not be a Separate Discipline

Change is a slow process and occurs at many levels. Some Information Technology members believed that the technology would continually become easier to use

and information system developers would become exposed to user-centered system development strategies through changes in fields such as Computer Science at the university level. One Information Technology member provided the following insight:

> *Well, I, think that, performance support, right now it kind of exists as a separate discipline. .. until it is, as long as it is a separate discipline, there will always have to be, a performance support representative. . . .throughout the process. Until, until our methodology thinking and, and our, all of our philosophies change.*

Joe proposed that the change occur at the university level and performance support principles be taught as part of the Computer Science and Management Information System curriculum. He went on to say:

> *until it's [performance support principles] integrated into our teachings about, about systems development. ... it will be a separate discipline looked at as something we're adding into the process all the time. until, ah, computer scientists and management information professionals can go to, their colleges and universities and technical schools and receive training where performance support issues are, integrated into the curriculum. . .integrated into the, the very courses around system design, until that happens. . the key players [to convince for including performance support] will be the traditional, development personnel. . ..in, in addition to performance support people who, who need to understand the business, ah, as well if not better than, ah, the business analysis themselves.*

Another interviewee familiar with Information Technology and expert systems provides this account:

Yes. I think that the electronic performance support systems directly parallel expert systems and if we really want to succeed with them and make them part of normal systems development and normal systems implementation [processes] at companies like [ours] than we have to make it [performance support] nearly invisible. We have to make it normal. We have to make the tools and processes the procedures to analyze where they [performance support solutions] are needed how they're built and , and the way that they're implemented into normal IT [Information Technology] shops.

He went on to reiterate that performance support principles must be integrated and looked upon as part of the normal process of developing systems: the Information Technology team must be able to see the relative advantage of incorporating performance support principles into the development process: He adds:

Make it part of the environment.. Make it part of the normal way of doing business or it's [incorporating performance support principles into the systems development process] going to fail because when people see it as different they're going to see it as something that, that people believe is (pause) perhaps beyond them, perhaps something that, we've always gotten by without it. Why should we need that now?

Another Information Technology member compares performance support systems to expert systems. He went on to say:

The only real barrier [to the success of performance support systems]... would be that it doesn't, you know it proves not to work. . . .then it's more development time, more cost, more resources and it doesn't accomplish anything. It will disappeaedr like the popular AI [Artificial

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Intelligent / Expert systems] products disappear because the cost of doing something were, just wasn't worth the, the value.

These were every powerful statements coming from team members with an Information Technology background. There are hundreds of system development models and strategies available and generally information system developers select a basic system development model and adjust the model according to their needs. Therefore to persuade information system developers to adopt a specific performance support model will not be easy. On the other hand, if information system developers are shown the relative advantage for incorporating performance support principles as a normal and effective way to create useful and usable software, the principles may be more readily adopted.

Organizational Diagnostics

The organization's formal and informal working environment is a factor for determining whether an idea will be adopted or rejected by a group. Weisbord (1978), a management consultant and researcher, proposed there are six areas where an organization most likely will encounter problems. Table 15 describes the six areas for organizational analysis and how they are represented in the formal and informal organization.

Table 15. Six Areas for Organizational Analysis
Adapted from Weisbord's Six Box Matrix (Burke, 1982, p.172)

Six Areas	Formal System (work to be done)	Informal system (process of working)
1. Organization Purpose	Goal clarity on the mission and vision statement	Goal agreement
2. Organizational Structure	Organizational chart or functional work matrix	How work is actually done or not done
3. Relationships	The assigned working relationships	The way work should get done.
	Who should deal with whom on what?	How well do they work together?
4. Rewards (incentives)	Explicit reward system	What do people feel about incentives?
5. Leadership	The President of The Company wanted to move from "old" hierarchical leadership to more participatory	Mixed leadership styles
6. Helpful mechanisms	Systems that are in place to help the team members do their job.	How do they function in practice?

Of the six areas to investigate for organizational discontent as described by Burke (1982), the reward system was most frequently mentioned by members of the Performance Support and Information Technology teams as a problem area in the organization. According to several Information and Performance Support team members, the reward system was not designed to reward a person for quality but for meeting the expected project completion date.

An Information Technology team member viewed the issue of the organizational culture and its impact on the reward system for the HR Business Reengineering project in this way:

The culture here is definitely the overriding issue. ... to me the underlying pinning here of this culture I think is two things. You have, you have the top management, senior management not committed to, really committed to, the kinds of things that are quality. And I don't mean that .. the group doesn't talk about quality and all that kind of thing but the reward system is totally the opposite.

A HR Business Reengineering project leader explains his view of how the reward system is tied to implementing system methodologies.

And I mean, I can't tell you, I can't begin to tell you how many methodologies, I've been here 17 years and I can't tell you how many methodologies I've seen come in here get put on the shelf and go out and it's because we're not rewarded for any of that. .... And until you change that you're never going to break the mold. You never are going to break the mold. I'm convinced of that. In fact, I'm so convinced of it that I've really begun to examine my own, my own reasons for being here. Because you try and you try and you try and you're constantly fighting the reward system and you know, [Senior managers and project leaders, we] are all going to be evaluated on the success of this system by making July '96 [date]. Oh and by the way with quality.

Note that in the description of time in Chapter 3, several other members of the HR Business Reengineering team discussed how time or completing the project on time was the driving factor on the project and the quality of the product was second.

