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Training Needs Assessment

Aligning Learning and Capability With Performance Requirements and Organizational Objectives

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This chapter focuses on a critical aspect of the training process: training needs assessment (TNA). Although many terms are used to describe this process—such as training needs analysis, gap analysis, or front-end analysis—Rossett (1987) designated TNA as an umbrella term. Rossett's approach has been adopted in this chapter; however, *analysis* is used when *assessment* threatens to be overused. TNA is a systematic process that applies work analysis techniques and procedures to identify and specify training requirements that have been linked to deficiencies in individual, team, or organization performance to develop learning objectives to address the identified deficiencies. These evidence-based objectives in turn guide design, delivery, and evaluation of training to close the gaps in underlying knowledge, skills, abilities, or other characteristics (KSAOs) or competencies that are related to the identified performance deficiencies. Although there is no strong consensus on specific TNA procedures (Rossett, 1987) and there are many TNA resources offering slightly different approaches, most processes include the same basic steps, starting with an initiating or triggering event that requires a TNA to be considered and using work analysis techniques to determine training requirements.

Table 24.1 presents a customizable TNA process consisting of four phases, which will be discussed and elaborated upon in this chapter. The first two phases are about determining if there is an issue and whether or not it is related to training. Once an issue related to deficiencies in work-related KSAOs has been identified, the third phase is conducting the actual TNA, and the fourth is evaluating the results of the TNA. Although the implementation of the process is often adapted to the specific context by the needs analyst, the generic process is a good starting point when planning a TNA. As will be discussed, an abbreviated process can be used under many circumstances, such as when an organization has invested in a well-specified competency model and only wants to identify the training needs of individuals within the scope of that model (see the Empower TNA Within the Organization's Competency Model section later in this chapter). The objective of this chapter is to present the TNA process and some of the factors that can potentially impact it to help human resources and training professionals make decisions about implementing the TNA process in their organizations.

Table 24.1 Steps Within Each Phase of the Generic TNA Process

Phase	Step	Description
Needs identification	1	Identify an event, issue, or opportunity that may require a TNA.
	2	Clarify and evaluate the event, issue, or opportunity with the available information to verify a potential need exists (preliminary gap analysis).
	3	Determine the potential value to the organization associated with addressing the need identified by the event, issue, or opportunity and the potential risk of not addressing it.
	4	Decide if the identified need and its perceived value warrant committing resources to a TNA and seek stakeholder approval for next phase of the TNA, if required.
Needs specification	5	Create an initial definition of the need space identified in the need identification phase.
	6	Conduct a more thorough gap analysis refining the need space.
	7	Analyze the nature of the gap and related need within context to identify key drivers and potential solutions.
	8	Specify potential solutions within the constraints of the context, refining the need space.
	9	Evaluate potential solutions and determine if training is a viable component.
	10	If training is determined to be part of the solution, then seek TNA phase approval.
TNA	11	Design and plan a customized TNA process with stakeholders.
	12	Conduct the TNA implementation within the constraints of the context.
	13	Analyze the data and report the results at the appropriate level of detail for decisions.
	14	Make decisions and take action based on TNA results.
TNA evaluation	15	Monitor and evaluate action based on the TNA and determine if need was addressed.
	16	Recommend modifications or iterative improvements as appropriate.

POTENTIAL SCOPE OF TNA IMPACT

Organizations invest in training and development opportunities to enhance the capability of their workforces to achieve desired outcomes and objectives. The American Society of Training and Development estimates U.S. organizations spent $134.39[1] billion on employee learning and development in 2007 and $134.07 billion in 2008; companies in the American Society of Training and Development Benchmarking Forum spending an average of $1608.88 per employee in terms of direct training expenditures in 2007 and $1587.73 per employee in 2008 (Paradise, 2008; Paradise & Patel, 2009). Although the effectiveness of learning expenditures must be measured on a case-by-case basis throughout evaluation, the likelihood of learning activities achieving the desired results increases when training objectives, design, delivery, and evaluation are linked to work performance requirements and organizational objectives and outcomes.

TNA provides a mechanism for aligning organizational objectives and organizational capability through specifying focused, relevant training requirements and objectives that drive training design and measurement (Goldstein, 1993; Salas & Cannon-Bowers, 2001). In essence, TNA facilitates the transfer of appropriate learning to the work environment, increasing organizational capability to address performance requirements at the focal level(s) (individual, team, business unit, or organizational) and to achieve organizational objectives (Alvarez, Salas, & Garofano, 2004). The more alignment between learning, capability, performance, and context created throughout

[1] All values in U.S. dollars. Total learning and development expenditures by U.S. organizations include internal and external sources of learning and development. For example, in 2007, $134.39 billion was composed of $83.62 billion for internal sources and $50.77 billion for external sources of learning and development (Paradise, 2008).

the system, the more likely individual, team, and organizational outcomes will be achieved. For example, a recent study found a strong link between TNA comprehensiveness and organizational effectiveness (van Eerde, Tang, & Talbot, 2008). This ability to impact desired outcomes positively through alignment makes needs assessment a critical first step in the learning and performance process (Goldstein, 1993; Salas & Cannon-Bowers, 2001). Given the amount of money spent annually on training by organizations in the United States and throughout the world, the impact and return on investment for TNA is potentially great, making it a value-adding activity.

PREVALENCE OF TNA

Despite the importance of TNA for the effective alignment of training, transfer, and performance with organizational objectives and the potential return on investment of TNA activities, no comprehensive data on the frequency and thoroughness of needs assessment activities exist. Therefore, the state of current practice is unclear. According to the American Society of Training and Development's 2008 *State of the Industry Report*[2] (Paradise, 2008) and 2009 *State of the Industry Report* (Paradise & Patel, 2009), most American Society of Training and Development BEST award winning companies (40 winners in 2007; 39 in 2008) reported having defined processes for aligning learning initiatives and priorities with individual and organizational performance goals. Some sort of needs assessment or analysis was likely involved in the processes reported to the American Society of Training and Development by the BEST companies, such as the use of personal development plans, performance management systems, competency matrices, and tracking of employee learning history (Paradise & Patel, 2009). However, no statistics of actual TNA activities were reported, and no data were presented on the prevalence of these activities for the other companies who provided data to the American Society of Training and Development in 2007 (316 companies including BEST winners participated; Paradise, 2008) or in 2008 (301 companies including BEST winners participated; Paradise & Patel, 2009). Although whether these examples provide evidence of TNA activities in organizations could be debated, it is not useful because this is the best information about TNA that we have from practice.

The research literature does little to help clarify the situation. Although there are exceptions (e.g., Dierdorff & Surface, 2008; van Eerde et al., 2008), a dearth of TNA research, corresponding to the lack of data on TNA practice, exists (Aguinis & Kraiger, 2009; Kraiger, 2003; Salas & Cannon-Bowers, 2001). If a recent meta-analysis on training effectiveness (Arthur, Bennett, Edens, & Bell, 2003) is to be taken as representative, then the outlook is bleak for TNA in organizational practice. Arthur et al. reported that only 6% of studies (22 of 397) included in the meta-analysis reported a needs assessment had been conducted. It is unclear whether needs assessments were conducted and not reported or just not conducted. Therefore, given the current information on TNA, the actual prevalence of TNA activities in organizations is unknown but the available data suggest that the technique is underused given its potential value.

CHAPTER OVERVIEW

If (a) maximizing the effectiveness of learning expenditures by increasing the alignment between employee learning, capability, and performance of work activities is critical for achieving individual and organizational objectives and outcomes, and (b) TNA is the primary mechanism for creating and ensuring this alignment, then the current state of affairs is problematic. There seems to be a discrepancy between the desired state (maximizing the potential benefit of learning and

[2] The ASTD *State of the Industry Report* is based on the previous year's data (e.g., 2008 report is based on 2007 data).

creating value through the alignment of training and performance created by effective TNA) and the current state (the lack of evidence that TNA activities are being used by organizations). This gap between recommended best practice and actual practice related to TNA suggests there is a need to be addressed and presents an opportunity for this chapter.

The question to ask is, Is the lack of knowledge about TNA process and its implementation one of the causes underlying the identified gap? If it is, then this chapter can help prepare practitioners by providing knowledge and insights into conducting TNA implementations. Thus, the main objectives of the chapter are as follows:

- Provide and elaborate on a TNA process
- Review some of the issues/factors that impact the TNA process
- Identify and discuss trends in the workplace impacting TNA
- Provide ideas to improve the practice of the TNA process
- Make a case for the importance of engaging in the TNA process
- Provide a list of additional readings and resources

IS A TNA NECESSARY?

Many practitioners struggle with the decisions of whether or not to conduct a TNA, and if yes, how elaborate a TNA to conduct. There is no decision that is correct all the time. The necessity and scope of a TNA really does depend on the specifics of the situation. The standard recommendation is often to conduct a full TNA with a task and KSAO analysis every time. This is not practical or feasible for all situations, and there are many cases in which a full task and KSAO analysis is not necessary or the TNA process can be narrowed dramatically. TNA is not one-size-fits-all when it comes to the details of implementation.

