

Part 3B

DECISION-MAKING TOOLS AND TECHNIQUES

As seen in *Part 3A. Data Collection Tools and Techniques*, this book provides options to consider using as you collect data to inform your needs assessment. However, once you have collected that information, another important step is required as you make decisions about using the data. And there are tools to support your decision-making process.

Part 3B. Decision-Making Tools and Techniques suggests tools for analyzing and prioritizing issues in your needs assessment process and, ultimately, for deciding to take action. Prioritizing information and making choices can be a difficult task for both individuals and groups. Instead of your making decisions through an informal, ad hoc process, this part describes tools that can be helpful in ensuring that issues are given due consideration in a participatory decision-making process.



NOMINAL GROUP TECHNIQUE (A GROUP CONSENSUS-BUILDING AND RANKING TECHNIQUE)

Purpose

The nominal group technique is used to engage in consensus planning so you can prioritize issues and make decisions.

Needs Assessment Applications

The nominal group technique can be a valuable tool for facilitating group decision making, and it can also be useful for data collection (such as for generating a list of the possible causes of a particular problem). The theorists who originated this technique used the term *nominal* (meaning *in name only*) to express the bringing together of a group that is assembled for the purpose of pooling ideas around a particular issue and ranking those ideas. We can also think of this technique simply as a *group ranking technique*. The technique provides a structured process for working with group members to prioritize their ideas, concerns, or other decision inputs in a format that is both inclusive and consensus-building.

During data collection, for instance, a nominal group technique can help a group of community members as they prioritize their list of public services that are provided by the city and that are inadequately addressing community expectations. This dynamic group decision-making process is flexible enough that you may use it multiple times at different steps within your needs assessment—whenever a group with multiple perspectives has to make a difficult decision.

Advantages and Disadvantages

Advantages

- The nominal group technique is more structured than the ordinary group discussion approach.
- Through a nominal group technique, everyone in the group is given an opportunity to contribute to the discussion and decision, thereby avoiding a situation where one person dominates the group process.
- The nominal group technique can be used with small (3–9 people) groups as well as with larger groups (for example, 10–30 people).
- By using the nominal group technique, you can get a sense of priority concerns that are represented among the group’s members.

Disadvantages

- The synergism that is experienced in more open-ended group discussions may not develop as easily in the nominal group approach.
- The nominal group technique may feel somewhat mechanical to some participants. This situation can be circumvented to some extent by ensuring that the facilitator shows flexibility in process and implementation.
- Although the nominal group technique can be used with a range of group sizes, it is hard to implement the technique effectively with large audiences unless you plan very carefully beforehand.

Process Overview

1. From the list of decisions to be made during your needs assessment, identify those elements that may best be attained through the nominal group technique.
2. Create a facilitator’s guide or protocol to guide the group. In the protocol, ensure that all participants are given multiple opportunities to contribute to group decisions. At the same time, the process must intentionally and continually move the group toward a decision, rather than letting discussions continue without advancing. The guide should offer

the facilitator a fair amount of flexibility to modify the process when the group requires additional information or when subdecisions must be made prior to other decisions.

3. Schedule a time for the group when the highest number of priority participants are available. Verify that you have a group facilitator available at the scheduled time.
4. To begin the exercise, give each group member some paper and a writing implement.
5. Present the session's single topic to the group members. For example, the group members could be presented with a context for why the group is meeting and could be asked to "identify what results you should be accomplishing but are not able to accomplish at this time," "list all of the things that could be improved about . . .," or "list which of the factors causing the performance gap should be our priorities for the next year." Only one key question should, however, be used in a session so that you can maintain a clear focus and objective.
6. Give the group members an opportunity to ask any questions that come to mind or to discuss anything that helps to elucidate the scope and specifics of the topic. In other words, accommodate interaction that will help increase clarity for the discussion.
7. Ask the group members to take time (generally a few minutes) to think about the topic and to write notes for their responses. Encourage group members to write down their thoughts in a bulleted, abbreviated format.
8. On a turn-by-turn basis, ask each group member to share a response with the group. As each group member shares his or her response, write it on a flip chart. Invite the group member to elaborate if necessary, but do not allow other group members to ask questions, challenge, or otherwise discuss the responses (to avoid subtle peer pressure, disagreements, arguments, unwanted embarrassment, and other undesired behaviors or emotions).
9. After all group members have given one response, go around the room again and ask each group member to give a second response, and then a third. Continue this process until all answers have been written on the flip chart sheets. Ask participants to scratch items from their individual lists as those points are added to the flip charts (to avoid duplication). Again, group members should not discuss the responses, but the

facilitator may ask for clarifications to ensure an accurate response is recorded.

10. Hang the flip chart sheets next to one another so all sheets can be seen at the same time by all group members. Assign a letter to each discrete contribution on each flip chart sheet. To facilitate discussion, give each item on the flip charts a unique letter.
11. Give each group member a stack of index cards. Ask each member to identify, for example, the five responses that he or she feels is most important, identifying each response on a separate index card by the letter it has been assigned on the flip chart.
12. Next, ask the group members to rank the five responses they selected in order of priority, from one to five (five being the highest priority and one being the least high priority). They should do this on their index card by writing the rank order value of each response next to the letter for the response. When the group members are done, ask them to reorganize their index cards in alphabetical order.
13. Reading from the flip chart, go through the list of responses in alphabetical order. As you read aloud the letter corresponding with a response, ask each group member to state the rank (if any) that they gave it.
14. Aggregate all the ranks for each response on the flip chart. The responses with the highest aggregated value constitute the top priorities for the group.
15. If necessary, a second or third round of rankings can be done to further reduce the responses and to advance the group toward a decision.

Tips for Success

- Each nominal group session that you conduct should last between 30 minutes and four hours. Each session should present only one key question to the participants.
- Arrange to have the following supplies available at the group meeting site: flip chart, masking tape, markers, paper, index cards, and pens or pencils.
- If you are working with a large group, consider assigning individual participants to smaller groups, with an assigned leader for each group.

References and Resources

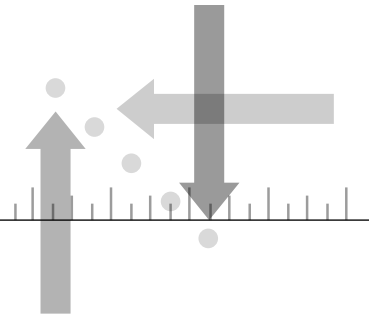
Witkin, Belle Ruth, and James W. Altschuld. 1995. *Planning and Conducting Needs Assessments: A Practical Guide*. Thousand Oaks, CA: Sage Publications.

Websites

“Expressed Satisfaction with the Nominal Group Technique among Change Agents” is available at <http://cogprints.org/4767/01/Gresham.pdf>. (This is a dissertation document; however, the literature review provides interesting and in-depth information on the use of the nominal group technique.)

“Nominal Group Technique” is available at http://syque.com/quality_tools/toolbook/NGT/ngt.htm. (This website includes a worked example of the technique being implemented.)

“Using Nominal Groups” is available at http://ppa.aces.uiuc.edu/pdf_files/NomGroup1.PDF.



MULTICRITERIA ANALYSIS

Purpose

The purpose of multicriteria analysis is to systematically provide a quantitative comparison across multiple options.

Needs Assessment Applications

Multicriteria analysis is a valuable tool for making decisions on the basis of information collected during a needs assessment. This analysis technique, which is based on the multi-attribute utility analysis frequently used by engineers and architects to select materials,¹ provides a systematic process of assigning and weighing quantitative (or numeric) values to a variety of potential performance-improvement programs and projects. Thus, it provides you with a justifiable process for determining what actions should be taken. As such, multicriteria analysis is a worthwhile tool for comparing across potential improvement activities, which can be particularly beneficial in organizational sectors (such as financial, manufacturing, aviation, construction, disaster management, and so on) that especially value quantitative and systematic comparisons of alternatives.

Advantages and Disadvantages

Advantages

- Multicriteria analysis offers a systematic and quantitative analysis procedure for comparing potential options. This method can be especially valuable if one alternative improvement activity is particularly popular (for instance six sigma, training, coaching, wells, roads, irrigation sys-

tems), even though it might not be the most useful activity for accomplishing desired results.

- Additional variables can be added to the comparison as the field of potential interventions or activities is narrowed. In the end, you can make justified recommendations based on the interventions or activities that score best across a variety of variables.
- Variables in the analysis (for instance, cost, time, expected outcomes) can each be given a weighting that reflects the priorities of the project. For example, if budgets are very tight, then scores related to costs of alternative activities may be weighted at four times the value of expected time to implement the activities.