<u>No Overall System Development Methodology</u>

During the first month at the field-site I was very discouraged with the progress of my research because I could not see evidence of an overall system development methodology being followed by the HR Business Reengineering team. It was not until April 21, 1995, when I had an interview with HR Business Reengineering team member who had previous experience with system development, that my intuition was confirmed. There was not an overall system development methodology in place for the project. He provided me with his view of the system development methodology used for the project:

> *There's a fundamental fault in this project and that is it doesn't have a methodology. To me that is extremely troublesome.. because the whole project team is trying to invent what, how they're doing things as they go along. That's why the Performance Support team didn't get started until so late in the game.*

When I asked another project leader about the system development methodology used on the project she replied:

> *... it's really the plan because there is no methodology that I can go to that says that we've now gone to a functional specs and so that I know where the checkpoint is.*

She further stated:

> *We adopt programs and methodologies for six months and then if we don't see immediate results we're out of them. We're out of them.*

Because there was not an overall system development plan, it made it extremely difficult to know why certain developmental decisions were made and where the Performance Support team fit into the overall system development plan. During a debriefing of my study with a colleague, she provided the following analogy for this study:

developing a system without a detailed plan is like driving in a fog: it takes you longer to get there and you never know when you will encounter a red light until it's almost too late.

Sponsorship of the Project

The Delivery Team, also known as the Performance Support team, could not have been formed without the sponsorship from senior management. According to Gery (1991):

Whenever there are new undertakings proposed in an organization, the first critical step is to obtain an adequate level of sponsorship for the activity or project. Sponsorship is defined as the political, logistical and economic funding of an activity. Because of its newness, the investment it represents, and its political and business implications, electronic performance support requires such sponsorship (Gery, 1991, p. 196).

Sponsorship for the performance support project occurred at three levels: the Vice President of the Human Resources organization; the project leader for the overall Human Resources Business Reengineering project; and the team leader for the Information Technology portion of the project. Figure 3 depicts the types of sponsorship sought from the Performance Support team leader on the HR Business Reengineering project.

The Vice President of the HR organization recognized that the new HR information system would have to be easy to learn and use. The analogy the Vice President used to describe the new system was that he was in charge of developing an HR information system that was similar to, as he called it, an airplane cockpit that would allow a manager to fly the plane even when the pilot didn't have formal training. The term "performance support" was never used but the performance support concepts were always described and supported by senior management. Politically, having the Vice President recognize the need for an easy to use and useful system was important. The challenge was transforming the fundamental

concepts that were articulated by senior management into user requirements and functional specification for the customization of the Trinity software.

Figure 3. Sponsorship for Incorporating Performance Support into
the HR Business Reengineering Project
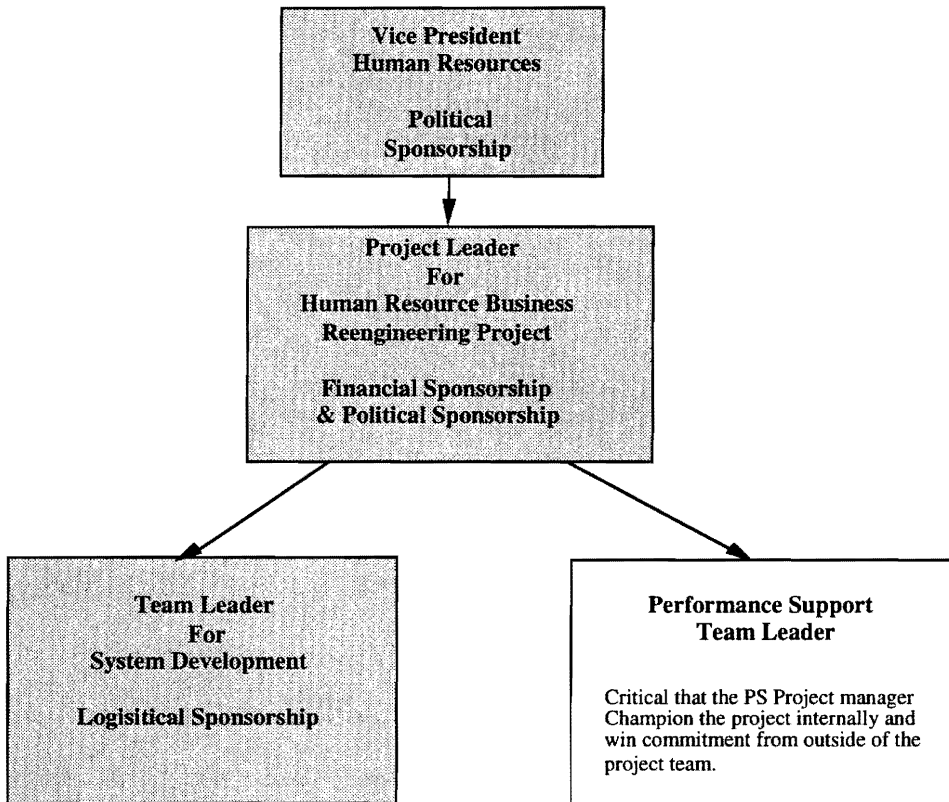
Finally it was an important factor for the Performance Support team leader to make a successful business case to the HR Business Reengineering project leader and the system development team leader for the importance of funding performance support solutions for the project. In addition, it was important that the organization "buys into" incorporating performance support principles into the HR Business Reengineering project. Without real organizational support, the accomplishment of the Performance Support team would be minimal.

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Roles Necessary for Change

To assist with having people adopt a new idea certain roles need to be filled in order to promote the new idea throughout the social system. On our project, the opinion leader was Thomas and the Performance Support team members were change agents. The Performance Support team leader was not involved in the daily activities of generating performance support solutions and viewed her role in a broader light.

When I asked the Performance Support team leader to describe her background and how she became involved with performance support, she replied,

Well, let me start by saying I'm not involved with performance support. I'm the project manager for HR reengineering and making sure that the reengineering processes systems that we're allowed can in fact be used by the people who do HR work. So my focus is making sure that the reengineering processes and systems allow work to get done once it moves out to managers, supervisors, HR professionals, and employees. So for me performance support is a tool, and a set of solutions to enable that to happen. So that's my focus. And in terms of background I've been in human resources as a general consultant for the last four years. Prior to that I was in education training and development area for about 10 to 12 years and then prior to that inconsequentially I was a supervisor in printing services and a typesetter. So that's my background.

