

# Advances in Developing Human Resources

<http://adh.sagepub.com/>

---

## **Analysis: The Defining Phase of Systematic Training**

Paul B. Roberts

*Advances in Developing Human Resources* 2006 8: 476

DOI: 10.1177/1523422306293014

The online version of this article can be found at:

<http://adh.sagepub.com/content/8/4/476>

---

Published by:



<http://www.sagepublications.com>

On behalf of:



[Academy of Human Resource Development](#)

**Additional services and information for *Advances in Developing Human Resources* can be found at:**

**Email Alerts:** <http://adh.sagepub.com/cgi/alerts>

**Subscriptions:** <http://adh.sagepub.com/subscriptions>

**Reprints:** <http://www.sagepub.com/journalsReprints.nav>

**Permissions:** <http://www.sagepub.com/journalsPermissions.nav>

**Citations:** <http://adh.sagepub.com/content/8/4/476.refs.html>

>> [Version of Record](#) - Oct 12, 2006

# Analysis: The Defining Phase of Systematic Training

Paul B. Roberts

**The problem and solution.** The analysis phase of analysis, design, develop, implement, evaluate (ADDIE) was originally based on the understanding that training was needed and that analyzing the content was the starting point. Over time the analysis phase has become the defining phase as it moved up from job-task analysis for identifying the content of a training program to (a) analyzing a worker performance problem that can be addressed by training, (b) to identifying and analyzing a worker-work system performance problem that can be addressed by a combination management and training intervention, and (c) on to an analysis process for diagnosing performance in an organization that may or may not involve training as part of a performance improvement intervention. The contemporary analysis process is designed to help decision makers gain a clear understanding of the “gaps” between the desired and current performance and the factors or variables impinging on them.

**Keywords:** *analysis; organizational diagnosis; up-front analysis; needs analysis; performance*

The analysis phase is seen as the foundation to strong human resource development (HRD) practice; and in any project, a good foundation is required for a success. In HRD, the right foundation is the key, and front-end analysis requires sound analytical tools and processes. Robinson and Robinson (1996) reflected on the analysis phase by noting that we must “ask the right questions right” (p. xii).

According to Stenzel and Stenzel (2003) analysts need to be absolutely clear about what they are expected to deliver. Therefore, two general questions need to be asked:

1. What is the purpose of this analysis? The answer to this question comes through the synthesis of answers to four more fundamental questions:
  - How will the analysis be used?
  - What decisions will be made with the analysis results?
  - What problem is the analysis trying to shed light on, or solve?
  - Is the purpose of the investigation worth using valuable resources?

2. What are the best tools to perform the analysis, given its purpose?
  - Which disciplines are likely to understand this situation best?
  - Are financial factors most important?
  - How can cross-functional views and multiple variables be included?
  - Where has this question been asked before that we might find data?
  - When was the last time our analytics were reviewed for currency?
 (p. 293)

The analysis phase is often called the *front-end analysis*, a name coined and defined by Harless (1973) as “a series of analytical and decision-making steps that lead to plans for overcoming deficiencies in human performance” (p. 231). Datta (1978) defined *front-end analysis* as “the bridge between recognizing a need and deciding what to do about it” (p. 13). Beckschi and Doty (2000) described the analysis phase in the following simple and easy to understand terms:

This phase requires that the developer first become familiar with every aspect of the operational system, job, or educational situation for which there is thought to be a need for instruction: Do we need to teach something? What is the subject all about? What should the learner be able to do? Analysis will help determine whether there is a need for instruction, what will be taught, and what behaviors and processes the learner should exhibit. (p. 31)

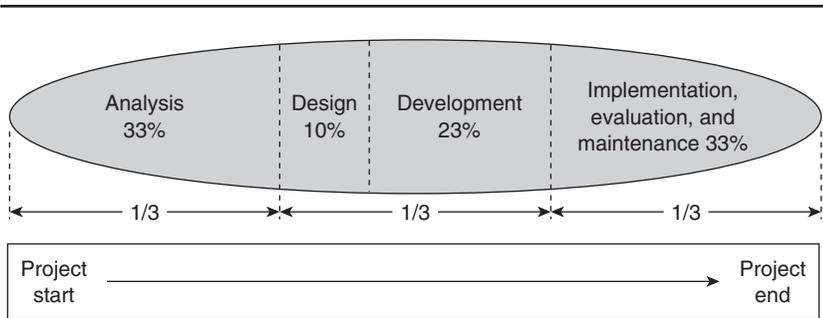
Historically, analysis was a phase or tool to determine the content of training. Robinson and Robinson (1996) illustrated the need to move beyond the original premise of the analysis phase of analysis, design, develop, implement, evaluate (ADDIE) and expand it as a tool for performance improvement as they stated,

the traditional trainer role must evolve into the performance consultant role. It is not that the traditional trainer role is bad; rather, it is no longer sufficient to address the needs of our organizations. Times have changed—and so must we. (p. xii)