Disadvantages

- Multicriteria analysis requires a higher level of effort than does some other analysis procedures because information regarding each potential solution (intervention, activity, and so on) is necessary for accurate comparisons. As a result, additional time and resources may be required; therefore, you may prefer to use this method only for high-cost or high-priority needs.
- The multicriteria analysis process can be manipulated by only selecting comparison variables that favor a preferred activity. Or other participants can manipulate their weightings on variables so they produce the results they desire. Such challenges can be controlled, but you have to be aware of the risk in order to ensure that this manipulation doesn't happen to you.

Process Overview

1. Understand that the multicriteria analysis process typically begins when two or more alternative interventions or activities have been identified as potential solutions to a need. Although you can complete the analysis for as many potential solutions as you have, the time and effort required to collect valid information for comparison typically will necessitate that you limit the analysis to the most likely contenders. (For helpful sample templates to serve as job aids, see page 179.)
2. Identify (a) the most important criteria to making the decision and (b) the performance criteria (attributes or characteristics) required of

alternative solutions. Typically, consider no more than five to eight attributes for any decision. Example criteria could include the following:

- Results you can expect after six months
 - Total time required
 - Number of outputs
 - Client satisfaction
 - Feasibility of implementation
 - Environmental impact
 - Ability to accomplish desired outcomes
 - Cost of the activity over the first year
 - Safety expectations
 - Number of people who will be working on the project in the first month
3. Note any “must have” (or “must not have”) attributes. For instance, if an activity or intervention must not cost more than the budget set by the organization, then this attribute provides a cap at which alternatives that go beyond the budget are no longer considered. Likewise, if minimal improvements in results must be demonstrated after three months, then potential solutions that cannot meet those specifications should also be dropped.
 4. Depending on the context of your decision and as a useful technique, apply weighting to the diverse criteria. The weights differentiate criteria according to their relative importance to the decision. For example, as you select among alternative irrigation technologies, the cost criteria may be twice as important to the decision as the time it will take to implement the technology.
 5. To establish weights, discuss the criteria with those who will be part of the decision-making process. During the discussion (which could apply a survey, interview, or focus group technique as an alternative), you should ask questions to establish the relative importance of each performance criteria that you identified in the previous step.
 6. In both establishing criteria to apply and weighing those criteria relative to one another, use a number of techniques² either separately or in combination, including the following
 - a. To assist decision makers, consider using a 100-point system (or ratio method). For instance, of the 100 total possible points, a decision

maker may assign 60 points to the maximum achievement of desired results, 40 points to cost, and 20 points to the number of staff members assigned to the project. Each value can then be divided by the total so that a percentage can be calculated. For example, if participants indicate a weight, on average, of 70 out of 100 for the cost criteria, then .70 would be the weight assigned to cost.

- b. Use hypothetical tradeoffs to prioritize criteria or set weights. For instance, ask partners whether they would prefer for the project to be completed several months late and achieve all of its objectives or for it to be completed on time but not achieve all of its objectives. Those establishing the criteria, thereby, have to make tradeoffs regarding which criteria are most important or should have the greatest weight in the decision.
 - c. Also include costs in the establishing of weights by using the pricing-out method combined with tradeoffs. This method would, for example, ask those establishing the criteria if they would prefer for the project to be completed two months late but on budget or for the project to be completed on time but 2 percent over the set budget.
 - d. Consider the *swing method*. Imagine, for example, that all of the criteria being considered were at their worst possible level (for instance, the project achieves none of its goals), then ask those establishing the criteria to identify which criterion they would want to “swing” to the highest potential level (for instance, the project achieves all of its goals), and assign this criterion 100 points. Next, ask which of the remaining criteria would be second-most important and swing its potential value. In points, how does the second criterion relate to the previous criterion (for instance, completing the project on budget might be assigned 80 points in relation to 100 points for completing all project goals)? Apply this method until you have identified the criteria to be applied or assigned weights to each criterion.
7. See how the examples in tables 3B.1 and 3B.2 illustrate how applying weighted criteria can influence the results of a multicriteria analysis. Now that you have your criteria (and weights for each when appropriate), it is time to rate each alternative activity on each of the criteria. It is important to use the same scale for each attribute. For example, if you select a scale from 1 to 10 for rating the attribute of client satisfaction (with 10 being given to alternatives that will achieve the highest levels of client satisfaction), then you would also rate the cost attribute from

Table 3B.1 Multicriteria Analysis Table Example

Comparison of Regional Government-Sponsored Alternatives for Providing Temporary Shelters after a Natural Disaster
 Ratings: 1–2 = very low, 3–4 = low, 5–6 = medium, 7–8 = high, 9–10 = very high

	Criterion 1 rating Speed in meeting needs	Criterion 2 rating Affordability (per unit)	Criterion 3 rating Quality of the shelter	Criterion 4 rating Durability (up to 12 months)	Criterion 5 rating Ease in coordination	Average rating
Alternative 1 Canvas tents (small, per family)	9	7	3	2	9	6.0
Alternative 2 Canvas tents (large, 4–6 families)	7	9	3	2	9	6.0
Alternative 3 Construction of temporary wooden structures	4	5	6	7	5	5.4
Alternative 4 Trailers, prefabricated	4	1	9	10	2	5.2

1 to 10 for each alternative (with 10 being given to the alternatives whose cost are most closely aligned with the desired budget).

8. Create a table or spreadsheet with the performance attributes listed in the columns along the top and the potential solutions listed in the rows. For each alternative intervention or activity, include an estimate for each performance criterion.
9. Review the results of the analysis. Just because a single alternative scores the highest doesn't always mean that it is by itself the right choice. In tables 3B.1 and 3B.2, for instance, alternatives 1 and 2 scored the highest overall in the unweighted comparison, suggesting that a combination of alternatives might be desirable. However, in the weighted example, where the option to assign relative value to each criterion was applied, alternative 1 was somewhat superior to alternative 2.

Table 3B.2 Multicriteria Analysis Table Example (with Weighted Criteria)

**Comparison of Regional Government-Sponsored Alternatives for
Providing Temporary Shelters after a Natural Disaster**
Ratings: 1–2 = very low, 3–4 = low, 5–6 = medium, 7–8 = high, 9–10 = very high

	Criterion 1 rating Speed in meeting needs	Criterion 2 rating Affordability (per unit)	Criterion 3 rating Quality of the shelter	Criterion 4 rating Durability (up to 12 months)	Criterion 5 rating Ease in coordination	Sum of weighted ratings
Weights	.30	.20	.15	.15	.20	
Alternative 1 Canvas tents (small, per family)	9 × .30 = 2.70	7 × .20 = 1.40	3 × .15 = 0.45	2 × .15 = 0.30	9 × .20 = 1.80	6.65
Alternative 2 Canvas tents (large, 4–6 families)	7 × .30 = 2.10	9 × .20 = 1.80	3 × .15 = 0.45	2 × .15 = 0.30	9 × .20 = 1.80	6.45
Alternative 3 Construction of temporary wooden structures	4 × .30 = 1.20	5 × .20 = 1.00	6 × .15 = 0.90	7 × .15 = 1.05	5 × .20 = 1.00	5.15
Alternative 4 Trailers, prefabricated	4 × .30 = 1.20	1 × .20 = 0.20	9 × .15 = 1.35	10 × .15 = 1.50	2 × .20 = 0.40	4.65

10. In most needs assessments and as a useful approach, consider a combination of alternative activities rather than viewing each option as mutually exclusive. You might find that combining alternatives accomplishes desired results and mitigates the potential risks of any activity on its own. In the earlier example, even though alternative 1 (small tents) ranked highest, there might be some basis for choosing a combination of the top three alternatives (small and large tents, plus wooden structures), and eliminating the remaining alternative (prefabricated trailers).
11. Use the results of the analysis and your interpretation of those results as you present decision makers with recommendations about which alternative solutions they should consider.

Note: Also consider using the multicriteria analysis technique to prioritize or rank needs (that is, gaps in results). In this application of the technique, you would work with decision makers to identify the criteria on which they would compare needs in order to set priorities (for example, the numbers of people affected by the continuation of the need, the availability of partners to help address the need, the costs to meet the need, the increasing severity of the need over time, and so forth). Then ask decision makers to compare each option using those criteria.

Tips for Success

- Don't get carried away with adding too many variables to the comparison. It is best to stick to the top five or six highest-priority variables and then to collect valid information for each alternative intervention or activity.
- Remember that no rule says you can select only one activity or solution. As you complete the analysis, keep in mind that a combination of one, two, three, or more potential activities or solutions may be the right choice for your organization and the identified need.
- As another alternative, ask participants to choose from options that include different levels of performance characteristics (for example, would you choose a solution that achieves 80 percent of the desired results over the next three years if it costs twice as much as the solution that achieves 50 percent of the desired results?). Each question in this format should include at least two of the performance characteristics at opposing levels so that you can move participants toward making a decision about which are the higher-priority characteristics in relation to the others. This procedure is an adaptation of analytic hierarchy process, another form of multicriteria analysis.
- Use multicriteria analysis in conjunction with other tools and techniques described in this section to ensure that valuable decisions are made about which performance-improvement programs and projects should be implemented.