I immediately reacted to that response and was very taken a back during the interview because I did not understand why the leader of a team that was still, at that time, being called the Performance Support team would say that she was not involved with performance support. During the time of the initial interview I was shaken and did not know where to go next with the interview question.

I was really afraid to ask her why she felt that way. My role as a researcher and a member of the Performance Support team really became intertwined at this point. It was very difficult for me to separate the two. On one hand, I felt as if my supervisor (she was the person who signed my checks) did not really understand what I did and I felt the old hierarchical employee/supervisor climate in the room. The Performance Support team leader never said or did anything specifically for me to point to that caused these feelings; it was really an issue I had to deal with on a personal reflection level. I had to find some understanding for that response. It was not until approximately four weeks after the initial interview that I scheduled a meeting with the Performance Support team leader and explained my feelings with her about our initial interview. She was glad that I had returned in order to gain clarity and she proceeded to reiterate basically the same response as she shared with me earlier. As a researcher this was one of my most frustrating moments. Somehow, either I was not able to communicate the right follow-up questions or there were some messages I just could not pick up on at that time. There was a dichotomy between the Performance Support team leader's view of performance support as an innovation and the Performance Support team members' view. The Performance Support team leader always saw her role in a broader sense of being responsible for delivering the new HR information system to the employees of The Company and viewed performance support as a tool or means of accomplishing that task. However, when the Performance Support team leader embraced the idea of using performance support as a strategy, the Performance Support team members saw the Performance Support team leader as the champion or change agent necessary to promote the innovation at all levels of the HR Business Reengineering project.

The Performance Support team leader needed to be involved with performance support on a broad level as well as a detailed level in order to promote and assist in the diffusion of the idea throughout the organization. If the Performance Support team leader

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was not able to effectively communicate some of the detailed performance support developmental issues to the Information Technology team leaders, it would be very difficult for the new idea to survive. According to Raybould (1995b) eight major roles exist on a Performance Support team. Table 16 was adapted from Raybould and describes the primary roles of the Performance Support team.

The Performance Support team leader was the intermediary between the Performance Support team and the Information Technology team members. However, in order to promote the innovation- incorporating performance support principles into the customization of the Trinity software- the Performance Support team leader was called upon to be the lead change agent or the champion for the project.

Change agents

According to Rogers, a change agent "is an individual who influences clients innovation decisions in a direction deemed desirable by a change agency. He or she usually seeks to obtain the adoption of new ideas but may also attempt to slow down diffusion and prevent the adoption of what he or she believes are undesirable innovations" (p. 28). In meetings many of the Performance Support team members would speak out on issues relating to performance support trying to influence and educate various members of the HR Business Reengineering project on the benefits of adopting performance support principles. The Performance Support team leader should have been the most important change agent because she interacted with the decision makers sometimes on a daily basis.

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Table 16. Analysis of The Primary Roles on the Performance Support Team
Adapted from Raybould (1995b)

Role	Responsibilities	Comments
Performance Support Project Manager	Determine project goals, objectives and scope • Plan time frames and cost • Coordinate team members • Resolve time/cost/technical issues and conflicts • *Champion the project internally and win commitment form outside of the project team* • *Develop Performance Support System architecture* • *Educate design team in Performance Support Systems concepts*	The Performance Support team leader did not have the expertise to perform the last three roles suggested by Raybould (1993). This role was informally led by Thomas and Anthony.
Instructional Designer	• Conduct task analysis • Develop scope and content of the performance support system • Evaluate effectiveness of the performance support solutions • Develop module outlines and storyboards and information maps	Of the nine people (including myself) on the Performance Support team six people had a background with instructional design. However for many of us it was the first major performance support project.
User Interface Designer	• Determine look and feel of the performance support system • Develop navigation methods • Determine interface elements • Determine usability goals	There were two team members responsible for usability and user interface issues.
Graphic Artist	• Create content graphics • Create interface graphics	There was a team member with a background in graphic art . In addition he understood the organizational politics as well.
Programmer	• Implement the user interface • Develop authoring tools to speed the development process • Integrate performance support solutions with other information systems	This was the role that Anthony eventually adopted. A very import role for educating and influencing the Information Technology Group
Users	• Provide input to the design • Test the prototypes • Provide input to current work environment	It was projected that users from the business community would test the system.

A critical event occurred on the project when Anthony, the Performance Support team member with an undergraduate degree in Computer Science, was placed in a very strategic new role. At the Thursday, March 23, 1995, performance support weekly team meeting the Performance Support team leader announced that Anthony's new role would place him in a liaison position with key Information Technology team leaders and team members. This position would give Anthony the opportunity to influence and educate the Information Technology group about performance support solutions. No longer would the team have the Performance Support team leader as an intermediary but a Performance Support team member with the expertise to discuss the details associated with performance support issues. This was an excellent move on the part of the Performance Support team leader's part to move the most technical team members into more strategic positions. Thomas was also moved into a new role where he and the Performance Support co-team leader were part of a new team that investigated issues that involved the overall project. However, Thomas still experienced some difficulties in promoting performance support issues.

Information technology organizations are being presented with the idea of collaborative systems' development. Brusca and Campbell (1995) who describe a case study on a performance support system being implemented on a business reengineering project, state:

> It is critical for performance support designers to partner with and establish a working relationship with any development organizations, usually information systems (IS) departments. In this case, the Performance Support team embarked on something rarely done with a development group- the Team was breaking down the fire wall that surrounded the IS world insisting on a cooperative design and development effort. In short, the Performance Support team wanted to have an active role in designing the

system's appearance and its interactions with the user. This was critical if the system was to include intrinsic performance support components p. 181. The above description is one type of goal for a Performance Support team; however, this study shows that breaking down the fire wall is not an easy task for some organizations. Therefore it is imperative that the Performance Support team leader, change agents, and opinion leaders who are advocates of performance support work closely together to influence change within an information systems group.