The analysis phase is a critical step that should not be skipped or undervalued. According to Lee and Owens (2004) this phase should comprise one third of the project time as seen in Figure 1 below. This further illustrates the need for a thorough analysis of the entire system to correctly diagnose the problem and identify the correct intervention.

## Alternative Analysis Processes

The analysis phase has been organized using several different processes. Three different processes are shown in Table 1. BEA Systems Inc. (2004) utilized a simple five-step process to conduct an analysis of information technology related training needs. Molenda, Pershing, and Reigeluth (1996) in the *ASTD Training and Development Handbook* utilized an eight-step process that seeks to answer additional questions concerning the source of the problem as well as a cost-benefit payoff.



**FIGURE 1: Instructional Design Phases and Time Ratio**

In terms of connecting organizational performance analysis and job analysis, Swanson (1996) utilized the organizers of diagnosing performance and documenting expertise. His methodology starts with an organization performance analysis that then dictates the potential need for training and performance-focused job-task analysis. This is a fundamental shift from simply doing job analysis within an organizational context without first determining the organizational performance requirements.

For this article the following processes are used to explore the analysis phase of systematic training:

- conduct an organizational diagnosis
- detail expert performer tasks and functions
- determine current expertise level
- perform an expertise gap analysis
- select training setting
- forecast the return of investment (ROI) of the intervention

Before examining these processes in detail, it is important to first determine if training is the solution to the problem or desired improvement and then discuss some of the methods used to collect the data necessary for a complete analysis.

### Is Training the Solution?

To decide if training is required, one of the basic questions needed to be asked in terms of attaining the desired performance is: “Does the employee know how to meet the performance standards for an accountable task?” (Laird, 2003). If the answer is *yes*, then training is not needed. If the answer is *no*, then training is needed to equip the employees in their job. In the event that training is not the answer, other actions such as counseling, job redesign, reward systems, and organizational development might rise to the surface.

**TABLE 1: Analysis Processes**

| <b>BEA Systems Inc. (2004)</b>              | <b>ASTD Training and Development Handbook (Molenda, Pershing, &amp; Reigluth, 1996)</b> | <b>Swanson (1996)</b>   |
|---|---|---|
| 1. Understand your environment and projects | 1. Define system of interest  | 1. Diagnosing performance<br>Articulate initial purpose<br>Assess performance variables                               |
| 2. Identify learning objectives             | 2. Determine performance deficiencies   | Specify performance measures  |
| 3. Determine current knowledge levels       | 3. Separate incentive, management, and ignorance problems                               | Determine performance needs<br>Construct improvement proposal   |
| 4. Perform gap analysis                     | 4. State problem to be solved   | 2. Documenting expertise<br>Prepare job description<br>Prepare task inventory<br>Conduct analysis of procedural tasks |
| 5. Present training recommendation          | 5. Determine cost-benefit payoff  | Conduct analysis of systems tasks   |
|   | 6. Learner analysis   | Conduct analysis of knowledge tasks   |
|   | 7. Analysis of setting  |   |
|   | 8. Job-task analysis  |   |

Note: ASTD = American Society for Training and Development.

Often, the employee does not perform to standards due to time factors, working conditions, or a misunderstanding of the required standards. Management must recognize and consider other factors which impact performance that may not be corrected with training. Factors such as quality of procedures, human factors, management style, and the work environment also affect performance. (Clark, 2000, n.p.)

Asking the broader question as to the performance problem or opportunity brings the elements of a comprehensive intervention (including training) into focus.

### **Methods of Data Collection in the Analysis Phase**

Methods of collecting data for use in the analysis phase can include, but not be limited to: interviews, questionnaires, observations, literature (organizational records or published literature), group discussions, or utilizing a panel of experts and participation. Interviews should be conducted with those most knowledgeable of the organization, job, or task under scrutiny. Persons interviewed could include: managers, job incumbents, employees, external experts, clients and customers, supervisors, engineers, or any other subject matter expert.