Sometimes a TNA is not needed. For example, the issue may be clearly unrelated to training; or, the training requirements may be well-defined but evaluation data show the real issue is that training is poorly designed and/or delivered, and this is why it fails to achieve the identified training objectives (i.e., the *training* needs to be redeveloped, not the learning objectives). Other times a narrow or abbreviated TNA is appropriate (see Gupta, 2005, for an example of a "mini needs assessment" process.). For example, to comply with federal regulation, an organization with well-defined training requirements and an effective training program may periodically identify individuals who need refresher training through individual-focused TNA (i.e., person analysis; McGehee & Thayer, 1961). Using the TNA process to select the best solution for a specific organization and its objectives should be the focus, not one particular approach. TNA can vary in terms of purpose, focus, scope, depth, sources of information, time, technology, cost, and output. Some of these are specified or constrained from the outset and others vary. The effective needs analyst creates a TNA that works within his or her situational constraints using the process in Table 24.1 as a guide.

Initiating or Triggering Events

Typically, the TNA process is initiated when a deficiency is suspected and communicated, resulting in further analysis to determine if a need exists. A need is basically a gap between what is desired and what is currently available. This actual or perceived deficiency is often communicated as a red flag from some other source of information, such as an employee survey, or triggered by an event, such as the implementation of a new manufacturing process. Table 24.2 presents sources or events that can indicate the need for a TNA. This list should not be viewed as exhaustive, nor should all the sources of information or events be considered to apply to all organizational contexts. Although a TNA may not be required every time, these sources of information or events offer an excellent

Table 24.2 Sources and Events That Can Indicate the Need to Initiate the TNA Process

1. Training and program evaluation findings
2. Input from supervisors, managers, and leaders
3. Input from personnel, teams, or work groups
4. Input from customers, clients, and partners
5. Results from organizational surveys and studies
6. Results from individual development planning, 360° feedback, and performance appraisal/management systems
7. New training requirements
8. Work analysis data (collected for other purposes)
9. Institutional process for determining training requirements
10. Changes in business strategy, doctrine, or mission
11. Changes in law or regulation
12. Changes in organizational structure or operating environment
13. Business or mission results
14. Implementation of new technology, systems, equipment, processes, or procedures
15. Organizational metrics such as attrition, error rates, accidents, customer complaints, etc.

Content adapted and supplemented to include business context from the "Battle Command Training Program" (TRADOC publication no. 350-70) by the U.S. Army Training and Doctrine Command (1999) (http://www.tradoc.army.mil/tpubs/regs/r350-70/index.html). Information is not presented in any order of importance and is not an exhaustive list.

starting point for engaging the process in Table 24.1 and should trigger an organization to decide whether or not to initiate a TNA intervention.

For example, an organizational survey identified dissatisfaction with supervision as an issue. Is this an opportunity for a TNA? Is there a gap between current and desired states? Are there implications of this dissatisfaction? What if the same survey indicates that employees who are dissatisfied with supervision are significantly more likely to indicate intentions to leave the organization? Is turnover a concern for your organization? What is the value to the organization of addressing the issue versus the risk of not addressing it? Does this provide sufficient justification to continue the TNA process? This perceived supervision issue may or may not be related to a training issue (e.g., lack of knowledge or skill). It may or may not be important to the organization. The organization may or may not implement a TNA. The point is that engaging in the TNA process can help the organization decide whether or not to move forward with the process and how to move forward. The questions in the above example roughly correspond to the needs identification phase of the TNA process in Table 24.1.

Some of the events presented in Table 24.2 require training and, therefore, the TNA process should be initiated. In these cases, the first two phases in Table 24.1 are largely decided for the organization. However, the resulting TNA implementations may vary greatly. For example, changes to public law or regulations require training to communicate the changes and to ensure compliance behaviors. The audience, the gap, and the KSAOs to close the gap are identified by the regulatory agency's actions; the mandated training and/or the specific modifications or additions to the law or regulation will drive training content, standards, and participants. Because the *who* and *what* of the training are identified, the TNA needs to focus on specifying *what* is to be trained in sufficient detail so the best *how* can be devised for the *who* within the organization. This situation requires the specification of learning objectives from the regulation content and of learning methods and techniques for the potential trainees within the organization to inform the training design.

Another example is purchasing new manufacturing equipment. The equipment vendor may provide training for operating the new equipment, but a narrow TNA may be required because the vendor's training likely does not cover how the equipment fits into your company's specific

manufacturing process (unless your company is replacing the entire process) or may not take into account the unique aspects of your company's physical work environment. Of course, some events, such as changing core business strategy, can have such a pervasive impact on all aspects of the organization that a needs assessment is definitely required. Depending on the extent of the change, the resulting needs assessment may uncover many opportunities for learning as well as other interventions, such as changes to compensation, to ensure successful execution of the new strategy.

Judgment Is Required

A TNA is not always necessary, nor are all TNA implementations the same. Judgment is required on the part of the organization's learning and performance experts throughout the process. It is always up to the organization to decide on engaging the process, regardless of the trigger event, issue, or opportunity. Table 24.2 provides some sources of information and events that can indicate the need for a TNA. The TNA process in Table 24.1 offers the steps (1–4) in the needs identification phase to determine the need for a TNA implementation based on the information or events such as the ones in Table 24.2. Steps (5–10) in the needs specification phase suggest a method for determining whether or not the identified need can be addressed by training. Some events trigger an unquestioned need for training (e.g., changes in federal regulation) and, therefore, address many of the steps in the first two phases of the TNA process. However, in many circumstances, there is no unquestioned requirement, and these decisions are up to the organization and the judgment of its experts. Once the decision is made to move forward, the practitioner should design the most effective TNA implementation for his or her situation. However, many decisions must be made along the way. The next section elaborates on the process and the questions that should be asked and answered.

TNA PROCESS: ASKING AND ANSWERING QUESTIONS

Table 24.1 presents a customizable TNA process to guide specific needs assessment interventions. Though one might question whether needs assessment is an intervention, it is described as such here because implementing one can have impact beyond its information collecting function. Collecting TNA data in an organization signals the importance of an issue for the organization and its leadership and focuses attention on the issue. The impact can be as simple as creating awareness that previously did not exist. My firm recently conducted a domain-focused needs assessment within an organization. It was sponsored by the element of the organization tasked with oversight and resourcing for this specific performance domain. One of the questions asked of the respondents was whether they were aware of this element and its services. Sixty-two percent of leaders in the organization who responded to the survey had not heard of the element. They have now. What if these newly informed leaders start requesting resources and support, resulting in a spike in requests that the sponsor is not prepared to deal with all at once? Just asking the question could potentially have an impact on resources and workload. Therefore, the needs assessment process should be entered into, planned, and executed with care and the potential consequences understood. Following the TNA process to guide decisions limits risk and helps to ensure success.

The TNA process is really about asking and answering appropriate questions at each phase and step of the process to achieve the needs assessment objectives (Arthur et al., 2003). This chapter conceptualizes the TNA process in the four phases depicted in Table 24.1. The first phase, the needs identification phase, was introduced in the previous section and focuses on determining whether or not a TNA should be conducted. The first phase relies heavily on events or available sources of information (see Table 24.2) to indicate a TNA is needed and provides a gate to implementation of the second phase, the needs specification phase. The needs identification phase includes a

preliminary gap analysis—an assessment of the difference between current and desired states—to determine if a gap and need exists. This preliminary analysis helps an organization to assess if a TNA is needed with less up-front investment. If no need is found, the resources of conducting a full gap analysis are saved.

Once a need is identified and the decision is made to move forward, the second phase focuses on defining and specifying the need space and determining whether or not learning can address the need. The *need space* refers to the initiating or triggering event (the initiator); the identified gap between current and desired states; and the related need, its drivers, its context, and its potential solutions. Basically, understanding the need space requires taking a systems perspective on the triggering event, issue, or opportunity within the organization to determine the best solution(s) to the identified need. Some authors, such as Franklin (2005), would call the combination of the needs identification phase and needs specification phase by the term front-end analysis, consisting of gap and root cause analyses.

If the needs specification phase determines that training is at least a partial solution, then the training needs assessment phase can be designed and implemented. This third phase corresponds to what might be thought of as the traditional TNA process, which includes organizational, work (task and KSAO), and person levels of analysis. It should be noted that many authors would incorporate the first and second phases into the organizational level of TNA. The advantage of the multiphase structure presented here is it allows stakeholders to focus on the critical decisions at the appropriate time and limits the impulse to delve directly into a full task and KSAO analysis. The fourth and final phase, the TNA evaluation phase, focuses on assessing the impact of the decisions that resulted from the TNA process on the identified need—i.e., did the training or other interventions from the TNA close the identified KSAO gap? It offers an opportunity for TNA process improvement and indicates whether the need still exists to be addressed. The remainder of this section elaborates on the four phases and associated steps of the TNA process (Table 24.1) and provides examples of questions that should be asked and answered (Table 24.3).

Needs Identification Phase

As described in the Initiating or Triggering Events section, once an initiating event, issue, or opportunity is identified (Table 24.1, Step 1), the initial phase of the TNA process has begun. Table 24.2 presents a list of example initiating events, issues, and opportunities (or initiators). The need analyst must determine whether or not the initiator represents an underlying need (Table 24.1, Step 2). This is done by conducting a preliminary gap analysis to determine if there is sufficient evidence of a need to proceed. The gap and associated need may not be completely defined or validated by this preliminary analysis, or, if the gap and associated need are straightforward, no additional gap analysis beyond the preliminary may be needed in the second phase. Regardless, there should be sufficient evidence from the initiator to suggest whether a gap does exist and enough information to assess the value of closing the gap to the organization.

Is the initiator clearly described and understood? What leads stakeholders to believe a need exists? What evidence (broadly defined) is available for the initiator? What is the source and quality of this evidence? Is additional evidence from other sources easily available? What are the current and desired states for the initiator? Is there a potential need (or gap between the current and desired states) for this initiator? In Step 2, the initiating event, issue, or opportunity is clarified and evaluated to determine if the process moves forward to determine the value of the potential need to the organization (Table 24.1, Step 3).