Opinion Leader

Thomas accepted the role of opinion leader. This was never formally expressed by anyone but Thomas's actions on the project corresponded almost perfectly to Rogers' definition of an opinion leader. Rogers describes an opinion leader as "an individual [who] is able to influence other individuals' attitude or overt behavior informally in a desired way with relative frequency" (p. 27). This person is the most innovative member of the organization.

Generally everyone on the team looked toward Thomas for the innovative ideas and guidance for performance support solutions. Some members on the team acknowledged that Thomas's style was sometimes perceived as aggressive, negative and non-conforming to The Company's culture. But Thomas was an excellent performer. Rogers explains that an innovator is often perceived as "a deviant from the social system and he or she is accorded a somewhat dubious status of low credibility by the average member of the system" (p.27). On the Performance Support team, for the most part, Thomas's technical credibility was fine. It seemed that sometimes Thomas's work style conflicted with those of his Performance Support team members. Thomas believed in acting first and explaining later when there were situations where he believe that there could be a lost opportunity.

This caused some conflict with Performance Support team members who might not have been as flexible with their work style.

Thomas's role in the change effort had to be primarily behind the scene. Because Thomas was also trying to play the role of the change agent by being very vocal and passionate in meetings about performance support issues, he quickly developed a negative reputation. Rogers also states that the opinion leader's role in persuading others about the innovation is likely to be limited.

The type of leadership Thomas provided was informal and according to Rogers, "opinion leadership is earned and maintained by the individual's technical competence, social accessibility and conformity to the system's norms" (p. 27). Thomas was extremely technically competent and people were aware of those skills, but because Thomas was not willing to conform to the social system norms or adjust his approach in order to maneuver politically throughout the organization and The Company, he was not able to continue in the role of opinion leader.

Risk Taking and Trust

When I attended a team building session with the Human Factors Engineering Group on the Friday of my first week at The Company, the facilitator had previously administered the Myers-Briggs (1987) personality type indicator and was debriefing the results at the team building session. I did not realize that my participation with the Human Factors team building session would provide me with important information that I could use throughout my entire stay at The Company. After being at The Company for only one week I was able to walk into a very personal event. I was able to watch the facilitator of the team building session pull out the commonalties and differences found among the nine people from the Human Factors Engineering group participating in the all day session. The two major issues that emerged from the session were that many of the team members did

not trust one another and were very cautious with how they approached risk taking. Of the nine people who attended the Myers-Briggs team building session, four of the participants, including myself, were participating on the Performance Support team.

On the Performance Support team, trust and risk taking emerged primarily between the Performance Support team leader and Thomas. Thomas was the most experienced Performance Support team member. Because Thomas had extensive experience in business systems development, performance support concepts, and business modeling simulations he was the most experienced person on the team. He also held a senior (non-managing) position at The Company. Some companies are creating positions of this nature that are considered a non management track. However Thomas incurred many problems because he did not have deep experience with the organizational culture of The Company. Thomas literally took the President of The Company seriously when he urged employees to act like a business owner. Since Thomas had previously owned his own business, to him that meant doing whatever it took ethically to create a quality product. Risk taking was simply a part of Thomas's personality, primarily because Thomas knew the risk of not moving forward with new ideas. Thomas also believed in pursuing well thought out opportunities like incorporating performance support into the customization of the Trinity product and business process modeling and simulation. Someone once said that "Opportunity always involves some risk. You can't steal second base and keep your foot on first." To put it simply, Thomas was viewed as always wanting to chase after opportunities that many on the Performance Support team were just not familiar with, especially the Performance Support team leader. Thomas liked being an expert and worked well in conditions where he could share his expertise openly as part of a team. In contrast, the Performance Support team leader had spent her entire career working for The Company and was part of the "old" organizational culture. The Performance Support team leader did try to progress toward the new organization culture and adopt risk taking behaviors, but I

think the problem was two-fold. First, the level of risk taking and trust required to promote the performance support innovations were in direct conflict with the Performance Support team leader's management style and technical expertise. Her style was primarily to be a team facilitator in meetings but to controll when it came to decision making. Second, the Performance Support team leader needed to understand, in detail, the reasoning behind various techniques proposed. It was difficult for her to relinquish some of her control to the Performance Support team members, especially Thomas. Their relationship was a symbiotic one where Thomas needed the Performance Support team leader and she needed Thomas.

Thomas needed to listen to the Performance Support team leader's expertise for maneuvering within The Company and the Performance Support team leader needed to trust Thomas's expert advice on performance support issues. By the Performance Support team leader's not having the technical knowledge required to promote the performance support concepts on her own, she had to rely on others. This placed the Performance Support team leader in a very precarious situation.

There was a Performance Support co-team leader. However, I always found his role very blurred. The Performance Support co-team leader did have significant work experience as a software developer; however, he was not experienced with developing performance support applications. The Performance Support co-team leader was an advocate of performance support; however, I am not sure how comfortable he was with fielding detailed questions on performance support issues during the HR Business Reengineering team leader meetings. Technical details about performance support and usability concepts were fielded primarily by Thomas.

It was understood by the Performance Support team members that the role of the Performance Support team was more that just incorporating performance support principles into the customization of the Trinity HR information system. However, all of

the internal documentation, interviews and participant observations collected from February 27, 1995 until May 8, 1995, primarily support the role of the team related to performance support issues. The fact remains, however, that the role of the team was always being redefined by someone with more status and influence than the Performance Support team leader.

In this chapter, I have tried to illuminated the emerging issues that were related to the Performance Support team incorporating principles of performance support into the system development life-cycle model. The organizational culture was an overwhelming issue, however anytime a researcher steps into a work environment that is experiencing the after shocks of a major layoff, the organizational culture will be a major issue. The fact that the team was customizing a purchased product made it extremely difficult for the team to follow a system development model because many of the system development models are designed for developments projects that are initiated from "scratch."