In considering questionnaires, there are two general generally types—structured and unstructured—as described by Bemis, Belenky, and Soder (1983).

An unstructured questionnaire basically asks employees what it is they know, have experience, or actually do. Such a questionnaire is easy to put together, but difficult to analyze and summarize. A structured questionnaire can be developed only after certain other techniques have been applied (e.g., background research, observation, interview). Structured questionnaires, inventories, or checklists normally request information on whether a specific phenomenon exists and the importance they attach to it. A structured questionnaire with limited open-ended questions is among the most frequently used. (p. 4)

Observation is an invaluable tool to determine the environment and context in which a performance or activity takes place. Bemis et al. (1983) stated

In the authors' opinion, this data-gathering technique is so important that it should be common practice for all analysts from outside the work unit. Observation is mandatory for understanding and legally, if needed to be defended in court, analysts are in a much better position to establish credibility if they have actually observed the situation. (p. 30)

There are some pitfalls of observation as Pratt (1980) warned,

Since subjects may alter normal behavior patterns when they know they are being watched, unobtrusive observation provides more valid data. Unless an observer is provided with detailed and easily understood instruction for observing and recording behavior, special training or expertise will be necessary. (p. 87)

The topic of background research or review of literature may include a number of sources such as: company records, production and worker logs, technical manuals, professional association materials, the encyclopedia of associations, organizational studies, dictionary of occupational titles—O\*NET listings, occupational outlook handbook listing, dissertations abstract international, analyze budget documents, evaluation reports, goal statements, production charts, quality control documents, scheduling and staffing reports, or other Web-based sources.

Group discussions or utilizing a panel of experts are often carried out using either the DACUM or Delphi approach. Adams (cited in Finch & Crunkilton, 1989) defined *DACUM* (Developing A Curriculum) as “a single sheet skill profile that serves as both a curriculum plan and an evaluation instrument for occupational training programs” (p. 139). The DACUM process utilizes a committee of experts in a particular field who are led by a facilitator who guides the group through the following steps as outlined by Finch and Crunkilton (1989):

1. Reviewing a written description of the specific occupation
2. Identifying general areas of competence within the occupation
3. Identifying specific skills or behaviors for each general area of competence
4. Structuring the skills into a meaningful learning sequence
5. Establishing levels of competence for each skill as related to realistic work situations.

When this process has been completed, the profile is used as a foundation for accessing specific developing instructional content.

The Delphi technique was originally developed by the RAND Corporation for predicting alternative defense futures; however, it has been widely applied to many educational applications. The Delphi technique consists of several rounds of mailed questionnaires sent to experts. Generally, the first round requests content that should be included in the curriculum. The second round includes the identified items for review and asks for each item to be rated in terms of importance. In the third round the participants review the ratings and are asked to revise their rating if necessary to reach consensus on each item. The fourth round allows for final review and revision in an attempt to reach full consensus (Finch & Crunkilton, 1989). Malasky (1984) stated that the purpose of the Delphi technique is to “promote maximum convergence of opinion, without the biasing influences of face-to-face confrontation” (p. 9.7). Table 2 contains a list of the advantages and disadvantages of the various methods of data collection.

## Conduct an Organizational Diagnosis

When looking at an organization it is important to understand the relatedness of all the parts or systems. Rummler and Brache’s (1995) book, *Improving Performance: How to Manage the White Space on the Organizational Chart*, sums this up well in the illustration

Pulling any lever in the system will have an effect on the other parts of the system. You can’t just reorganize, or just train, or just automate, as if you were merely adding some spice to the stew. Each of these actions changes the recipe. (p. 13)

It is important to note the underpinnings of their work. They started out as ADDIE experts, moved to performance-based training, on to human performance, and finally to an improving performance model that incorporated all the previous vantage points. Their journey was from being systematic to becoming systemic. Thus, an organizational diagnosis results in a performance improvement proposal that would validate the need for expertise among specific workers. The needed expertise then becomes the focal point of detailing the expert performer tasks and functions. The performance proposal would also specify nontraining actions needed to ensure success of training.

The performance diagnosis matrix of enabling questions (Swanson, 1996) helps to illustrate the analysis framework required in moving from a systematic to a systemic approach to HRD work (see Figure 2).