Step 2 revolves around determining if the event, issue, or opportunity warrants pursuit. If the organization decides the initiator does not provide sufficient evidence of an underlying need, then the process stops at Step 2. In addition, the initiator may be found to be flawed (i.e., no evidence or

Table 24.3 Examples of Questions Throughout the TNA Process

Phase	Step	Example Questions
Needs identification	1	What is the initiating event, issue, or opportunity? Is the initiator clearly described?
	2	What evidence is available for the initiator? What is the source and quality of the evidence? What are the current and desired states for this initiator? Is there a potential need for this initiator?
	3	Is addressing the potential need (closing the gap) of value to the organization? What are the risks of not investigating the potential need? What are the potential costs and benefits of pursuing or not pursuing the TNA process associated with this need? Is the value sufficient to recommend continuing the TNA?
	4	Is the recommendation approved? Do we move to the needs specification phase?
Needs specification	5	What is the definition of the need space? Do we have enough detail on the current and desired states? Is a more thorough gap analysis needed?
	6	What information about the need space is lacking? What sources of information are available to complete the gap analysis? What metrics and standards will be used to calculate the gap?
	7	Why does the gap exist? What are the potential drivers or root causes of the gap? What contextual and systemic factors are impacting the gap? What potential solutions are suggested?
	8	What are the detailed descriptions of the potential solutions? How are the potential solutions linked to the gap? What is their projected impact on the gap and associated need?
	9	Which solutions are feasible? Which solutions will have the desired impact on the gap? What option(s) is/are the most viable? Is training a viable component of the solution? Is a TNA needed?
	10	Is the TNA approved? If no training solution is required, have the other solutions been presented and approved or forwarded to the appropriate stakeholders?
TNA	11	What are the factors to consider in designing this TNA? What are the most appropriate approaches and techniques to accomplish the TNA in this context? Is a full task and KSAO analysis required?
	12	What are the key success factors for executing the planned TNA? Has the TNA been marketed? Are senior leaders communicating support? Is the participation rate sufficient? Is more marketing required?
	13	How should the data be analyzed? What is the appropriate level for presenting the results? What is the product of the TNA? What are the recommendations for training selection or design and delivery?
	14	What decisions about the training solution are approved and implemented? How are they to be evaluated?

Table 24.3 Examples of Questions Throughout the TNA Process (Continued)

Phase	Step	Description
TNA evaluation	15	Did the training or learning intervention result in the development of needed KSAOs? Did the KSAOs translate into capability and performance that closed the identified gap and addressed the need?
	16	What lessons learned can be applied to future TNAs or the iterative cycles of this TNA?

KSAO = knowledge, skills, abilities, and other characteristic. Not an exhaustive list of questions.

invalid evidence that a gap exists). For example, a division manager calls saying that the annual climate survey indicates there is a supervision problem and that all first-line supervisors need training. This initiates the first and second steps of this phase of the TNA process. Upon completing a preliminary gap analysis in Step 2, it is discovered that the manager had seized on a few very vivid, negative comments from the employee survey, and otherwise the survey data indicate no issue with supervision. A quick review of relevant available data—such as employee complaints against supervisors, employee absenteeism, employee transfers, accidents, error rates in production, supervisor performance data, and disciplinary actions against supervisors—suggests no major issues with first-line supervisors exist. Therefore, the process should stop at Step 2. In this situation, the needs analyst indicates she has done due diligence and builds a solid case with the evidence to support the decision not to move forward with the request for training. Dismissing the initiator in Step 1 or 2 and *not* engaging in Step 2 or 3 is not advisable unless the available evidence provides a compelling case, as in the example above, or the organization is in extreme circumstances with no resources to pursue TNA. However, if sufficient evidence of a potential need exists, the process should continue to Step 3.

Step 3 is all about determining if the potential need has enough value to recommend continuing the TNA to the needs specification phase. Is addressing the potential need (closing the gap) of value to the organization? If so, how much value? What are the risks of not continuing the process? If this need exists and is not addressed, what is the potential cost to the organization? What is the likely cost of the TNA in the second phase? Is the value sufficient to recommend continuing the TNA? Based on the best available information, a value proposition must be created for continuing the process: What are the potential costs and benefits of pursuing or not pursuing the TNA process for this need? In addition, the value proposition depends on factors external to the need itself, such as resource constraints and competing priorities.

During Step 3, the need analyst must ask questions about the value of the potential need; competing priorities; available resources such as money, expertise, and time; and other constraints and issues; the answers to these questions should be incorporated into the value analysis process to generate the recommendation. The goal of Step 3 is to formulate a defensible and persuasive argument for continuing the process or not, yielding a recommendation either way. Then, the argument and recommendation must be presented and a decision made (Table 24.1, Step 4). If the need analyst is also the decision maker, then Steps 3 and 4 are combined. A defensible argument based on the available evidence is still needed to inform and justify the decision. If other stakeholders will make the decision and not the need analyst, then structuring the TNA pitch is important.

Making the case and decision for initiating events is often relatively straightforward. For example, if there is a new regulation, manufacturing process, or tool that will impact how work is done and standardized training is required, then no questions need to be answered. Many events, such as regulatory changes, dictate the first phase of the TNA process—there is a trigger, the underlying need exists, and there are consequences and/or value to the organization. The second phase of the TNA process may be dictated as well. The case for and decision about an issue or opportunity is not

always as clear cut. Focusing on uncovering as much relevant, easily accessible evidence to inform the decision is a key success factor for dealing with initiating issues and opportunities. Ask lots of questions. The questions and examples presented above and in the previous Initiating or Triggering Events section can serve as a basic guide to this stage of the process. Table 24.3 provides sample questions across all four phases for the steps in the TNA process in one convenient location.

Needs Specification Phase

Once a need is determined to exist and to be of sufficient value to address, the organization can decide to continue the TNA process to the needs specification phase. The purpose of this phase is to fully understand the need space—the initiating event, the identified gap between current and desired states, and the related need, its drivers, its context, and its potential solutions—and to determine and evaluate potential solutions to address the need. This phase culminates in the determination of whether or not training or some other learning intervention, such as mentoring, is part of the solution to close the gap and address the need. If the need is related to a deficiency in KSAOs, then a TNA must be conducted to determine the training requirements and objectives to inform successful selection or design of training content and delivery of that content. If no KSAO deficiency is involved, then a TNA need not be conducted and the other nontraining solutions should be planned and implemented as appropriate.

The first step in this phase is creating an initial definition of the need space identified by the triggering event, issue, or opportunity (Table 24.1, Step 5). Using all available evidence from the preliminary gap analysis and the value analysis conducted in the needs identification phase, this definition is created to inform the specification process. What is the current definition of the need space? What information is known and unknown about the gap and need? Do we have thorough enough detail about the current and desired states? Use the current definition and what it is lacking to develop the exact process to assess and specify the need space: What information is missing? This process can be customized to the specific case. For example, as mentioned in the previous section, some initiators and gaps are very straightforward and no additional gap analysis is required beyond the preliminary one, such as in the case of implementing a new work process. The gap is between the current state—knowledge, comprehension, and application of the current process, if one exists, and no knowledge, comprehension, and application of the new one—and the desired state—knowledge, comprehension, and application of the new process. In this situation, a more thorough gap analysis is not needed (Table 24.1, Step 6), and the answers to questions in the other steps in the needs specification phase are straightforward because the difference between the current and desired states revolves around KSAO deficiencies that must be addressed, which requires a TNA.

When required, the next step in the needs specification phase is conducting a more thorough gap analysis to refine the need space (Table 24.1, Step 6). This is often combined with the following step of analyzing the nature of the gap and associated need to identify key drivers (also called root causes; Franklin, 2005) and potential solutions (Table 24.1, Step 7). Defining the current and desired states is fairly straightforward and requires talking to stakeholders and seeking out all sources of information associated with the gap, such as policy documents, individual performance data, individual training histories, sales numbers, absenteeism, compensation data, and organizational survey data. It may involve original data collection in some cases, such as a survey of incumbents and/or supervisors. Quantitative and qualitative data are both useful but the source should always be considered. See the Further Reading section for readings that discuss needs assessment data, such as Altschuld (2010).

The idea is to define the current and desired states with sufficient detail to calculate the gap and analyze why the gap exists and, therefore, generate a list of potential solutions. Two components of the need space, the appropriate metrics and associated standards, are needed for this

gap calculation and the linkage of the need (gap) to business objectives and goals. For example, if manufacturing team leaders are believed to be ineffective and are preventing their teams from meeting their production goals, then metrics and standards that allow a comparison between current and desired states are necessary. What metrics would indicate the quality of team leaders? What metrics would indicate the team leaders' impact on production? What are the standards on these metrics for effective and ineffective team leaders (which will be important for person analysis)? What data are readily available? For example, production numbers are readily available. How do these differ across teams? How much of a difference can be related to team leaders? What level indicates an effective team leader and under what conditions? These questions identify the types of metrics and evidence required for the gap analysis and how we analyze and evaluate them. In the case above, the data might be sufficient for conducting a multilevel statistical analysis to determine if team leaders have a significant impact on team production across teams. If feasible, this would provide a metric and a standard for describing and discussing the gap. Team leader characteristics could be included in the model, which could indicate potential drives or causes of the gap.

