EVALUATION OF THE ELECTRONIC PERFORMANCE SUPPORT SYSTEM (EPSS) FOR THE TRAINING DEPARTMENT AT COMPANY A

by

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ABSTRACT

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In the past decade, technology and a changing business environment have had a tremendous impact on training departments. Throughout this technological era, industry trends reveal that maximizing human performance is the key to maintaining a competitive edge for businesses in the 21st century. With training as a key component to "bridging the performance gap", progressive companies now view training as "results oriented" and now (more than ever before) look to training departments to achieve business goals. The challenge that training departments face today is two-fold: First, jobs today are transformed every five to eight years requiring workers to acquire new skills. In most instances, these skills are at a higher level than a workers previous job and training departments must teach these skills to ensure that employees perform at a maximum

level. Second, the use of computers and changing technology in the work environment enables new methods to deliver the information and teach the new skills required of employees.

Company A had an aging workforce. In anticipation of significant retirements of senior, experienced operations personnel, Company A began to research and develop a solution to manage the skill development of new hires. Their research evolved to a "Training System" or an initiative to tie technical training to the business objectives of the company, plants, departments, and individuals, and to link training to other systems (quality, performance management, etc.) within the company. The result of their research was to implement an Electronic Performance Support System (EPSS) developed in conjunction with Claymore, Inc. This EPSS system provides workers at Company A with procedures, quality standards, and safety information to perform their job.

The purpose of this study is to evaluate how effective this EPSS system is and to provide the management team at Company A with recommendations to improve the system if necessary. Since implementing this EPSS system in 1996, Company A has not evaluated the system to verify that the Claymore system meets their needs and helps the employees perform their jobs. The study population includes technical trainers and the operations training manager responsible for training operations personnel in the manufacturing areas of Distribution, Packaging, and Shipping.

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ACKNOWLEDGEMENTS

Looking back over the past six years of my life I realize that the desire to pursue this Master's Degree was the influence of work, family, and friends. My exposure to the field of Training and Development and Electronic Performance Support Systems was through the publications and training departments at Cray Research and Silicon Graphics, Inc. (SGI). That exposure, along with turbulent times in the computer industry, generated the spark for me to begin my coursework. I owe a special thanks to my research advisor, Joseph Benkowski, and my friend, coworker, and student companion Becky Pearl for continuing to motivate me to "get that paper done, it really isn't bad!"

However, nothing gets done without the support and encouragement from loved ones, especially those who give up their time and money so that I could complete what I started. With that I owe a very special thank you to my husband Dan, who has been a great husband and father and always "promised" to take the kids when I needed to "work on that paper." I thank my parents, Frank and Joan Adkins, for their support and encouragement during my times of unemployment and new motherhood, and I thank my little Evie--though your keyboarding skills need improvement, they did remind me that not much gets done with a baby in the house. Finally, but most important, I want to thank my son Kirk. Your support and your desire to see me graduate have been the true reason I completed this paper. I hope that in some way, I have taught you that learning is unending. No matter how old or knowledgeable you become in your lifetime, you can always learn more and share your learning with others. Thanks to all of you, and to my little angel, I finally did it!

Chapter 1

INTRODUCTION

In the past decade the evolution of technology and the demands generated by organizational change have created tremendous change in the field of technical training. Instructor-led training--what use to be the norm for training delivery--is continually being redirected into different forms of E-learning. *E-learning*, defined as "the use of network technologies to create, foster, deliver, and facilitate learning, anytime and anywhere" (LINE Zine, 2000) encompasses many styles of delivery including computer-based training (CBT), Web-based training (WBT), knowledge management or learning management, online documentation, and electronic performance support systems (EPSSs). E-learning, along with a changing workforce and greater demands on workers, created the need for Company A to define a training system and to create an EPSS as the tool to provide the on-demand learning and information source for workers in the manufacturing areas of, Packaging, Distribution, and Shipping.

Background

In the early 90's, the technical training manager at Company A identified a training strategy for Corporate Technical Training. This strategy gained overwhelming approval from the plant managers, but neglected to obtain the needed ownership and buy-in from the operations area. Therefore, its success and implementation never progressed. In 1994, the upper management at Company A identified a trend within its workforce.

Skilled workers, who were experts on equipment operations and maintenance, would be retiring, taking with them a wealth of resources and experience that new, unskilled workers would need to perform their jobs. In addition, changes in technology and manufacturing equipment, the creation of "work groups" in the manufacturing environments, along with the culture change brought about by the "total quality movement", reduced the number of workers required per line, yet tasked each worker with more job responsibilities. Training time was also an issue with Company A. While many workers requested additional training, most training occurred during overtime hours and was still seen at as a "short-term" fix in some areas. These trends, and the need for workers to know more in less time, caused Company A to readdress the training issue and focus, as a company, on providing workers with information to perform their jobs efficiently with just the right information at just the right time.

In 1994 Company A, under the direction of a consulting firm, defined a "Training System" with a vision that included the following strategies:

- Obtain commitment from management to provide resources for the learning that drives business results
- Ensure that the culture is one of a learning organization
- Provide a standardized approach to technical training that all divisions throughout the company adhere to
- Create clear, concise job descriptions that identify required skills
- Tie technical training to performance objectives
- Use technology effectively

- Enable workers to be responsible and have control over their individual skill development needs
- Provide ownership and involvement within all levels of the organization

The goal of this initiative was to develop a continuous learning process as a strategy for business involvement (Benkowski, Rothwell, 2002). After thorough research and benchmarking processes, and creating actions from each of the strategies, Company A created the training system illustrated in Figure 1.

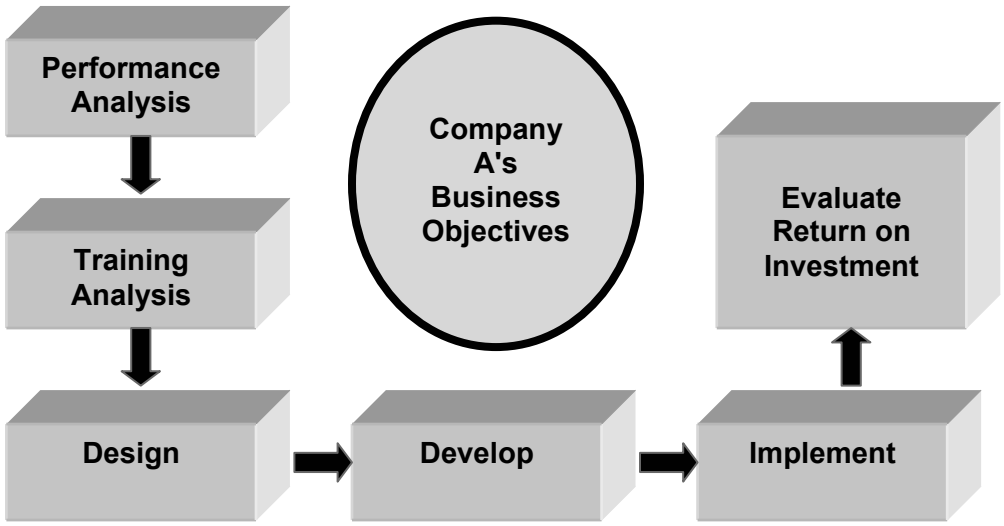

Figure 1. Company A's Training System

This training system tied the training process to Company A's goals and organizational strategy to ensure competitiveness within its market. It also provided Company A with a standard approach to training, which included the following steps:

1. **Performance analysis**: Gather information to establish the ideal performance state that helps link training to organizational goals.

2. **Training analysis**: Analyze systems and audience, identify gaps and causes of gaps, and recommend solutions to bridge the performance gap and determine what competencies the workers need to establish ideal performance.
3. **Design**: Delineate the training plans and instructional strategy to help the work force develop competencies necessary to perform in a way that impacts organizational goals.
4. **Development**: Develop or buy training methods and media.
5. **Implementation**: Prepare, conduct, and document training.
6. **Evaluate Return on Investment (ROI)**: Assess individual and organizational performance.

The key to the success of this training system was the implementation of two committees: a steering committee and a design task force. The steering committee, which comprised the Vice Presidents of Engineering, Operations, and IS, as well as the Master Processor, was tasked with the following:

- Ensure that training system is tied to the business goals and set the philosophy for change.
- Set objectives so the training system is consistent across all the manufacturing plants.
- Provide necessary funding for the design process and funding to implement the system.
- Define the mission of the design task force and select team members.

The design task force, consisting of 26 members, included HR managers, plant managers, technical trainers, corporate safety, engineering, and manufacturing personnel,

and included one representative from each of the different plant sites. In setting up this task force, the steering committee had to ensure that the following three conditions were met:

1. Task force had the knowledge of operations and performance needs for the various plants (cultures, contractual issues) and a willingness to learn about training systems.
2. Task force understood business within the organization and at the different plants.
3. Task force had adequate political constituent representation.

As Company A progressed into the implementation phase of their training system, the design task force took the following actions to identify the best approach to deliver training to Company A employees:

- Performed a competitive analysis to determine the current state and future of technical training among their competitors.
- Performed an environmental scan to identify the elements that affect customers, stakeholders, and influencers.
- Benchmarked different companies to determine the best training practices.
- Conducted focus groups at each plant to determine the current state of training and to identify future needs of internal customers.

These actions provided the task force with the information to determine that the best way to implement the training system was to purchase an electronic performance support system (EPSS) through Claymore, Inc. By using existing information (Company A documented procedures, processes, etc.) and the knowledge obtained from technical experts in Company A, Claymore, Inc. created an EPSS that was consistent throughout

the company and provided information that enabled workers to perform their jobs at the time they need the information.

Research Objective

With all training systems, a major component is that of evaluation or return on investment. By evaluating training and incorporating feedback into the system, a company can enhance its training initiative to improve worker performance. The purpose of this study therefore, is to obtain that feedback and evaluate the effectiveness of the EPSS that Claymore Inc. created for Company A. This study will answer the following questions:

1. Does the Claymore EPSS provide operations workers at Company A with all the information they need to perform their job at the time they need it?
2. Does Company A use the Claymore EPSS as it was intended to be used?

Significance

This research is significant to Company A because a key component in an effective training system is evaluation. Evaluating a system - in this case the EPSS tool and its contents - and incorporating the feedback into the tool can enhance and improve the original system. This concept of evaluation also supports Raybould's Organizational Performance/Learning Cycle. This cycle illustrates how new learning (possible changes from evaluation) goes back into a corporate knowledge database (Claymore's EPSS) and enables new learning for other workers (Raybould, 1995). Enabling new learning also ensures that Company remains competitive in the market because production can increase when a worker performs at his/her maximum potential.

Terminology

The following definitions apply to the terminology used throughout this paper**:**

Electronic Performance Support System (EPSS): A computer application that is linked directly to another application so that when users access the application, it trains or guides them through steps they need to complete a task in the target application. Or, more generally, a computer or other device that enables workers to access information or resources to help them achieve a task or performance requirements (Kaplan-Leiserson, 2002).

Learning Management System (LMS): A system that manages learners, keeping track of their progress and performance across all types of training activities (Brandon-Hall, 2002)

Learning Content Management System (LCMS): A software application that enables trainers and training directors to manage both the administrative and content-related functions of training. An LCMS combines the course management capabilities of an LMS (learning management system) with the content creation and storage capabilities of a content management system (CMS) (Kaplan-Leiserson, 2002).

Performance Zone: The intersection or overlap in which the user gets just enough information, appropriate to the task, at just the right time (Howell, 2001)

E-Learning A wide set of applications and processes, such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audiotape and videotape, satellite broadcast, interactive TV, and CD-ROM. (Kaplan-Leiserson, 2002).

Chapter 2

REVIEW OF LITERATURE

Gloria Gery, creator of the term electronic performance support system (EPSS), defines an EPSS as "an electronic system that provides integrated, on-demand access to information, advice, learning, and tools to enable a high level of job performance with a minimum amount of support from other people." As the technology era and business environment of today evolve, so does the definition of an EPSS. In a discussion on performance improvement technologies, Wentling and Johnson cite Raybould's EPSS definition as "a system 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" (Johnson & Wentling). Bill Marquardt simply states that "An EPSS is any computer-based program that assists people to do their jobs more effectively" (Marquardt, 1998).

EPSS and the Performance Zone

While many definitions of EPSS exist, it is important to note that the concept of EPSS is not necessarily to provide training, but to provide the specific information that a person needs to do a task/job exactly when needed. In her presentation entitled Pillars of an eLearning and Performance Support Strategy, Gloria Gery refers to this as "Getting people to The Performance Zone quickly and consistently" (Gery, 2001). Colby Howell illustrates and defines *The Performance Zone* as "the intersection or overlap in which the

user gets just enough information, appropriate to the task, at just the right time" (see Figure 2). When a performer is in the Performance Zone, then maximum performance is achieved.