According to Pratt (1980), “It is unwise to develop curricula in a vacuum. Designers need to have a clear idea of the institutional, community, and social context within which the curriculum is to be implemented” (p. 109). Dublin (2000) stated that:

**TABLE 2: Advantages and Disadvantages of Methods of Collecting Data**

| Method                                   | Advantages   | Disadvantages   |
|--|--|---|
| Questionnaire                            | <ul style="list-style-type: none"> <li>May yield large amount of information</li> <li>Restricts respondents to specific areas</li> <li>Does not require trained interviewers</li> <li>Time effective for a large number of participants</li> </ul> | <ul style="list-style-type: none"> <li>Requires explicit instructions</li> <li>Return rates tend to be low</li> <li>Try building in an incentive to motivate people to completion</li> <li>Requires a significant sample size for an acceptable confidence level</li> </ul> |
| Observation                              | <ul style="list-style-type: none"> <li>Establishes what people actually do, not what they say they do</li> <li>May be accomplished via trained observers or automatic cameras</li> <li>Helps pinpoint problem areas</li> </ul>                     | <ul style="list-style-type: none"> <li>Requires skilled observers</li> <li>May be expensive and time-consuming</li> <li>Data not easily quantifiable</li> </ul>   |
| Face-to-face interview                   | <ul style="list-style-type: none"> <li>Yields a high response rate</li> <li>Provides most information for time spent and most accurate detail</li> <li>Provides opportunity to pursue responses for more detail</li> </ul>                         | <ul style="list-style-type: none"> <li>May be costly in time and money</li> <li>May provide extraneous information</li> <li>Requires trained interviewers</li> </ul>  |
| Telephone interview                      | <ul style="list-style-type: none"> <li>Less costly than face-to-face interviews</li> <li>Less time-consuming than face-to-face interview</li> </ul>  | <ul style="list-style-type: none"> <li>Provides no nonverbal feedback</li> <li>Respondent may cut interview short</li> </ul>  |
| Group data collection<br>DACUM<br>Delphi | <ul style="list-style-type: none"> <li>Yields a high response rate</li> <li>Provides significant amount of information for time spent</li> <li>Experts can identify what is and what needs to be</li> </ul>  | <ul style="list-style-type: none"> <li>May be difficult to schedule</li> <li>Requires some degree of structure</li> <li>Dominant participant may bias group response</li> <li>Requires a trained facilitator</li> <li>May provide extraneous information</li> </ul>         |

Source: Adapted from Institute of Electrical and Electronic Engineers (2001).

Note: DACUM = Developing A CurricuLUM.

| PERFORMANCE VARIABLES<br>↓ | PERFORMANCE LEVELS   |  |   |
|----------------------------|--|--|---|
|                            | Organization Level   | Process Level  | Individual Level  |
| <b>Mission/ Goal</b>       | Does the organization mission/goal fit the reality of the economic, political, and cultural forces?  | Do the process goals enable the organization to meet organization and individual missions/goals? | Are the professional and personal mission/goals of individuals congruent with the organization's? |
| <b>System Design</b>       | Does the organization system provide structure and policies supporting the desired performance?      | Are processes designed in such a way to work as a system?  | Does the individual face obstacles that impede their job performance?                             |
| <b>Capacity</b>            | Does the organization have the leadership, capital, and infrastructure to achieve its mission/goals? | Does the process have the capacity to perform (quantity, quality, and timeliness)?               | Does the individual have the mental, physical, and emotional capacity to perform?                 |
| <b>Motivation</b>          | Does the policies, culture, and reward systems support the desired performance?                      | Does the process provide the information and human factors required to maintain it?              | Does the individual want to perform no matter what?   |
| <b>Expertise</b>           | Does the organization establish & maintain selection & training policies and resources?              | Does the process of developing expertise meet the changing demands of changing processes?        | Does the individual have the knowledge, skills, and experience to perform?                        |

**FIGURE 2: Performance Diagnosis Matrix of Enabling Questions**

Source: Swanson (1996).

based on assessment and evaluation techniques such as interviews, focus groups, and surveys, ascertain and describe the company's business in terms of its characteristics (values, disciplines, technology, goals), business drivers (cost reduction, innovation, service), and corporate culture (human purposes, points of pride, motivational factors, idiosyncrasies, habits). The characteristics that constitute a company's culture act as accelerators and inhibitors of change and influence performance and behavior. (p. 160)

It is important to understand where the program will fit in the organization and who will be responsible for its approval, development, implementation, maintenance, evaluation, and supervision (Pratt, 1980).