There are many organizational systems that can impact the gap analysis and that can be potential drivers, or root causes, of the gap. A deficiency in worker capabilities—KSAOs requiring training—is just one potential key driver of the gap. Steps 6 and 7 require an in-depth analysis of the gap and its context with the organizational system. Organizations are collections of interacting systems and subsystems that can impact individuals, teams, and their behavior. Although it is beyond the scope of this chapter, systemic and contextual factors can be described by any number of models or categories. For example, recommended by Franklin (2005), Gilbert (1978) provides six categories that cover the majority of contextual factors: information and feedback, environment and resources, consequences and incentives, motivation and expectations, knowledge and skills, and capability. Figure 24.1 presents a fairly straightforward model of TNA and how it fits in

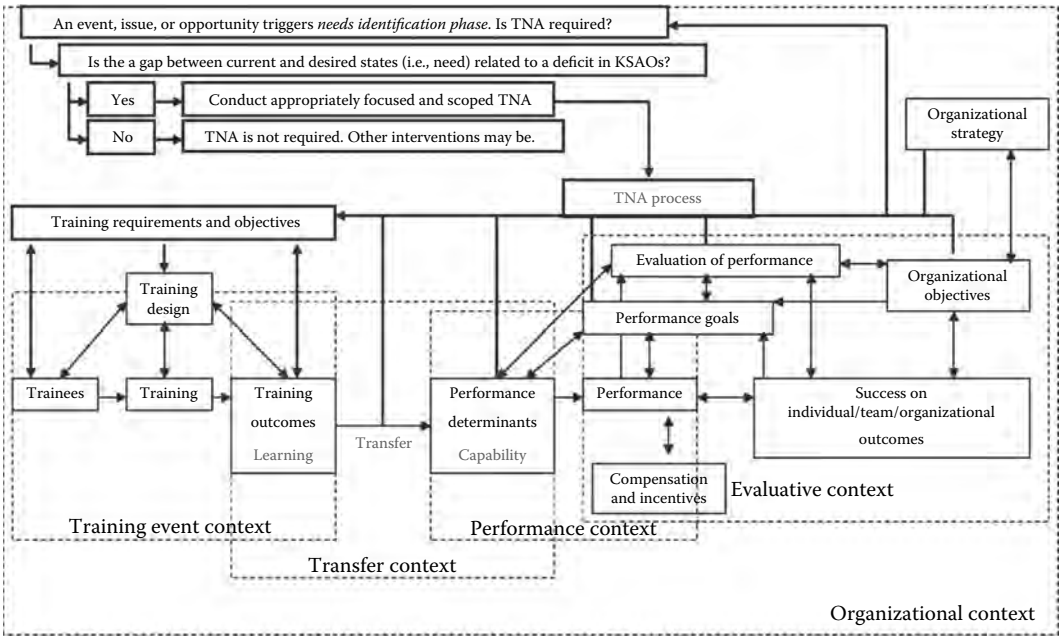

Figure 24.1 Conceptual and process model of how needs assessment aligns learning, transfer, capability, performance, and outcomes with an organization's context. Boxes with broken lines represent the influence of numerous contextual factors that might impact an organization or an organizational process. The training needs assessment process is represented by the solid lines and boxes. Some relationships have been excluded to simplify the model.

Table 24.4 Environmental Factors to Consider When Analyzing the Need Space and Specifying Solutions

1.	Unclear expectations
2.	Poor communications
3.	Unclear policies
4.	Unclear or inconsistent performance standards
5.	Poor feedback or performance management
6.	Lack of resources
7.	Lack of opportunity to perform
8.	Insufficient time to perform
9.	Lack of peer support
10.	Lack of supervisor or management support
11.	Disruptive work environment
12.	Insufficient or inaccessible information or data
13.	Unsupportive or ineffective policies, processes, and procedures
14.	Inadequate equipment, tools, or technology
15.	Counterproductive consequences for performance
16.	Lack of career prospects or career development
17.	Lack of on-the-job performance support
18.	Frequent work stoppages or disruptions due to external factors
19.	Inadequate job requirements or selection procedures
20.	Insufficient or ineffective compensation systems or incentives

Adapted from Stolovitch, H. D. and Keeps, E. J., in *American Society for Training & Development Handbook for Workplace Learning Professionals*, American Society for Training & Development, Alexandria, VA, 2008.

the organizational system, and Table 24.4 presents some environmental factors that might inhibit successful interventions (Stolovitch & Keeps, 2008). Although a discussion of the model and environmental factors are beyond the scope of this chapter, models and frameworks should guide your analysis. For example, Figure 24.1 suggests alternative drivers and solutions to gaps, such as compensation and performance management, which should be investigated as part of the analysis. The point is to consider all relevant systemic and contextual factors that might impact the gap. This will help with generating a list of potential solutions as the last component of the step and evaluating them in the next step.

Once the analysis in Step 7 is complete, all potentially viable solutions should be specified in sufficient detail to allow for evaluation, planning, and implementation if accepted (Table 24.1, Step 8). The key components of the specification are (a) the detailed description of the solution, (b) the linkage between the solution and the gap, and (c) the projected impact of implementing the solution on the gap and the initiating event, issue, or opportunity. These specifications should be written in a clear and consistent way across all solutions being considered. If only one solution emerges, the task is straightforward. Because a single need space can involve different criteria (e.g., job performance), standards across those criteria and different business objectives, it is important that the potential solutions are specified using the same or similar metrics to allow for effective evaluation of options in Step 9. At this point, training may or may not be a viable solution. If the need is not related to a deficiency in KSAOs, then training would not be a solution for specification.

From the TNA perspective, the evaluation of potential solutions (Table 24.1, Step 9) serves two purposes: evaluating all the potential solutions for impact and feasibility and determining whether or not training is one of the viable solutions. What are the evaluation criteria for the potential

solutions? As part of the initial planning for the needs specification phase, these evaluation criteria should be determined by the organization. Is the cost of implementation an important feasibility criterion for your organization? For training, one important feasibility criterion is transfer climate. Will the application of learned KSAOs be supported and facilitated in the work environment? If the work or organizational environment will not support training, it is not a viable solution for the need. Other solutions might be more feasible and, therefore, more effective.

Another legitimate concern is the impact on closing the gap and addressing the need. Will the solution fully or partially address the need? What standard of impact is acceptable for a solution? For example, your company is starting a new product line and needs workers with a specific skill set. One potential solution would be to train workers from other product lines to work on the new line. Is this an effective solution? It would depend on whether the organization was scaling back the other lines and had sufficient workers who could learn the new KSAOs to the cover the need. What if it would take three years to staff the new line with this solution? Is this a complete or partial solution? It depends on the evaluation criteria and standard of impact for closing the gap. The evaluation and determination of whether training is a viable part of the solution is up to each needs analyst. The point is to have a set of criteria established a priori to guide the decision, including standards for evaluating the impact of the solution on the gap.

If training is determined to be part or all of the solution to the identified need, then seek approval from the appropriate stakeholders to start the training needs assessment phase (Table 24.1, Step 10). At this point, it might be necessary to make the case for the TNA, so one must be prepared to present the case developed in the first and second phases of the process. The scale of TNA interventions can vary from simple (a very narrow focus) to complex (all jobs and units in a multinational corporation), with obvious resource implications. Usually, the planning should take place with the stakeholders after initial approval is provided. For the more complex (costly) TNA interventions, doing some initial planning and cost analysis prior to seeking approval can help win support for the initiative by defining required resource commitments and the expected return for those commitments as well as the timeline. Again, the process can be adapted to each situation.

Training Needs Assessment Phase

At this point, there is a verified need that has a deficiency in knowledge and/or skill as its root cause, requiring training as at least a partial solution. TNA is necessary to determine *what* needs to be trained, *how* it needs to be trained, and *who* needs to be trained to best close the gap. The data gathered during the training needs assessment phase will inform training content, design, delivery, and evaluation. These data are crafted into specific learning objectives that are used to select or to develop training interventions. The success of the training in addressing the need—closing the identified knowledge and/or skill gap—rests on the effectiveness of the TNA, the translation of TNA data into learning objectives, and the training design. TNA and the subsequent specification of learning objectives create alignment throughout the entire system. An effective TNA ensures linkage and alignment between needed knowledge and skill capabilities, performance, outcomes, and business objectives. If the TNA is poorly executed and the learning objectives are not properly specified, then the training, even if well designed, will not address the need. The first two phases of the process in Table 24.1 are about ensuring there is a verifiable need related to knowledge and/or skill deficiencies that can be feasibly addressed with a training intervention. This phase is about analyzing the need space and identifying and specifying the knowledge and/or skill in sufficient detail to create effective training.

Needs analysts can arrive at this point through different paths. In some cases, an event in Step 1, such as a change in government regulation, dictates training. A triggering event, issue, or opportunity initiates a rigorous application of the needs identification phase and then the needs

specification phase, resulting in training being identified as a viable solution. An abbreviated needs assessment is conducted within an established competency model to identify KSAOs to be trained and individuals who need to be trained, and the process starts here. A required, well-specified training program exists and the organization periodically conducts person analysis to determine who needs refresher training. A strategic needs assessment identifies a future need for knowledge and skills that does not currently exist. Regardless of how the needs analyst finds herself here, the training needs assessment phase is all about collecting the most appropriate data from the most appropriate people using the most appropriate techniques within the constraints of the organization. As with the other phases, this phase is all about asking and answering questions. What knowledge and skills need to be trained? How are these best trained? Who needs to be trained? What factors need to be considered to optimize transfer? Is full task and KSAO analysis required? What is the appropriate level of data to collect? Who should be asked to participate? What is the best data collection technique? How should the data be analyzed? Who will be responsible for developing learning objectives from the data? Who will design and deliver the training?