Notes

1. The technique also uses elements of the simple multi-attribute ranking technique (SMART), which is an alternative used by engineers for applying the principles of multi-attribute utility analysis.

2. Borcherding, Eppel, and von Winterfeldt (1991) compared four methods for establishing weights; the results of the research indicated that a mix of methods was typically best, with no one technique being superior to the others.

References and Resources

- Altschuld, James W. 2010. *Needs Assessment Phase III: Collecting Data* (Book 3 of *Needs Assessment Kit*). Thousand Oaks, CA: Sage Publications.
- Altschuld, James W., and J. N. Eastmond Jr. 2010. *Needs Assessment Phase II: Getting Started* (Book 2 of *Needs Assessment Kit*). Thousand Oaks, CA: Sage Publications.
- Borcherding, K., T. Eppel, and D. von Winterfeldt. 1991. "Comparison of Weighting Judgments in Multiattribute Utility Measurement." *Management Science* 37 (12): 1603–19.
- Roth, R., F. Field, and J. Clark. 2011. "Multi-Attribute Utility Analysis." http://msl.mit.edu/maua_paper.pdf.
- Witkin, Belle Ruth, and James W. Altschuld. 1995. *Planning and Conducting Needs Assessments: A Practical Guide*. Thousand Oaks, CA: Sage Publications.

Websites

- "Analytic Hierarchy Process" can be found at http://en.wikipedia.org/wiki/Analytic_Hierarchy_Process.
- "Answers to Frequently Asked Questions about Decision Analysis" can be found at <http://www.infoharvest.com/ihroot/infoharv/infoharvestfaq.asp>.
- Multiattribute utility models can be found at http://www.ctg.albany.edu/publications/guides/and_justice_for_all?chapter=9&PrintVersion=2.

Samples of Job Aids

Multicriteria Analysis Template (no weights)

	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	<i>Average rating</i>
Alternative 1						
Alternative 2						
Alternative 3						
Alternative 4						

Multicriteria Analysis Template (with weights)

	Criterion 1	Criterion 2	Criterion 3	Criterion 4	Criterion 5	<i>Sum of weighted ratings</i>
Weights	Insert weight	Insert weight	Insert weight	Insert weight	Insert weight	
Alternative 1						
Alternative 2						
Alternative 3						
Alternative 4						



TABLETOP ANALYSIS

Purpose

Tabletop analyses are facilitator-led discussions that are used in a wide variety of settings to identify gaps, performance deficiencies, and communication problems in a given system.

Needs Assessment Applications

Tabletop analyses can be used as a decision-making technique for numerous needs assessment applications. They can identify gaps in performance at several levels (individual performance, unit or group performance, or organizational performance). In addition, they can *identify gaps within systems*, such as communication breakdowns or poor resource allocation). Finally, a tabletop analysis can *identify, analyze, and evaluate potential solutions* to a performance problem.

A tabletop analysis is a discussion-based activity in which a group of participants works with a facilitator. A problem or need, which is based on a specific performance area (such as municipal sanitation services), is presented to the participants. The participants then (a) systematically work through, discuss, and refine the problem focus; (b) develop a strategy for analyzing the problem; (c) collect data on the basis of the analysis plan; (d) analyze the data to determine the specific performance gaps; and (e) identify potential solutions for the performance gap. The participants and facilitator use a collaborative problem-solving approach to identify and find solutions to performance-related problems. The outcomes from this exercise allow you to identify and analyze the actual performance and to identify potential sources (and solutions) for a given performance area.

Advantages and Disadvantages

Advantages

- You do not require access to a lot of resources to conduct a tabletop analysis. This technique is not expensive to use in terms of material requirements.
- Tabletop analyses are usually conducted over a time frame of only a few hours, so the time requirements for participants are minimal. Note, however, that the time required to effectively prepare and analyze the tabletop analysis is longer.
- Employee participants learn about the needs assessment process and key issues (such as goals, gaps, actual, and ideals) through their active participation and are, therefore, able to create awareness of such issues in their on-the-job environment.¹
- The tabletop analysis is an effective technique for
 - Reviewing and analyzing existing plans, procedures, and policies
 - Identifying any factors inhibiting effective performance
 - Handling breakdowns in communication between groups or systems
- Tabletop analyses promote buy-in for both the process and the results of the exercise, because stakeholders and representatives from the organization are an active part of the process.
- Tabletop exercises generally require participants to review performance-related documents and to participate actively in discussions about the performance environment. The tabletop analysis can, therefore, yield much information in a short time span, potentially reducing the necessity for extensive use of other techniques and tools to complete the needs assessment.²

Disadvantages

- The tabletop analysis process is a discussion-based approach to analyzing performance within a system. Because no simulation and no on-the-job performance observations are conducted, the tabletop analysis may not be a true test of the effectiveness of a system's performance.
- An essential ingredient for the tabletop analysis is the active participation of key representatives from the system where the performance gap is sus-

pected to be. If you are not able to secure the involvement of key participants, the effectiveness and accuracy of the tabletop analysis will be hampered significantly.

- Active participation and dialogue are an essential part of this technique. If the facilitator cannot enable a high level of active engagement during the technique, then the amount of insight gained from the activity is very limited.
- The activity requires two sessions (or meetings), with some work being done by group members in between sessions.

Process Overview

Planning and Preparing

1. From the list of information required for the needs assessment, determine the specific scope of the tabletop analysis by focusing on what functions or elements should be analyzed through the tabletop analysis and on who should participate in the tabletop analysis.
 - a. When identifying the functions or elements, ask, “What is the specific performance area, and what are the key procedures or operations that should be analyzed by the tabletop analysis participants?”
 - b. When selecting participants, ask, “Who are the specific individuals who should take part in the exercise?” Examples of individuals interested in municipal sanitation could include sanitation department managers and supervisors, sanitation workers, staff members from the mayor’s office, commercial business owners, and community members—among others.
2. Schedule the tabletop analysis activity, and invite the appropriate participants. Introduce the participants to the tabletop analysis by (a) introducing them to the concept of a tabletop exercise and (b) explaining how the tabletop analysis is being used in the context of the needs assessment. Set the tone for the collaboration process and the ground rules for the activity, if appropriate.
3. If possible, arrange to have an experienced facilitator coordinate the implementation of the tabletop analysis.
4. Make arrangements for a comfortable meeting facility that provides conditions for the use of projection technology, if appropriate.

Conducting the Tabletop Analysis: First Session

1. Use the broad information identified during the planning and preparation stage. To kick off the tabletop analysis with the participants, focus on building consensus about the problem to be tackled and the desired outcomes from the tabletop analysis. Introduce the problem to the participants (for example, community frustration with sanitation services), and engage them in a brainstorming discussion as they explore questions and issues such as the following:
 - a. Effect of the problem on the community
 - Garbage is piling up in some communities. Residents complain of rodents, smells, and other related problems to the mayor's office.
 - b. Factors potentially contributing to the problem
 - The community has increased urbanization, inadequate housing, garbage truck breakdowns, inadequate inspections, and shortages of sanitation workers.
 - c. Questions that should be answered to analyze the problem
 - How does the community plan to address housing shortages?
 - What can be done in the short and long term to address increases in garbage quantity?
 - What are options for recycling and reducing community consumption?
 - d. Expected outcomes of the tabletop analysis
 - Recommendations will be made to the sanitation department to address the different causes of the sanitation complaints.
 - e. Strategy for using the results from the tabletop analysis
 - The organizers of the tabletop analysis will follow up with community leaders on recommendations and will bring back this group in six months to discuss changes that have and have not occurred.
2. Work with the participants to generate a specific problem statement. Write the problem statement and the expected outcomes of the tabletop analysis in a prominent place, so that both the participants and the facilitator can refer to the list during the remainder of the activity.
3. Facilitate a discussion to develop a strategy for analyzing the problem. Begin the discussion by asking participants to identify the following:

- a. Describe the specific types of information required to answer the key unknowns about the problem. These types of information should be structured in general categories such as (a) ideal performance, (b) current (actual) performance, (c) performance gaps, (d) causes of performance gaps, and (e) solutions to performance gaps.
 - b. Name the sources that can be consulted to gather each type of information that participants identify as part of the analysis. Sources of information may include documents, individuals, performance observations, work products, and so on. Ask participants to identify, to the extent possible, the specific source of information (for example, the specific documents that provide information on ideal performance).
 - c. As the participants identify the information necessary, verify that the information requirements are aligned with the purpose statement. Ask, “Will this information help you find answers to your original problem and to the outcomes you wish to achieve?”
4. After the list of sources has been identified, make the arrangements necessary for locating any document sources that participants identified and that have not been located yet. In addition, schedule the interviews and meetings that are required to gather information described in the analysis plan. Assign interview responsibilities to participants as required.