### **Detail Expert Performer Tasks and Functions**

This process usually begins with a job analysis that is followed with analyzing specific job tasks after determining which tasks require training. Brannick and Levine (2002) defined *job analysis* as "the process of discovery of the nature of the job" (p. 8). Bemis et al. (1983) defined *job analysis* as "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" (p. 1). This definition is especially useful in that frequently the aspects of the requirements or qualifications and the context in which the job is performed are forgotten or ignored in favor of the job content. Although the duties and tasks that make up the content of the job are of key importance, if identified and analyzed in absence of the requirements and context, flaws will be designed into the program. Swanson and Holton (1998) identified the three basic steps to a job task approach to analyzing the expertise required to perform at the desired level. They included:

- (1) Developing a list of job tasks that may be performed in a job; (2) Verification of the task list as a valid representation of the job; and (3) Analysis of precisely what a person needs to know and be able to do to meet a specified performance standard for each task. (p. 30)

Table 3 includes a list questions to ask or consider when performing a task analysis. This is a compilation of questions gleaned from several sources (Clark, 2000; Gilley, Egglund, & Gilley, 2002; Nolan, 1996; Pratt 1980). These questions should not be seen as an exhaustive list, but rather as a guide to lead the analyst through doors that may otherwise be ignored.

### **Determine Current Expertise Level**

Without a thorough understanding the a person's current level of expertise, a great deal of time and money can be invested in a person who already knows and can perform the task or one who does not possess the prerequisite knowledge and experience for the training. Pratt (1980) stated:

**TABLE 3: Questions to Consider When Conducting Job and Task Analysis**

| Organizer                         | Questions  |
|-----------------------------------|--|
| Job content                       | What are the essential tasks for this job?<br>How difficult or complex is the task?<br>When and how often is the task performed?<br>How critical is the task to the performance of the job?<br>To what degree is the task performed individually, or is it a part of a set of collective tasks?<br>What is the completion time needed to perform this task?<br>What is the task delay tolerance? (must the task be performed on identification of the problem or can it be delayed)<br>How often is the task performed during a specified time-frame (i.e., daily, weekly, monthly, yearly)? |
| Minimum qualifications            | What level of task proficiency is expected following training?<br>What education is required to perform the task?<br>What prerequisite skills, knowledge, and abilities are required to perform the task?<br>What information is needed to perform the task? What is the source of information?<br>What behaviors are used in the performance of the job?<br>What are the current criteria for acceptable performance? What are the desired criteria?  |
| Context in which job is performed | What are the environmental conditions?<br>What is the consequence if the task is performed incorrectly or is not performed at all?<br>Are the demands (perceptual, cognitive, psychomotor or physical) imposed by the task excessive?<br>How is performance evaluated?<br>What behaviors are critical to the performance of the task?  |
| Other                             | If a subset of a set of collective tasks, what is the relationship between the various tasks?<br>To what extent can the task be trained on the job?<br>Can the training be performed in-house?   |

It is not enough for evaluation merely to indicate that the student has “passed” or “failed.” If remediation is to be effective in bringing the student up to the required standard, both the instructor and the student must know the areas of student weakness; if remediation is to be efficient, they must also know the areas in which the student is competent. (p. 196)

Lee and Owens (2004) identified the following activities and steps that must be analyzed for an audience to determine if training is required, what should be done, they include:

**Activity 1: Analyze demographics and special requirements**

Step 1: Verify the audience using job task information

Step 2: Confirm the number of individuals who are targeted and their general education and background

Step 3: Analyze information about audience language, tone and use of humor.

Step 4: Note any physical, ergonomic, or environmental requirements.

**Activity 2: Determine attitudes toward content.**

Step 1: Determine any misconceptions or misinformation that might exist.

Step 2: Determine negative and positive attitudes.