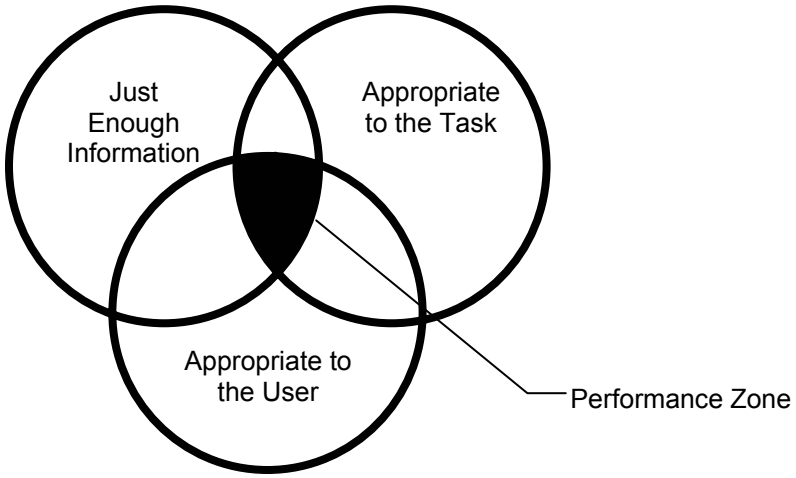

Figure 2. The Performance Zone (Howell, 2001)

With an understanding of The Performance Zone and its components, one might argue that the traditional paper-based "job aid" and quick-reference type information is all the information a performer needs to support training and to obtain maximum performance. So, why the hype for EPSS? Marquardt considers an EPSS as "an online version of job aids—a performance technology that has long been in use for technical training", and identifies the following factors for the emergence of EPSS and its continued effectiveness in the business environment:

1. Knowledge management technology constantly changes and proliferates.
2. Greater access to computers exists in the workplace.
3. Traditional means of making information available are less convenient and not always available instantly like an EPSS.
4. Computer literacy in the workforce has changed with age and experience.

These factors, along with the emergence of technology and an increased emphasis in organizations on performance technology and just-in-time (JIT) training, enable EPSSs to emerge and continue to evolve in the business environment (Marquardt, 1998). As with Company A, these changes enabled management to create a new training system and deliver an electronic job aid or EPSS to help bridge the "performance gap" and get the workers at Company A into the Performance Zone.

In their paper Around the Interface in 80 Clicks, Degler and Battle examine the three elements of the Performance Zone and how each element is important to the international audience. They note that when dealing with internationalization, the primary focus is the performer, which in this context is not just an individual but a cultural group. Therefore, the questions they derive focus on the following categories:

- Language (i.e. language the target group speaks, local vs. major language groups, style and tone of cultural group, dialects, focalizing for tonal languages).
- Time (how performers think/represent time, standardized date formats, time periods used, special days/holidays).
- Cultural Expectations (different ways of reading, habituated skills such as touch screens/typing, display of information).
- Metaphor and Representation (symbolism through icons, color, literal representation).
- Performer's Locale (one country or more than one, seamless transitions from one place to another).

When focusing on the process and information circles in The Performance Zone, Degler and Battle remind us that it may not be adequate to just convert an existing

product or information to a foreign language or version. Even though the words may translate effectively, the information is not limited to the language translation and the process of using the system may not make sense to the user. They conclude their article by noting that many of the principles used for internationalization are also considered general principles of good software design, including that of an EPSS. The focus for Company A's system did not necessarily address the international community. However, it did need to focus on the different cultures at its various plants in the United States and did support Degler and Battle's philosophy by performing an environmental scan and conducting focus groups as a way to collect information and define the differences among its U.S. facilities.

EPSS Genres: Forms and Styles of EPSS Systems

In addition to understanding what an EPSS is and how it relates to performance improvement, it is also important to understand the many different forms of information that function as EPSS's. The following list highlights some of the well known genres of EPSS (Carliner, 2002):

- Knowledge management systems
- Online help and reference systems
- Wizards/assistants that recommend a course of action and carry it out per the users request
- Cue cards that guide users through a task step-by-step but do not perform the task for them

- Software system components that provide answers to questions workers have (e.g. maintenance or repair procedures) and are available on the production floor as "just-in-time" training or information
- Information database
- Expert systems

These genres of EPSS that directly support a workers performance when, how and where it is needed, all support Brown's statement that "EPSS is a concept", or "a shift away from viewing workers as people that need training to people that need support to do the job" (Brown, 1996). Company A's training manager also realized the potential of this new concept for learning as the requests for training increased, computer technology enabled new opportunities for delivering training, and the workforce itself was changing.

This computer-mediated environment, in which task performance and learning is an integral part of the technological environment, produces what Gloria Gery considers the three fundamental types of performance support: Intrinsic support, Extrinsic support, and external support.

Intrinsic support is embedded into a software program and integrated into the interface structure so well that it is impossible to differentiate between the software and the performance support system. *Extrinsic* support is integrated within the system but is not the primary support. Examples of extrinsic support include wizards, cue cards, and advisors. *External* support is external to the computer-mediated workspace and does not have to be computer mediated. For a performance-centered system, Gery states that "a designers goal is to integrate as much as 80% of the required performance support as intrinsic support with plus or minus 10% each in the extrinsic and external categories".

(Gery, 1995). Per Stan Malcolm, "in a well-designed Performance Support system, learning is likely, desirable, even inevitable - but it's not the point. ***Performance*** is the point" (Dickelman, 1999). This was certainly true with Company A--performance was the bottom line for their EPSS system.

Performance-centered Design and the Learning Organization

With performance as the bottom line, the EPSS concept moves closer and emerges into performance-centered systems forming a new look for the business environment. In his article on Performance Support Engineering: An Emerging Development Methodology for Enabling Organizational Learning, Raybould provides his definition of EPSS, which supports the model he *calls The Organizational Performance Learning Cycle* (refer to **Figure 3**). This model relates performance-centered design concepts to those of a learning organization. Raybould contests that organizational learning is achieved at the completion of each of the 5 phases of this learning: Performance Centered Design, Performance, Individual Learning, Generation of New Knowledge, and Knowledge Capture.

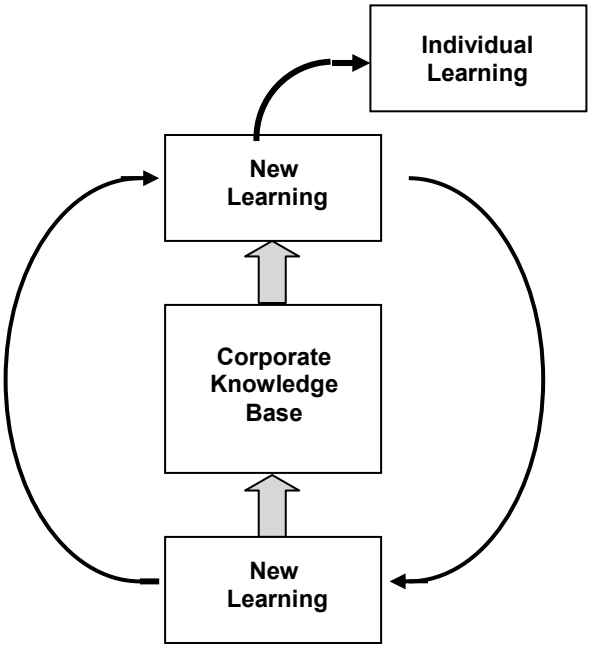

Figure 3. The Organizational Performance/Learning Cycle

Raybould states that the older definitions of EPSS don't include this model of organizational learning and therefore are too limited and restricted. To support Raybould, David T. Bill says in his paper Transforming EPSS to Support Organizational Learning says that for organizations to remain competitive, they need to create new ways of capturing, storing, and retrieving information. He states "There is also a need to capture knowledge of individuals as well as that which is created by the organization, for the purpose of providing individuals and the organization with information to perform current job tasks and adapt to the changing external environment" (Bill 1999). In a discussion between Gary Dickelman and a panel of professional experts in the field of Performance Support, Hal Christianson supports Raybould's model by stating that "Learning must be turned into performance, shared with the entire organization, then cycled back into the next iteration of training. He continues by saying "Learning

Technologists must take an interest in - if not responsibility for- the full cycle. They need to embed performance support and knowledge sharing into learning activities so they become second nature to the learners/performers" (Dickelman, 1999). Company A's training system supports Raybould's Organizational Learning Cycle by incorporating an evaluation process to collect and evaluate data and input changes back into the system as needed.

So one may ask then, "what is a performance centered system?" Gery summarizes the answer in Table 1 as the19 attributes of Performance Centered Systems.

Table 1. Attributes of Performance-centered Systems (Gery, 1995)

Attribute	Function
1. Establishes and maintains a work context	Text sequencing to set a context, figure out what to do, do it in the best way.
2. Aids goal establishment	
3. Structures work process and progression through tasks and logic	
4. Institutionalizes business and strategic best approach	
5. Contains embedded knowledge in the interface, support resources, and system logic	Describes things that appear on the display
6. Uses metaphors, language, and direct manipulation of variables to capitalize on prior learning and physical reality.	
7. Reflects natural work situations	
8. Provides alternative views of the application interface and resources	
9. Observes and advises	Describes function of a user or system action
10. Shows evidence of work progression	

Attribute	Function
11. Provides contextual feedback	
12. Provides support resources without breaking the task context	
13. Provides layers to accommodate performer diversity	Describes system behavior, options and underlying functionality and what appears on the interface
14. Provides access to underlying logic	
15. Automates tasks	
16. Provides alternative knowledge search and navigation mechanisms	
17. Allows customization	
18. Provides obvious options, next steps, and resources	
19. Employs consistent use of visual conventions, language, visual positioning, navigation, and other system behaviors	Provides conformance to standards or conventions

Using this list of attributes, Gery develops a chart that describes the criteria required for each of these attributes. The criteria are rated using numbers 1, 3, and 5; with 1 indicating low representation, 3 intermediate representation, and 5 high representation. Table 2 shows an example of Gery's chart listing two of the attributes of performance centered systems. The more attributes within the software program and the higher level of representation, the more powerful the software program is in generating user performance.

Table 2. Example Chart of Attributes for Performance Centered Systems

Attribute	Low Representation 1	Intermediate Representation 3	High Representation 5
Establish and maintain a work context	Not task oriented. Presents itself as "software". Employs technical rather than work language. No task orientation, cueing or structuring. Requires performer to make mental connections between the software and the work context task or deliverables.	Employs some task language or representation metaphors to establish work context. Low to moderate fidelity to actual work context. May employ some multimedia in metaphors and objects.	Task centered. Employs ask language and metaphors to establish a psychological work context. Results in perception or feeling of "doing work" rather than being in "software".
Aids in goal establishment	Performer must generate goals prior to interacting with software; must know options and the relationship between options and goals and where and when to execute them.	Presents either some specific or general goals to stimulate performer interaction from within the interface. May provide detailed information about goals with extrinsic support researches such as manuals, instruction, Help. Goal states may be presented in multimedia objects or models to serve as points of comparison for the performer.	Presents explicit goal options from within primary displays. Employs dialogue (e.g. "what do you want to do…) and presents initial and progressive options for selection. Both overall and context specific goal establishment are supported. May provide intrinsic or extrinsic resource to help performer compare and contrast goal options and/or consequences. In rich 3-D or virtual environments, goals and models of desired outcomes might be represented.

By constructing a grid listing the attributes, Company A could observe their EPSS system to see how it does or does not reflect the terms in Gery's master chart. By rating the attributes (1, 3, 5) Company A could construct a mathematical average and obtain a quantitative assessment of how performance centered their EPSS system is.

Effectiveness of a Training Model for EPSS

Company A defined a training system before implementing their EPSS. This system, which was tied to the company's business objectives, included the following phases: Performance Analysis, Training Analysis, Design, and Develop, Implement, and evaluate return on investment (ROI). These phases are similar to the traditional ADDIE model (analyze, design, develop, implement, and evaluate) and therefor, one may ask, "what is an effective training model for EPSS?"

In her book Designing and Developing Electronic Performance Support Systems, Lesley Brown defines her training model for an EPSS as the $ED^{4:}$ model: Define, Design, Develop, and Deliver. The Define stage, or first and most important phase, is analogous to an assessment phase in the ADDIE model. She states the outcome for the Design phase includes a performance assessment (determining the problem), task assessment (defining the critical job tasks), defining the technical functionality (software application requirements and functional specifications), and planning the development process (project plan and schedule). This phase helps to create the philosophical and technical foundation of the EPSS and to define the composition of the EPSS and how performers interact with it. The Design phase, or second phase in her process, requires the EPSS team to perform the following steps:

1. Identify, collect, and design information.
2. Create tools, templates and standards.
3. Structure the EPSS design.

This Design phase provides the developers with the tools to articulate the design in both verbal and written form and enables a feedback loop among the EPSS team, client, and the performers. Fulfilling this phase ensures consistency throughout the design and development phases. The Develop phase (phase 3) is where the creation of the EPSS components begins and is very dependent on an effective Design phase. The following list provides the steps for the Develop phase:

1. Create a prototype
2. Plan the development effort
3. Develop EPSS components
4. Test and revise the EPSS
5. Build the software installation kit
6. Prepare to implement the EPSS

The Deliver phase, Brown's fourth and final phase in her ED^4 model, is the phase in which the EPSS is actually made available to the performer and includes the following steps:

1. Decide on the EPSS delivery medium
2. Support the EPSS delivery medium
3. Support the EPSS implementation
4. Evaluate the EPSS
5. Archive the project

Brown also supports the need to evaluate a system and make necessary changes for continuous improvement.

Literacy Access Online (LAO), a graduate program effort between the Helen Keller Institute at George Mason University (GMU) and the Parent Educational Advocacy Training Center (PEATC), employ a Web-based EPSS system called the Literary Explorer. The design team for this tool followed Brown's model of EPSS which they say "delineates the steps of define, design, develop, and deliver as an approach to the development of an EPSS solution" (Bannan-Ritland, Egerton, Page, Behrmann 2000).