Although these questions can seem overwhelming, there are many books and articles that address TNA planning, data collection and analysis, and reporting. Some of these are listed in the Further Reading section at the end of the chapter. There are chapters in Parts II and III, this volume, that cover specific work analysis methods and systems that can be used to collect appropriate task and KSAO data. A detailed presentation of the process, techniques, and issues is beyond the scope of this chapter. This is the beginning of the development process for a novice needs analyst. The approach adopted here is to provide a macrolevel process and to review the traditional TNA framework—organizational, task and KSAO, and person analyses (Goldstein, 1993)—to help needs analysts understand the holistic nature of TNA and become effective consumers of the more detailed process information in the other resources.

The macrolevel process is very straightforward. The TNA must be designed and the implementation planned (Table 24.1, Step 11). For any TNA process to be effective, it must (a) consider the objective and need space; (b) involve stakeholders in planning; (c) address the constraints of the situation; (d) address the correct questions to yield the required data; (e) use appropriate techniques for data collection and analysis; (f) ask the correct individuals to participate; (g) have sufficient resources for implementation; and (h) have support from leaders at all levels. Once the process is designed and the implementation planned, the TNA is conducted within the constraints of the context (Table 24.1, Step 12). Depending on the objectives, the data collection could focus on tasks and KSAOs, only knowledge and/or skill, identifying organizational constraints to the training, identifying individuals who require training, or all of the above. Regardless, the execution never goes as smoothly as one would hope. The key is to monitor the implementation and make adjustments.

Once the collection is complete, the data must be processed, verified, and analyzed to produce the promised deliverables (Table 24.1, Step 13). The data analysis should be specified in the design (Step 11). It should be focused on achieving the objectives and deliverables of the TNA. Considering the data and analysis to achieve objectives must be done a priori. It is too late once data have been collected from an incorrect level of specificity for the required analysis, for example. The deliverables should be spelled out in Step 11 and agreed upon by all stakeholders. This will inform the data collected and how it is analyzed and reported. Is the deliverable the task and KSAO data only? Is it learning objectives? Is it recommendations about training design features and transfer strategies? Having a clear end point during planning is a key success factor.

Finally, there may be any number of decisions to be made and actions taken based on the TNA results and deliverables (Table 24.1, Step 14). Will the training be purchased off the shelf or custom built? Who will design and develop the training if it is to be custom built? Who will deliver the

training? When will the training be conducted? Will training be required? For whom will it be required? What actions need to be taken to prepare individuals for the training? Does the training need to be marketed? What actions are needed to facilitate transfer? Is a companion training program needed for supervisors? Remember, the TNA is just the beginning of the training odyssey. The effectiveness of the training at addressing the gap depends on how well TNA data is translated into training by the decisions and actions taken in Step 14. Before moving on to the TNA evaluation phase, a brief overview of the traditional TNA framework—organizational, task and KSAO, and person analyses—is provided.

Organizational analysis is about determining whether or not the capability exists where it is needed and how best it can be developed or acquired. A thorough organizational analysis determines the goals and objectives of the TNA and provides the linkage between training objectives and organizational objectives, outcomes, resources, and constraints. This includes identifying and specifying all the organizational and contextual factors (or potential constraints) that might influence the design, delivery, and outcomes of the learning intervention (Goldstein, 1993; Salas & Cannon-Bowers, 2001). Factors or potential constraints that will influence transfer must be considered as well because it is the mechanism through which learning becomes the capability needed to support performance. There are many potential constraints to be investigated. Does the climate support conducting the training? Is the tempo of operations or business so high that training will be viewed negatively as distraction? Are the resources available? Sufficient computer access may not exist to support computer-based training, which limits delivery options. What organizational policies will impact training and transfer? A skill-based pay system that provides incentives for some skills but not for others will impact what training employees might select to attend. Organizational support, learning orientation, and training reputation can also foster positive attitudes toward training, which can increase employee participation (Hurtz & Williams, 2009).

Task or task and KSAO analysis (e.g., Arthur et al., 2003; Goldstein, 1993) is about identifying what must be learned so the organization has the underlying capability for the performance needed to support organizational objectives and outcomes. The key questions are as follows:

- What capability is required for desired performance?
- What must be trained or learned to ensure the desired performance?

The resulting analysis should identify and specify the learning objectives and content that will guide design, delivery, and measurement. The resulting work analysis should be at the appropriate level for its goals, context, and work content. For example, if you determine that training on a new manufacturing process is required for successful performance, then a task-level analysis is required because the procedure must be specified exactly. Also, the analysis could be focused on the mental processing and requirements for performance as well, requiring a cognitive task analysis component to complement traditional methods (Salas & Cannon-Bowers, 2001). This analysis should also include an analysis of the conditions under which the work will be performed and the KSAOs necessary to perform the work. What conditions in the work environment will impact performance and, therefore, training? What KSAs are necessary to perform the work or learn the skills necessary to perform the work? Creating effective learning objectives requires complete information about the work, the conditions under which it is performed, and the underlying KSAOs required. The TNA should also identify the cues and cognitions that enable the learner to apply the learned knowledge and skills, which can be incorporated into the training and transfer design (Salas & Cannon-Bowers, 2001). The goal of this task and KSAO analysis is to identify what must be learned to ensure the learning transfers to the desired capability and performance.

Traditionally, person-level analysis (Goldstein, 1993; McGehee & Thayer, 1961) focuses on which individuals need what training. However, the focus of the "person" analysis could easily be a standing or impromptu team, department, or unit. Team-level analyses are becoming more common, especially as teams are being created to pursue high-stakes projects, such as product development, which might take years. The main objective is to determine who needs to be trained on what KSAOs or competencies, regardless of the who. Person analysis falls into two categories: event driven and ongoing. Event-driven person analysis results from a deficiency or need being identified and, therefore, a needs assessment being conducted. Ongoing person analysis provides organizations with a systematic process for identifying individual development needs. Because these ongoing person analyses are tied directly or indirectly to performance requirements and organizational objectives, the resulting individual learning objectives and interventions develop capability that should transfer to performance and achieving organizational outcomes. Regardless of whether it is event-driven or ongoing, the individuals and teams who require training to develop the capability to perform must be identified effectively; otherwise, an organization's learning outcomes are not maximized and its learning dollars are not well spent.

TNA Evaluation Phase

Context impacts individual and group behavior and related processes in organizations. Figure 24.1 provides an illustration of contexts within the organizational system. Taking an ongoing, continuous improvement approach to identifying and addressing capability needs is important for success. The TNA evaluation phase asks questions about whether the identified KSAO gaps were closed by the training intervention or other learning interventions (e.g., mentoring) that followed from the training needs assessment phase. Ultimately, the concern is about whether the issue, opportunity, or event that triggered the TNA process was addressed (Table 24.1, Step 15). This information could be used to modify the intervention, to suggest a new intervention if the underlying reason for the TNA still persists, or to indicate the intervention is no longer needed if the underlying reason for the TNA has been resolved. Some TNA processes may continue indefinitely because of legal requirements or the need for ongoing person analysis. Evaluation also provides an opportunity to learn about the effectiveness of the TNA process and to make evidence-based process improvements (Table 24.1, Step 16).

The evaluation phase has two foci: Did the training or learning intervention result in the development of needed KSAOs, and did the KSAOs translate into capability and performance that addressed the triggering issue, opportunity, or event? The first is training evaluation, specifically summative evaluation, of proximal outcomes. The trained KSAOs can be measured and certified by assessments after training. Measurement before and after training is required if judgments about the effectiveness of the training are required for process improvement. The second is training evaluation of more distal outcomes, such as transfer and performance, and their impact on the underlying reason for the TNA intervention. Data should be collected related to the use of the trained KSAOs on the job, the job or team performance, and outcomes. These data provide an indication of whether or not the learned KSAOs actually translated to performance and addressed the triggering event, issue, or opportunity. The specific evaluation design, measurement, and data will vary based on the specifics the situation. A full treatment of evaluation is not possible here, but many resources about training and program evaluation exist that can guide practitioners.

Saliently including the TNA evaluation phase in the process communicates that TNA is related to training design, delivery, and evaluation and should not be viewed in isolation. The goal of TNA is to identify and specify a gap and a solution to address that gap, which is related to the underlying event, issue, or opportunity. The diagram in Figure 24.1 demonstrates the interrelationships among all the components of the process. Learning, transfer, performance, and the context in which these

occur are important factors in the system and, therefore, must be considered in the TNA design and implementation and subsequent design, delivery, and evaluation of training (or other intervention). The TNA process does not exist in a vacuum and data are required throughout the system for effective TNA.