Step 3: Determine special terminology or vocabulary

**Activity 3: Analyze the language skills of the audience****Activity 4: Document the results. (pp. 19-20)****Perform an Expertise Gap Analysis**

The difference or “gap” between the current state and the desired is determined using what is called a *gap analysis*. When the tasks and functions have been identified and the current level of knowledge has been determined, the gaps can be identified. Gilley et al. (2002) identified four different types of gaps which challenge HRD professionals, they include:

1. Need gaps—deficiencies in skills, knowledge, and attitudes needed by employees to carry out their assignments and duties.
2. Performance gaps—deficiencies in the way the organization manages performance, designs jobs, or reinforces and rewards performance.
3. Management gaps—deviancies in the way employees are managed and motivated within the organization.
4. Organizational gaps—deficiencies in the way the organization is conceived, designed, and managed. (pp. 274-275)

Zemke and Gunkler (1985) identified several practical examples of priorities and importance issues which must be considered in conducting the analysis.

1. Cost-effectiveness: How does the cost of the problem compare to the cost of implementing a solution? In other words, we perform a cost-benefit analysis.
2. Legal mandates: Are there laws requiring a solution? (e.g., safety or regulatory compliance)
3. Executive pressure: Does top management expect a solution?
4. Population: Are many people or key people involved?

5. Customers: What influence is generated by customer specifications and expectations?

## Select Training Setting

Although the finalization of program configuration takes place in the design phase, it is important for HRD professionals to anticipate general design strategies during the analysis phase. This is particularly important as it affects budget requests and the rollout timetable.

In specifying the training setting, the population to be trained must be established. The following must be considered in selecting the instructional setting: (a) anticipated number of learners, (b) location of learners, (c) education and experience of the learners, (d) background of learners, (e) experience in present or related jobs, (f) job performance requirements versus present skill levels, (g) language or cultural differences of learners, (h) motivation of learners, (i) physical or mental characteristics of learners, and (j) specific interests or biases of learners (Clark, 2000). The duration of the course must also be factored in when considering the instructional setting. Another important consideration in selecting the instructional setting is to determine a delivery method. Valenti (2004) defined various delivery options, which will help you to understand and select the most appropriate (see Table 4). The delivery method must be carefully chosen and must be designed based on what is effective, not just what the learners will say was fun. This is reflected in the statement by Swanson and Holton (2001), "Best practice would say you need to be effective first and worry about being interesting second" (p. 245).

## Forecasting the ROI of the Intervention

As part of the improvement proposal that comes out of the analysis phase, forecasting the ROI of the proposed intervention is critical in gaining organizational approval. ROI is a fairly simple straightforward process at first glance; however, there are pitfalls along the way. The formula below is used to calculate ROI (Swanson, 2001, p. 30):

$$\frac{\text{Performance Value (performance value resulting from HRD intervention)} - \text{Cost (cost of HRD intervention)}}{\text{Benefit (benefit is the performance value minus the cost)}}$$

Benefit (benefit is the performance value minus the cost)

The major pitfall is in the fundamental connection of the intervention to the core production of goods or services by the host organization. Without this connection, calls for training based on superficial analysis will not likely be real solutions to solving performance problems or improving performance.

**TABLE 4: Instruction Delivery Options**

| Name  | Description  |
|---|--|
| Asynchronous<br>Internet-based<br>classroom training                          | Learners log on to the Internet-based course when it is convenient for them (they need not be logged on simultaneously) to learn new information and participate in bulletin board discussions and activities with the trainer and their classmates who may all be in different locations. |
| Audiographics training  | Audiographics training is similar to learning over a conference call with one addition: learners and the trainer also can create computer-generated graphics to share with other sites.  |
| Audio teletraining  | Audio teletraining is similar to learning over a conference call. Learners can hear the trainer and each other, and the trainer can hear learners.   |
| Computer-based<br>training (CBT)/<br>Web-based training<br>self-paced CBT/WBT | Learners work at their own pace to learn new information, participate in practice activities, and take tests provided electronically on a CD-ROM, over the Internet, or over their company's intranet.   |
| Classroom training  | Learners meet face to face with the trainer and their classmates to learn new information and participate in discussions and activities.   |
| Coaching and/or<br>structured on-the-<br>job training (OJT)                   | Learners work under the direction of a designated expert who serves as a coach to learn new information and skills.  |
| Electronic performance<br>support system<br>(EPSS)                            | Learners access electronic information as needed in the course of performing their jobs to look up steps and procedures. A good example is online help for Microsoft Word.   |
| Interactive TV  | Learners can see and hear the trainer by watching a video monitor. The trainer can receive immediate feedback from learners via an audio system, a keypad viewer response system, telephone, or fax. The trainer cannot, however, see the learners.  |
| Job aid   | Learners look up how to do a specific task on a cheat sheet.   |
| Paper-based self-paced<br>training  | Learners work at their own pace to learn new information, participate in practice activities, and take tests provided in a printed workbook.   |
| Synchronous<br>Internet-based<br>classroom training                           | Learners log on to the Internet-based course simultaneously at a designated time to learn new information and participate in discussions and activities with the trainer and their classmates, who may be in different locations.  |
| Video teleconferencing  | Learners can see and hear the trainer by watching a video monitor. The trainer can also see and hear learners.   |