Barry Raybould considers this ADDIE model a generic performance support engineering development cycle and illustrates it as shown in Figure 4.

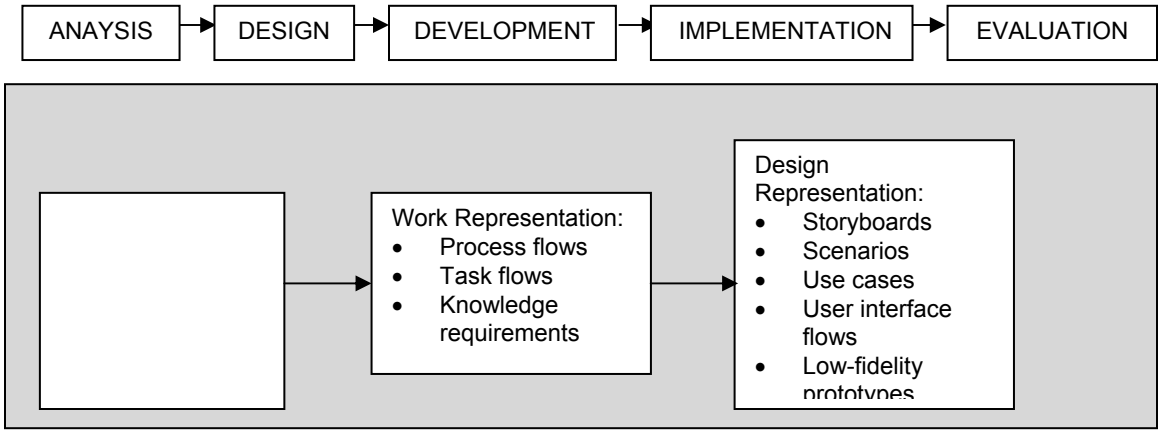

Figure 4. Generic Performance Support Model

Raybould states that this generic process focuses more on deliverables than a pre-established sequence of activities. Raybould prefers his "Performance Support Mapping" model, which consists of the following four phases:

- Phase One: Look and Listen
- Phase Two: Understand the Work

- Phase Three: Design the Work
- Phase Four: Design the Interface

In phase one, Raybould collects raw data by observing in the workplace, conducting focus groups, logging task events, conducting constructive interviews, and consulting with management to understand the goals that drive the business. In phase two, Raybould creates models and work maps that represent work at the individual, organizational, and process levels and identify the barriers and roadblocks to peak performance. He also focuses on differentiating factors between high and low performers and analyzes the knowledge flow within the organization. Phase three is Raybould's design phase in which he builds various models and maps to represent the work and to design the system. He creates abstract representations of the design and user interface and envisions alternative solutions to work problems, then selects viable solutions. In phase four, Raybould actually designs the interface using paper-based or computer-based prototypes and evaluates the design using a set of performance heuristics, which he also uses in the usability testing process of the performance support tool (see Table 3).

Table 3. Performance-centered Design Heuristics (Raybould, 2000)

Principle	Description
Advance warning	Provides advance warning of consequences.
Affordance	Visual appearance suggests use.
Answers descriptive questions	Answers: "What does this do?"
Automates tasks	Automates tasks wherever possible.
Captures best practice	Captures the best practice of the experts.
Consistent	Is consistent.
Feedback	Gives feedback on what you've done or where you've been.

Principle	Description
Forgiving	Lets you make a mistake and go back to a previous state.
Goal establishment	Helps establish what you can or want to do, or where to go.
Interprets	Answers: "Why did that happen?" "How did that happen?"
Layered	Provides increasing levels of detail to suit diverse audiences.
Matches flow of work	Matches how work presents itself to you.
Minimizes translation	Minimizes interpretation of special terms.
Proactive support	Proactively monitors and evaluates to provide support when needed.
Recognition	Relies on ability to recognize, rather than recall, knowledge.
Relevant	Omits irrelevant information.
Resources	Provides access and links to all resources and tools needed.
Search	Lets you search for answers to questions.
Stimulus response path	Provides an unbroken path from stimulus to response.
Task or process focused	Directly shows the structure of the task or process.

Raybould's four-phase method evolves not only around the deliverables, but raw data from job performers and subject matter experts. His methodology follows the "rule of three actuals": Observe actual work, observe actual job performance, and observe the actual work place (Raybould, 2000). Following Raybould's "rule of three actuals" the performance gap may become more obvious to trainers.

Colby Chambers Howell defines the ADDIE model as being a linear approach and suggests that designers are doing most of the decision making and designing for the computer, not the user. Her solution of a Performance Centered Design (PCD) approach uses a representation from total quality management (TQM), usability modeling, and

human factors engineering and also supports Raybould's four-phase model. While all phases in a training model are valuable and somewhat consistent among the different authors, the three phases that create the most attention for an EPSS include design, development, and evaluation.

Design: A key component of a PCD training model

Analysis is a term used over and over within the design phase of a training model. While many authors break down their phases into different types of analysis, Kim Ruyle notes that the major emphasis in the design phase should be that of task analysis. Ruyle identifies task analysis as "the key to identifying performance problems and developing improved performance support systems and training. He states that before implementing performance improvement one must first conduct an analysis to identify the root cause of poor performance. He notes that the three "ingredients" that must examined include a) the target population of performers, b) the work environment, and c) the specific job tasks. Ruyle uses a series of four simple questions (abbreviated W2H2) to analyze the principal tasks:

- What does the performer do?
- When is it done?
- How is it done?
- How does the performer know when the task is done (correctly)?

Often the third question results in subordinate tasks, which helps to achieve the granularity necessary to identify all tasks performed. When the following two conditions

are met, then Ruyle believes the performance technologist is granular enough in his/her task analysis:

- The performance technologist understands the task well enough to explain it to the target population
- The task represents a single teachable concept or procedure

Ruyle provides a task performance model that is a guide for evaluating and redesigning tasks. Ruyle's model, similar to components within Raybould's model, represents tasks as a system of interrelating elements that integrate the performer with the work environment. To apply this model, Ruyle uses a checklist that is very similar to Gery's Attributes of Performance Centered Systems. The task elements of Ruyle's model are as follows (Ruyle, 1999):

- Initial perception
- Cognition
- Kinesthesia
- Subsequent and synchronous perception
- Feedback
- Motivation
- Task output

Saul Carliner also believes that design represents the most significant challenge in EPSS's. However, Carliner doesn't just focus on the tasks and work environment, but looks at the bigger picture of design, how it relates to the business as a whole, and yet encompasses all the qualities and components supported by other authors. Carliner's components of design include:

- Translating the traditional request for training or documentation into performance requirements
- Addressing the bottom line performance need that is driving the request
- Developing an overall approach that supports performers throughout the life-cycle of their performance
- Choosing the most appropriate intervention
- Ensuring the elegance of the solution

Carliner supports Gery in his statement that "performance support is not about tools; it's about design" (Carliner, 2002).

As with all examples of good design, Company A took great effort in the design phase of their training system by conducting focus groups and identifying workers tasks. A key action of the design team was to identify the tasks for each job function and customize the processes for the different plants. Company A also addressed much of Carliner's concepts to ensure that their EPSS was tied to business goals.

Development phase: technology driven or performance centered?

This ever-changing world of technology has impacted the human race even though they may be only indirectly involved—frustration with computers is the rule, not the exception. However, technology is here to stay, and therefore the focus of developing an effective EPSS tool is crucial to its usefulness. Raybould's Phase four, Design the Interface, takes great effort to implement the design concepts he identified in Phase Three (Designs the Work) and apply effective design principles. Colby Chambers Howell brings to light some of the issues regarding software design and says that to define the

solution, you must first clearly define the problem. She states “the old ways of designing software solutions don’t cut it any more; hence, the phrase “We need to think outside of the box”. Howell sites Glory Gery by stating that “no matter how much or how well we do, the problems we are attacking are accelerating at an even faster rate. Or the development efforts are simply taking too long. We are applying radically different technological alternatives to old frameworks without reexamining their underlying assumptions and structures. In our pursuit of solutions, we have assumed that the future should be an extension of the past. We have not taken time to step back from the situation to reexamine whether the old approaches should or must be the best solutions. We apply sophisticated technology to an obsolete paradigm of human performance development. And, as a result, we are not making the difference we should" (Howell, 2001, p. 17).

Howell identifies content and software as the two issues around the development of an EPSS. Between both issues is the need to create more information, deliver it faster, make it usable, and ensure that it meets the needs of a workforce that is responsible for more tasks than the predecessors of this technology era. Howell's resolution of the design and development issue is to create her adaptive user interface which she calls a Morphing Waldo (a mini program that sits between the larger application and the user). She would use the elements of performance-centered design, diversity modeling and process modeling and gather information through observation, surveys, and interviews. Then, Howell would create personas from the information (paying attention to personality types and cognitive processing styles) and a rubric listing the most frequent functions and tools the user performs. Combining the preferences in the rubric with the personas, Howell believes she could design an interface that would be most appropriate for the users

particular style and use. (Howell, 2000). This method incorporates design into the development process of software and doesn't necessarily treat design and development as two separate entities.

Looking into the software component of an EPSS, Gary Dickelman asks the question "What can performance support professionals learn from video games?" Dickelman focuses on the concept that the goal of video games is the same as that of performance support professionals, "for people to keep playing and to want to keep playing" (Dickelman, 2001). Video game interface design and the impact that it has on the user are similar to interactive programs in the business world. The point of any interactivity is to enable the user to complete a task as efficiently as possible. When the software allows the user to become angry or frustrated his/her performance suffers. However, when the user feels as though he/she is in control and confident of his/her actions, there is ultimately an increase in performance. In well-designed video games, there are generally four positive game experiences:

1. The user learns the rules of the game easily.
2. The user is able to perform some action more skillfully than his or her perception of ability suggests.
3. The user can perceive an improvement of skill during game play.
4. The user feels like he or she is in direct control of the avatar (an onscreen representation of himself or herself—an extension of the user).

The kinds of interaction designed can lead the user to a positive or negative state. Knowing the positive game experiences, the following criteria are interactive designs that can create the positive state (Shirinian, 2001):

- Immediate feedback
- Graceful recovery from mistakes
- High-quality feedback

Many of the examples Shirinian uses for video games are consistent with Gery's attributes of performance centered systems; however, the issue of content is not addressed. As Carliner states in Online Learning e-Reviews "The biggest misunderstanding about e-learning is that it's about technology. Technology only enables us to teach online. We still have to make the content effective and engaging"(e-Reviews, 2002). Therefore, without creating good content from task analysis and observation, and applying good design principles, heuristics, or attributes, the promise of a quality EPSS will never be achieved.

Evaluation: The assurance of a quality EPSS and ROI

Despite the emphasis on design and development of an EPSS, it is also necessary to focus on the evaluation phase. While many businesses correlate evaluation with a return on investment, it is also important to remember that ROI comes only when the EPSS tool provides the user with the right information when he/she needs it. This reminder reinforces Li-An Ho's comment that because the process of creating a performance support system is technology driven and not requirement-driven, designers must recognize that evaluation is a critical link in the of development process because it provides the necessary information to keep the process on track (Ho, 2001). Saul Carliner clarifies the need for evaluation as the ultimate way to assess business performance. He notes that there are really three levels to actually assessing an EPSS: user satisfaction,

user performance, and business results. Carliner emphasizes the importance of planning for the evaluation phase early, rather than later, in the process of EPSS design. So what does the evaluation phase look like and when does it occur to ensure ROI with the EPSS?

Craig Marion, in his article Attributes of Performance-centered Systems: What can we Learn from Five Years of EPSS/PCD Competition Award Winners, identifies two distinct ways of evaluating EPSSs: 1) Examine the results of EPSSs and 2) Examine the systems to see what they do and how they do it. To examine the results, Marion considers Donald Kirkpatrick's four level model for evaluating effective training courses which links the results of training to business results. Unfortunately the data acquired from this type of evaluation provides statistics that has little or no value to system designers and leaves the question of "what goes into these EPSSs and how do they work?" Therefore, Marion uses Gery's 19 attributes, and with his experience in the EPSS/PCD competition, notes that these attributes remain extremely useful in describing the design of all competition winners and with a few enhancements Marion can strengthen Gery's original list (Marion, 2002).

If we conclude then that Gery's attributes remain the most effective form of evaluating the program or EPSS, how does one evaluate the ROI? Kim Ruyle cautions that oversimplification of cost justification processes in calculating return on investment is a real danger. He recommends that with every EPSS project, a proposal in the early stages should contain direct and indirect measures and should include documentation of the following information:

- Identify indirect measures that management holds most dear (i.e. mentioned most often by management company-wide).

- Identify contributions expected from the EPSS (i.e. project measureables and evaluation criteria).
- Estimate what the project will accomplish as it pertains to the contribution criteria.

An example Ruyle provides is to "Improve customer service by reducing the length of service calls by 15%." His second strategy is cost justification by calculating the net present value (NPV) and treating an EPSS like any other expenditure for capital equipment. Once calculated, Ruyle provides the following "rules of thumb" for ROI (Ruyle, 1998):

1. Use only green dollars in quantitative cost justification.
2. Identify the qualitative benefits of EPSSs and recognize that they are usually greater in value than quantitative benefits.
3. Look for another application if implementing an EPSS is questionable.

Changing technology, new ideas, and multiple opportunities provide companies with advancement and change. However, it is ultimately the incorporation of an EPSS into the business goals and support from management that enable EPSS to move forward and to provide a return on investment assuming the development efforts provide good content and an "easy-to-use" tool.

