

Needs Assessment and Analysis Methods

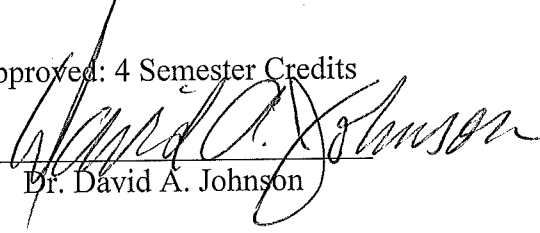
by

Angelina Messner

A Research Paper
Submitted in Partial Fulfillment of the
Requirements for the
Master of Science Degree
in

Training and Development

Approved: 4 Semester Credits


Dr. David A. Johnson

The Graduate School

University of Wisconsin-Stout

April, 2009

**The Graduate School
University of Wisconsin-Stout
Menomonie, WI**

Author: Messner, Angelina M. M.
Title: *Needs Assessment and Analysis Methods*
Graduate Degree/ Major: MS Training and Development
Research Adviser: Dr. David A. Johnson.
Month/Year: April, 2009
Number of Pages: 28
Style Manual Used: American Psychological Association, 5th edition

ABSTRACT

This review of needs assessment and needs analysis literature from the training and development field assembles common needs assessment methods and the proposed or best use of each method according to the reviewed literature. The most common needs assessment methods are task analysis, job/process analysis, performance improvement, competency-based assessment, strategic needs assessment, and knowledge and skill assessment. While performance analysis is sometimes used in literature to describe a type of needs assessment, in definition, it is needs assessment and analysis combined.

TABLE OF CONTENTS

	Page
.....	
ABSTRACT.....	ii
Chapter I: Introduction.....	1
<i>Statement of the Problem</i>	2
<i>Purpose of the Study</i>	2
<i>Assumptions of the Study</i>	3
<i>Definition of Terms</i>	3
<i>Limitations of the Study</i>	4
<i>Methodology</i>	6
Chapter II: Literature Review	7
<i>Needs Assessment and Analysis</i>	7
<i>Performance Analysis</i>	8
<i>Task Analysis</i>	9
<i>Job/Process Analysis</i>	11
<i>Performance Improvement</i>	12
<i>Competency-based Needs Assessment</i>	13
<i>Strategic Needs Assessment</i>	14
<i>Knowledge and Skill Assessment</i>	14
Chapter III: Methodology	16
<i>Subject Selection and Description</i>	16
<i>Data Collection Procedures</i>	16
<i>Data Analysis</i>	17

Chapter IV: Results..... 18

Chapter V: Discussion 20

Conclusions..... 20

Recommendations 21

References..... 22

Chapter I: Introduction

Needs assessment is the first step in the instructional design process and as such is an important process for performance improvement practitioners (Rossett, 1987), especially for those for whom training is a primary function. Needs assessment is not just for training, however; performance improvement practitioners identify and prioritize all types of performance gaps by conducting a needs assessment (Kaufman, 1994; Rothwell & Kazanas, 2004). This leads to a needs analysis to determine the cause of the performance problem and the appropriate solution that will close the gap in performance, regardless of whether the solution is training (Kaufman, 1994).

Even though performance improvement practitioners generally accept needs assessment and analysis as important first steps to solving performance problems (Rossett, 1997; Fulop, Loop-Bartick, & Rossett, 1997), they do not always conduct needs assessments prior to implementing performance improvement solutions. Sometimes organizational needs or constraints prevent the use of a needs assessment or dictate the assessment method used in each situation. Generally, the practitioner chooses his or her preferred method of conducting a needs assessment (Bemis, Belenky, & Soder, 1983). Since there is no one method of needs assessment to fit all situations, examining and using more than one method for needs assessment may be confusing for practitioners new to needs assessment (Cline & Seibert, 1993).

There are multiple terms in needs assessment literature to refer to the process. Front-end analysis, training needs assessment, needs assessment, needs analysis, task analysis, and job-task analysis are several terms used synonymously with needs assessment (Rossett, 1987; Robbins, Doyle, Orandi, & Prokop, 1996). Most of these

terms tend to have the same meaning in that they all seek to determine performance needs. At times, practitioners also consider the analysis of the cause of problems and the selection of a performance improvement solution as part of the definition. With so many terms for needs assessment, it becomes clear why new practitioners are confused when choosing a needs assessment method. This study seeks to outline needs assessment methods and their appropriate application for assessing and analyzing performance problems.