Issues Affecting TNA Implementation

There are a number of contextual factors and design choices that can influence the effectiveness of the TNA process. Although full treatment is beyond the scope of this chapter, Table 24.5 presents six potential issues that should be considered when planning a TNA implementation. This consideration allows the practitioner to determine if these factors are points of concern and to plan the process to mitigate these factors if they are concerns. These issues can range from technology availability to participation. For example, technology can streamline the TNA process, making it more efficient and effective, but many manufacturing and service organizations do not provide computer access on the job for their employees, making web-based TNA impractical. Participation is important to data representativeness and can be improved by leaders and managers communicating support and asking for participation. Many of the issues that impact TNA quality have to do with data collection and analysis methodology choices and execution. There are numerous books about TNA methods (see the Further Reading section at the end of the chapter). Another issue is the availability of data on key components, such as transfer and performance, which might not be collected by the organization. The point of this section is not to provide an exhaustive list of contextual and design issues impacting TNA implementation and effectiveness but to create awareness that these

Table 24.5 Six Issues Affecting TNA Implementation

Technology availability	Technology can make conducting the TNA process more efficient and effective. However, for example, many workers do not have consistent access to computers for web-based surveys. Plan according to your technology context. Paper surveys still collect data.
Premature diagnosis	Jumping straight from "I need training" to collecting task and KSAO data and developing and delivering training has set back many organizations. Follow the process. It will keep you on the right path.
Lack of leadership support	Without leadership support, it will be difficult to gain sufficient resources and participation for a successful TNA. Market TNA and gain leader support early (see the Making the Case for TNA section).
Who is asked?	Consider the impact of who is asked to participate. Are the relevant individuals—the most knowledgeable about the event, issue, or opportunity—being invited to participate? Is the group representative of the target population? Are there group differences in terms of opportunity to perform? Are there existing KSAO differences that might impact the responses? For example, Dierdorff and Surface (2008) found that skill levels affected TNA ratings. Consider this as part of your data collection or sampling plan.
Participation	Nonresponse can have dramatic impacts on TNA results. Leadership support and effective marketing of and communication about the TNA are critical to participation. If your organization has unions, union support is also critical. Create a participation plan as part of the upfront planning.
Poor data collection methodology	Collecting data is not as simple as typing a few items into an online survey engine (although it can be for narrow-domain TNA). Data collection—whether it is surveys, focus groups, interviews, observations, documentation reviews, or a combination—can have a very negative impact on TNA if flawed. Data collection and analysis take expertise. Do not be afraid to hire an expert to do this if it is not your area of expertise.

This is not meant to be an exhaustive list. KSAO = knowledge, skill, ability, or other characteristic.

issues exist and should be thought through as the TNA is planned and executed. These issues operate at the microlevel to impact TNA. The next section introduces societal and organizational trends at the macrolevel that could impact TNA.

FACTORS/TRENDS AFFECTING TNA

Instead of focusing on TNA solely from a traditional perspective, one goal of this chapter is to look into the future and determine trends in the workplace that might impact TNA practice. This is not to say that traditional approaches to TNA are not valuable and will not continue to be used. For example, in process-oriented jobs such as manufacturing, food service, and auditing, task and KSAO analysis of the work to determine the tasks and the relevant knowledge and skill requirements to guide training will continue to be important. However, this will not be the case in other contexts. To be prepared, organizations need to be aware of relevant workplace trends and determine their impact on TNA and other human resource processes. Examining the writings of workplace futurists is a useful place to start. Table 24.6 presents 10 current trends that will impact the 2020 workplace (Meister & Willyerd, 2010). Meister and Willyerd also make a number of predictions about the future workplace, such as, "Your mobile device will become your office, your classroom and your concierge" (p. 215); "The corporate curriculum will use video games, simulations and alternative reality games as key delivery modes" (p. 221); and "Corporate social networks will flourish and grow inside companies [being used for informal learning]" (p. 223), and provide many current examples and suggest more widespread adoption by 2020. Nine of their 20 predictions have implications for TNA.

Most of these trends and predictions suggest the same impact on TNA. Here are some thoughts based on Meister and Willyerd (2010). The workplace of the future will require, and future workers will demand, immediate identification, specification, and resourcing of their learning needs because learning will be focused on meeting the immediate demands of their jobs in their context. Their learning solutions will be customized, increasingly socially constructed, participatory, often informal, and will need to be delivered on demand. Cutting-edge knowledge and skills will be seen even more as a provider of individual and organizational advantage, and lifelong learning will be a business requirement and a highly desired attribute among workers. Technology will play a large role in learning needs identification and resourcing, with mobile devices and social

Table 24.6 Trends Currently Affecting or That Will Affect the 2020 Workplace

1. Shifting workforce demographics
2. The knowledge economy
3. Globalization
4. The digital workplace
5. The ubiquity of mobile technology
6. A culture of connectivity
7. The participation society
8. Social learning
9. Corporate social responsibility
10. Millennials in the workplace

Adapted from Meister, J. C. and Willyerd, K., *The 2020 Workplace: How Innovative Companies Attract, Develop, and Keep Tomorrow's Employees Today*, HarperCollins, New York, 2010.

technologies such as multiplayer videogames playing increasing roles. Granted, these are a few examples of trends that will likely impact some organizations and industries more than others. However, organizations should be aware of the potential impact of these trends on TNA in their organizational contexts. Basically, if you think stakeholders complain about the time a TNA takes now, just wait until 2020. The speed and flexibility of need identification, specification, and resourcing will have to increase. It will be a business necessity. In the fast-paced competitive environment, which authors such as Meister and Willyerd predict, organizations will live and die based on their ability to meet changing performance requirements.

Besides the work of futurists, important trends can be identified by listening to what training professionals are discussing at conferences and meetings. Table 24.7 presents a brief sidebar of two examples of these trends: the increase of informal learning and the focus on "scrap learning" as opposed to "transfer." Trends can be identified from the research community as well. Kraiger (2008a) discussed the three generations of instructional models—first, second, and third—and the implications for training; in his response article (Kraiger, 2008b), he lamented that none of the commentaries had addressed the implications for needs assessment. The choice of instructional model definitely has implications for needs identification and specification and how work analysis methods are implemented. Table 24.8 presents a brief discussion.

IDEAS TO IMPROVE TNA PRACTICE

Of course, basing a TNA intervention on sound work analysis methods and systems is the best way to improve TNA practice. Some examples of other potential ideas to improve TNA practice

Table 24.7 Two Current Trends in Training with Implications for TNA Practice

Trend	Description and Implication for TNA
Informal learning[a]	Informal learning, such as Google searches and peer-to-peer learning, is on the rise (Paradise, 2008; Paradise & Patel, 2009). Informal learning is appealing—it is under the control of the individual, timely, context relevant, and related to current performance requirements. The challenge is facilitating (a) individual identification of training needs that are appropriately addressed by on-the-job informal learning, (b) identification of informal learning options, and (c) the match between them in real time. Organizations will have to provide tools to facilitate informal learning and related TNA. Many organizations have knowledge-sharing portals or databases on their corporate networks where employees are encouraged to share knowledge and ask for help with problems, such as customer support issues. Informal learning options can enhance customer support (a business objective) while providing learning opportunities that transfer, such as reduced call time when the same customer service issue is encountered. Peer-to-peer matching sites are another example.
Scrap learning	Scrap learning, or wasted learning from training, has been a recent addition to our lexicon. It is basically the inverse of transfer. However, the trend for learning professionals is to talk more about scrap learning than about transfer. Although the goal of transfer of learning (and reduction of scrap) has always been implicit to the TNA, the concept of scrap learning is more intuitive for most laypeople. How we sell TNA and talk about the process and findings may be assisted by the term *scrap learning*. Concerns about scrap learning provide an emphasis for ensuring that TNA processes include steps for identifying contextual factors that are barriers to the application of learned knowledge and skill. Factors related to scrap learning, such as lack of supervisor support, should be explicitly evaluated.

[a] Paradise (2008) describes a study conducted by the American Society of Training and Development and the Institute for Corporate Productivity that defines informal learning as "A learning activity that is not easily recognizable as formal training and performance support. Generally speaking, it takes place without a conventional instructor and is employee-controlled in terms of breadth, depth, and timing. It tends to be individualized, limited in scope, and utilized in small chunks" (Paradise, 2008, p. 25).

Table 24.8 Three Generations of Instructional Models and TNA

Instructional Model[a]	How TNA Fits With the Model
First generation	The organization identifies the need, the content, and design of the training; for whom training is required; and how and when training will be delivered. The organization has all the decision power and assumes all the responsibility for the TNA process and effectiveness. Individuals provide information in TNA and participate in training. The first-generation model is appropriate in many contexts, especially where there are high-stakes (e.g., safety) or a standard work process (e.g., complex manufacturing) and training must be standardized.
Second generation	The shift is to learner-centered instruction, including more learner control and learner-constructed content (Kraiger, 2008a). Organizations identify training requirements or facilitate individuals in doing so and provide formal training opportunities, but the learner is more of an active participant in TNA and training. The role of the organization is to provide authentic training experiences and facilitate learner exploration and learning. The organization identifies needs and priorities and provides resources, but the responsibility is shared with the individual. Individuals may be given responsibility to identify their needs and construct their own training experience from the available corporate training resources or within a training program or event. Technology has made this possible. Learning can now be customized to each individual learner within the confines of the learning content and design. Organizations are facilitators and have a responsibility to ensure TNA leads to the purchase or design of training tools or platforms that allow for learner choice and customization. However, the individual learner has a much greater responsibility for his or her learning experience.
Third generation	The organization allows work teams or groups to identify, define, and address their learning needs. Learning is socially constructed. Individual training needs can be socially constructed because understanding of skill and knowledge requirements of the job in the individual's context and related deficiencies (needs for training) are influenced by peers and their understandings. The shift in responsibility is complete. Individuals and their teams or work groups have the lion's share of the process. The organization's role is that of facilitator on both ends of the process. Meister and Willyerd (2010) identified social learning as one of their workplace 2020 trends. In second- and third-generation models, organizations still have the responsibility for directing learning activities to be aligned to strategy and business needs.