When the benefit is not expressed in production terms, to which a monetary value is easy to assign, it is more difficult to factor into the equation. Several models that assist the HRD professional in estimating the value of benefits and calculating the ROI of a project will assist in this process (Bernthal, n.d.; Phillips & Phillips, 2003; Robinson & Robinson, 1989; Swanson, 2001; Worthen, 2001). The following steps to calculate a ROI were described by Phillips (1996): (a) identify outcomes, (b) place a value on the outcomes, (c) determine the change in performance after eliminating other potential influences on training results, (d) obtain an annual amount of benefits (marketing operation results) from training (in dollars) by comparing results after marketing training to results before marketing training, (e) determine the marketing training costs (direct costs + indirect costs + development costs + overhead costs + compensation for marketing trainees), (f) calculate the total savings by subtracting the marketing training costs from benefits, (g) calculate the ROI by dividing benefits (operational results) by costs. The ROI gives an estimate of the dollar return expected from each dollar invested in training (p. 22).

When the relevant factors have been isolated and supported by data, it is much easier to decide when and how the training will be conducted, alone or in concert with nontraining elements. Similarly, with the right data, the decision to use in-house resources or to outsource the intervention can be determined.

## Conclusion

Possibly the biggest challenge facing the profession has to do with the gap between the desired and actual professional practices within the analysis phase. Studies of professional practice consistently show that although the profession espouses the “bookend” phases of analysis and evaluation, these two phases are the ones that consistently get short changed. What is actually going on in analysis practice does not come near to what is advocated in terms of best theory and practice. The demand for fast and high-quality answers threatens the analysis process. Using analysis teams, technology, and carefully selected processes and tools from the many available options is critical in meeting these demands.

Although Lee and Owens (2004) advocated that the analysis phase is a most important step that should not be skipped or undervalued and that the analysis phase should comprise one third of the project time—this is rarely happening in practice. The barriers to the analysis phase include the amount of time required of this phase, the amount of professional expertise required of this phase, and the amount of risk to the HRD professional engaging in this work. There are counterarguments and convincing evidence that these three barriers should be easily overcome. Even so, they remain a challenge to the profession if it wishes to capture its full potential.

The alternative training models article by Cowell, Hopkins, McWhorter, and Jorden in this issue contains very clear examples of the value of analysis

as it is documented through the selected models they describe and compare. Regardless of the name applied to the analysis phase, it remains the foundation of any intervention and fundamentally directs each of the following phases.