Statement of the Problem

While there is general agreement among performance improvement practitioners that needs assessment is an important step that leads to performance improvement solutions (Rossett, 1997; Fulop et al., 1997), practitioners do not always conduct a needs assessment. A lack of organizational resources and support is a common reason that practitioners do not conduct needs assessment, but a lack of knowledge regarding needs assessment methods and their application is also a barrier. There is more than one way to conduct a needs assessment; but there is a lack of a comprehensive resource that outlines those methods and the best use for each.

Purpose of the Study

This study is a review of needs assessment literature with the aim to provide an aid for performance improvement practitioners regarding needs assessment methods. When complete, this aid will describe needs assessment methods and the situations when the method is best used.

Assumptions of the Study

For this study, it was assumed that performance improvement practitioners need to learn and use different types of needs assessment methods; one needs assessment method is not adequate for investigating all types of performance improvement problems.

While needs assessment and needs analysis are distinct processes, in the literature, practitioners do not typically distinguish the terms or their processes. In order to determine appropriate performance solutions that will make a difference, practitioners need both needs assessment and needs analysis.

Definition of Terms

Competency. Knowledge, skills, attitudes, or behaviors that result in performance of a function to standard (Gupta, 2007).

Job. A group of related positions with similar work and goals (Brannick & Levine, 2002; Bemis et al., 1983).

Job Analysis. “Job analysis is a systematic procedure for gathering, documenting, and analyzing information about three basic aspects of a job: job content, job requirements, and the context in which the job is performed” (Bemis et al., 1983, p. 1).

Knowledge. What a person knows that is applied to the performance of a task (Bemis et al, 1983; Rothwell & Kazanas, 2004).

Need. The gap or discrepancy between current performance and desired performance (Altschuld, 2004; Kaufman, 1994; Watkins & Kaufman, 1996).

Needs Analysis. The process for identifying the cause(s) of performance needs in order to select performance improvement solution(s) (Kaufman, 1994).

Needs Assessment. The process for identifying and prioritizing performance needs (Kaufman, 1986, 1994; Rothwell & Kazanas, 2004).

Performance. What people must do on the job and the results of that work (Gupta, 2007).

Skill. “A present, observable competence to perform a learned psychomotor act” (Bemis et al, 1983, p. 61).

Task. A discreet action taken by a worker to produce a service or product (Bemis et al., 1983).

Task Analysis. Task analysis is a method for determining the knowledge, skills, tools, conditions, and requirements needed to perform a job (Bemis et al., 1983).

Limitations of the Study

One limitation of this study is that literature from fields outside of training and development was excluded, thus eliminating potential needs assessment methods. In addition, the volume of literature on needs assessment even within training and development is greater than the ability of one researcher to review in its entirety. In order to limit the literature included for study, focus was placed on more recent books and articles with a primary emphasis on needs assessment within the training and development profession. Older books and articles generally considered foundational to the field of needs assessment were included when these resources were referenced often in literature that is more recent.

The nature of a literature review requires judgment in considering the merits of literature for inclusion and in weighing importance. Judgment was used in determining what constitutes a needs assessment method, when a method is best used, and whether the method is unique. It is possible that the intentions of authors were misunderstood and therefore misrepresented or not included at all.

While the purpose of this study is to describe needs assessment methods that can be used by practitioners, a lack of knowledge regarding needs assessment methods is not the only reason practitioners do not conduct needs assessment. Practitioners frequently encounter barriers within an organization such as time, workload, and management support (Rothwell & Kazanas, 2004) which can serve to limit or eliminate needs assessment. In addition, a literature review does not train practitioners in the practical application of needs assessment methods. Since this study does not address these issues, it will not fully close the gap on the performance problem that performance improvement practitioners do not use needs assessment when analyzing performance problems to design solutions.