It became quite obvious that the concepts of performance support were very new for many of the Information Technology members early on in my study. Many times the interviewees were uncertain about what I was going to ask during the interview, even though each participant received background information about my study. However after the interview began people had a great deal to say on the topic and once the interview was over, some interviewees commented that they actually had fun discussing the topic.

Chapter 6

Conclusions

I began this research looking more at the technical side of developing performance support systems. I wanted to know the exact steps required to create a performance support system. While working at the field-site, it did not take me long to realize that to investigate an entire system development model for the creation of a performance support system would take more than eleven weeks of investigation. In addition, a more rich research focus emerged, in that the Performance Support team was always called upon to influence and educate people about the importance of performance support solutions. In fact, the primary question emerged: How do we get them (the Information Technology team members and Human Resources business representatives) to understand what we (the Performance Support team) need to do on the project? As a result of this issue emerging, I began to focus my research around the following question:

> What were the major issues associated with successfully incorporating performance support principles into a system development life-cycle model?

Major Issues

Three major issues emerged:

1.   The definition of performance support and the role of the Performance Support team were inconsistent. Some members of the Information Technology team suggested that the only way performance support concepts would be included in the system development life-cycle was for the Performance Support team members to be a part of the Information Technology team and located in the same physical location working side by side on a project. By the team members working in the same area, there would be more

opportunities for informal communication to take place between the two groups. In addition, to increase the communication and discourse between the Performance Support and the Information Technology teams, at each kickoff meeting the roles and responsibilities, as well as the system development model or framework, should have been acknowledged. This would have provided an opportunity to educate members and adopt one or a combination of system design and developmental strategies for the system development project. Last, the role of the Performance Support team should have been consistent. The Performance Support team leader should have provided as much consistency as possible with the primary roles and responsibilities of a Performance Support team.

2.   *The Performance Support team was required to convince the Information Technology team to adopt the principles of performance support.* It was difficult for a change initiative to occur without a strong champion or lead change agent representing the innovation. The champion should have been extremely knowledgeable of the innovation, yet able to discuss the detail issues of the innovation in layman terms to the receiving group. It is extremely critical to the longevity of the project for the project champion to cultivate and develop a workable working relationship with the person most knowledgeable about the innovation. This requires a leader to acknowledge diversity in personality and work styles because people who are innovators are not likely to be well-liked or conform to the norms or the organizational culture.

In addition, the Performance Support and Information Technology team had established separate organizational cultures. However, members from both teams acknowledged that the corporate culture was established to reward team leaders and members for completing projects on time and not necessarily for releasing and implementing a quality product. Yet, it was difficult to incorporate the principles of

performance support into the system development methodology because the team had a difficult time establishing a system development methodology for the HR Business Reengineering the Performance Support and Information Technology teams to follow.

3. *Sponsorship of the Performance Support team was required at all organizational levels.* The HR Business Reengineering project obtained political sponsorship from the Vice President of the Human Resources organization and financial sponsorship from the HR Business Reengineering Project leader. A team leader from the Information Technology group also committed to financial support for the performance support strategy. These steps were accomplished, but alone it was not enough. In addition, informal "buy-in" was required from the technical leaders of the Information Technology team.

HR Business Reengineering Project Update

The HR Business Reengineering project was extremely complex. Because the team was trying to promote four innovative ideas all at once, there were constant uncertainty and ambiguity on the project. These four innovative ideas were:

- organization change within The Company and the Human Resources department;

- hardware changes moving from a mainframe to a client/server environment;

- customizing the software of a purchased product and;

- system development life-cycle model changes, i.e., incorporating performance support principles.

During the first week of November 1995, I contacted a former Performance Support team member to see how the project was progressing. It was interesting to hear that the project was scaled back and the customization of the Trinity information system would not include the following:

- Human Resource business redesigned processes;

- Performance support solutions that would require customization of the Trinity information system;

- A release strategy that included employees other than those employees specifically working in the field of Human Resources.

It was interesting that the changes made to the project were almost exactly what Sam recommended during our interview. He suggested that the members of the HR Business Reengineering project not implement any performance support solutions during the initial release and instead released the Trinity information system only to specialists working in the field of Human Resources.

By the members of the HR Business Reengineering team scaling back the project, the team members were now only trying to initiate one innovation: moving from a mainframe to a client server environment. By eliminating three of the four innovation initiatives, the HR Business Reengineering team leaders reduced some of the uncertainly associated with the project. However, the question remains: Will the principles of performance support ever be incorporated into the customization of the Trinity information system? I can say that the Information Technology team members were made aware of performance support concepts and at least one Information Technology team member experienced a paradigm shift from a data-centered system development paradigm towards a user-centered system development paradigm. In Chapter 4 when Sam made the following statement I could see he was experiencing a change in mindset towards a user-centered system development approach.

My initial direction is, "Let's get it [the new HR information system]

out the door. We'll push it through. We'll move it out there, they'll learn

to love it. It's not going to happen that way, I understand that much

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more clearly now, but I think we need the formula for where we think performance support can help out and when it needs to be part of the delivery package[the final customization of the HR Information System].

I was able to experience first hand how important it was for the new HR Information system to be developed in context with the work environment. In essence, in order to create an information system that is designed for the user's maximum work performance, the development process cannot be divorced form the user's work environment or developed in a vacuum.

Discussion

This research supports for this social environment the idea that a new performance support system development model would have had a difficult time being adopted by the Information Technology team. Information Technology team members, on more than one occasion, mentioned how expert systems were made to be different form the normal system development life-cycle and as a whole failed to be adopted by The Company. What would be more likely to be adopted is a framework that could be incorporated into the system development life-cycle and viewed as a normal part of the process. This dissussion addresses the working relationships between the Performance Support and the Information Technology team members. On the HR Business Reengineering project each group was working on the steps and procedures for their respective team in order to produce their respective deliverables.