EPSS in the Internet Age: A Look to the Future

Before one can look to the future with EPSS, it is important to understand the current state of performance in the business environment. In her presentation Pillars of an eLearning and Performance Support Strategy, Gery illustrates the current state as a lot of content and resources “all over the place” as shown in Figure 5 (Gery, 2001).

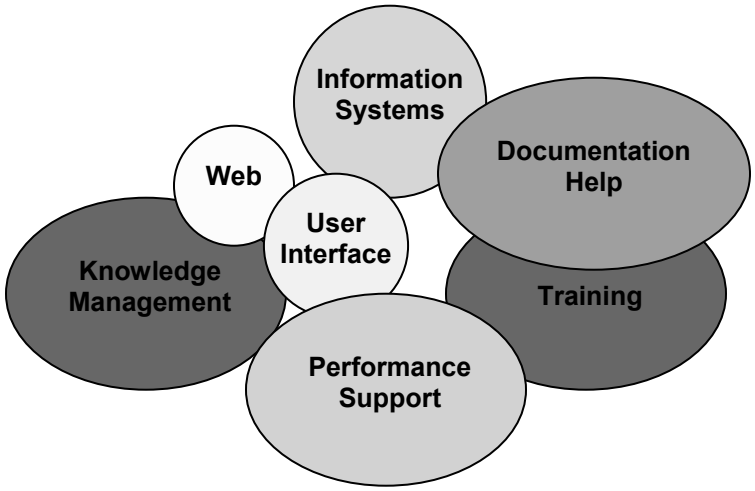

Figure 5. Current State of Information in Today's Business Environment

As the illustration shows, the scope of an EPSS goes beyond the discipline of training and uses a variety of skills from different fields including programming, instructional design, usability, and technical communication.

Colleen Mackenzie explores three key design strategies that are the underlying strategies of EPSSs in the different disciplines highlighted by Gery: Minimalist, Performance-centered, and User-centered design. Minimalism gained interest among technical communicators in the late 1980s when John Carroll observed that novice computer users' learning was being slowed down by the traditional training and documentation. Mackenzie cites Caroll's proposal that "documentation should observe minimalist principles, providing users with the minimum information they need to start real tasks immediately, while allowing them to learn on their own as needed (Mackenzie, 2002). Performance-centered design has been widely acknowledged by instructional designers and performance technologists since Gloria Gery first proposed PCD in 1995 with the goal to "increase overall productivity within organizations by enabling workers

to complete meaningful work as quickly as possible" (Mackenzie, 2002). User-centered design (UCD) has been the interest among usability engineers and human factors engineers in the fields of computer programming to create easy-to-use products. UCD involves actual users as part of a design team to ensure that the software design remains focused on the users needs. Mackenzie references The Performance Zone in that "optimal performance occurs at the intersection of well-designed representations or "cognitive artifacts" that are appropriate to the task and to the person."

Despite the terminology, all three strategies propose that good design achieve the following:

- Lets users perform work efficiently
- Supports users within the natural workflow
- Incorporates business processes
- Is easily accessible
- Is adaptive according to user needs
- Is "easy-to-use"
- Is what users want
- Provides a pleasing experience

These criteria are consistent with performance-centered design, attributes of a performance support system, and requirements for getting workers into the performance zone. The missing component in the illustration and the required effort for EPSSs to move forward is that of business as a whole--the culmination of each department, field,

and organization sharing their expertise and delivering one tool for workers to succeed and achieve in the workplace.

Carliner highlights the same issues in his discussion on the field of Human Performance Technology (HPT) in which the goal of training and documentation is to improve workplace performance. Performance issues have the following three components:

- Skills and knowledge
- Resources
- Motivation

The skills and knowledge component address the question "do workers have the skills and knowledge to perform the task? Carliner references findings from Peter Dean that indicate only 17% of performance gaps arise from the lack of skills and knowledge. The resource component addresses the question " do users have the tools to perform a given task?" which can include software as well as information about the job performance itself. The third component, motivation, addresses the question "do performers really want to do this task?" Even though the performer has the skills, knowledge, and the resource, he/she may not be motivated to perform a specific task. This lack of motivation can be the result of interpersonal relationships, a reward system (or lack of one), or lack of recognition. These three HPT components go well beyond the scope of a structured system of interventions and touch on multiple divisions within a company (Carliner, 2002).

EPSS is a powerful tool and holds the potential for influencing the performance support movement, HPT, minimalism, and user-centered design. However, if the

corporate training community is to take advantage of the opportunity made possible by EPSS technology, then, as noted previously by Hal Christianson, learning technologists must be involved or responsible for the outcome. In working with all these fields and organizations that are attempting to accomplish the same task, it would be best to provide the user with one system to avoid the common frustration of information overload and to support Raybould's Organizational Performance/Learning Cycle. However, the question still remains "where do organizations go from here and how does an organization manage all their content and learning?

In the September 26 issue of OL Reviews, Bryan Chapman, an e-learning analyst, notes that the key component of success for online learning (including an EPSS) is content-management systems. Chapman notes that currently it takes two enterprise systems to solve one problem: Learning-Management Systems (LMS) and Learning-Content-Management Systems (LCMS) (Chapman September 2002). An LMS manages learners, keeping track of their progress and performance across all types of training activities. An LCMS manages content or learning objects that are served up to the right learner at the right time. (Chapman & Hall, September 2001). Chapman also notes that any changes to content management systems will be a result of a continuing “shakeout” in e-learning. The key to successful e-learning and content management is to create and manage content fast enough to keep up with the demand.

Glory Gery, on the other hand, states that businesses are too focused on these content management systems and not on the job itself. She says while “those pipes and processes are important, they are simply repositories for data or launch pads. I often see people confusing architecture with strategy.” She continues to state her ongoing belief

that “based on a true understanding of the work, the task should be to support the job with tools, reference, training and collaboration”. People still default to training and equate eLearning with that training, not with performance support. In the same issue of Online Reviews, Saul Carliner suggests that we look for better content. While technology enables us to teach online, the content still needs to be effective and engaging.

As learning technologists, performance-centered design experts, or technical communicators continue to address the future of EPSS, it is apparent that the concept will continue to move forward. It also appears that its success will be based on the implementation of key attributes, communication, and teamwork among the different fields supporting and promoting the technological changes brought about by this information age.

Chapter 3

RESEARCH METHODS

In their book The Elements of Information Gathering, Muraski and Zimmerman state that "Good information gathering skills enable you to focus and refine problems, generate alternative approaches to problems, and identify information needed to solve problems." They also state that in fields where rapid changes occur "Good information-gathering skills will enable you to keep abreast of the constant changes." (Muraski, Zimmerman, 1995). Their statements on information gathering support the purpose this research was conducted, which answers the following two questions: 1) Does the Claymore EPSS provide workers with all the information they need to perform their job at the time they need it? 2) Is Company A using the Claymore EPSS as it was intended to be used? This chapter discusses how the research for these two questions was conducted. It includes information on the study population, the instrument used to conduct the study, how the instrument was structured, and how data was collected and validated

Background

Company A has six manufacturing plants within the U. S. Initially, the researcher planned to survey the workers at one of these six plants to identify the usefulness of Company A's EPSS system and to answer the two research questions. The plant that the researcher chose to survey was the plant that most frequently uses the EPSS. (Refer to Appendix A for a copy of the survey instrument and consent information.) Because

another manufacturing company recently purchased Company, employees at all plants were dealing with transitions and changes within the work environment. Therefore, management at Company A determined that it was in the best interest of the employees not to distribute the survey. However, the researcher identified a second alternative to obtaining data on the effectiveness of Company A's EPSS system. The alternative was to interview the technical trainers and management at Company A who were instrumental in the design and implementation of the EPSS system.

Study Population

Company A's training department employs an Operations Learning Manager and six Technical Trainers within the U. S. The study population for this research included 4 individuals working in these two capacities. Two of the trainers were involved in the strategy planning session of the training system; the other two were not involved. In addition, three of the individuals involved in this research were members of the original design task force and were aware of the business reasons and strategic plan for implementing the Claymore EPSS training system. The fourth individual became involved after the planning but, along with other interviewees, was instrumental in developing the job charts, work instructions, and training materials available to trainers, trainees, and operations personnel that use the system for on-the-job training.

Research Instrument

Interview questions were used to gather and collect the data for this research. The researcher worked with the Training Manager who was a member of the Steering Committee that implemented Company A's training system. This individual provided the

researcher background information about the intent and use of this training system and suggested areas to evaluate. In addition, Company A provided the researcher with a CD-ROM of the Claymore EPSS system that included the job aids, work instructions, and tools for on-the-job training. Although this CD-ROM included procedures for only one of Company A's U. S. plants, the content was similar to the information provided to workers in all of Company A's manufacturing plants. The researcher reviewed the contents of the CD-ROM to obtain an understanding of the types of information provided to operations workers and then drafted questions for data collection. She derived questions based on the purpose and reasons that Company A implemented the system, her literature review, and the purpose of this research study. Table 4 lists the interview questions and provides the attribute or function to which the question is directed. Note that measurement for performance improvement is a result of many attributes of an EPSS and is not the result of individual characteristics. Refer to Appendix B for a copy of the position paper and the detailed interview questions.

Table 4. Example of Research Questions and Data Analysis Technique

Interview Question	Attribute/Function
• Provide examples of operations positions that use the Claymore system and how they use it.	Establish a main work context
• How does the Claymore system enable trainers to customize, update, or add information?	Allows customization and trainer input
• What attributes does the Claymore system contain to make it useful for a diverse audience?	System behavior
• How effective is the Claymore system in enabling performers to fix problems accurately and in a timely manner?	All attributes
• How interactive is the Claymore system in providing feedback as a result of a user's actions?	Function of user interaction
• How is the Claymore EPSS system used to evaluate an individual's performance?	Customization, system behavior
• How has individual performance improved as a result of this system being implemented at Company A?	All attributes
• How involved are the plant employees in determining what information is included in the system?	Allow customization
• What is the process for individual users to give feedback and to provide recommendations/enhancements to system content?	System behavior
• How does this system employ "Business Knowledge" or strategic processes that evolve or change at Company A?	Establish work context
• Has the Claymore system reduced the amount of training you provide to employees?	All attributes
• If you started over with the implementation phase of this training system, what would you do differently?	All attributes

Interview Question Validation

The research advisor, who is an expert in the field of Training and Development and is also the training manager that was instrumental in creating this new training system for Company A, reviewed the interview questions. In addition, the researcher provided Company A with a position paper entitled *A Position Paper on The Effectiveness of Company A's EPSS.* This paper, along with the interview questions, was

distributed and reviewed by Company A's Operations Learning Manager, Vice President of Operations, and the legal department. Comments from this review were incorporated into the final set of interview questions. Refer to Appendix B for a copy of the position paper and the interview questions.

Interview Process

The interview questions were emailed to each interviewee and telephone interviews were conducted on an individual basis. Each interview took approximately 45 minutes. Each interviewee thoroughly answered each question and provided additional information to the researcher about training issues associated with the EPSS system and impacts to the end user. Interviewees also provided the researcher with additional reference material for online and Web-based learning.

Limitations of this Study

As with any interview there can be limitations with the instrument and how it is distributed. The following list defines the limitations of this interview process for this research project:

1) Only four out of six technical trainers were interviewed for data collection.
2) Operations workers that actually use the system on a daily basis were not included in the interview process. Their input may be different than technical trainers implementing the system.
3) Retirement and a change in workers can have an impact on the overall attitude or acceptance of the EPSS system.

4) The Training Manager who was instrumental in the strategic plan and implementation of this system retired and ownership transitioned to different individuals. Interest and understanding in the project and its evolvement could have been impacted.
5) Computer technology is constantly evolving and impacting systems within the manufacturing environment. This study did not address specific changes to manufacturing equipment or the EPSS due to technological advancements.

Chapter 4

INTERVIEW QUESTION RESPONSES

Introduction

Company A implemented a training system in all their U. S. manufacturing plants because a large portion of the employees were approaching retirement and the loss of these experienced workers would result in a loss of operating experience and product knowledge. The intent of this system was twofold: first, to meet the strategic plan of the organization as a whole; second, to ensure that Company A was following the "best practices" to deliver training and retain the skills of their plant employees. It was also an objective of the training department to ensure that the information being delivered was standardized across the company.

The solution to their training strategy was to implement a system from Claymore, Inc. that provided a standard approach to job analysis, competency identification, performance management, and employee assessment. The tool, SkilBase®, is the backbone for Company A's learning and performance support system. SkilBase provides employees with job charts, operating and maintenance procedures, safety policies, and troubleshooting procedures. The system enables analysts (on-the-job trainers at each plant), to create and deliver procedures in a standardized format. Operations employees in each plant can access the procedures and reference information using one of the following two delivery methods from computer terminals at their work site:

1. SkilBase tool
2. Intranet Web site

SkilBase not only allows employees and supervisors access to the reference and procedural information, but also provide individuals access to the following information:

- Job chart (skill list) specific to the job they perform
- Performance and certification information for individual employees
- Quizzes for recertification and automatic updating of an individual's recertification
- Learning or training records automatically tracked by the system

The Intranet Web site provides all workers with quick access to procedural and reference information for any job or task performed within each plant. Information employees access in both SkilBase and the Intranet Web site comes from the same source file so that when changes within a procedure occur, the analyst incorporates the change in one file.