Methodology

This study was begun with an online search of journals as well as a search of books for material related to needs assessment, needs analysis, training needs assessment, and training analysis. The literature reviewed was primarily from 1990 to the present and only from the training and development field. Articles or books from before 1990 were included only when they were repeatedly referenced in literature or were the primary source for a needs assessment method in the recent articles. From these books and articles, a list of the most commonly accepted methods for conducting a needs assessment were compiled along with the proposed best use or expected outcome for each method.

Chapter II: Literature Review

Needs Assessment and Analysis

Needs assessment is the process of identifying performance needs and then prioritizing those needs (Kaufman, 1986, 1994; Rothwell & Kazanas, 2004). Stated another way, a performance need is the difference between current and desired performance or *what is* versus *what should be* (Altschuld, 2004; Kaufman, 1994; Watkins & Kaufman, 1996). *What should be* performance is typically the performance of the best or star performers. It is a known high-level of performance.

Once a practitioner identifies a need, he or she determines if the need has enough priority or impact to allocate resources for an analysis that will determine the root cause of the performance problem. Based on the root cause, the practitioner designs a solution to close the performance gap (Nolan, 1996). Confusion and disagreement regarding assessment and analysis terms is a common occurrence in the needs assessment literature. Authors use the terms needs assessment and analysis interchangeably to mean one or both of the definitions presented in the *Definition of Terms*. This may stem from the fact that both assessment and analysis are vital to the design of performance improvement solutions that work.

Once the root cause of a performance gap is determined, the solution may or may not include training or instruction. If the solution is training, the instructional objectives derive from the organizational, operational, and/or individual needs identified in the assessment (Rothwell, 1984). At times, the term training needs assessment is described as needs assessment, but according to Watkins and Kaufman (1996), if the solution is training there is no need to do an assessment or analysis. A training needs assessment is

more accurately described as a training requirements assessment that may follow a needs assessment and needs analysis. Despite this, many organizations conduct a training needs assessment and implement a training solution prior to conducting a needs assessment in the hope that performance problems will disappear (Renard and Sinnock, 1990). Without a needs assessment, however, there is no guarantee that the training solution will solve the performance problem. Resources, time, energy, and learner goodwill may be depleted while the performance problem persists.

Performance Analysis

Some authors define performance analysis similarly to the definition of needs analysis; analysis of discrepancies between possible and potential performance that determines which problems can be addressed through instructional solutions versus non-instructional solutions (Rothwell & Kazanas, 2004; Mager, 1972).

Swanson (1994) describes performance analysis as the analysis of performance variables to determine actual versus desired organizational, process, and individual performance, which is similar to the definition of needs assessment. He then follows performance analysis with documentation of expertise to analyze the expertise necessary for the desired performance. This definition of performance analysis, including documentation of expertise, mirrors the definition of needs assessment and analysis combined, as described by Kaufman (1986, 1994) and Nolan (1996). Important elements in this description of performance analysis are the interrelated elements of individuals, processes, and the organization (Castle, 2005). Rummler and Brache (1995) also present all three of these elements in their method of analysis for improving performance.

The second half of Swanson's (1994) performance analysis is diagnosis of expertise, which includes job description, task inventory and task analysis. This is similar to the descriptions of the task and job analysis methods from other practitioners.

Swanson (1994) does not suggest using a full performance analysis and documentation of expertise for every performance issue reasoning that this would be a large investment of time, especially in a changing work environment. He suggests using parts of the organization, job, and individual analyses processes to identify organizational performance requirements and then documentation of expertise to focus on the tasks that can quickly close the gap on those requirements.

Clarke (2003) recognizes an advantage to the performance analysis model in that it identifies the criteria to meet organizational level performance needs via individual level and process level performance. This advantage also applies to Rummler and Brache's (1995) performance improvement method.

Task Analysis

All jobs are comprised of tasks or discrete activities. A task analysis typically follows a needs assessment and narrows the focus to the specific task(s) that is the identified performance opportunity (Robbins et al., 1996). Then, a task analysis details the expertise required to perform the task: the knowledge, skills, tools, conditions, and requirements necessary for performance (Swanson, 1994; Bemis et al., 1983). Typically, those requirements are documented in a formal task statement, which includes the action performed, what is acted upon, the purpose or outcome of the action, and what tools, machines, equipment, etc. are used. The task statements set the standard for performance

and help shape the performance improvement solution as well as the evaluation of the solution's impact.