Conducting the Tabletop Analysis: Second Session

1. Ask the participants to reconvene and to work through the data that were identified during the first session so they clearly formulate the current and ideal performance for the problem area explicated in the purpose statement.
2. Guide the participants in creating a systematic listing of the conditions, procedures, and tasks that would, under ideal circumstances, take place. Encourage participants to refer to the document sources and collected data as this list is created. Create the list on a flip chart or whiteboard so that it can be seen by all participants.
3. Ask the participants to review the list of ideal tasks, procedures, and conditions and to verify its completeness and accuracy.
4. Next, ask participants to refer to the documents and data that were collected so they identify specific gaps in the performance area. Emphasize that gaps, rather than causes, should be identified. Also verify regularly that the gaps that are being identified are directly related to the purpose

statement for the tabletop analysis. If appropriate, work with the participants to group together gaps that have common attributes. Write the list of gaps on the flip chart or whiteboard.

5. After the gaps have been identified, ask participants for insight about potential causes of each of the gaps, as well as for potential solution strategies. Work through the list of gaps in a systematic manner, and write possible solutions for each gap (or group of gaps) on the flip chart or whiteboard. Solutions should be aligned with the original purpose statement and should be evaluated for feasibility.
6. To conclude the tabletop analysis, evaluate the results from the analysis against the expected outcomes that were listed during the first tabletop analysis session. If there is consensus that the expected outcomes have been achieved, then conclude the discussion by working with the participants to determine what to do with the results from the analysis. For example, a debriefing session could be conducted with key stakeholders to report on the results of the analysis and to discuss the solution strategies that were identified. Alternatively, the decision could be made to use additional data collection techniques to validate the results from the tabletop analysis.

Tips for Success

- Carefully select the participants for the tabletop analysis. Consider including experts, decision makers, supervisors, and current employees in the activity. The specific participants in the tabletop analysis should be aligned with the specific goal of the activity.
- Because facilitation is an essential ingredient for the success of the tabletop analysis, select an experienced facilitator for implementing this technique.³ The facilitator should be well informed about the topics of discussion, including potential areas of sensitivity among tabletop participants.
- Develop and distribute materials about the goal, focus, and purpose ahead for the scheduled activity of the tabletop analysis. These materials will ensure that the tabletop analysis can get under way most efficiently.
- Limit the length of each tabletop analysis session. Each session should generally not last more than 3–4 hours.
- Consider recording the actual tabletop analysis, thereby giving you the option at a later date to revisit the information shared during the activity.

If you decide to record the session, make sure that you inform all of the participants and that you identify a secure way of storing the recorded data so that participants do not have to be concerned about their participation in the tabletop analysis negatively affecting them professionally.

- Control the size of the group for the tabletop analysis. To be effective and manageable, the size of the group of participants should generally range from between 5 and 15 participants.

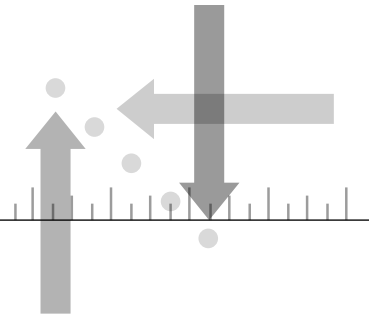
Notes

1. See <http://www.hss.doe.gov/nuclearsafety/ns/techstds/docs/handbook/hdbk1103.pdf>.
2. Ibid.
3. Ibid.

Websites

An example of the technique applied in instructional design context can be found at <http://www.nwlink.com/~donclark/hrd/needsalt.html#various2>.

The U.S. Department of Energy handbook on tabletop needs analysis is located at <http://www.osti.gov/bridge/servlets/purl/459762-JeQi3h/webviewable/459762.pdf>.



PAIR-WISE COMPARISON

Purpose

The pair-wise comparison technique is used when you have multiple options to prioritize. It helps you to narrow the options according to a set of agreed-upon criteria. It may be used to prioritize or rank needs (that is, gaps in results) or possible solutions (that is, interventions or activities) to address those needs.

Needs Assessment Applications

A pair-wise comparison is a simple, yet effective, tool for facilitating group decisions that are based on the information collected during a needs assessment. This analysis technique is a worthwhile tool for prioritizing needs, determining the relationships among multiple causal factors, or recommending potential improvement activities. Whenever you have multiple options or alternatives to consider, you can quickly use a pair-wise comparison to advance group discussions toward a decision. (For a helpful sample template to serve as job aids, see page 190.)

Advantages and Disadvantages

Advantages

- A pair-wise comparison is easily done and can be completed quickly during a group discussion to progress toward a decision or recommendation.

- Criteria for comparing options can remain informal, thereby letting participants make judgments that are based on their experience and expertise.

Disadvantages

- Pair-wise comparisons do not provide the level of detail or sophistication of a multicriteria analysis (see page 171).
- Although criteria for making comparisons are discussed within the group, each participant may apply varying criteria (without public disclosure to other group members) when making comparisons.

Process Overview

1. Make sure that the analysis process begins (as is typical) with (a) two or more needs, (b) two or more alternative interventions, or (c) activities that were previously identified as potential solutions to a need. Although you can complete the analysis for the number of potential needs solutions that you have, the time and effort required to collect valid information for comparison typically necessitates that you limit the analysis to no more than five or six of the most likely contenders.
2. List the possible options in both the first column and the first row of the pair-wise comparison table (see table 3B.3). Working with those who will be making the decision or recommendation, discuss the performance criteria required of alternatives.

Examples of Criteria for Comparing Needs and Solutions

Example criteria for comparing **needs** could include the following:

- Number of people influenced by the continuation of the need
- Availability of partners to help address the need
- Anticipated costs to meet the need
- Increasing severity of the need over time
- Alignment of the needs with the institution's mission

Example criteria for comparing **solutions** could include the following:

- Total time required
- Cost of the activity over the first year
- Environmental impact

Table 3B.3 Sample of a Completed Pair-Wise Comparison Table

	Option A Playground equipment	Option B Benches	Option C Picnic tables	Option D Tree and flower planting	Option E Walking paths
Option A Playground equipment					
Option B Benches	B				
Option C Picnic tables	A	B			
Option D Tree and flower planting	D	D	D		
Option E Walking paths	E	B	E	D	

Note: This example presents some options preferred by community members for a new community park, which is part of a larger municipal project to build and improve green spaces in the city. In the example, the number of pair-wise “wins” is as follows: A (playground equipment) = 1, B (benches) = 3, C (picnic tables) = 0, D (tree and flower planting) = 4, E (walking paths) = 2. By using this example, you might concentrate your group discussions going forward more on building a park that emphasizes trees and flowers, benches, and walking paths. But you might also consider that you may not have had a representative number of young parents with children in your pair-wise session. This example gives one set of rankings at one point in time and is a good reminder that multiple sessions may be needed with different groups to get a representative picture of community preferences.

- Results expected after six months
 - Feasibility of implementation
3. Talk with others about the most important criteria (or attributes) to making the decision (time, cost, number of outputs, client satisfaction index, number of injuries, ability to accomplish desired outcomes, and so on). Typically, consider no more than two to three criteria for any decision.
 4. If you are in a group setting, write the agreed-upon criteria on a whiteboard or flip chart.
 5. Ask participants who will be making the decision or recommendation to keep each of the discussed criteria in mind as they compare each option using the pair-wise comparison table in table 3B.3. For example, is Option A or Option B the preferred option according to the discussed criteria? Then, is Option A or Option C the preferred option, and so forth. Continue until all options have been compared.

6. Have participants count the number of times each option appears in the table. The option that was selected the greatest number of times, in comparison with the alternatives, is the leading option.
7. Review the analysis carefully, noting that this technique does not directly facilitate the comparison of combinations (for example, Option A combined with Option C). Discuss with participants the results of the analysis so that you can make decisions or recommendations, with the analysis results being one of the primary inputs to the decision.

Websites

An example of pair-wise comparisons applied to voting can be found at <http://www.pbs.org/teachers/mathline/concepts/voting/activity3.shtm>.
 Examples worked through to illustrate the technique can be found at http://deseng.ryerson.ca/xiki/Learning/Main:Pairwise_comparison.

Sample of Job Aids

Pair-Wise Comparison Template

	Option A	Option B	Option C	Option D	Option E
Option A					
Option B					
Option C					
Option D					
Option E					



2 × 2 MATRIX DECISION AIDS

Purpose

The purpose of a 2 × 2 matrix decision aid is to examine multiple perspectives on issues identified during a needs assessment. A number of perspectives can be compared in the 2 × 2 matrix format (for instance, risks vs. rewards, your view vs. the view of others, what you know vs. what you don't know, or urgency vs. importance). Therefore, we have combined these techniques on the basis of their shared similarity of using the 2 × 2 matrix to represent alternative perspectives.