[a] This should not be construed as an endorsement of any one of the models over the others. The goal is for organizations to think about the TNA responsibilities under each model. All three instructional models have their relevance to learning in organizations.

are presented in Table 24.9. The examples selected attempt to address some of the issues, factors, and trends that impact or will potentially impact TNA, as discussed in previous sections. These examples are meant to be representative of the range of potential solutions, not exhaustive. Some of the ideas are quite simple and result in abbreviated TNA interventions, such as the use of existing data to streamline the TNA intervention (Noe, 2009). Others, such as web-enabling the entire TNA process, are quite involved. Others leverage trends in society, such as the increasing prevalence of social media use (Meister & Willyerd, 2010). Others address the supply side of the equation (i.e., availability of training resources), which is necessary to facilitate a real-time match of individual needs with formal and informal learning resources. The remainder of this section focuses on four of the ideas covering the range of potential improvements to the TNA process: (a) Empower TNA within the organization's competency model; (b) use pulse surveys for TNA; (c) use social media and technologies for TNA; and (d) embed TNA in technology-delivered training options.

Empower TNA Within the Organization's Competency Model

A well-developed competency model can be used to streamline the TNA process (Noe, 2009). Linked to strategic objectives and to organizational and performance outcomes, a competency

Table 24.9 Ideas for Improving TNA Practice

1.	Make use of existing data to streamline the TNA intervention.
2.	Web-enable the entire TNA process.
3.	Use technology to reduce costs and improve TNA timeliness.
4.	Develop a streamlined TNA process for your organization.
5.	Focus on performance enhancement.
6.	Empower TNA within the organization's competency model.
7.	Embed TNA in technology-delivered training options.
8.	Use pulse surveys for TNA.
9.	Use smart phones for TNA.
10.	Use social media for TNA.
11.	Use social media to match needs with informal learning opportunities (e.g., mentoring).
12.	Create a training portfolio of formal and informal resources for your organization.
13.	Use technology to conduct periodic training resources audits.
14.	Use technology to match identified needs to organizational resources in real time.

model narrows the domain of focus and priority for needs identification and specification and resourcing to address training needs. This allows the organization to provide thorough resources in these competency domains, including tools to help individuals and teams identify learning needs and match needs to existing formal and informal resources. Because competencies are typically designed to be valid across an organization (Green, 1999; Noe, 2009), they can be used to generalize TNA processes, such as person analysis, across jobs and teams. Because the need space is limited to the competency model, tools can be developed and implemented to allow for real-time need identification and resource matching and delivery. Employees and teams or work groups are empowered within a limited need space to take control of their learning. Using competency models as the basis for learning needs assessment and fulfillment is a way for organizations to provide an efficient and effective solution that covers the most relevant KSAOs. There will always be the need for TNA and training outside the domains of the competency model, and this approach will not work for some organizations and contexts. However, this is a viable solution that can be used to improve an organization's capability related to its performance and business objectives and retain control of the learning process while empowering individuals and teams to take responsibility for their own learning.

Use of Pulse Surveys for TNA

Pulse surveys are short, focused surveys that can be sent out periodically to the entire population or a sample of the organization. The idea is to "take the pulse" of the organization on a particular issue. These surveys are easy options to identify and specify training needs within a focused domain, such as a competency model, or to provide a periodic vehicle for individuals to bring potential needs to the attention of the organization. Pulse surveys can be delivered via a web site, e-mail, or smart phone. Table 24.10 describes a pulse survey implementation. This particular survey is being used to identify potential needs within a competency model and is designed for a smart phone and has no more than one or two questions per screen. It can also be used to identify general needs periodically or to conduct a task and KSAO analysis in a very narrow domain. The pulse survey is effective for identifying areas where the organization needs to develop training resources. An extension would be to use the pulse survey for person-level analysis, specify the nature of the training within each competency, and recommend training options to the individual.

Table 24.10 Example of a Pulse Survey Used for TNA

1. Respondent has previously signed up to participate in pulse TNA surveys via his or her smart phone.
2. Respondent receives an e-mail or text with a customized link (allowing for fewer items).
3. Respondent clicks on the link.
4. Respondent receives introduction screen about pulse TNA survey related to core competencies, which asks, "Are your training needs being met?" (branches to end if yes)
5. If no, respondent is asked, "Indicate in which of XYZ Company's three core competencies you have training needs (select all that apply)."
6. For each selected competency, the participant is asked, "Please describe in a tweet-sized statement (140 characters or less) what you need specifically," and "Can we contact you to follow up?"
7. Respondent is asked about participant in current training.
8. Respondent is thanked.

Use Social Media for TNA

As Meister and Willyerd (2010) pointed out, there are a number of trends, such as a culture of connectivity, millennials in the workplace, and the participation society, aligning to push the use and adoption of social media in organizations. For example, one of their predictions for the 2020 workplace is that organizations will require social media skills of employees. Will future work analyses bear this out as an employee requirement? Social media can be adopted now to improve both sides of the TNA process: identifying needs and resources to meet those needs. Using social media can be as simple as creating an online, interactive community via the company web site or using social media tools, such as Twitter. Having a company web site listing and providing learning resources or a web site where employees can discuss their jobs and share knowledge are not new ideas. But, these sites could be turned into "learning mash ups" that bring everything learning together for the organization. These could be leveraged for TNA across organization, work, and person levels. These sites could include TNA tools that identify individual training requirements within a narrow domain, such as the corporate competency model, and recommend existing training tools for the individual.

Using social media to match individual needs with informal learning opportunities, such as peer-to-peer learning, is a fairly straightforward use. Now, individuals are tapping their social networks for information, job leads, and mentors. Why not for learning opportunities or training recommendations as well? Real-time chats, instant messaging, and video conferencing could be used by teams or groups to develop learning requirements. Of course, the data from board postings, Twitter messages, and chats could be mined to identify training requirements so the company can more quickly provide formal training resources for prevalent and important deficiencies. A team of researchers at Carnegie Mellon University found fairly high correlations between consumer confidence and public opinion polls and the sentiment word frequencies in Twitter messages of the same period (O'Connor, Balasubramanyan, Routledge, & Smith, 2009). If this technique could be applied to TNA surveys, then it could be used for the needs identification and needs specification phases of the TNA process.

Embed TNA in Technology-Delivered Training Options

Second-generation instructional models revolve around learner-centered instruction and more learner control over the learning content and process (Kraiger, 2008a). Well-designed,

technology-delivered training offers the promise of learner control. However, many learners do not know how to optimize their own learning or to diagnose their learning needs. Given the increased reliance on technology-delivered training and the push for more effective use of training resources, organizations should purchase or create technology-delivered training that provides an individual-level needs assessment (person analysis) and uses it to help the learner guide learning. By using the organization's competency model to narrow training offerings to domains linked to organizational strategy and objectives, the organization can focus on purchasing or developing computer-based training, simulations, virtual worlds, videogames, and smart phone applications that include a person analysis linked to these organizationally valued competencies. This has the benefit of using existing information to eliminate the majority of the TNA process and of being linked to organizational objectives. Embedded person analysis and dynamic creation of individualized training guidance within technology-delivered training should become standard.

Although not an exhaustive list of potential ideas or solutions to improve TNA, the goal of this section was to provide a few examples to show the range of what can be done now. TNA will only increase in importance, and trends now being developed in the workplace indicate the need to use technology more effectively to identify training needs using work analysis techniques and linking them to resources to meet the demands of the future workforce and competitive marketplace.

MAKING THE CASE FOR TNA

If learning objectives are not adequately known or are improperly specified prior to design (or purchase) and implementation of training initiatives, the likelihood that employee learning will be aligned with capability requirements, performance, or organizational objectives is not very high (Goldstein, 1993). Lack of alignment between training objectives and the capability requirements underlying performance and organizational objectives yields ineffective training; it does not address the identified gap between desired and actual states. If the ineffective training does address the need, it will be by accident. We know TNA is a mechanism for aligning training with capability and performance requirements and outcomes in organizations; therefore, it optimizes the likelihood training will successfully address the identified need. Given the importance of learning for organizational competitiveness and the prevalence and expense of learning initiatives, the TNA process should be used extensively. However, the current evidence suggests TNA is not prevalent. A gap between current and desired states of practice exists. How do we make the case for TNA?

To sell TNA, the training practitioner needs to understand why TNA is not conducted more frequently, both in general and within their organization specifically. Although there are likely additional reasons that are idiosyncratic to any specific case, Table 24.11 presents seven common, interrelated reasons why TNA is not used.

Keep in mind that some of these can be valid reasons for not conducting a TNA, but they can be excuses as well. For example, cost and the perceived value can be legitimate issues for an organization. If the identified need (gap in capability) is not a high priority for or of value to the organization, then cost and potential return on investment are important initial decision factors for implementing the TNA process, and the decision may be not to implement in the case of no or limited value or priority. However, if the organization uses cost to justify jumping straight from a potential gap to a training solution without conducting a TNA, then cost is being used as an excuse to not follow a beneficial practice that will likely optimize the value of the training investment and save money.

Table 24.11 Seven Common Reasons Why TNA Is Not Conducted

1. Time	TNA takes too long, and the solution is needed now.
2. Expertise	The organization does not have in-house TNA expertise.
3. Lack of leadership support	The key stakeholders do not support it.
4. Cost	The TNA process is too expensive and will add too much cost to the training.
5. Lack of perceived value	There is no immediately tangible benefit or return on investment.
6. Leadership certainty	"I know what the problem is and I know training is the solution. There is no need to waste time and money on a TNA."
7. Lack of TNA awareness	In many organizations, training decisions are made by nontraining experts who just do not know or understand the training process.

This is not an exhaustive list, and each situation will likely have idiosyncratic factors that affect the use of TNA.