With the training system in progress for approximately eight years, the researcher interviewed three of the technical trainers and the Operations Learning Manger at Company A to help answer the following two research questions:

1. Does the Claymore EPSS provide operations workers at Company A with all the information they need to perform their job at the time they need it?
2. Does Company A use the Claymore EPSS as it was intended to be used?

Interview Responses

The following subsections provide answers to the interview questions. Refer to Appendix C for a transcription of each individual's response.

Positions that use the Claymore system and how they use it

The primary positions within Company A that the system was designed for include operations workers in the areas of processing, packaging, and distribution/shipping. Each plant utilizes the system a little differently and therefore has a different timeline for completing operations procedures in each of the areas. For example, some plants focused efforts on completing procedures in the packaging and distribution area and only have about 20% of the procedures completed for the processing area of manufacturing. Others started documenting procedures in the processing area and therefore system usage is greater with workers in the processing area and less prevalent in the areas of packaging and distribution. In addition to operations workers, supervisors and clerical or administrative personnel also access the system for report information or to input and track training. While these employees may use the system, they are not considered a primary audience.

How the system enables trainers to customize, update, or add information

Each plant employs analysts, usually one analyst for each shift on the production side of manufacturing. As part of their job function, the analyst is responsible for building the system. The analysts work with the subject-matter experts (SMEs), sometimes referred to as subject-matter resources (SMRs), to document the procedures. The SMEs are the people most knowledgeable on the equipment and processes that employees use.

Analysts act as technical writers collecting the information and compiling it into a set of procedures. The procedures are documented in a standard template to ensure consistent format and approach for all the procedures within the system. The analysts make any modifications to the procedures that support each task and often work with a team to ensure that the process being documented is the best way in which to complete a task. A team may comprise the analyst, technical trainer, and SME. In some cases, changes occur within a training session and are the result of input from the operations personnel. In a recent training session, an operator attending the session recommended an improved way to complete a procedure and the analyst updated the information during the training session. Not only did this scenario provide a better way to document the procedure, it also reinforced the concept that individuals performing the procedure can provide valuable insight into how tasks should be performed and reinforced the expert knowledge as a user of the performance support system.

Attributes of the EPSS that make it useful for a diverse audience

EPSS's can have many attributes that make it more usable to a diverse audience. Attributes can include different languages, voice communications, touch-screen monitors, visual images, and interactivity to name a few. Because of the way in which Company A utilizes this system and how it ties into other aspects of the company, attributes are limited to visual aids like photographs and diagrams. Two of the three plants included within this research study have a large percentage of Hispanic employees. Early in the implementation process, one plant translated about 12 resources into Spanish for its Hispanic audience. However, what they discovered was that if workers had trouble

reading English, they also had trouble reading Spanish. In addition, this plant as well as the other plant that employs about 30% of Hispanic workers, noted that all other requirements of these employees need to be completed in English and therefore it did not seem beneficial to provide workers with resources in Spanish.

The systems effectiveness at enabling performers to fix problems accurately and efficiently

Before the EPSS training system was implemented, Company A did not have adequate procedures for operations employees to follow when operating manufacturing equipment. The EPSS provided these workers with a consistent and similar approach to all manufacturing procedures and enabled workers to access the processes they needed to perform their jobs at the time they needed the information. The trainer at manufacturing plant that utilizes the system most often finds the system to be very effective. Within the past few years this plant employed 18 new operations workers and trained them using the system. Now, these new employees have key positions on the floor and are quality workers. The system took the "guess work" out of long processes that were difficult for workers to remember. Even experienced workers use the procedures within SkilBase for refresher training. In addition, each plant has the capability on the manufacturing floor to print out the procedures for workers to use as they operate equipment. When analysts or trainers get feedback from the operators to "tweak" or update information, they know the system is being used and that it is enabling the operators to fix problems accurately and more quickly than before Company A implemented the training system.

How the system provides feedback or interaction as a result of a user's actions

Because Company A's EPSS is not intrinsic, it does not provide the user with any feedback as a result of his or her interactions and therefor, interviewees responded to this question defining feedback as a way for a user to provide input into the content or procedures within the system. The system provides two ways for users to provide the analyst with feedback on information within the system. The first mechanism is a feedback button for users accessing information via the Intranet Web site. Although this mechanism is rarely used, it is a way for users to get changes, revisions, or suggestions back to the information developers. The second is an email link that enables a user to email the analyst with content changes. In addition to these formal mechanisms, much of the feedback or content change comes from word of mouth between the users or operations workers and the analysts. Strong relationships between these employees enable good communication and trust and ensure that trainers and analysts are receptive and responsive to the users needs.

How Company A uses the system is used to evaluate an individual's Performance

While the system itself does not evaluate an individual's performance, it is used to create a training plan or "job chart" that identifies the specific skills required for each task that a person is trained on. The job charts are linked to competencies and can be used to identify skill gaps for employees. For example, a supervisor can log onto the system and run a skill gap report. This report identifies who needs performance or recertification upgrading. The supervisor can view an employee's chart and confirm the performance or

certification status. In turn, the employee can also log onto the system and receive a notice indicating that he/she takes a quiz to upgrade his/her status and get re-certified. Once the employee successfully completes the quiz, his/her certification status is automatically upgraded. While these capabilities are built into the system, not all plants utilize these features in the system.

Individual performance improvement as a result of the EPSS

Although each plant utilizes different features of the system, each trainer was confident that the EPSS improved employee performance. Even though there are no quantitative studies showing statistical data, one plant continued to be recognized with an award even after a 25% change over in workforce. Providing the reference and process information to the operations workers has been a big improvement in all plants. Workers are receptive to accessing the data and getting the "how to" information. As with any system, it can only be effective if people use it.

Plant employee's involvement in determining system content

Employees are very involved in generating information included within this system. As one trainer says "it's their system, we work from the bottom up so they determine what goes into the system, with the exception of OSHA standards and quality guidelines". Analysts work with the SMR or someone who knows the machine and process best. Working together, they draft the content or process and then use the information to train operators on a new system.

How users give feedback and enhance system content

Within most plants, workers go directly to the analysts to provide feedback or changes to the content. As previously noted, the system has two mechanisms that allow users to send information to the analysts; the feedback button and email address. In addition, operators often mark up a written document and submit that to the analyst for content changes.

"Business knowledge" or strategic processes as part of the system

When Company A defined this training system, the intent was to look at the needs of the entire organization and ensure that management had the commitment to resources and learning that drives business results. It was also the intent to have a standard approach to technical training. While most interviewees believe that the system has provided a standardized format for documenting the procedures and provides useful links to other information within the company, it is not clear that the ownership of this system resides within the organization that can drive the business results. In addition, because each plant is so unique, it is difficult to share procedural information across plants. It does, however, provide business knowledge for plant workers to perform their job.

How the system reduces the amount of training provided to workers

Company A's EPSS is a resource that provides information to operation workers. Because this information enables people to perform their job one can assume that it reduces the time for training. However, in some cases the implementation of this system has created a demand for more training. SkilBase enables trainers to create job charts and identify the skills required to perform a specific job. It also performs a skill gap analysis

that enables a supervisor or manager to identify performance issues and certification upgrading. One trainer noted that "when I look at a job chart, they only know about 80% of the job, so I see huge training gaps." Unfortunately, it requires both time and money to train and close those skill gaps so workers don't always get the on-the-job training they need. However, the system has proved very beneficial and reduced the amount of traditional training previously required for upgrading an employee's certification.

What trainers would do differently if they could start over and implement a new EPSS

As with the implementation of any training system, it is always advantageous and easier to look back and identify what should be done differently the next time around. Because Company A was on the forefront of EPSS technology and trying to impact an entire organization with standardized training, all interviewees had suggestions that provide insight on ways to improve the implementation of such a system The following list highlights some of their common thoughts:

- Move the ownership of the system into the organization that can have impact on it. Currently Human Resources owns the system, but operations employees use it to do their jobs. Ownership should reside within the operations organization.
- Ensure adequate funding to support the system and that the organization (i.e. Operations) budgets for and is accountable for the system.
- Ensure that adequate players from all areas within Company A have impact into to the system. This can include IS support, technical writers, technical trainers, analysts, and operators.

- Begin the implementation on a smaller scale. Choose one plant and one job function to complete all job charts, procedures, reference information, and on-the-job training. Use the successes and failures of this plant as input to the implementation for other plants.

Chapter 5

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Introduction

Eight years ago Company A implemented an electronic performance support system (EPSS) as the primary tool to support their vision for technical training. The vision consisted of the following key strategies, which were tied to business goals and objectives:

- Management was committed to providing the resources to learning that drive business results.
- Company culture was that of a learning organization
- A standard approach to technical training was used throughout the company.
- The organization created job descriptions that identify required skills.
- Technical training had an impact on performance.
- Technology is used effectively to deliver training.
- Individuals are responsible and have control over their skill development needs.
- Individuals have ownership and involvement in the design, development and delivery of technical training.

After a thorough literature review and interview process with three technical trainers and the operations training manager, the researcher answered the following two research questions:

1. Does the Claymore EPSS provide operations workers at Company A with all the information they need to perform their job at the time they need it?
2. Does Company A use the Claymore EPSS as it was intended to be used?

The following subsections provide a summary of the results and recommendations to Company A based on the research findings. This chapter concludes with general recommendations for businesses that implement an EPSS.

Summary

Company A's EPSS is both an extrinsic and an external support tool. The SkilBase interface for creating job charts and tracking an employee's training records is extrinsic--or a support tool that is integrated into the system but is not considered the primary support. The process and reference information (accessed through SkilBase or the web) is the external support tool because the information is external to a computer-mediated workspace and does not have to be computer mediated (Gery, 1995). Two plants utilize this EPSS more as a reference tool than a tool to replace training. It contains job charts that identify the skills required to complete a specific task. A job chart can be used as a lesson plan because it lists all the tasks a worker needs to do to complete a job. The EPSS also contains written procedures and reference information that an employee uses when operating or maintaining equipment. Workers can view these procedures from a computer in the work environment or print out a procedure and bring it with them to the equipment for reference when performing a procedure. Analysts in each plant work with subject matter experts (SMEs) to write the procedures and incorporate them into the EPSS. Operations workers and users of the EPSS can provide feedback to the analysts via

personal communication or a feedback button embedded in the system to ensure that analysts change content based on user input. Company A's EPSS also enables managers, trainers, and operations workers to track and update their personal training. A manager or employee can log onto the system and identify whether the employee needs to upgrade his/her performance or certification. If the system indicates that upgrading is necessary, the employee can log on to the system, learn or refresh his/her memory on the task(s), and take a quiz. When the employee successfully completes the quiz, the system automatically upgrades his/her training records.

This EPSS is a powerful tool that provides Company A with a consistent approach to delivering information to operations workers. However, each plant utilizes the system and its features differently and to different degrees. The researcher believes that the answer to question one is yes, the system does provide operations workers with the information needed to perform their jobs when they need it. However, this answer only applies to the manufacturing areas (for example Packaging, Distribution, Processing) in which the information is completely documented and incorporated into the system.

Company A intended that this EPSS enable them to provide a standard approach to technical training throughout the company, create job descriptions that identify required skills, have an impact on performance, use effective technology to deliver training, and provide individuals with ownership and control over skill development needs. This EPSS provides Company A with all these capabilities. However, because this system has been in place for approximately 8 years and because not all plants utilize all the features and capabilities of this system, the researcher believes the answer to question

two is no, the system is not being used as it was intended to be used. It is clear that completed job charts and procedures provide operations workers with standardized information to perform their job when they need it. It is also clear that the operations workers trained using this system and work at the plant that utilizes all the features of this system, provide Company A with quality work and are efficient on the job. An additional objective for this training system was to have commitment from management to provide the resources to learning that drive business results. This commitment needs to come from the Operations organization to help ensure that tasks are identified, job charts created, and procedures documented. Currently, ownership of content within this EPSS resides with the technical trainers and analysts and is owned by the Human Resource division, not Operations or the organization that could have greater impact on the system. If the Operations organization owned this system and provided the resources to support the system for all areas of manufacturing, Company A may be more successful in implementing the system and utilizing its capabilities as was initially intended.

Recommendations

As with the implementation of any training system, evaluation is always an essential component. Unfortunately, it is also an area companies often avoid because of time and budget. Each plant at Company A has had an opportunity to use the system and many of its features. Each technical trainer understands the features and capabilities of the system and how it can benefit the organization. The following recommendations are suggestions for the training department and management to ensure this training system is

utilized to its full potential and that it enables Company A to remain competitive in the manufacturing areas of processing, packaging, and shipping and distribution:

- Determine how the Operations organization can take responsibility and ownership for the training system.
- Select one completed job function (packaging, processing, and shipping/distribution) and thoroughly evaluate the data and its effectiveness for an individual worker or group of workers.
- Perform a Return on Investment (ROI) of the system based on the results from the sample evaluated.
- Identify the current state of Company A for technical content and resources to define an implement a cohesive work environment across departments and manufacturing areas.
- Use the data from the evaluation, ROI, and company organization to propose a solution to complete and utilize the EPSS as a key component to the success of Company A.