Needs Assessment Applications

Needs (or gaps between current and desired results) are viewed from many perspectives within an organization, which can make the findings of an assessment challenging to prioritize and to turn into justifiable decisions. For example, when gaps between current and desired results are identified, the perspectives of individuals directly associated with the performance (for example, public service providers) will often differ from the perspectives of those who depend on the results (for example, general public, customers, and so on). Likewise, perspectives on the amount of potential risk that can be tolerated in relation to the potential benefits will also vary across individuals and groups—including the views of partners internal to your organization (such as managers from other units, technology specialists, and others) and those external to your organization (such as government agency staff members, development partners, community groups, and others).

Use 2 × 2 matrix decision aids to assist in identifying the priorities, selecting solutions or activities, facilitating group discussions, or verifying that you have examined the issues identified in the needs assessment from multiple viewpoints. Although examples of 2 × 2 matrix decisions aids are

used in this guide to illustrate the value of the technique, you can substitute these examples with other examples within the context of your assessment. The 2×2 matrix format allows you to compare and contrast a variety of perspectives in an easy-to-complete format.

Advantages and Disadvantages

Advantages

- A 2×2 matrix decision aid can ensure that multiple perspectives are considered when needs assessment findings are prioritized.
- The results of a 2×2 matrix decision aid can help you communicate with others when prioritizing needs, identifying appropriate solutions, or justifying decisions.
- You can use a 2×2 matrix decision aid to expand on needs assessment findings, including information on the preferences of differing groups regarding what should be done in response to identified needs.
- A 2×2 matrix decision aid allows for potential positive and negative consequences to be considered prior to decision making.
- Using this technique, you can compare and contrast the value of taking an action (or selecting a need as a high priority, or implementing a solution) to *not* taking an action (or not selecting a need as a high priority, or not implementing a solution). Too often the latter—decisions not to do something—are not considered for their potential consequences or payoffs.
- A 2×2 matrix decision aid ensures that multiple perspectives are included in decisions regarding all needs and potential solutions, thus avoiding a situation where needs assessment data are simply used to confirm preexisting perspectives about what should be done.

Disadvantages

- A 2×2 matrix decision aid can be more limited than other tools or techniques (for example, SWOT or brainstorming) for generating ideas about what to do next.
- A 2×2 matrix decision aid typically requires that all stakeholders value the perspectives and potential differences between groups within the organization.

- The analysis of this technique is only as useful as the quality of information available from the needs assessment.
- Identified comparative characteristics in each “cell” of the 2×2 matrix decision aid are only listed, and not prioritized or given differentiating weights.

Process Overview

1. Create either a list of the needs (or gaps in results) that were already identified in the needs assessment process or a list of the potential activities (or solutions) that you are considering as recommendations that are based on the needs identified during the assessment. It is best not to mix the two (needs and solutions). If you want to gain perspectives on both the prioritization of the needs and the prioritization of potential interventions, then conduct two separate applications of the 2×2 matrix decision aid.
2. Identify representatives from other groups with varying perspectives on the issue (for instance, agency managers, new employees, field employees, central or headquarters employees, donor institution representatives, government ministry officials, community members, or other development partners).

Example of Differing Perspective¹

1. Provide the representatives with the issues identified during the needs assessment (for instance, needs or potential activities), and ask them to prioritize these issues according to their perspective.
2. Prioritize the same list of issues from your perspective as well. If you are working with a team on the needs assessment, then this prioritization can be done as a team through a variety of group decision-making techniques.
3. With a priority list from each group, place the highest priority data elements into the 2×2 matrix decision aid. Consider including your priorities in comparison with the priorities of another group (see table 3B.4). Or compare the priorities from differing groups, leaving out your perspective (see table 3B.5).
4. Review the complete 2×2 matrix decision aid—along with recommendations of how to expand the needs assessment to address gaps between

Table 3B.4 Differing Perspectives Example A: Prioritizing Needs (Youth Employment)

	High priorities of city youth	Low priorities of city youth
High priorities of city employment agency	<ul style="list-style-type: none"> • Low youth employment rate • Few internship opportunities with local businesses 	<ul style="list-style-type: none"> • Low employment rate for aging populations
Low priorities of city employment agency	<ul style="list-style-type: none"> • Few youth recreation centers open in evenings • Moderately high education fees for youth training courses 	<ul style="list-style-type: none"> • Decreasing retention rate of city employment agency employees

Table 3B.5 Differing Perspectives Example B: Comparing Potential Solutions (Organizational Performance)

	High priorities for new employees	Low priorities for new employees
High priorities for managers	<ul style="list-style-type: none"> • Performance specific training • Redesigned new employee orientation 	<ul style="list-style-type: none"> • New hiring standards • Renewed emphasis on standardized interviewing procedures
Low priorities for managers	<ul style="list-style-type: none"> • Improved mentoring program • Quarterly performance feedback system 	<ul style="list-style-type: none"> • Motivational workshops

what is known and what is unknown from each perspective—with your needs assessment partners.

Example of Risk vs. Rewards

1. Provide the representatives with the issues identified during the needs assessment (for instance, needs or potential activities), and ask them to identify the associated risks and rewards for each issue. For example,
 - What are the associated risks and rewards of addressing or not addressing the identified need?

- What are the associated risks and rewards of implementing or not implementing this activity?
2. Note that the analysis combines perspectives to examine the risks and rewards of taking or not taking action. Work with assessment partners to come to an agreement about the risks and rewards included in each 2 × 2 matrix.
 3. Create a 2 × 2 matrix to illustrate the associated risks and rewards for each issue (see tables 3B.6 and 3B.7).
 4. Review the complete 2 × 2 matrix with your needs assessment partners, along with recommendations of how to expand the needs assessment to address gaps between what is known and what is unknown.

Table 3B.6 Rewards vs. Risks Example C: Addressing Needs (Project Completion Delays)

	Address need (takes too long to complete projects)	Do not address need (takes too long to complete projects)
Rewards	<ul style="list-style-type: none"> • Reduces the time to complete projects • Makes project completion as important as project initiation 	<ul style="list-style-type: none"> • Maintains focus on project initiation
Risks	<ul style="list-style-type: none"> • Distracts managers from other strategic priorities • Increases the cost of projects 	<ul style="list-style-type: none"> • More projects are at risk of failure to meet goals • Country needs change before a project can be completed

Table 3B.7 Rewards vs. Risks Example D: Implementing Solutions (Employee Mentoring)

	Implement mentoring program	Do not implement mentoring program
Rewards	<ul style="list-style-type: none"> • Knowledge sharing • Better engagement of new staff members 	<ul style="list-style-type: none"> • Saves time and money • Do not have to place additional burdens on managers
Risks	<ul style="list-style-type: none"> • Encourages sharing of bad habits • Requires time of managers 	<ul style="list-style-type: none"> • New staff members are not able to perform roles as soon • Knowledge of staff members continues to leave when they leave

Tips for Success

- Before getting started, discuss with participants the specific goals you are hoping to accomplish by using the 2×2 matrix decision aid.
- Work with group members to include factors in all four quadrants of the matrix. Leaving quadrants of the matrix empty will limit your ability to make quality decisions.
- Focus each 2×2 matrix on just one need or potential solution. It can be tempting to save time by combining needs or solutions, but doing so typically leads to general discussions rather than to a focused decision.
- Strive to include at least three items in each of the four cells of the 2×2 matrix.
- Remember that a decision not to take action (or not to address a need, or not to implement a solution) is a decision that carries potential risks and rewards, just as does a decision to take action.
- The book by Alex Lowy and Phil Hood (2004) contains more than 50 examples of 2×2 decision aids that can be used to improve performance.

Note

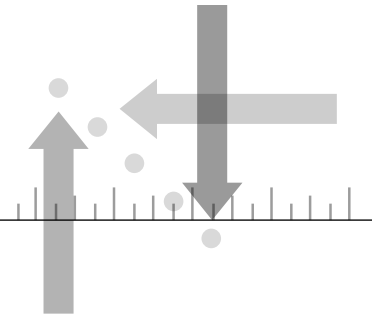
1. The differing perspectives example is loosely based on the Johari Window activity used by psychologists.

References and Resources

- Beach, E. K. 1982. "Johari's Window as a Framework for Needs Assessment." *Journal of Continuing Education in Nursing* 13 (1): 28–32.
- Lowy, Alex, and Phil Hood. 2004. *The Power of the 2×2 Matrix: Using 2×2 Thinking to Solve Business Problems and Make Better Decisions*. San Francisco: Jossey-Bass.
- Witkin, Belle Ruth, and James W. Altschuld. 1995. *Planning and Conducting Needs Assessments: A Practical Guide*. Thousand Oaks, CA: Sage Publications.