The Performance Support team used human computer interface, instructional systems development and socio-technical system design approaches. Each of these design approaches focused on the user and his or her interaction with the Trinity HR information

system. In contrast, the data-centered approach of system development methodologies focuses on the representation of the data elements and the functionality of the system first and how the usability and the usefulness of the system second.

Figure 4 represents how the Performance Support team had the greatest chance of incorporating principles of performance support into the system development life-cycle model. This framework was created with the assistance of a colleague, R. Mark Moore, who completed his Masters degree in instructional systems design at Bloomsburg University.

Figure 4. Current State

Scales & R. Moore Framework for Performance Support Development
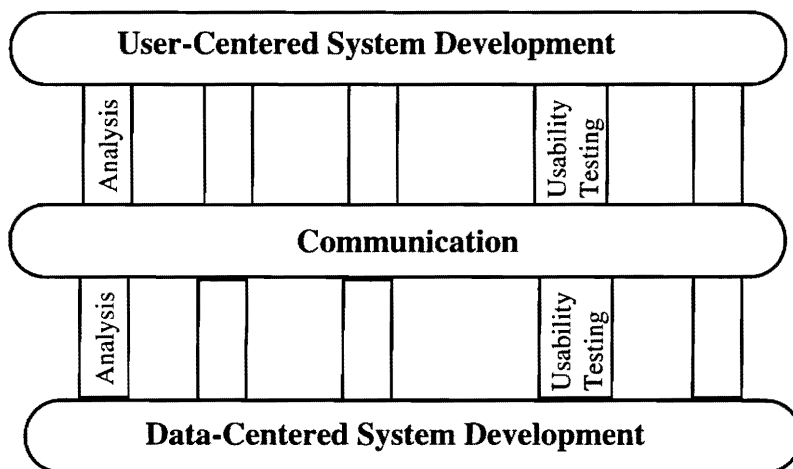
Because change is a slow process, each team- Performance Support and Information Technology- will have a methodology or steps they are familiar with for producing an information system. No matter which methodology is adopted by the Performance Support team or the Information technology team, someone has to manage the communications between the two groups- preferably someone who has the skills, knowledge and ability to maneuver between both groups seamlessly.

In terms of the system development process, the two less complicated places to begin incorporating principles of performance support are at the analysis phase and the user testing phase. It is at these two stages in the system development process that the influencing and education and significant discourse about principles of performance support can occur. This study suggests that the two models of system development- data-centered model and the user-centered model- need to become one. The future state or framework for incorporating performance support principles into the system development life-cycle model will call for information system developers to view performance support as a normal part of the process- as normal as a data map. The analogy of a braided rope would fit my description for the working relationship for the Performance Support and the Information Technology team. Each methodology has evolved separately; however, to create a holistic system, advocates for each approach will need to come together and work together as a team.

The braided rope analogy is applied because even though each section may have a methodology currently associated with it, in order to develop a useful and usable system, the three separate areas should be intertwined. When the individual sections are intertwined, they are more dependent upon each other and are stronger together than they would be separately. The more communication and understanding that occurs between the Performance Support and Information Technology teams, the less noticeable the individual paradigms will be to the group.

Conducting Research

This study was fascinating to me because I was able to see a company stepping out and having the courage to try to initiate several innovative ideas. As a researcher, I learned that conducting field-work is a fast paced and unpredictable environment. On several occasions I felt lost and alone. There were times when I would be working on my research

until 3 am. It was important for me to discuss my findings, but there was no one for me to call at that time of morning and my work responsibilities during the day prevented me from discussing my research. So on several occasions, when I needed clarity about The Company, I discussed my research with Halies, the security guard. He was able to provide me with additional insight about the organizational culture of The Company. Because Halies had worked for The Company for several years he provided me with very good insight on how to maneuver within The Company. In addition, Halies had hosted several international graduate students and realized the importance of good research.

Also, on several occasions, Thomas, Anthony, and I discussed my research after work hours. They both provided me with in-depth insight on performance support strategies and system development concepts.

Suggestions for Future Research

Because the project was so complex and contained so many different facets, I had to be very selective in how I described the study, in order to keep the study manageable. Based upon the results of this study, articles read, and discussions with colleagues in the area of performance support, six issues emerged as possible areas for future research.

1.   To study the group dynamics of the various teams as these dynamics related to their working relationships and their impact on incorporating performance support principles into the system development life-cycle.

2.   To investigate the nature of work and the changing workplace as it relates to developing performance support solutions for the redesigned work processes.

3.   To investigating how the organizational culture and structure relates to the adoption or rejection of innovations related to performance support.

4.   To evaluate of the framework for incorporating performance support principles into the system development life-cycle model.

5. To study the impact of intelligent agents on the development of performance support solutions.

6. To investigate the balance between incidental and intentional learning designed into a performance support system.

Overall this study provided a rich description of how a team attempted to incorporate performance support solutions into the system development life-cycle. The challenge to innovators promoting technical change is to not lose sight of the social and organizational aspects of change. Many times it is not the technical issues that dismantles a change effort but the non-technical issues. I would like to sum this study up by using the following quote from the Office of Technology Assessment:

> The main stumbling blocks in the near future for the implementation of
> programmable automation technology are not technical, but rather are
> barriers of cost, organization of the factory [or workplace], availability
> of appropriate skills and social effects of these technologies. (Office of
> Technology Assessment, Washington DC, 1984)