## References

- BEA Systems Inc. (2004). *BEA training needs analysis*. Retrieved January 19, 2006, from [www.bea.com/content/news\\_events/white\\_papers/BEA\\_Education\\_TNA\\_DS.pdf](http://www.bea.com/content/news_events/white_papers/BEA_Education_TNA_DS.pdf)
- Beckschi, P., & Doty, M. (2000). Instructional systems design: A little bit of ADDIEtude, please. In G. M. Piskurich, P. Beckschi, & B. Hall (Eds.), *The ASTD handbook of training design and delivery* (pp. 28-41). New York: McGraw-Hill.
- Bemis, S., Belenky, A., & Soder, D. (1983). *Job analysis: An effective management tool*. Washington, DC: Bureau of National Affairs.
- Bernthal, P. (n.d.). *Methods for calculating ROI and bottom-line impact*. Retrieved February 6, 2006, from [www.ddiworld.com/pdf/ddi\\_methodsforcalculatingroi\\_wp.pdf](http://www.ddiworld.com/pdf/ddi_methodsforcalculatingroi_wp.pdf)
- 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.
- Clark, D. (2000). *Instructional system design—Analysis phase*. Retrieved January 2, 2006, from [www.nwlink.com/%7EEdonclark/hrd/sat2.html#analysis](http://www.nwlink.com/%7EEdonclark/hrd/sat2.html#analysis)
- Datta, L. (1978). Front-end analysis: Pegasus or shank's mare? *New Directions for Program Evaluation*, 1, 13-30.
- Dublin, L. (2000). How to plan for technology-based training. In G. M. Piskurich, P. Beckschi, & B. Hall (Eds.), *The ASTD handbook of training design and delivery* (pp. 158-172). New York: McGraw-Hill.
- Finch, C., & Crunkilton, J. (1989). *Curriculum development in vocational and technical education: Planning, content, and implementation* (3rd ed.). Needham Heights, MA: Allyn & Bacon.
- Gilley, J. W., Egglund, S. A., & Gilley, A. M. (2002). *Principles of human resource development* (2nd ed.). Cambridge, MA: Perseus.
- Harless, J. H. (1973). An analysis of front-end analysis. *Improving Human Performance*, 2, 229-244. Institute of Electrical and Electronics Engineers. (2001). *Reference guide for instructional design and development*. Retrieved January 7, 2006, from [www.ieee.org/organizations/eab/tutorials/refguide/mms01.htm](http://www.ieee.org/organizations/eab/tutorials/refguide/mms01.htm)
- Laird, D. (2003). *Approaches to training and development* (3rd ed.). Cambridge, MA: Perseus.
- Lee, W., & Owens, D. (2004). *Multimedia-based instructional design* (2nd ed.). San Francisco: Pfeiffer.
- Malasky, E. W. (1984). Instructional strategies: Nonmedia. In L. Nadler (Ed.), *The handbook of human resource development* (pp. 9.1-9.31). New York: John Wiley.
- Molenda, M., Pershing, J., & Reigeluth, C. (1996). Designing instructional systems. In R. L. Craig (Ed.), *The ASTD training & development handbook* (4th ed., pp. 266-293). New York: McGraw-Hill.
- Nolan, M. (1996). Job training. In R. L. Craig (Ed.), *The ASTD training & development handbook* (4th ed., pp. 266-293). New York: McGraw-Hill.
- Phillips, J. (1996, April). How much is the training worth? *Training and Development*, 50(4), 20-24.
- Phillips, J., & Phillips, P. (2003). Action plans to measure ROI. *Performance Improvement*, 42, 22-31.
- Pratt, D. (1980). *Curriculum: design and development*. New York: Harcourt Brace Jovanovich.
- Robinson, D. G., & Robinson, J. C. (1989, August). Training for impact. *Training and Development Journal*, 43(8), 34-42.
- Robinson, D. G., & Robinson, J. C. (1996). *Performance consulting: Moving beyond training*. San Francisco: Berrett-Koehler.
- 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.

- Stenzel, C., & Stenzel, J. (2003). *From cost to performance management: A blueprint for organizational development*. New York: John Wiley.
- Swanson, R. A. (1996). *Analysis for improving performance: Tools for diagnosing organizations and documenting workplace expertise*. San Francisco: Berrett-Koehler.
- Swanson, R. A. (2001). *Assessing the benefits of human resource development*. Cambridge, MA: Perseus.
- Swanson, R. A., & Holton, E. F. (1998). Developing and maintaining core expertise in the midst of change. *National Productivity Review*, 17(2), 29-38.
- Swanson, R. A., & Holton, E. F. (2001). *Foundations of human resource development*. San Francisco: Berrett-Koehler.
- Valenti, D. (2004). *Training budgets step by step: A complete guide to planning and budgeting strategically aligned training*. San Francisco: Pfeiffer.
- Worthen, B. (2001, February 15). Measuring the ROI of training. *CIO Magazine*. Retrieved February 1, 2006, from [www.cio.com/archive/021501/roi.html](http://www.cio.com/archive/021501/roi.html)
- Zemke, R., & Gunkler, J. (1985, July 9). *Using small group techniques for needs assessment, data gathering, and other heinous acts* [Seminar notes, American Society for Training and Development Southern Minnesota Chapter, Minneapolis].

**Paul B. Roberts** is an associate professor of human resource development (HRD) and technology and the undergraduate program coordinator of HRD at The University of Texas at Tyler. He has been awarded more than \$500,000 in grants and contracts. His research focuses on mentoring and/or induction programs and the application of multimedia. He earned his Ed.D. from the Department of Educational Human Resource Development at Texas A&M University.

- Roberts, P. B. (2006). Analysis: The defining phase of systematic training. *Advances in Developing Human Resources*, 8(4), 476-491.