Rossett (1987) considers task analysis to be a type of needs assessment, but Jonassen, Tessmer, and Hannum (1999) disagree. Jonassen et al. state that task analysis and needs assessment frequently use the same tools and produce similar results, but the purposes are different. Needs assessment identifies needs for analysis, but task analysis solves an instructional problem; meaning that training has already been identified as the solution.

According to Rothwell and Kazanas (2004), task analysis is useful for determining competent performance, determining exactly what a worker must know and do, clarifying conditions for performance, and establishing standards for performance. Practitioners often use task analysis to determine performance objectives for use in developing instruction since task analysis produces goals and objectives, tasks to teach, importance of tasks, task sequence, design, media, assessment and evaluation (Jonassen et al., 1999).

Rossett (1999) defines task analysis to include not only what a performer does, but also what the performer knows and thinks about during performance. Swanson (1994) separates task analysis procedures and titles them by the type of task: procedural task analysis, knowledge task analysis, and systems task analysis. No matter what type of task is analyzed, it follows that task analysis is most often used to document expertise in order to develop instruction.

Job/Process Analysis

“The purpose of job analysis is to provide an objective description of the job, not of the person performing it” (Bemis et al., 1983, p. 1). Just like task analysis, once a performance problem is identified, a job or process analysis determines the cause of the performance problem, which then informs the solution.

Sometimes practitioners consider job analysis and task analysis as one in the same because of their similarities (Gupta, 2007). A job analysis gathers information on the scope, responsibilities, and tasks of a job while a task analysis gathers information on the knowledge, skills, tools, conditions, and requirements to perform a task. Both task and job analysis focus on expertise, but at different levels of detail with task analysis delving into the minute detail of performance.

Job analysis is best used to develop or revise job descriptions, to redesign tasks for jobs, and to develop a consistent set of training requirements, especially for highly technical or specialized job functions (Gupta, 2007). Practitioners should also conduct a job analysis when the current job descriptions are inadequate for use with a more thorough task analysis (Rothwell & Kazanas, 2004). Job analysis works best with stable jobs, not jobs that are constantly changing (Swanson & Houlton, 1998). One important drawback to a job or especially a task analysis is the level of detail and the time to gather the details of tasks. A job or task analysis requires significant time from subject matter experts to validate the tasks performed on a job and to validate the requirements of the tasks.

Nolan (1996) describes job analysis as the second step when analyzing a training problem. This description assumes that training is the solution. In this case, job or process

analysis considers the learner, the organization, and the job in order to create training. It includes a task analysis, organizational analysis, and skills and knowledge analysis. The inclusion of organizational analysis is rare in descriptions of job analysis, but is also included in analysis for improving performance as described by Rummler and Brache (1995).

Performance Improvement

Rummler and Brache (1995) take a systems view and approach to analysis. The systems view provides an understanding of the variables that influence performance and an understanding of how changing one variable in a system will have an effect on other variables within the system. Therefore, to understand the cause of a performance problem, a practitioner must understand and analyze all Three Levels of Performance. These Levels are the Organization Level, the Process Level, and the Job/Performer Level. Within the analysis of each Level, Rummler and Brache examine the goals, design, and management that support performance. This approach crosses functional boundaries of workflow. Another important aspect of this method is that it is useful for continuous improvement. It does not need to be used only when there is a performance problem to be assessed and analyzed.

The higher or outer Level of performance for analysis is the Organization Level (Rummler & Brache, 1995). It includes an analysis of variables that affect performance such as strategies, goals and measures, organization structure, and the use of organizational resources to determine the solution(s) to solve the performance problem under investigation.

Organization analysis when used by Nolan (1996) reviews aspects of the work unit that may influence on-the-job training. As opposed to Rummler and Brache (1995), this analysis does not determine what factors of the organization may cause or affect the performance problem under analysis. It focuses instead on the organizational factors that may impede the implementation of training as the solution.

Going deeper into performance, the second Level of Rummler and Brache's (1995) performance model is the Process Level. Analysis at the Process Level ensures that processes meet the needs of customers, that customer and organization needs drive the process goals and measures, and that the process works effectively and efficiently.