The strategic plan and the Claymore, Inc. EPSS were highly endorsed by senior vice presidents at the onset of this training system. Because of changes within management and system ownership, not all the processes, procedures and system content that a worker needs to perform his/her job are complete nor are workers and technical trainers using the system to its full potential at all plants. For this system to succeed and provide Company A with a return on its investment, it is essential that ownership of this system belong to the Operations organization. It is also essential that management, trainers, analysts, and operators

are accountable for learning the system, creating usable content, and using the system to its full potential. The following list provides suggestions to accomplish this recommendation:

- Reconvene the steering committee and identify the need to transfer ownership of this system to the Operations organization.
- Meet with the Vice President of Operations and determine how his/her organization can take responsibility for and be accountable for this system.
- Set clear goals and expectations for the Technical Trainers and Operations Learning Manager to use the system and evaluate their goals and objectives on a yearly (or biyearly) basis.

Because much of the information in the system is technical documentation, a thorough review of completed procedures can ensure their usefulness and accuracy for operations workers. Beyond the review of editorial and technical input, Company A should consider the following methods for reviewing the data to ensure that information is accurate, accessible, and usable for operations workers:

- Field Observation
- Usability testing
- Focus Groups

In his performance support mapping methodology, Raybould recommends observations and usability testing of performance support systems. By conducting field observations, Company A can leverage Raybould's suggestions to document processes or validate processes a worker follows to complete a task. In addition, formal usability tests of the system and its content can enable trainers to identify performance gaps within job

charts and procedural documentation. Data from usability tests can enhance system content, identify relevant or non-relevant information, and promote the ongoing need for the Operations organization to support the EPSS (Raybould, 2000). Focus groups can also provide analysts and trainers with collective data and input from operations workers as a way to enhance the EPSS. By showing new processes and obtaining feedback on content and design, final data and information may become more usable because of up-front input from individuals that actually use the equipment and EPSS.

Company A has invested time and money into this EPSS. However, to ensure its value and to promote the ongoing effort to add and maintain system content, Company A should conduct an ROI for a part of the system in which all information is complete. While an ROI is no easy task, ROI methodology can provide the information Company A needs to determine the bottom line value of the EPSS, its expenditures and need for continuing to implement system features. ROI requires up-front planning. A company should ultimately plan and conduct an ROI before a system is implemented. To conduct an ROI, Company A must identify what to measure and then assign costs and benefits to each variable in monetary terms. In the article What is Involved in Performing a Return on Investment Calculation for Electronic Performance Support Systems, Hasan Altalib sites Hawkins, Gustafson, and Nelson with an evaluation methodology and five spread sheets to calculate ROI at stages of planning, developing and implementing an EPSS. **Table 5** lists an example of one spreadsheet Altalib sites. Company A could use this type of data to measure the ROI for their EPSS if they have comparative data of measurement and costs before they implemented the EPSS.

Table 5. ROI Measurement Data (Altalib, 2001).

EMPLOYEE IDENTIFIED AREAS OF SAVINGS	YOU MEASURE	CALCULATION			
		Hours/Person Avg.	Cost/ Hour	# of People	Total $ Saved
Reduced time to learn system/job (worker hours)	➔				
Reduced supervision (supervision hours)	➔				
Reduced help from coworkers (worker hours)	➔				
Reduced calls to help line/user assistance (technical assistance hours + phone call)	➔				
Reduced "down" time (waiting for help, consulting manuals, etc.)	➔				
Reduced "down" time (waiting for help, consulting manuals, etc.)	➔				
Fewer or no calls from help line to supervisor about overuse of help service	➔				
TOTAL SAVINGS OVER LIFE OF SYSTEM					

The third recommendation is for Company A to look at its current business environment and identify where content and resources reside. As previously illustrated in Chapter 2, Gery indicates that the scope of an EPSS goes beyond the discipline of training and uses a variety of skills from different areas (i.e. technical communication, information systems). By working together to achieve the same business goals, Company A could leverage the knowledge and skills from the IS department and technical communications department to ensure proper software is selected for system enhancements and that the company avoids any redundant efforts across organizations.

If Company A considers the first three recommendations, they can then use the data gathered to identify any gaps or shortfalls of the system and determine how to proceed to accomplish its original goals.

The Claymore EPSS is a powerful tool that can provide operations workers with all the information they need to perform their job(s). It is also a tracking system that managers and operations workers can use to track training and recertification status. However, a tool is only good if it is complete, used, and supported as the mean to access and deliver information throughout the company. Therefore, from the data collected, one can assume that the system is effective in the areas in which it is being used. However, Company A can only measure true effectiveness of this EPSS by completing an ROI and performing ongoing evaluations of the system and its content.

REFERENCES

Altalib, Hasan (2001, November). What is Involved in Performing a Return on Investment Calculation for Electronic Performance. **http://www.it.gse.gmu.edu/portfolio/haltalib/coursework/returnoninvestmentforepss.doc**

Bannan-Ritland, Brenda, Egerton, Emily, Page, Jen, Behrmann, Michael (2000, July). A Performance Support Tool for Novice Reading Facilitators. Performance Improvement 39 (6), 47-53.

Battle, Lisa, Degler, Duane (2001, August). Around the Interface in 80 Clicks. Performance Improvement, 34-43.

Benkowski, Joseph A., Rothwell, William J. (2002). Building Effective Technical Training. San Francisco, CA: Jossey-Bass/Pfeiffer.

Boehle, Sarah, Cook,Jean, Dahlberg, Steve, Hart, Gail, Hequet, Marc, Jones, Phil, Maquire, Becky (2002, September). Content Management: Not There? Online Learning Reviews, Thursday, September 26, 2002 **http://www.vnulearning.com/archive.htm**

Brown, Lesley A. (1996). Designing and Developing Electronic Performance Support Systems. Newton, MA: Digital Press.

Carliner, Saul (2002, November). An Introduction to This Special Issue. Technical Communication. 399-404.

Carliner, Saul (2002 November). Considerations for Designing Electronic Performance Support Systems. Technical Communication 411-419.

Claymore, Inc. SkilBase® Demo. http://www.skilbase.net/

Dickelman, Gary J. (1999). Performance Support in Internet Time. The State of the Practice on the eve of the New Millennium. Performance Improvement, 39 -17.

Dickelman, Gary J. (2001, August). From Abrasion to Waldos: Connecting the Performance Support Dots. Performance Improvement, 40 (7), 7-8.

Hall, Brandon (2002). Learning Management Systems and Learning Content Management Systems Demystified. **http://www.brandonhall.com/public/resources/lms_lcms/**

Gery, Gloria (1995). Attributes and Behavior of Performance Centered Systems. **http://www.pcd-innovations.com/key-concepts.htm**.

Gery, Gloria (1995). Attributes and Behavior of Performance Centered Systems. Performance Improvement Quarterly, 8(1), 47-93.

Gery, G. (1991). Electronic Performance Support Systems: How and Why to Remake the Workplace through the Strategic Application of Technology. Boston: Weingarten Publications.

Hambrecht + Co, as listed in ASTD's E-Learning Glossary (**www.learningcircuits.org/glossary.html**)

Ho, Li-An (2001). A Case Study of Evaluation Practice in the Design process of a Performance Support System. Bloomington, Indiana: University of Indiana.

Howell, Colby Chambers. (2001, August). The Morphing Waldo: An adaptive User Interface. Performance Improvement, 40, 16-19.

Johnson, Scott D., Wentling, Tim L. (1999). The Design and Development of an Evaluation System for Online Instruction. http://www.outreach.uiuc.edu/hre/public/eval_model.pdf

Kaplan-Leiserson, Eva (2002) Learning Circuits (2002). Glossry. http://www.learningcircuits.org/glossary.html

LINE Zine (2000, Fall). E-Learning. ELearning. "e"Learning. Elearning. http://www.linezine.com/elearning.htm

Mackenzie, Colleen (2002, November). The Need for a Design Lexicon: Examining Minimalist, Performance-centered, and User-centered Design. Technical Communication 49 (4). 405-410.

Marion, Craig (2002). What Can We Learn from Five Years of EPSS/PCD Competition Award Winners? Technical Communication. 49 (4). 428-443.

Muraski, Michel Lynn, Zimmerman, Donald E. (1995). The Elements of Information Gathering. Phoenix, AZ: The Oryx Press.

OLNews@vnulearning.com. (2003, Spring) Training vs. Business: Online Learning News and Reviews.

Raybould, Barry (2000, July). Building Performance-Centered Web-Based Systems, Information Systems, And Knowledge Management Systems In the 21st Century. Performance Improvement, 39. 32-35.

Raybould, Barry (1995). Performance Support Engineering: An Emerging Development Methodology for Enabling Organizational Learning. Performance Improvement Quarterly, 8(1) 7-22.

Ruyle, Kim E. (1999, March/April). Analyzing Tasks to Improve Performance. Technical Training, 24-28.

Ruyle, Kim E. (1998, May/June). The "Three Rs" of ROI. Technical Training. 26-29.

Shirinian, Ara (2001, August). It's All Part of the Game. Performance Improvement, 40, 43-49.

Appendix A

COVER LETTER, CONSENT FORM, AND SURVEY

Dear Company A Employees:

Attached is a survey that is being used to obtain your opinion on the effectiveness of the Claymore, Inc. Electronic Performance Support System (EPSS). An EPSS provides integrated, on-demand access to information, advice, learning, and tools to enable a high level of job performance with minimal support from other people. Company A, along with Claymore, Inc., developed this EPSS to provide the major production areas of Processing, Packaging, and Distribution with comprehensive job aids, work instructions, and training.

The California plant has been selected to participate in this survey. By answering the questions and providing your input on the effectiveness of this application, Company A can ensure that they are meeting your training needs and provide you with the necessary information you need to perform your job.

If you choose to participate in this survey, you do not need to provide your name so you can be assured that your name will not be linked to any of your responses and neither management nor the researcher will be aware of your participation. In addition, your employment will not be affected in any way if you choose not to participate.

Thank you for taking the time to provide valuable feedback on this product. Please return your copy of the survey to the Technical Trainer by December 14, 2002. If you have questions regarding this survey, please contact:

Operations Learning Manager
Company A

Consent Form

I understand that by returning this survey I am giving my informed consent as a participating volunteer of this study. I understand the basic nature of the study and agree that any potential risks are exceedingly small. I also understand the potential benefits that might be realized from the successful completion of this study. I am aware that the information is being sought in a specific manner so that only minimal identifiers are necessary and so that confidentiality is guaranteed. I realize that I have the right to refuse to participate and that my right to withdraw from participating at any time during the study will be respected with no coercion or prejudice.

NOTE: Questions or concerns about the research study should be addressed to Jill Hietpas, the researcher at (715) 382-5141 or Joseph Benkowski, the research advisor at (715) 232-5266. Questions about the rights of research subjects can be addressed to Sue Foxwell, Human Protections Administrator, UW-Stout Institutional Review Board for the Protection of Human Subjects in Research, 11 Harvey Hall, Menomonie, WI 54751, phone (715) 232-1126.

Survey

Please complete the following survey and return it to the Technical Trainer, by December 14, 2002. Your input and comments are very much appreciated. The information will be kept confidential and can be used to improve the effectiveness of the Claymore, Inc. Performance Support System.

Instructions: Listed below are questions pertaining to your experience with the Claymore, Inc. Performance Support System. Check the box that most closely supports your experience with this system. Provide written comments in the space provided or on the backside of this form.

5. *How effective is your Claymore Electronic Performance Support System (check the appropriate box):*

	Excellent	Very Good	Good	Fair	Poor
• Reduces the time to find information needed to perform your job	☐	☐	☐	☐	☐
• Helps you fix problems accurately	☐	☐	☐	☐	☐
• Provides procedures when you need them	☐	☐	☐	☐	☐
• Assists you in performing your job	☐	☐	☐	☐	☐
• Provides learning when you need it	☐	☐	☐	☐	☐

6. *What is the main purpose you use the Claymore Electronic Performance Support System (check the appropriate box)?*

	100-80%	79-60%	59-40%	39-20 %	0 %
7. Follow maintenance/repair procedures	☐	☐	☐	☐	☐
8. Learn equipment operation	☐	☐	☐	☐	☐
9. Troubleshooting equipment problems	☐	☐	☐	☐	☐
10. Follow communication procedures	☐	☐	☐	☐	☐
11. Follow CQS procedures	☐	☐	☐	☐	☐
12. Follow safety procedures	☐	☐	☐	☐	☐

7. *Has the Claymore system reduced the amount of training required for you to perform your job (Check the appropriate box)?*

100-80%	79-60%	59-40%	39-20 %	0 %
☐	☐	☐	☐	☐

8. *How are you involved in the development process of this product (check the appropriate box):*

	100-80%	79-60%	59-40%	39-20 %	0 %
• Provide input into the design/usability of the system	☐	☐	☐	☐	☐
• Provide task and procedural information	☐	☐	☐	☐	☐
• Provide feedback/evaluation	☐	☐	☐	☐	☐

	Supervisor	Team Leader	Maintenance	Production
9. *What is your position with this company (check the appropriate box)?*	☐	☐	☐	☐

	1 - 2 years	3-5 years	6-10 years	>10 years
10. *How long have you been in this position (check the appropriate box)?*	☐	☐	☐	☐
11. *How long have you been employed by this company (check the appropriate box)?*	☐	☐	☐	☐

Please provide any additonal comments or feedback on the Claymore Electronic Performance Support System. _____

_____

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Appendix B

POSITION PAPER AND INTERVEIW QUESTIONS

Position Paper on
The Effectiveness of Company A's EPSS System

The purpose of this position paper is to provide Company A management and technical trainers with the necessary information to support my research and help me to conclude my thesis on the effectiveness of electronic performance support systems (EPSS), specifically the system implemented Company A in 1995. Joseph Benkowski, my research advisor and associate professor at the University of Wisconsin-Stout, was the technical training manager at Company A and very instrumental in the implementation of this EPSS system.