If viewed from a sales perspective, the items in Table 24.11 are "customer objections" to be overcome or opportunities to educate the customers about the product (TNA). In each case, one should be prepared to overcome the most likely objections and to educate the stakeholder. As an internal consultant or practitioner, there is an advantage of knowing the culture, the stakeholders, and the most likely issues. What is important in the culture? What have been the stakeholders' reasons for not doing TNA in the past? Every organization has values, a shared history, and even a mythology. Stakeholders have their own values and histories. Use this information. For external consultants, who may not have such insights, the best option is to provide salient examples of the value of TNA and the risk of not conducting a TNA. Presenting a business or mission case for TNA is important. These cases work for internal practitioners as well.

Practitioners need to make a case for TNA. This case is related to but different from the case for learning. The result of the TNA might be a nontraining solution, so selling learning as a solution comes at the end of the needs specification phase, when it is clear the gap is related to a KSAO deficiency and the TNA phase is required. Although every situation is different and the specific organization and stakeholders will influence the argument presented, Table 24.12 presents information that could be highlighted when crafting a logical and relevant argument for TNA.

Arguing from data or projections can be effective if the stakeholders are data-based decision makers. Often, the most effective tool is to use an example related to the organization's core business or mission. For example, many consumer products companies spend millions of dollars

Table 24.12 Potential Information to Make the Case for TNA

1. High-level overview of TNA and the TNA process
2. Specific benefits of TNA and the increased alignment with business objective and performance requirement created by TNA
3. Conducting the TNA process in phases optimizes the effectiveness of resource expenditures
4. Initial quick identification and specification of the potential issue and solutions optimizes the effectiveness of resource expenditures
5. Options to reduce the time and cost associated with TNA; abbreviated TNA using existing data or with an existing competency model
6. Why TNA should be conducted in this case
7. Expected value or return on investment achieved by conducting TNA in this case
8. Potential risks or costs associated with not conducting TNA in this case
9. Cost and benefit data or projections to make your point
10. Examples from corporate history or culture to support the use of TNA

This is not meant to imply an order of importance or to be an exhaustive list.

identifying and specifying customer needs and developing and testing associated products. These companies would never develop a product without sufficient market research. TNA is basically the same process. There are many examples of failed products and services for which the need was incorrectly identified or specified. Your organization may even have an example that is part of its mythology. This works for mission-based organizations as well. In the military, planning a mission without a clear objective and accurate intelligence would not be endorsed by many, if any, leaders. Some nonprofit organizations use software to identify potential donors and specify (customize) their pitch for donations. Examples abound for most organizations.

Each case is different. The point is to make a well-formed, relevant argument for conducting a TNA. Use your knowledge of the organization and the stakeholders to help shape the argument. Not every argument will be successful, but do not be discouraged. The potential benefits of TNA—increased effectiveness of training, increased alignment of capability with performance requirements, and increased organizational effectiveness—are worth the continued effort. TNA will never be conducted unless someone advocates for it.

As a final note, with this text being *The Handbook of Work Analysis*, it is important to mention that TNA is not possible without work analysis methods such as task analysis, task and KSAO analysis, and cognitive task analysis. Hopefully, this chapter helps the reader to understand and better engage in the TNA process. When planning TNA interventions, readers should integrate the contents of this chapter with other chapters in this volume to develop an effective solution.

FURTHER READING

TNA cannot be thoroughly addressed in a single chapter and probably not a single book. To offer the reader more resources, we have provided a list of TNA-relevant references below. Because this chapter focuses more on TNA decisions, most of these refererences are focused on the nuts and bolts of the TNA process, such as data collection. Many of the chapters in this volume provide excellent references when planning the work analysis components of the TNA process.

Altschuld, J. W. (Ed.). (2010). *The needs assessment kit* (Vols. 1–5). Thousand Oaks, CA: Sage.

Altschuld, J. W., & Witkin, B. R. (2000). *From needs assessment to action*. Thousand Oaks, CA: Sage.

Austin, M. (1998). *Needs assessment by focus group* (Infoline issue 9401). Alexandria, VA: American Society for Training & Development.

Burner, K. J. (2010). From performance analysis to training needs assessment. In K. H. Sibler & W. R. Foshay (Eds.), *Handbook of improving performance in the workplace: Vol. 1. Instructional design and training delivery* (pp. 144–183). San Francisco, CA: Pfeiffer.

Elliott, P. H. (2008). Identifying performance and learning gaps. In E. Biech (Ed.), *American Society for training & development handbook for workplace learning professionals* (pp. 107–125). Alexandria, VA: American Society for Training & Development.

Franklin, M. (2005). *Performance gap analysis* (Infoline issue 0603). Alexandria, VA: American Society for Training & Development.

Gupta, K. (2005). *Conducting a mini needs assessment* (Infoline issue 9611). Alexandria, VA: American Society for Training & Development.

Gupta, K., Sleezer, C. M., & Russ-Eft, D. F. (2007*). A practical guide to needs assessment* (2nd ed.). San Francisco, CA: Pfeiffer.

Sparhawk, S. (2002). *Strategic needs analysis* (Infoline issue 9408). Alexandria, VA: American Society for Training & Development.

Stone, R. D. (2009). *Aligning training for results: A process and tools that link training to business*. San Francisco, CA: Pfeiffer.

Tobey, D. D. (2007). *Data collection for needs assessment* (Infoline issue 0704). Alexandria, VA: American Society for Training & Development.

Waagen, A. K. (1998). *Task analysis* (Infoline issue 9808). Alexandria, VA: American Society for Training & Development.

REFERENCES

Aguinis, H., & Kraiger, K. (2009). Benefits of training and development for individuals and teams, organizations, and society. *Annual Review of Psychology, 60,* 451–474.

Altschuld, J. W. (Ed.). (2010). *The needs assessment kit* (Vols. 1–5). Thousand Oaks, CA: Sage.

Alvarez, K., Salas, E., & Garofano, C. M. (2004). An integrated model of training evaluation and effectiveness. *Human Resource Development Review, 3,* 385–416.

Arthur, W. Jr., Bennett, W. Jr., Edens, P. S., & Bell, S. T. (2003). Effectiveness of training in organizations: A meta-analysis of design and evaluation features. *Journal of Applied Psychology, 88,* 234–245.

Dierdorff, E. C., & Surface, E. A. (2008). Assessing training needs: Does work experience and capability matter? *Human Performance, 21,* 28–48.

Franklin, M. (2005). *Performance gap analysis* (Infoline issue 0603). Alexandria, VA: American Society for Training & Development.

Gilbert, T. F. (1978). *Human competence: Engineering worthy performance.* New York, NY: McGraw-Hill.

Goldstein, I. L. (1993). *Training in organizations: Needs assessment, development, and evaluation* (3rd ed.). Pacific Grove, CA: Brooks/Cole.

Green, P. C. (1999). *Building robust competencies: Linking human resource systems to organizational strategies.* San Francisco, CA: Jossey-Bass.

Gupta, K. (2005). *Conducting a mini needs assessment* (Infoline issue 9611). Alexandria, VA: American Society for Training & Development.

Hurtz, G. M, & Williams, K. J. (2009). Attitudinal and motivational antecedents of participation in voluntary employee development activities. *Journal of Applied Psychology, 94,* 635–653.

Kraiger, K. (2003). Perspectives on training. In W. C. Borman, D. R. Ilgen, & R. J. Klimoski (Eds.), *Comprehensive handbook of psychology: Vol. 12. Industrial and organizational psychology* (pp. 171–192). Hoboken, NJ: Wiley & Sons.

Kraiger, K. (2008a). Transforming our models of learning and development: Web-based instruction as enabler of third-generation instruction. *Industrial and Organizational Psychology, 1,* 454–467.

Kraiger, K. (2008b). Third-generation instructional models: More about guiding development and design than selecting training methods. *Industrial and Organizational Psychology, 1,* 501–507.

McGehee, W., & Thayer, P. W. (1961). *Training in business and industry*. New York, NY: Wiley & Sons.

Meister, J. C., & Willyerd, K. (2010). *The 2020 workplace: How innovative companies attract, develop, and keep tomorrow's employees today*. New York, NY: HarperCollins.

Noe, R. A. (2009). *Learning system design: A guide to creating effective learning initiatives.* Alexandria, VA: SHRM Foundation.

O'Connor, B., Balasubramanyan, R., Routledge, B. R., & Smith, N. A. (2009, May). *From tweets to polls: Linking text sentiment to public opinion time series*. Paper presented at the 4th International Association for the Advancement of Artificial Intelligence Conference on Weblogs and Social Media, Washington, D. C.

Paradise, A. (2008). *2008 state of the industry*. Alexandria, VA: American Society for Training & Development.

Paradise, A., & Patel, L. (2009). *2009 state of the industry*. Alexandria, VA: American Society for Training & Development.

Rossett, A. (1987). *Training needs assessment*. Englewood Cliffs, NJ: Educational Technology.

Salas, E., & Cannon-Bowers, J. A. (2001). The science of training: A decade of progress. *Annual Review of Psychology, 52,* 471–499.

Stolovitch, H. D., & Keeps, E. J. (2008). Selecting solutions to improve workplace performance. In E. Biech (Ed.), *American Society for Training & Development handbook for workplace learning professionals* (pp. 107–125). Alexandria, VA: American Society for Training & Development.

van Eerde, W., Tang, K. C. S., & Talbot, G. (2008). The mediating role of training utility on the relationship between training needs assessment and organisational effectiveness. *International Journal of Human Resource Management, 19,* 63–73.