Analysis at the Job/Performer Level is the most detailed Level of Rummler and Brache's (1995) method for improving performance. At this Level, the analysis focuses on the individual and his or her performance of the processes uncovered in the Process Level. The performance variables at this Level include "hiring and promotion, job responsibilities and standards, feedback, rewards, and training" (Rummler & Brache, 1995, p. 17).

Competency-based Needs Assessment

Swanson and Houlton (1998) define competencies "as underlying characteristics of employees that enable them to perform a job or task" (p. 30). Competencies are more general in nature than specific expertise, which makes them useful for analyzing what people need to know to be successful in a job class versus a particular task. Because competencies are slightly removed from the task, they are more flexible and applicable to jobs that are changing. Rothwell (1984) cautions that in competency assessments,

“specification of improvement is too often based on performance measures already existing (p. 20)” versus the performance that is possible in a future condition.

A competency-based needs assessment is useful for developing competencies for a job class or group; when developing a system for recruiting, hiring, developing, and promoting; and when analyzing competencies for a job group across organizations or cultures (Gupta, 2007).

Strategic Needs Assessment

A strategic needs assessment examines performance against an organization’s business strategy and identifies the difference between the current and the desired conditions (Gupta, 2007). In this case, the desired conditions do not exist and are not met by performers. It is a long-term approach used when conditions are uncertain or in flux (Rothwell 1984; Swanson & Houlton, 1998) as well as when undertaking organizational change initiatives (Gupta, 2007). The primary difference between a strategic needs assessment and other types of assessments is that the desired performance condition is typically a new objective with different goals from the current condition.

Knowledge and Skill Assessment

A knowledge and skill assessment identifies the knowledge and skills that workers need “...in order to perform effectively on the job” (Gutpa, 2007, p. 26) so that the necessary solution can be implemented to close the gap. Usually, a knowledge and skill assessment occurs after an assessment or analysis identifies a lack of knowledge and skill as the performance problem. A knowledge and skill assessment does not have the detail of a job and task analysis, a competency assessment, or a strategic needs assessment (Gupta, 2007).

According to Gupta (2007), a knowledge and skill assessment is best for new business opportunities, the implementation of a new system or technology, to revise or update an existing training program, to add new job responsibilities to a position, to reorganize when an organization downsizes, and to support rapid organizational growth.

Chapter III: Methodology

Needs assessment is an important first step for identifying and analyzing performance problems (Rossett, 1997; Fulop et al., 1997), but practitioners do not always conduct a needs assessment. Understanding needs assessment methods and their application is one barrier to conducting a needs assessment and analysis.

This literature review aims to compile needs assessment methods and their recommended use to serve as an aid for performance improvement practitioners. In the following sections, the process used for reviewing the training and development literature to uncover needs assessment methods is described.

Subject Selection and Description

To select reference materials, a keyword search was used in online journal databases for journal articles using the words needs assessment, needs analysis, performance analysis, and training needs assessment. Articles were then selected based on their relevancy to the training and development field as well as needs assessment. Articles were generally omitted if they were published prior to 1990; however, when a recently published article referenced a needs assessment method from another, older source, the original source was included. The selection of literature was not limited to journal articles; books on needs assessment were included and chosen according to frequent reference in journal articles.

Data Collection Procedures

In order to glean needs assessment methods from the literature, the selected journal articles and books were read to identify references to needs assessment and

analysis. Any titles and descriptions given to those methods as well as their recommended use were documented.

Data Analysis

Once the needs assessment methods were collected from the literature sources, duplicate were eliminated by combining those that were similar in goal or in outcome. For any needs assessment methods that used more than one method as described in other sources, it was treated as a separate method.

Chapter IV: Results

Conducting a needs assessment requires selecting the right method to fit the situation to be assessed; there is no one method that fits all situations. While many of the methods found through this study include suggestions about when the method is best used, not all situations fit neatly into one description or another. Practitioners will need to use their best judgment to determine the appropriate method for the performance problem to be analyzed.