Website

"Risks versus Rewards Worksheet" is available at <http://www.lifehack.org/articles/lifehack/risks-versus-rewards-worksheet.html>.



FISHBONE DIAGRAMS

Purpose

The fishbone diagram—so called because of its resemblance to a fish skeleton—is a cause-and-effect diagram that can be used to identify the potential (or actual) cause(s) for a performance problem. Fishbone diagrams provide a structure for a group’s discussion about the potential causes of a problem.

Needs Assessment Applications

Fishbone diagrams are often used in needs assessment to assist in illustrating and communicating the relationships among several potential (or actual) causes of a performance problem. Likewise, these graphical representations of relationships between needs (or discrepancies between desired and actual results) offer you a pragmatic tool for building a system of performance-improvement interventions—for instance, a combination of mentoring, using job aids, training, enhancing motivation, and arriving at new expectations—around the often complex relationships found across potential (or actual) causes.

Advantages and Disadvantages

Advantages

- Fishbone diagrams permit a thoughtful analysis that avoids overlooking any possible root causes for a need.

- The fishbone technique is easy to implement and creates an easy-to-understand visual representation of the causes, the categories of causes, and the need.
- By using a fishbone diagram, you are able to focus the group on the big picture as to possible causes or factors influencing the problem or need.
- Even after the need has been addressed, the fishbone diagram shows areas of weakness that—once exposed—can be rectified before causing more sustained difficulties.

Disadvantages

- The simplicity of a fishbone diagram can be both its strength and its weakness. As a weakness, the simplicity of the fishbone diagram may make it difficult to represent the truly interrelated nature of problems and causes in some very complex situations.

Process Overview

1. Identify gaps between the results (or performance) that are required for the successful accomplishment of your program's or project's results chain (also commonly referred to as a results framework, logic frame, or logic model) and the current achievements to date.
2. Generate a clear, concise statement of the need(s). Make sure that everyone in the group agrees with the need as it is stated. For example, the application of modern agricultural techniques among the population is at 25 percent, and the aim of your program or project is for 75 percent of the population to use modern techniques (leaving you with a gap or need of 50 percent).
3. Using a long sheet of paper or a white board, draw a horizontal line. This line will be the spine of the fish. Write the need along the spine, on the left-hand side.
4. Identify the overarching categories of causes of the need. Brainstorming is often an effective technique for identifying the categories of causes. For each category of causes, draw a bone—a line at a 45-degree angle from the spine of the fish. Label each bone (see figure 3B.1) with the cause categories; for instance, categories could include materials, knowledge or skills, time, motivation, incentives, performance feedback, and others.¹
5. Have the group brainstorm to identify the factors that may be affecting the cause or the need or both. For each category of causes, the group

should be asking, “Why is this happening?” Add each “why” to the diagram, clustered around the major cause category it influences.

- Repeat the procedure by asking, “Why is this happening?” for each effect until the question yields no more meaningful answers (see figure 3B.2).

Figure 3B.1 A Basic Fishbone Diagram

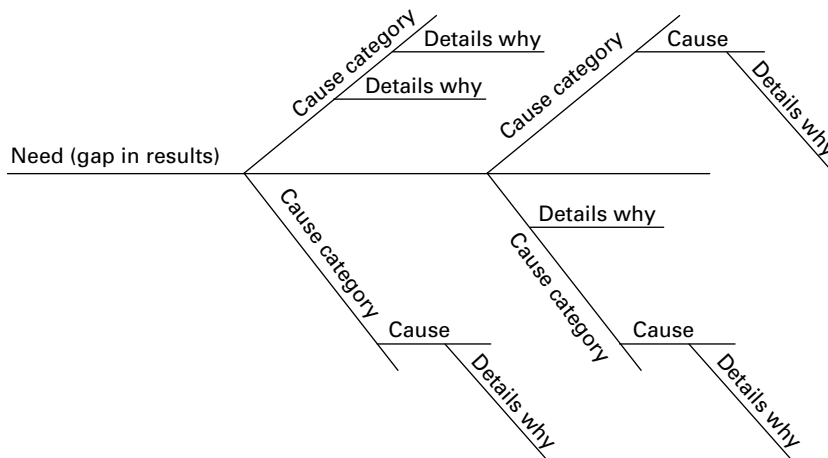
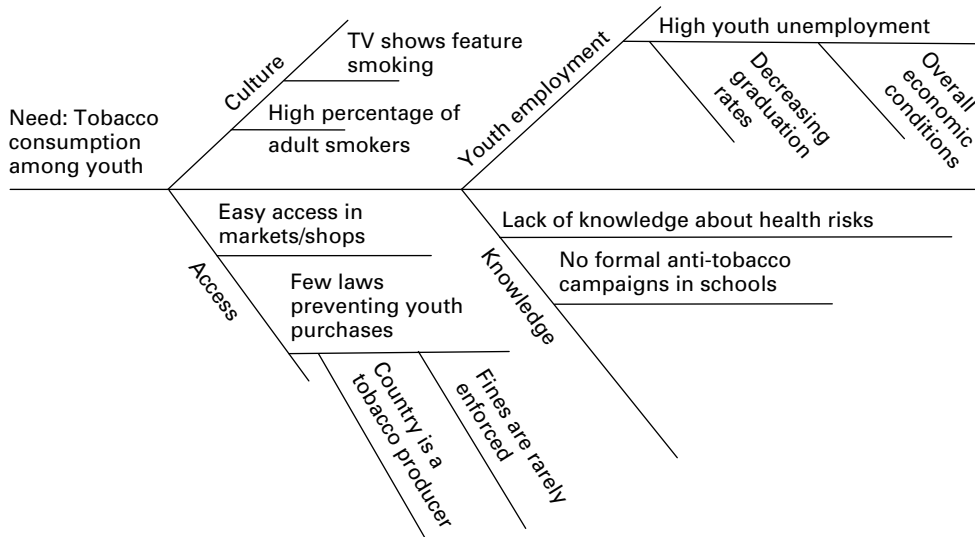


Figure 3B.2 An Annotated Fishbone Diagram



7. When the group has reached a consensus that the diagram contains an adequate amount of information, analyze the diagram. In particular, look for causes that are appearing in more than one section of the diagram.
8. Circle anything that seems to be a root cause for the need. Prioritize the root causes, and decide to take action, a move that may involve further investigation of the root causes.

Tips for Success

- Make sure that the group has consensus about both the need and the characteristics of the cause statement before beginning the process of building the fishbone diagram.
- If appropriate, graft (add) branches that do not contain a lot of information onto other branches. Likewise, you can split branches that have too much information into two or more branches.
- Make parsimonious use of words while populating the fishbone diagram. Only use as many words as necessary to describe the cause or effect.

Note

1. Also see the performance pyramid tool (page 236) for additional categories that may be applied.

References and Resources

- Altschuld, James W. 2010. *Needs Assessment Phase III: Collecting Data* (Book 3 of *Needs Assessment Kit*). Thousand Oaks, CA: Sage Publications.
- Altschuld, James W., and J. N. Eastmond Jr. 2010. *Needs Assessment Phase II: Getting Started* (Book 2 of *Needs Assessment Kit*). Thousand Oaks, CA: Sage Publications.
- Gupta, Kavita, Catherine M. Sleezer, and Darlene F. Russ-Eft. 2007. *A Practical Guide to Needs Assessment*. San Francisco: Pfeiffer.
- Witkin, Belle Ruth, and James W. Altschuld. 1995. *Planning and Conducting Needs Assessments: A Practical Guide*. Thousand Oaks, CA: Sage Publications.

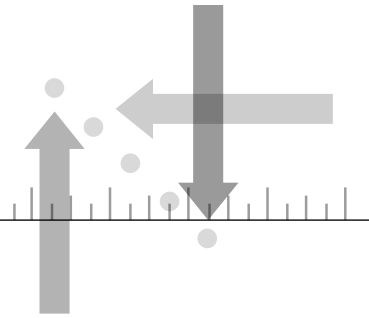
Websites

Cause analysis tools (American Society for Quality has an example of a fishbone diagram) are available at <http://www.asq.org/learn-about-quality/cause-analysis-tools/overview/fishbone.html>.

The fishbone diagram (Six Sigma has templates for making fishbone diagrams in Microsoft Word and Microsoft Excel) is available at http://www.isixsigma.com/index.php?option=com_k2&view=item&id=1416:the-cause-and-effect-aka-fishbone-diagram&Itemid=200.

“Use a Fishbone Diagram to Help Attack Complex Problems” (from TechRepublic) is available at http://articles.techrepublic.com.com/5100-10878_11-6092236.html?tag=nl.e053.