Background of Company A's EPSS System

During the mid 1990's, Company A created a training system that tied the training process to the company's goals and organizational strategy. This process, a result of an organizational strategic plan for technical training, provided Company A with a standard approach to training and included the following steps in the training process:

- *Performance Analysis*: Gather information to establish the ideal performance state that helps link training to organizational goals.
- *Training Analysis:* Analyze systems, audience, identify gaps and causes of gaps, and recommend solutions to bridge the performance gap and determine what competencies are required of the workers to establish ideal performance.
- *Design:* Details the training plans and instructional strategy to help the work force develop competencies necessary to perform in a way that impacts organizational goals.
- *Development:* Develop or purchase a training method and media.
- *Implementation*: Prepare, conduct, and document training.
- *Evaluate ROI*: Assess individual and organizational performance.

After performing a competitive analysis, an environmental scan (internal and external), and benchmarking different companies, and conducting focus groups at each plant to determine training needs of internal customers, Company A purchased an EPSS system through Claymore, Inc. to use for their standard approach to training. By using existing information (documented procedures, processes, etc.) and the knowledge obtained from technical experts, Claymore Inc. created an EPSS that was consistent throughout the company and provided the information that enabled workers to perform their jobs at the time they needed the information.

How this Research Project can Benefit Company A

Similar to many businesses, Company A's training model correlates evaluation with a return on investment (ROI) in its final process of the training system. While ROI is one component of evaluation that can measure and provide the business results for assessing the value of the Claymore, Inc. system, the proposed research evaluation will focus on two additional levels of assessment for the EPSS system: user satisfaction and user performance.

User satisfaction can be measured by obtaining data on how individuals use and interact with the Claymore, Inc. system and how they provide feedback to enhance system capabilities and knowledge. User performance can be measured by obtaining data on how task oriented the system is, perception of how individuals feel when they are using the system, consistency of language, processes, and system behavior, and how automated and adaptable the system is to meet individual needs. A compilation of this data can identify the effectiveness of the Claymore, Inc. system and provide Company A with recommendations for future enhancements if necessary.

Process for Collecting Research Data

The researcher will conduct interviews with three technical trainers. The names of the technical trainers will be kept confidential. The research paper will reference these individuals only by their professional title of Technical Trainer (i.e. Technical Trainer A). The trainers selected were involved in the initial implementation phase of the Claymore EPSS system. Interview questions will be provided to each candidate prior to the interview. The interviews will take approximately 45 minutes and be conducted via telephone communication. Proposed times of the interview will be as follows:

Plant:	**Technical Trainer:**	**Date:**	**Time:**
WI	Technical Trainer A	March	8:30 Central
TX	Technical Trainer B	March	9:30 Central
CA	Technical Trainer C	March	10:30 Central/8:30 Pacific

The researcher will compile data from the interviews and provide recommendations based on this data and her literature research. A final copy of the research paper will be provided to the technical trainers and to the technical training manager. The research paper will only refer to this manufacturing company, as *Company A* to ensure proprietary information is not disclosed.

Interview Questions
Effectiveness of Company A's EPSS System

Conducted by: Jill Hietpas, UW-Stout Graduate Student

1. Please provide examples of positions that use the Claymore system and how it is used.

2. How does the Claymore system enable trainers to customize, update, or add information?

3. What attributes does the Claymore system contain to make it useful for a diverse audience (i.e. non-English speaking, physical limitations, etc.)?

4. How effective is the Claymore system in enabling performers to fix problems accurately and in a timely manner?

5. How interactive is the Claymore system in providing feedback as a result of a user's actions?

6. How is the Claymore EPSS system used to evaluate an individual's performance?

7. How has individual performance improved as a result of this system being implemented at Company A?

8. How involved are the plant employees in determining what information is included in the system?

9. What is the process for individual users to give feedback and to provide recommendations/enhancements to system content?

10. How does this system employ "business knowledge" or strategic processes that evolve or change at Company A?

11. Has the Claymore system reduced the amount of training you provide to employees?

12. If you started over with the implementation phase of this training system, what would you do differently?

Appendix C

INTERVIEW RESPONSES

Interview Question Responses

1. **Please provide examples of positions that use the Claymore system and how it is used. (Should not provide employees names.)**

Trainer A: *We're limited to three areas. Packaging, distribution and shipping are complete; processing is about 20% complete. We also use it to train new employees. Operations, limited maintenance, and safety procedures are online and CD-ROM for reference.*

Trainer B: *Primary people that the system is intended to be used for are in the manufacturing area: process, packaging and warehouse/shipping. Now again, there may be other people in the training dept. so maybe administrative positions would use it to input and track training and there is some use by maintenance operators if they had to look at a procedure related to change over. They are not the target audience. I doubt many of these people would use it but they can. They could be classified as a secondary audience.*

Trainer C*: Did not start in packaging. Started in processing. Most usage in processing. Input in finishing area of processing. Our processes were designed with a lot of variance and back-up capabilities. It is not a linear process. Can go option A, B, C or D. Procedures have been very beneficial. There were a limited number of people on each shift that knew the procedures and because the procedures are now being done across the shift new people can do them as well. Negative to this is that we did such a good job with the procedures that we have not done the OJT that goes*

along with the procedures. Training gets ignored because of the need to get accomplished what needs to get accomplished with limited dollars to free up someone. Procedures are also coming on strong in distribution (about 80%). Analyst just finished a training session on procedures related to finishing and a 4 hr training session for operators, which also allowed them to provide feedback on processes.

Trainer D: *We have bottlers in packaging, warehouse and quality. Also we have teamster processors on both the dry side and wet side. All the clerical uses the system to document training, deliver reports. Also the supervisors of all the above functions use it. A bunch of the documentors (i.e. quality) use it as a tracking tool.*

2. **How does the Claymore system enable trainers to customize, update, or add information?**

Trainer A*: Templates enable us to have a standard format and standard approach to writing procedures. Operations/analyst from each department write and update procedures. The subject matter expert (SME) provided information to the analyst. The system and contents are user or end-driven. It makes the process straightforward.*

Trainer B: *I would have to include the analysts that are helping to build the system. The system enables them,(this isn't a true EPSS system that a vendor is building for us), the people or analysts that work with the trainer, to use it on a regular basis to build because they are putting together the job chart or job analysis which is really the building block or tasks pertinent to that job. Wherever there are tasks then we build the procedures that support the task. They make modification s or changes that they get from peers on the floor. 80% of tasks may not change, but*

things like buttons, screens, or interface may change and need updating. It is the analysts that make the changes. Typically what happens is we have a vendor or expert that document the technical writing. They train our analysts to take digital photos, write procedures, etc. that are needed on the floor. SME's get a hold of the analyst if change occurs. The analyst or hourly employee make changes and perform the role of job analysis person or technical writer. The end result is that we are self-sufficient.

Trainer C: *Yes, it does. There are several ways that the system allows for customization. Recently when our analyst was doing training the operators said "no we need to do it this way". The analyst loaded Front Page and actually changed the procedure right on the spot. This action blew everyone away with how responsive we are trying to be. New processes tend to get initially done in our corporate plant. We decide the operating procedures and then use analysts and people on development to develop the initial procedures, which get rolled out to other plants. We do a lot of new equipment and process changes and actually determine what the operator procedure is. Then we sit down with engineers that built the equipment and also work with the analyst and operators to determine what needs to be built into the procedure.*

Trainer D*: It doesn't able them to do that at all. If they want any materials updated they have to get with the SkilBase team. That includes the analyst and myself. Analyst goes into the system to make any changes. Five analysts in our plant. Analyst for each shift on the production side. Part of the analyst duties is the OJT trainer. We make sure a trainee has their job chart or lesson plan. On that job chart is a grid that has all the resources necessary to do that job. Analyst follows up with the trainer*

making sure they are covering all the material. We try to make the process like you would do a driver's test. For example, if you go to take a driver's test, you go get the material (i.e. SkilBase) like reading material and then take a quiz. The key to making this work is that they can demonstrate that they can do the work. Like your drivers test, you get the information, study it, and then demonstrate. You can only learn so much from the paper. You also have to have the opportunity to do that job.

3. **What attributes does the Claymore system contain to make it useful for a diverse audience (i.e. non-English speaking, physical limitations, etc.)?**

Trainer A: *About 30% of our operations employees are Hispanic; however, all procedures and guidelines are in English. Everything within the company has to be completed in English and therefore we chose not to create the procedures in Spanish. 75-80% of terminals are near the work area and it is easy to access the information. We also have the ability to print the procedures or checklist.*

Trainer B: *Right now we are not utilizing language attributes. Our main attributes would be digital photos that aid those that don't read or understand English very well. It's not necessarily the system, but in the procedures that sit outside the system which links to them electronically. People can link to the resources without going through the SkilBase system. Use of photographs, charts, graphs, visuals are the main attributes. We did look into Spanish, but then we would have had two systems. Our reason for not doing it is that when we looked at other information (i.e. safety requirements, chemicals, etc.) it is all in English. This is not a true EPSS on one piece of equipment. It's electronic; it is performance support because there is information and knowledge. The capability exists to do alternative training such as*

video other than just text-based. One reason we don't do that is computer access on the training floor and streaming. Because our procedures sit outside the system you would have to have two or three sets of procedures to maintain.

Trainer C: *We do not have a second language problem. We use photos a lot in the procedures and find them to be extremely beneficial. Most procedures don't have long paragraphs. We use a lot of white space and incomplete sentences and leave only information that a person needs to skim. It is a training tool, but more important a reference tool. Joe used Chilton Automotive Manual as a reference. Don't need all the info--need just what you need!*

Trainer D*: We did about 12 resources in Spanish and had an adult education school translate. It really wasn't that successful because if they had trouble reading English, they also had trouble reading Spanish. We use photographs but never attempted doing video. I don't think the system has the capability of voice communications.*

4. **How effective is the Claymore system in enabling performers to fix problems accurately and in a timely manner?**

Trainer A: *It provides more operational guidelines. Prior to the system, we had a lack of procedures on the floor. The system provided consistency and similar approach for all procedures. We did a modified DACUM to develop job charts using 1-3 operators. We listed competencies/skills and grouped into safety, quality, common operations, maintenance, and sanitation. The system helps to track the job skills of each of these categories.*

Trainer B: *It is only as effective if people use it. Does the system and what is built into the system provide the tools for people not sure how to do a task or certain process, the information is there for that to do it. Now we have access via the web so they can get to it quicker. The system is actually a training management system. A user on the floor can go right to the computer and look it up on the web in one or two clicks, find the job, and do it. If they brought up SkilBase, there are more steps. Web enables quicker access to information. The SkilBase system is designed not only to have job information but also to be a tool at an individual level so I can go in and access just the tasks I need to do. Procedures in SkilBase support a specific job. Web makes information available for anybody. It's not intuitive or intrinsic. It's not linked in with the machine so error messages don't tie into the system and make it intrinsic as you refer to it as. SkilBase doesn't contain the procedures. Procedures are on the web or network. You link electronically to the procedures in SkilBase. Only one source for maintaining procedures. Procedures on a web server. SkilBase lists the task, duty, and a link to the procedure that tells how to do the task. On the web, go directly to procedure. If the web link is broken, we have to maintain two links. A new version is supposed to fix the problem of two links. Analyst or training specialist maintains links.*

Trainer C: *Hard to say. I can't give a good answer at this time. It does enable you to make changes and fixes. At this point in time we are still trying to develop procedures and get them in the system. I've got operators that realize procedures are out there and available and we are getting feedback. When I get feedback to "Tweak this way or that way" I then know people are listening and using the system. We also*

get requests from the finishing area. Ideally the system is set up electronic. Being the older plant we have we don't have many PCs, only smart terms. Operators can load a half page of information, visually see it, load another half page--a real pain and very slow. Instead the Finishing area prints hard copies which are used very much and need to get updated. All copies are coming from the same source. We also get rid of hard copy when we update the source. We use paper more than we want to.