The needs assessment methods identified through this study differ mainly based on the level of information that is analyzed. The lowest or deepest level of detail is the task assessment. Since a task assessment includes identification of the knowledge, skills, abilities, and conditions necessary to perform a task (Swanson, 1994; Bemis, et al., 1983), the knowledge and skill assessment could be considered a more detailed level of assessment. However, Gupta (2007) writes that the knowledge and skill assessment is not as detailed as the task analysis. This discrepancy either in terminology or this reviewer's understanding creates confusion in the application of the knowledge and skill assessment.

The next level of detail after the task is the process or job analysis. This analysis outlines the required tasks and processes for success on the job (Gupta, 2007). The competency-based needs assessment follows the job analysis as it typically assesses competencies for a job group across an organization or culture. The strategic needs assessment does not follow this progression of assessment methods for task, job and competency. The strategic needs assessment considers future needs at any level of detail or performance.

Swanson's (1994) performance analysis method along with Rummler and Brache's (1995) performance improvement method are the only methods found in this literature review that include analysis of the performance problem at multiple levels of performance in the organization. Both methods included analysis at the organization, process, and the individual or job level to uncover the root cause of performance problems.

Only one method of needs assessment has the primary purpose of assessing future needs for performance improvement and that is the strategic needs assessment method presented by Gupta (2007). Gupta's knowledge and skill assessment could be argued to be future-focused since the purpose is to identify the knowledge and skills necessary for new initiatives, but those new initiatives have been identified and are being prepared for implementation. The strategic needs assessment focuses on determining those future needs that will change performance needs.

Only Rummler and Brache (1995) include continuous improvement as a possible application for their performance improvement method. It is an interesting and important application for a constantly changing work environment that is not well served by labor-intensive task and job analyses.

Chapter V: Discussion

Performance improvement practitioners do not always conduct a needs assessment to identify and then analyze performance problems even though needs assessment and analysis provide the foundation for an effective performance improvement solution (Rossett, 1997; Fulop et al., 1997). In other instances, practitioners chose only a preferred or known method of assessment and analysis (Bemis et al., 1983). By reviewing training and development literature to document options for needs assessment, this study aims to provide a resource to practitioners.

Conclusions

In this study, many methods were found for conducting a needs assessment and analysis: task analysis, job analysis, performance improvement, competency-based needs assessment, strategic needs assessment, and knowledge and skill assessment. While performance analysis is used in literature to describe one possible needs assessment and analysis method, it more aptly describes needs assessment and analysis itself. In essence, performance analysis is another term for needs assessment.

Understanding when and how to use these methods can be confusing for new practitioners. There is not one correct way to apply each method, but there are best uses for each that were outlined with the descriptions of the methods.

While there is still a focus on training within the needs assessment and analysis literature, there is growing use of the term performance to describe more accurately the array of performance problems that a needs assessment and analysis solve. Since performance is such a broad term, practitioners need more information on how to evaluate performance problems and how to implement assessment and analysis methods.

Recommendations

Training is still a major focus in needs assessment literature, but there is a move toward analysis of performance and all the possible variables for improvement. This change requires a change in assessment and analysis methods. Most needs assessment and analysis methods do not analyze organizational culture or environmental factors that may lead to solutions other than training. The focus is primarily on the individual performer and the tasks performed. More needs assessment and analysis methods are needed that include assessment and analysis of the organization and environment as factors for performance improvement. Existing needs assessment and analysis methods may also be revised to include a more comprehensive view of performance and the factors that influence performance.

Since practitioners show a preference for particular needs assessment and analysis methods, they would benefit from continuous study and application of multiple needs assessment and analysis methods. There was no one needs assessment or analysis method identified in the literature review that was recommended for all performance improvement problems, so practitioners will need multiple methods to choose from in order to apply each one to the appropriate situation under investigation.