SCENARIOS



Purpose

The purpose of scenarios is to provide contextual explorations of the potential strengths and weaknesses of different combinations of performance-improvement interventions. Scenarios are most useful in situations where the number of possible directions is large or where there is a large degree of uncertainty.

Needs Assessment Applications

The best decisions are typically made when you can compare and contrast the potential benefits and the potential risks of each decision. The same is true in needs assessment, especially when it is time to recommend what to do next according to your needs assessment findings.

Use scenarios during this stage of your needs assessment to provide examples of different combinations of performance-improvement activities. For instance, scenario A could be a mentoring program paired with some training and a job aid, whereas scenario B could be a management performance feedback tool paired with training, new work policies, and a new rewards structure. By comparing both the benefits and the risks of alternative scenarios, you have a foundation for recommendations about the appropriate balance of risk and reward for your program or organization.

Advantages and Disadvantages

Advantages

- Scenarios allow decisions to be made by examining multiple alternatives rather than single solutions.
- Instead of simply reviewing options as discrete alternatives, scenarios can provide contexts for making decisions. Scenarios are especially valuable when you are dealing with a complex situation in the context of the needs assessment.
- Decision makers often value scenarios for their ability to provide a visual illustration of different alternatives within the organization's context.
- Multiple scenarios can also be used to contrast positive and pessimistic views, thus providing a balanced perspective.

Disadvantages

- Developing realistic scenarios can be time-consuming, and there is no guarantee of what results will actually be yielded as the situation in the scenario is implemented.
- Scenarios can (but should not) limit decision makers to examine only the combinations of activities or solutions included in the presented scenarios.

Process Overview

1. Complete the identification of needs (gaps in results) and the associated analysis of causal factors.
2. Identify sets of potential activities or solutions that will assist in accomplishing desired results while also addressing the potential causes of problems with the current performance.
3. For each set of potential activities, create a scenario based on the results your program or organization could realistically expect to accomplish and the risks associated with the implementation of each set (including economic, time, and opportunity costs). Each scenario should use the same concrete time frame (for example, 1 year, 18 months, 3 years) and should apply similar constraints that could affect implementation.

4. In each scenario, describe the factors that are internal and external to the organization and that are likely to increase or decrease the successful achievement of desired results. Here are some ideas to consider when developing the substance of a scenario:
 - a. Build uncertainties and unexpected events into each scenario.
 - b. Use information on trends and on the character of the organization to write each scenario.
 - c. Write each scenario so that it seems plausible. Choose names used in the scenario carefully; they can communicate a great deal to the reader.
 - d. It is generally a good idea to make each scenario about one page long.
 - e. Give each scenario a short and meaningful title.
5. Develop two or three scenarios for each of the sets of potential activities (or solutions) that meet the requirements dictated by the performance pyramid tool (see page 236) by Wedman (2010). Scenarios can be written from several perspectives (for example, yours, the agency management's, a community member's). Therefore, it is important that you describe each scenario from a similar perspective (thus ensuring that you are comparing "apples to apples").
6. After a solid draft of each scenario has been developed, validate the scenarios with experts and others who are familiar with the situation. Make any changes recommended by the scenario reviewers before sharing the scenarios with decision makers.
7. Schedule time with the groups or individuals who will be making decisions about which activities to implement.
8. Provide at least two or three scenarios to the groups or individuals selected for participation. Often, it is helpful to provide varying perspectives in different scenarios, including both positive and pessimistic views. If your scenarios are longer than a page or two, provide the scenarios to the decision makers before the meeting.
9. Discuss each scenario with the participants, highlighting the strengths and weaknesses exhibited in the context described in each. (Scenarios are best estimates of how the interventions would be implemented and how the results would be accomplished; thus, decision makers must

take into account that later implementation may or may not mirror the scenario's description).

10. Ask group members to rank each scenario and to provide alternative combinations of the activities that could be used for a second round of scenarios (if desired).
11. After you have finished administering the scenarios, you may be asked to write a report discussing the results. If so, it is generally a good idea to include summaries of the scenarios, as well as an overview of how scenarios were shared with participants. Keep your report short, highlighting key data without overburdening the readers with too much detail. Include observations and conclusions, and provide some suggestions for next steps.

Tips for Success

- Create multiple scenarios, with each scenario having a unique balance of risk and benefits that are based on multiple perspectives within the organization.
- Don't paint too rosy a picture within each scenario. The scenarios should be realistic and should show no preference for one set of activities or solutions over another.
- Inform decision makers that they don't have to select a scenario but that other combinations can also be developed, depending on the balance of rewards and risks that the organization is looking for in the program or project.

References and Resources

- Watkins, Ryan. 2007. *Performance by Design: The Systematic Selection, Design, and Development of Performance Technologies That Produce Useful Results*. Amherst, MA: HRD Press, and Silver Spring, MD: International Society for Performance Improvement.
- Wedman, John F. 2010. "Performance Pyramid Model." In *Handbook of Improving Performance in the Workplace*. Vol. 2: *Selecting and Implementing Performance Interventions*, edited by Ryan Watkins and Doug Leigh, 51–80. San Francisco: Wiley/Pfeiffer, and Silver Spring, MD: International Society for Performance Improvement.

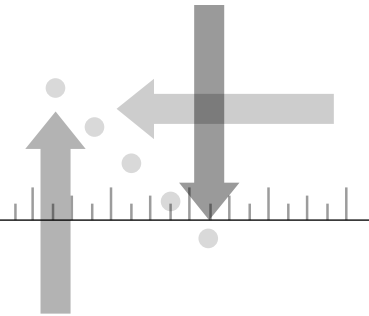
Witkin, Belle Ruth, and James W. Altschuld. 1995. *Planning and Conducting Needs Assessments: A Practical Guide*. Thousand Oaks, CA: Sage Publications.

Websites

Examples of scenarios (from Arizona State University) are available at <http://cals.arizona.edu/futures/sce/scemain.html>.

Scenarios: An explorer's guide is available at http://www-static.shell.com/static/aboutshell/downloads/our_strategy/shell_global_scenarios/scenario_explorersguide.pdf. (This document from the Shell Corporation is written for people who want to build scenarios and for those who want to help develop scenario-thinking skills.)

Scenarios Toolkit developed for The European Centre for the Development of Vocational Training is available at http://www.cedefop.europa.eu/EN/Files/6009_en.pdf.



ROOT CAUSE ANALYSIS

Purpose

The goal of a root cause analysis (RCA) is to identify the contributing causal factors that have led to a performance problem.

Needs Assessment Applications

Identifying gaps between current and desired performance is the primary goal of a needs assessment, yet alone this information is not adequate for making decisions about what to do to improve performance. An RCA is, therefore, a useful tool for examining the contributing factors that are preventing current achievements from matching your desired accomplishments (see box 3B.1). An RCA offers a systematic process that can help you determine which processes, procedures, tools, or policies (or combination of the three) are limiting performance and leading to the needs found in your assessment.

Identified root causes can then be targeted by the solution recommendations coming out of the needs assessment. Later, the results of the RCA can

Box 3B.1 Sample Uses of Root Cause Analysis

- Separate problems from symptoms when conceptualizing new projects with clients or partners.
- Identify factors causing a project to be at high risk of failure.
- Determine why a policy reform did not accomplish desired results.
- Resolve questions about how corruption entered a project.

also be monitored to ensure that organizational changes are having the desired effect and to avoid suboptimization (where improvements in one area lead to new problems in other areas). The ability of the RCA to provide this valuable information makes it an integral component to most needs assessments.

Advantages and Disadvantages

Advantages

- An RCA provides a systematic process for examining performance problems for their root causes rather than relying on unverified assumptions or stakeholder perceptions about causes.
- An RCA ensures that you inspect a performance issue from multiple perspectives to determine the range of causes leading to the less-than-desired performance (as opposed to assuming that the causes of the issues are well known and agreed upon by everyone involved).
- Many times an RCA will identify both the components of the system that are blocking desired performance (for instance, out-of-date-procedures or misunderstood expectations) and the parts of the system that are working well at promoting desired performance (for instance, quality managerial feedback). In the end, improving performance routinely requires both fixing the problems and expanding on the things that are being done right.

Disadvantages

- An RCA will frequently identify more causal factors than you have anticipated or are likely to have the budget to address individually. Therefore, it is important to determine the relative effect of each factor and to address as priorities the effects that are the most critical to success.
- As with other systematic processes, an RCA can include procedures that are not familiar to your organization and thus can require that you build a business case for taking additional time and resources to accurately identify the causal factors leading to the performance issue.
- An RCA focuses on causes and does not tell you which interventions or activities will best address each causal factor. However, possible activities are frequently identified during the process. Only after causes are

identified is it beneficial to turn to possible interventions or activities to address the causes.