APPENDIX A

Acronyms for Performance Support Systems

Acronyms		Description
KSS	Knowledge Support Systems	The initial description for the concept. *Used by Ziff Technologies and Comware Inc.*
EPSS System	Electronic Performance Support	This description replaced **KSS**. *Used in Electronic Performance Support System (Gery, 1991)*
HPSS	Human Performance Support System	This description is used by Yeh((1993)
OPSS	On-line Performance Support System	
PSS	Performance Support System	This description assumes that computers are associated with the acronym. "I don't believe we gain much by stressing "electronic"- especially when optical media are becoming more and more important" Carr (1992) *Used in several articles and dissertations*
APSS System	Automated Performance Support	The same description as **EPSS**. *Used in article by Clark (1992)*
IPSS	Integrated Performance Support System	This description is the same as **EPSS**.
PLSS	Performance Learning Support Systems	This description is the same as **EPSS**.
PST	Performance Support Tool	This describes a smaller system or subset of an larger performance support system. *Used in article by Carr (1992)*

Informed Consent Form

This is a request for your participation in a study of the development and evaluation of a business system development model that incorporates a performance-centered design. The study will be conducted by Glenda Rose Scales a doctoral candidate at Virginia Polytechnic Institute and State University who is currently working on the HR Business Reengineering project as a Human Factors intern. Ms. Scales will be investigating how a performance support strategy is incorporated into an overall business system development process. In addition, she will be investigating the conceptual and theoretical underpinnings that emerge during the analysis phase of the project.

Although the study is related to Ms. Scales work at The Company, the study itself is not an HR Business Reengineering project and you are NOT required to participate in the study as part of your job at The Company. The Company does however, support Ms. Scales work and would like to facilitate the study through the participation of employees such as yourself.

Study results will be used in two ways. First, Ms. Scales will provide The Company and the performance support team members with documentation of a design process that is in its infancy. In addition, Ms. Scales will use the results of the study as the topic for her doctoral dissertation at Virginia Polytechnic Institute and State University.

If you chose to participate in this project:

- Ms. Scales will collect documents solely related to the development of performance support systems;
- Ms. Scales will attend and observe meetings related to performance support issues;
- And list, all responses and records obtained by Ms. Scales will be held in confidence unless you request or agree otherwise. To preserve anonymity, she will use pseudonyms and remove identifying markers from any notes she takes or interviews she conducts. If audio taping is used, only Ms. Scales will have access to those tapes. She will transcribe them using pseudonyms and will remove any identifying markers. The tapes will be erased when transcribed.

If you wish to participate in the study being conducted at The Company by Ms. Scales, please read and complete the employee consent portion of this form below. Completed forms should be returned to Glenda Rose Scales no later than May 10, 1995.

I have read completely the description of the project and understand the procedures that will involve me and the purposes for which the results of this study will be used. I agree to participate in this project and fully understand that no compensation will be provided for my participation in the study. In addition, I realize that I am free to withdraw my consent and to discontinue participation at any time.

If you have any questions, or wish to withdraw, contact Glenda Scales or Dr. Mike Moore, 220 War Memorial Gym, Blacksburg, VA, (703) 231-5587.

_____   _____
                Signature   Date

APPENDIX C

Interview Guide

These open-ended questions served as a starting point for discussing performance support issues with project managers, programmers and performance support team members.

I.   General Background

1. Briefly describe your background and how you became involved with performance support.

2. How would you define the following: the performance support concepts, performance support tools, and performance support systems.

3. What are the characteristics of a performance support systems?

II.   Business Information Systems Development Process

1. Are you familiar with the techniques used by information systems to develop systems?

2. Will you describe (a high level overview) of the procedures information systems developers used on previous projects?

3. How would you incorporate a performance support strategy into the information system development process?

> Who would be the key players involved in this process and what would be their roles on the project?

> Who initiated the process to bring performance support into the HR Business Reengineering project? How was it done?

4. Please describe the relationship between the Business HR Reengineering project's performance support strategy and the Information Technology system development model?

> Describe the measures for implementing a successful performance support strategy.

> What are the critical success factors for the information technology group adopting a performance support strategy?

> What barriers would prevent the successful implementation of such a strategy?

5. What role does instructional design play in having the Information Technology group adopt a performance support strategy?

III. The Nature of work and the worker

1. Please react to the following quotes

A.   I think the country has a problem. The managers want everything to be run by computers. But if no one has a job, no one will know how to do anything anymore. who will pay the taxes? What kind of society will it be when people have lost their knowledge and depend on computers for everything? (Zoboff, 1993)

B.   The technocratic idea of progress is a belief in the sufficiency of scientific and technological innovation as the basis for general progress. It says that if we can ensure the advance of science-based technologies, the rest will take care of itself. The 'rest' refers to nothing less than a corresponding degree of improvement in the social, political and cultural conditions of life. (Leo, Marx)

APPENDIX D

Performance Support Event Flow
10/26/94 - 2/17/94

Vice President of HR Hires
HR Business Rengineerng (HRBR) Project
Leader

Expressed a need for the new
HR Informaiton System(HRIS) to
be as easy to use as an ATM

HR Reengineering Team
Formed by HRBR Project Leader

HRBR Project Leader
staffs the project

Information
Technology
System Developers
Project Leader

Represents the product

Performance Support
Team
Project Leader

**Represents
the users of the system and
the business processes**

need to staff the team

10/26/94 date of contract proposal

Internal Contract with
Corporate Education
Human Factors Engineering

**12/8 Preliminary Project Plan for PS
is in the developement stage**

**12/19 Consultant presents Kickoff
meeting for User Performance
Support**

12/22 /94 - 1/25/95

Performance Support Team participate in
the Business Functional Requirements

Detailed performance support
requirements were completed for the
staffing function

False Start
**This task focused more
on the technology vs. the
business process.. The
team was not really
reengineering the
processes but just
automatiing them**

2/17 Draft review of the PS strategy

**This document encourages the
response to be open and candiade and
discourages the cultural norm "Acting
Nice", which means that everyone is
agreeable during the meeting but the y
are not expressing their true feelings.
In short, team member avoide
expressing opinions that may cause a
conflict with the most popular opinion**

Salvaged the nine major buisess
requirements which were the major
functions of the HR organization

End of events that occured
prior to my first day
on the job 2/27/95

*** Anthony, a member of the
Performance Support team was
working with a member of the
Information Systems group**

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Performance Support Event Flow B
2/27/95 - 3/23/95

2/27/95: My first day on -the-job

Kick off meeting for the
Workflow Analysis: and Process Mapping

This phase was lead by the PS Team Leader

2/28 - 4/10 Process Mapping Sessions

The Process Mapping Sessions were
Faciliated by representives from the
Change mangement group of a large
Accounting Consulting Firm

3/9/95 HRBR project-wide meeting

A large Software Consulting Firm was
hired to help the HRBR project team with
a lose structure of framework for
developing and implementing the new
HRIS .