References

- Altschuld, J. W. (2004). Emerging dimensions of needs assessment. *Performance Improvement*, 43(1), 10-15. Retrieved November 17, 2008, from <http://www3.interscience.wiley.com/journal/114114518/abstract>
- Bemis, S., Belenky, A., & Soder, D. (1983). *Job analysis: An effective management tool*. Washington, DC: Bureau of National Affairs.
- Brannick, M. T., & Levine, E. L. (2002). *Job analysis; Methods, research, and applications for human resource management in the new millennium*. Thousand Oaks, CA: Sage Publications.
- Castle, D. K. (2005). Physician, heal thyself: A case study demonstrating outcomes from using performance analysis. *Performance Improvement*, 44(9), 14-26. Retrieved November 17, 2008, from <http://www3.interscience.wiley.com/journal/114114912/abstract>
- Clarke, N. (2003). The politics of training needs analysis. *Journal of Workplace Learning*, 15(4), 141-153. Retrieved November 9, 2003, from Emerald Insight database.
- Cline, E. B., & Seibert, P. (1993). Help for first-time needs assessors. *Training & Development*, 47(5), 99-101. Retrieved November 28, 2008, from EBSCO MegaFILE database.
- Fulop, M. P., Loop-Bartick, K., & Rossett, A. (1997). Using the world wide web to conduct a needs assessment. *Performance Improvement* 36(6), 22-27. Retrieved November 17, 2008, from <http://www3.interscience.wiley.com/journal/117888262/abstract/>

- Gupta, K. (updated and expanded by Sleezer, C. M. & Russ-Eft, D. F.). (2007). *A practical guide to needs assessment*. San Francisco: Pfeiffer.
- Jonassen, D. H., Tessmer, M., & Hannum, W. H. (1999). *Task analysis methods for instructional design*. Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
Retrieved December 8, 2008 from NetLibrary.
- Kaufman, R. A. (1994). A needs assessment Audit. *Performance and Instruction*, 33(2), 14-16. Retrieved November 17, 2008, from
<http://www3.interscience.wiley.com/journal/114120569/abstract>
- Mager, R. F. (1972). *Goal analysis*. Belmont, CA: Fearon Pitman Publishers, Inc.
- Nolan, M. (1996). Job training. In R. L. Craig (Ed.), *The ASTD training & development handbook: A guide to human resource development* (4th ed., pp 747-775). New York: McGraw-Hill.
- Renard, P. G., & Sinnock, P (1990). Training needs assessment: Fact or fiction? *Performance and Instruction*, 29(8), 12-15. Retrieved November 17, 2008, from
<http://www3.interscience.wiley.com/journal/114117498/abstract>
- Robbins, D. W., Doyle, T. R., Orandi, S., & Prokop, P. T. (1996). Technical skills training. In R. L. Craig (Ed.), *The ASTD training & development handbook: A guide to human resource development* (4th ed., pp 776-802). New York: McGraw-Hill.
- Rossett, A. (1987). *Training needs assessment*. Englewood Cliffs, NJ: Educational Technology Publications.

- Rossett, A. (1997). Have we overcome obstacles to needs assessment? *Performance Improvement*, 36(3), 30-35. Retrieved November 17, 2008, from <http://www3.interscience.wiley.com/journal/117888249/abstract>
- Rossett, A. (1999). Analysis for human performance technology. In H. Stolovitch & E. Keeps (Eds.), *Handbook of human performance technology* (pp. 139-162). San Francisco: Jossey-Bass Pfeiffer.
- Rothwell, W. J. (1984). Strategic needs assessment. *Performance and Instruction Journal*, 23(5), 19-20. Retrieved November 17, 2008, from <http://www3.interscience.wiley.com/journal/114119328/abstract>
- Rothwell, W. J., & Kazanas, H. C. (2004). *Mastering the instructional design process: A systematic approach* (3rd ed.). San Francisco: Jossey-Bass Publishers.
- Rummler, G. A., & Brache, A. P. (1995). *Improving performance: How to manage the white space on the organization chart* (2nd ed.). San Francisco: Jossey-Bass Inc.
- Swanson, R. A. (1994). *Analysis for improving performance: Tools for diagnosing organizations & documenting workplace expertise*. San Francisco: Berrett-Koehler Publishers, Inc.
- Swanson, R. A., & Holton, E. F. (1998). Intellectual capital: Developing and maintaining core expertise in the midst of change. *National Productivity Review* 17(2), 29-38. Retrieved November 28, 2008, from ABI/INFORM Global database. (Document ID: 750159391).
- Watkins, R., & Kaufman, R. (1996). An update on relating needs assessment and needs analysis. *Performance Improvement*, 35(10), 10-13. Retrieved November 17, 2008, from <http://www3.interscience.wiley.com/journal/114120827/abstract>