Trainer D: *It is very effective. Those who were trained the SkilBase way, let me give you an example. A couple of years ago we had a number of retirees. We brought in a group of 18 new employees and trained them the SkilBase way. They all have key positions on the floor now and are quality workers. What happens is, as a trainee, there were some procedures impossible for a person to learn. For example, one process had 178 steps. The system and step-by-step procedures eliminated that guessing game. You also have to have a certain amount of paper because the computer isn't necessarily right next to the spot they are at doing procedures. The system has to have the capability to print. We were the first to see that reality and noted that a printer needed to be available on the floor to print out procedures. Hard to say how often these procedures are needed--it depends on the experience of the employee. Sometimes they are only needed for refresher training.*

5. **How interactive is the Claymore system in providing feedback as a result of a user's actions?**

Trainer A: *There is a feedback form or you can email the supervisor. Operators usually email or tell the analyst if there is a problem.*

Trainer B: *It's not interactive (not true EPSS) because the machine doesn't know if the person has done something right or wrong. However, it is interactive for feedback if the procedure. The certification piece, or QuizBase, is interactive and a way to use quizzes to validate if someone knows the job or information they need to know to perform a task. We use this a lot with our quality checks. We take people through a hands-on training and then they have to be rectified every two years. They have to pass a quiz to rectify. There is some interactivity there. Not all plants are using it, but is interactive because they get notified and onto the system, take the quiz, and informs if done accurately.*

Trainer C*: Limited at this point. There is a feedback mechanism, but have not seen people use it relative to the system in terms of electronic feedback. Assigned analyst gets contacted by operators with changes that are needed. Two ways to look at this. EPSS system and its availability via the web and SkilBase. Skilbase is a tracking mechanism or quasi employee database. CA plant uses it the best. TX uses it to track and train as a database. Other plants use it as a good way to provide quality training through modules or mini CBTs with quizzes. EPSS is web-based, SkilBase is tracking mechanism. One source of data, so you change information at one place only but delivered two different ways.*

Trainer D*: We have a feedback sheet that they print anything they want and its get emailed to the analyst. We get more feedback from the phone. Analysts are trainers and a resource that are readily called. The do IS functions as well. We get more phone feedback than written feedback because of the relationships built. They are very comfortable using SkilBase and talking with analysts.*

6. **How is the Claymore EPSS system used to evaluate an individual's performance?**

Trainer A*: It doesn't. They can print out a job chart or job survey form and give a self-rating of 1-4 skill level. The supervisor also rates on 1-4 skill level. They are given this job chart and rating before they can perform the job. The system provides the job details and resources to perform the job. It really takes about 120 hours before they know the job.*

Trainer B: *CA plant did it with new employees. The system doesn't evaluate, but we use the system as a job/training plan, to create the job chart for a specific position a person is trained on. This chart is used so they can demonstrate they can do all tasks required. Somebody has to manage the system. But the capability to maintain a person's performance for qualification is in the system.*

Trainer C: *Skilbase is not implemented in the plant in .my location. I'm not real happy with the system and reluctant with the longevity of the system. It needs to be easier to access via the web. Quiz base is a nice program, but I'm not sure if there are easier programs to be used. We needed to look at the process of implementation and to get better involvement of the IS group. Write the information out, but I think there is a better tool than Front Page. It is simple, but use of quizzes is a different level. I question if that is the right choice of software selection. It was used to link into SkilBase. SkilBase is 18 -20 years and I know software and systems have changed and there may be other options that would be easier and better for operators. I'm looking at whether the operators and work groups access and monitor information easily. SkilBase is what Claymore provides which gives us the job charts and*

database for employees. It also links employees to job charts that are linked to competencies and linked to resources. The other side is the resources. Our plant went to the development of the resources and made them web accessible (procedures). People from all plants can access resources from all plants and access other's resources. Ideally, that's where we need to go. Then I would put the tracking system as a web-based link. Our plant is not currently using SkilBase. CA plant completed their SkilBase so they could use it for new hires and use the tracking system so it was beneficial to them and used the way in which an EPSS system should be used. This system has been in place for 8 years.

***Trainer D**: It's really only evaluated when somebody learns a new job. You can only take it at face value. We come up with a job chart; you have to make an assumption that they know their job. When they learn a new job, we go through the steps and he has to say, "yes I know that" the job chart includes a skill level to indicate that he does/doesn't know it. We observe them. We only do that demonstration on key competencies. For example, logging onto a procedure is the same for all, so we only check on one. For example, do they know how to do crimps and torque's. We only check the critical things. We also do some tracking like safety talks, off-sight, procedures, we document that data and it goes into their personal training records.*

7. **How has individual performance improved as a result of this system being implemented at Company A?**

***Trainer A:** Training time has been reduced. It has been a positive thing for the new people and older workers are more receptive to it than originally perceived.*

***Trainer B**: Yea, I think as much as you can quantify performance being improved as a result of it. Most performance has to be qualitative. If someone is doing his or her job, then it is working. We have not taken control groups to compare. When we trained new employees on the job, we heard from their peers asking "am I going to get the same level of training". Comments from operators, we can assume it is working. I would say where we have utilized SkilBase, I would say yes, performance has improved. But I would also say, I am expecting people to be able to perform their job. Because it is a continuous operation, can we measure filler down-time, we could, but then we have to separate out factors (i.e. equipment issue, training issue, other). I think everyone would tell you it's a valuable system, but probably not able to give you quantifiable data.*

***Trainer C:** I think there are some big improvements out there. People are glad to access the data and the "how to" to do the job. We have not done a good with the OJT. It has saved an immense amount of time and a lot of work and enabled us to speed up the implementation of processes. It has given us the depth that we normally would not have had. We still maintain 3 people full time. What I would do in the future is hire out student interns as technical writers and train them and have SMRs within each area tap into and work with the technical writer to get the data. After information is in the system then I would train an hourly employee to maintain the data. It costs us a lot and we're not getting completion. It doesn't show a lot of positive implementation and don't think that management can see the benefits because it is taking so long to get all the procedures in. The templates and process of gathering the information provides consistency and allows you to name procedures,*

and look at and track data maintenance. If rules are not adhered to, system maintenance is hard to accomplish.

***Trainer D**: We changed over early last year, 25% of the workforce and still got Plant of the Year. This is real boastful; we probably use this system better than anybody else does.*

8. **How involved are the plant employees in determining what information is included in the system?**

***Trainer A:** It's their system. We work from the bottom up so they determine what goes into the system except for OSHA requirements and quality guidelines mandated or required by our organization. There is some cross-plant working together.*

***Trainer B:** It's their system The analysts, trainers are the ones to get data into the system. They walk us through how to do the job. It isn't a work group manager or other manager telling them what to write. They are the ones that do the job and determine what needs to be included.*

***Trainer C**: Very involved especially at this plant. There was a reluctance to do it but what's happening now is employees gather the information and do what they can then work with the SMR. The original game plan was to have an SMR here all the time, but budget didn't allow for that. Complex thoughts and dual actions help them document. Analysts mostly do the procedures. Recently we documented a new process. Analysts sat in on a debriefing of the new system upgrades and MMI software screens. This gave them awareness. Second, they attended another debriefing with the implementation engineers. Neither of the individuals was familiar with the new system. The debriefings helped them to become familiar and then crank*

out what they perceived to be the operation procedures. Then they worked with someone on the implementation start-up team. In the words of the SMRs, the analysts wrote procedures for operators--not what management, trainers or others needed but what operators needed. We then used these procedures to train on the new system. We did this all within a two week period and created about 10 procedures within this timeframe working across shifts with few people.

***Trainer D**: What we do is try to find a SMR that knows the machine the best. We pick the persons brain to put it together. We get feedback from employees that say, maybe, "that's not the best way to do it". We usually get the best person at the job it is pretty much the best way to do it.*

9. What is the process for individual users to give feedback and to provide recommendations/enhancements to system content?

***Trainer A**: Usually feedback is direct contact with the analyst on the floor. Trainer to analyst communication as well and there is a committee to address the changes.*

***Trainer B: The** answers I'm giving you, you have to realize this is not being utilized the same way across the system and to the same extent. There is a formal mechanism on the web pages where people can respond to a web address where the analysts access. We also get it informally where people that use the procedure notify if something has changed.*

***Trainer C**: Two things. First a feedback button allows users to send back feedback via the web. Bad thing nobody is really using it. We have not done much training on that mechanism. Most often people will call or email changes. Sometimes*

they mark up a complete procedure and send it in. I think in the past operators would come to trainers for verification, now they go to the analyst. ***Interviewer:*** *Do you find that operators come to the trainers for changes/enhancements? I keep myself out of the loop and have them follow the proper mechanism. I tried to expedite any help to make it happen.*

Trainer D: *It's more verbal than written. It's funny to as you get SMRs involved they take pride because it is their procedure. They mother hen it and take ownership over it. When something changes, they let us know and get it updated.*

10. **How does this system employ "business knowledge" or strategic processes that evolve or change at Company A?**

Trainer A*: It's a repository for information, but it is pretty much pure operational. It does link to different sites.*

Trainer B: *It employs the processes that we do as part of that job. Business knowledge gets to the process knowledge. Some case manuals are linked into some of the system. I'm trying to separate out business knowledge. It's primarily the job of system knowledge. For example is their process information is there things, I would say there is business knowledge in there. I would say yes. For example, we have a work order system called Maximum that is a separate system from Skilbase. In Skilbase we capture the procedure and how to access and write procedures. We do employ other business functions. It's not the primary function of that system, but it is something people need to know in order to do their job. I still see it connected as part of their job because they have to do those things. We are linking to other systems like the package to schedule and information in SkilBase and how to access it. Maybe call*

them complimentary systems that people need to use. We link to them or provide the procedures or training to get the information to them.

***Trainer C**: I think the history of this system and why it was put into place. Two different reasons. Initial fate was to look at the support element as another training or support tool. It has shifted so that management views it as the sole tool not just one of the development tools. It's okay but not the complete picture. It was also intended for the large number of retirees, and the procedures become a very good way for new hires to access information when needed. Some business knowledge, but we have really not gotten into that aspect. If I was an operator, I could access some information, but it is almost too much information to obtain the big picture. It is meeting the need in retirees; however, because we are not where we need to be with the procedures, we need to get to the OJT point and meet the expectations from the OJT process.*

***Trainer D**: That's too vague for me to put into words**. Interviewer**: Original intent was to have standardization of training. Each plant is so unique. There is nothing the same. For example, we have 5 distinctly different fillers. The process for changing the CO2 valve is so different, so we can't share. Take the example of a car, every time you buy a new one there are differences. Technology changes--it's the nature of America's business. You buy a bottle filler; next years model is different.*

11. Has the Claymore system reduced the amount of training you provide to employees?

***Trainer A:** It doesn't really. It's a resource system that provides information to individuals. That in itself reduces time for training because now we have the*

resources. Procedures and a more complete library of resources reduced the management or number of supervisors on the floor. Analysts are available in the day.

***Trainer B**: It's helped out a lot. The biggest thing is it has provided a reference tool. Don't think it has reduced training, we see a greater need for training. It allows training to be focused on employees development and employees can recognize that because of a combination of the job charts and actually setting up a process that is built on the job charts. If used correctly in the OJT process, then you are running the system in sequence and the way it is suppose to run. It provides the direction that when you go into the OJT mode. It provides the structure and forces the standardization.*

***Trainer C**: Yes and no. I guess I say that because we are not using it as much as we would like to move forward for OJT. If we nailed down that process, then I think we could reduce the amount of classroom training. We really look at it as a support system, not a system that we are just going to take someone that doesn't know how to do the job and give the SkilBase and say, "go do the job". You still have to take people through how to train on and run the job. The system is there for two reasons. One to train on the job and one to reference on the job. So hopefully it has and probably will continue to reduce the amount of repetitive training. We've trained people many times on the same piece of equipment. What it has done in the area of quality training it has reduces training and training time of the quality people, so it has reduced training from that perspective. It's reduced training time because we just recertify we don't run them through training again. Refresher or recertification is where I can say we have reduced amount of training.*

***Trainer D**: When I look at the job chart, they only know about 80% of the job. We've seen huge training gaps, but it takes money to close up those gaps. Claymore has definitely uncovered many skeletons.*

12. If you started over with the implementation phase of this training system, what would you do differently?

***Trainer A:** It should be operations driven instead of HR driven. HR has to provide or make operations group responsible. The operations manager should get the system up and running and it should be funded. Plants have to provide support, but there is no money for them to do so. Operations needs to fund and to budget for the system and track employee training and skills. Plants have to provide support, but there is no funding.*

***Trainer B**: Three things: One is I would involve the IS group. I would have pushed more for the web than the other system (the technology wasn't there at the time) I would have involved operators at the SMR or SME phase, not initially. I would have involved technical writer sand then go back and train SMRs for the full analyst responsibilities and duties. I would also finish off one area before beginning another. For example, get distribution done from job charts to procedures to OJT. We can't implement OJT because time and money is not available. I would also use more corporate funding to ensure it gets done. I would also focus on one plant before getting others involved. We need to see more headway among all the plants and it would have been easier to complete one plant before getting all plants involved.*

***Trainer C**: Well the main thing I would do, again Hindsight is always 20/20. I guess I would have put together a plan to focus on just one training and facility for*

the development and implementation before expanding it and moving it forward. We covered way more than what we should have initially. We tried to do it all and try to develop at the same time. Because of the scope and the many processes, I think on the development side and building the system we continue to forge ahead but we are still not done. If I were to do it all over again, I would take one plant in one specific area and have phase one as building it to get data, then implement it in terms of training and lock in people processes that go along with it that really anchors it, and then also the process that goes into it. Then I would have taken the best processes from there and determined a go/no go with the system to determine if it was worthwhile to invest. On the good side, I think people know there is value there in terms of what it's done and can do. On the flip side, because it is so big and we have six individuals plants where everyone wants to do it their own way; implementation may have gone faster to complete one facility first before trying to do it all.

***Trainer D**: I don't know if this would make sense or not, but I would change some of the accountability. All of the accountability rests on me. There should shared accountability otherwise we just keep fighting battles. There should be a training coordinator within each department that would report to me. There is lack of structure and lack of cooperation. SkilBase is very intimidating to a lot of people. The web is like a cheatsheet for SkilBase. It dilutes the system. It's quicker and two steps easier than going through the system. It avoids the tracking. If someone is in SkilBase, we know how long he or she has been in there. Because it is so intimidating and we were ahead of the electronic age, everybody wanted change to make it more user friendly. Take Maximum, you either write a work order or a report and that's*

how you use it. We diluted SkilBase to make it easier instead of saying this is the system, you have to use it. Now you avoid using some of the components that make SkilBase what it is. SkilWeb gives you a resource, not a job chart. It takes away from the totality of the system.