Because the project team was customizing
software, many of the traditional SDLC
models were not appropriate. A lose
structure for the phases of project
development were applied to the project.
as a result some members of the team
belived that consults should be called in to
help the team leaders provide more
directions and a framework for how to
complete the various task on the project.

This type of joint meeting with all of the HRBR
members only occured once
while I was working on the project

Big Status meeting with all of the project
team leaders. This meeting provided an
update on the HRBR project. The new
SDLC framework was also presented

An Information Technology team leader
and the Peformance Support team leader
were not together on Performance Support
issues.. When the Information Technology
leader made the statement "that every
thing else [other than the system
development issues] was a distraction"
This was interperted by PS team members
to mean that the software developers
viewed the PS Team as a "distraction", just
one more thing to keep the Information
Technology team members from meeting
their delivery date.

**3/16/95 e-mail message stating the the
PS Business Case to the IT leader and
the HRBR project leader was accepted**

Process Mapping Complete

3/23/95

Anthony moved into a new role. He was
now a liason between the PS group and
the logistics / development team

END

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Wileden, J., & Dowson, M. (1986). Proceedings of an international workshop on the software process and software environments. Software Engineering Notes. 11(4), p. 3.

Witt, L. C., & Wager, W. (1994). A comparison of instructional systems design and electronic performance support systems design. Educational Technology, 35(6), 20-24.

Yeh, N. K. (1993). Procedural model for forecasting costs and benefits of computer-based human performance support systems (HPSS). Dissertation Abstracts International. (University Microfilms order number 9401720).

Zuboff, S. (1993). In the age of the smart machine. In A. H. Teich (Ed.), <u>Technology and the future</u>. (pp. 340-349). New York: St. Martin's Press.

VITA

GLENDA ROSE SCALES

EDUCATION

Doctoral Candidate, 8/92 to 11/95
Virginia Polytechnic Institute and State University, Blacksburg, VA
      College of Education, Instructional Technology
      Honors: Recipient of the State Graduate's Dean Fellowship

Master of Science in Applied Behavior Science, 1992
Johns Hopkins University, Baltimore, MD
      Concentration: Human Resources Development, Technical Training

Bachelor of Science in Computer Science, 1985
Old Dominion University, Norfolk, VA

PROFESSIONAL INTERESTS AND EXPERTISE

Areas of professional interest include:

      Electronic performance support system design and development
      Developing applications for the Internet using HTML
      Multimedia development
      Performance technology
      Conducting training workshops
      Research projects using ethnographic methods

Areas of professional expertise include:

Research Consultant
      Designing and implementing professional development training programs
      Conducting organizational analysis for business process redesign

Technical Training
      Designing, implementing and conducting training workshops
      Developing training materials using the technique Information Mapping

Computer Programming
      Created several projects in Hypercard and Supercard
      Designed financial applications for the Department of Defense

Word Processing and Desktop Publishing Applications
      Developed several training manuals and user documentation

RECENT PROJECTS
Faculty / Staff Workshops

The Instructional Development Initiative, was a project initiated by the Educational
Technologies group at Virginia Tech.

- During the summer of 1993, I conducted several in-depth workshops on various Macintosh software applications, 5/93 -8/93.

A Hands-on instructional workshop, was sponsored by the Education Technology Lab at Virginia Tech.
- This workshop focused on the introductory and advanced features of WordPerfect for the College of Education Dean's office. 3/93.

"UNIX Survival Training," a training workshop at the Department of Defense
- This workshop focused on assisting senior managers converting from a VAX/VMS system to a SUN workstation, 1992.

Instructor
The Intensive Summer Workshop Program was sponsored by the College of Education at Virginia Tech.
- During the summer of 1994, I assisted with the development and implementation of the summer workshop in Rockbridge County and for the course 5774, Multimedia Development held at Virginia Tech, 5/94 - 8/94.

Contract Management
The monitoring and evaluation of a major government training contract, 1991 - 1992.

PUBLICATIONS

Conference Proceedings

Scales, G. R., (1994). Trends in instructional technology: Educational reform and electronic performance support systems. Proceedings of the Annual Conference of the Association For Educational Communications and Technology (in press).

Ruberg, L., Scales, G. R. and Nespor, J. (1994). The impact of digital technologies on the elementary school classroom. Proceedings of the 25th annual conference of the International Visual Literacy Association, 151-156.

ERIC Documents

Scales, G. R. & Yang, C. S. (1993). Perspectives on electronic performance support systems. Blacksburg, VA: Virginia Polytechnic Institute and State University. (ERIC document Reproduction Service No. Ed 354 883).

PRESENTATIONS

Scales, G. R., (1994, February). Trends in instructional technology: Educational reform and electronic performance support system. Paper presented at the Association for Educational Communications and Technology (AECT), Nashville   TN.

Note: This paper was selected as a topic for AECT's special session on electronic performance support systems.

Scales, G.R., Yang, C. (1993, February). Perspectives on Electronic Performance Support Systems. Paper presented at the Eastern Educational Research Association, Clearwater, FL.