Process Overview

1. Identify a discrepancy in performance (or need) from the information you have collected thus far in the needs assessment. Frequently, you will only want to complete an RCA for the highest-priority needs so that you can save resources.
2. Create a plan for analyzing the identified need (gap in results). In many ways, the steps of the analysis will often look like a miniature needs assessment within the broader needs assessment. For instance, use a variety of techniques—interviews, focus groups, and document or record reviews—to collect information on the causal factors leading to the performance problem. That information will then be used to identify and prioritize the causal factors and their relative attribution to the performance gap.
3. Remember that your analysis may take from a couple of hours to a week or more, depending on the performance issue. Consequently, as you develop your plan, be sure that you take the scope of the analysis into account when developing a budget and schedule.
4. Know that sometimes your RCA will be driven by a need that is directly related to a specific situation or incident (for instance, you find out that a staff member is using your organization's procurement procedures to make fraudulent transactions or to cover up bribes to a local official). In those cases, it is especially important to start by determining exactly what happened and where the processes, procedures, training, policies, or regulations failed to prevent the incident in the first place.
5. Observe that in other cases, however, the need will not be generated by any single event (such as when an agency fails to meet its annual performance targets for two years in a row). In those situations, it is more challenging to determine which events, policies, procedures, or other activities led to the gap in performance. The RCA processes work effectively in both situations, though the tools and techniques for collecting information may differ.
6. Understand that the analogy of peeling an onion is often associated with RCA because causal factors are frequently many layers deep. At the beginning of the analysis, the causes of the need may seem easily identified.

For example, you may initially find through interviews with managers that a procurement problem is caused by younger staff officers who do not have the experience or training to manage procurement matters. But that is only the first layer. Later, when you talk to staff members you might learn that because of time constraints and inadequate staffing, training is offered only twice a year and contains outdated information. Again, however, as you peel away the next layer and talk to the training department about why the course is offered only twice a year, you may discover that the training department only has a budget to offer training twice a year. Additionally, the training department staff members say that they are waiting for the department that sets procurement policies to update the procurement training manual.

7. As is often recommended, ask the question “Why?” at least five times so you can peel away the layers of causal factors. (See the questions and table 3B.8.)

Problem Statement: In rural areas of the country, the number of female students completing primary school education is significantly below the desired results.

1. **Why** are female students in the area not completing primary school?
 - *Because very few of them ever start primary school.*

Table 3B.8 Root Cause Summary Table

Problem: *Low education rates for girls in rural areas*

Causal factor #1	Path through root cause map	Recommendations
Costs to rural families to send girls to school	<ul style="list-style-type: none"> • School fees • Girls provide labor in the home (child care, food preparation, water gathering) 	<ul style="list-style-type: none"> • Eliminate or reduce fees • Subsidize parents who send girls to school
Causal factor #2	Path through root cause map	Recommendations
Cultural norms about girls' education	<ul style="list-style-type: none"> • Boys regularly favored over girls • Religious or other cultural restrictions 	<ul style="list-style-type: none"> • Advocacy programs • Awareness-raising about longer-term household economic benefits of girls attending school
Causal factor #3	Path through root cause map	Recommendations
School access	<ul style="list-style-type: none"> • Schools are not available in all villages 	<ul style="list-style-type: none"> • Education reform to reach rural schools • Visiting seasonal tutors

Source: Adapted from Rooney and Vanden Heuvel (2004).

2. **Why** do they not start primary school?
 - *Because it is a great burden on their family to have them go to school.*
3. **Why** is it a great burden?
 - *Because it is expensive to send a child to school.*
4. **Why** is it so expensive?
 - *Because school fees must be paid for each child.*
5. **Why** are there additional fees for attending school?
 - *Because to get a teacher to come to a rural school, the village must supplement the teacher's salary.¹*

With each need having many layers of closely related causal factors, plan to analyze at least four or five layers for each causal factor and its root causes. Use fault tree analysis (see page 214), fishbone diagrams (see page 197), concept mapping (see page 220), performance pyramids (see page 236), and many other tools and techniques described in this book to assist you in peeling away the layers of causal factors.

8. Review the information you have collected at each layer of the RCA to identify and prioritize the causal relationships. For instance, using that information, you might determine that the primary causes leading to the performance issue are related to motivation and incentives, with lesser causes being knowledge, skills, and available time to complete required procedures. In the end, you want to have a prioritized list of all the causal factors you identified during your analysis.

In most circumstances, you will not be able to quantify the contribution of each causal factor to the performance gap—that is, you will not be able to attribute 45 percent of the performance gap to cause A, 30 percent to cause B, and 25 percent to cause C—though it is usually beneficial to prioritize causes from major to minor contributors. You can use a number of collaborative decision-making techniques included in this book to assist in setting the priorities. Often, it is also valuable to create a visual representation of the relationships among causal factors.

For example, ask several of the participants who provided you with information during your analysis (through interviews, surveys, focus groups, reports that they authored, and so on) to review the prioritized list of causal factors. Each participant should review the list to determine whether (a) all of the causal factors are identified, (b) all of the relationships between the causal factors are taken into account, and (c) the highest-priority factors are those that contribute most significantly to the need.

9. For each high-priority causal factor that is identified (and verified through participant review), find at least two potential interventions or activities that address the causal factor, and ensure that it doesn't continue to negatively affect performance. The activities can then be assessed and compared as possible recommendations coming from the needs assessment.

Tips for Success

- Don't assume that the first causal factor that people tell you about is the root cause of the performance problem. Take time and ask lots of questions as you peel away the layers of causal factors to identify all of the factors leading to less-than-desirable results.
- Focus on what components of the performance system (activities, processes, procedures, equipment, rules, policies, interpersonal relationships, and so on) are limiting the achievement of desired performance.
- Avoid shifting the focus to any solution, intervention, or activity that might be recommended during the analysis. Make note of the recommendation, and maintain your focus on the causal factors. Later, all of the recommended activities for improving performance can be compared and assessed for their potential value (both singularly and in various combinations).

Note

1. Based in part on an example from <http://www.isixsigma.com/library/content/c020610a.asp> (July 23, 2008).

References and Resources

- Altschuld, James W. 2010. *Needs Assessment Phase III: Collecting Data* (Book 3 of *Needs Assessment Kit*). Thousand Oaks, CA: Sage Publications.
- Altschuld, James W., and J. N. Eastmond Jr. 2010. *Needs Assessment Phase II: Getting Started* (Book 2 of *Needs Assessment Kit*). Thousand Oaks, CA: Sage Publications.
- Paradies, Mark, and Linda Unger. 2000. *Tap Root: The System for Root Cause Analysis, Problem Investigation, and Proactive Improvement*. Knoxville, TN: System Improvements.

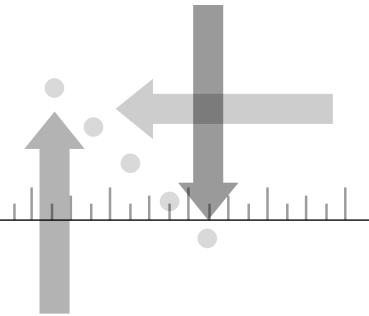
Rooney, James, and Lee N. Vanden Heuvel. 2004. "Root Cause Analysis for Beginners." *Quality Basics* (July): 45–53. Milwaukee, WI: American Society for Quality.

Watkins, Ryan. 2007. *Performance by Design: The Systematic Selection, Design, and Development of Performance Technologies That Produce Useful Results*. Amherst, MA: HRD Press, and Silver Spring, MD: International Society for Performance Improvement.

Website

"Root Cause Analysis for Beginners" is available at http://www.nmenv.state.nm.us/aqb/Proposed_Regs/Part_7_Excess_Emissions/NMED_Exhibit_18-Root_Cause_Analysis_for_Beginners.pdf.

FAULT TREE ANALYSIS



Purpose

A fault tree analysis (FTA) is a step-by-step procedure that is used to logically identify, evaluate, and quantify potential problem causes for a performance gap (failure) in a system and to determine strategies for preventing these causes.

Needs Assessment Applications

In a needs assessment, the typical function of a fault tree analysis is to identify the *causes* of performance gaps in a system (for example, your organization, a division within your organization, or a government unit). FTA is especially useful when specific failures within the system lead to performance gaps. The FTA provides a systematic process for analyzing situations and determining the relevant causes.

An FTA can help you to recognize the interrelationships among causes in the system and to evaluate the potential effects of causes in terms of the failure of the system. By addressing multiple causes, the FTA can also help you identify strategies that can be used to reduce the probability of future problems in the system.

The analysis procedures in an FTA are based on creating a visual representation (a fault tree) that identifies each of the potential causes, the relationships (failure sequences) between the causes, and the prioritized prevention strategies. Fault tree analysis is used widely in many engineering disciplines, but it can also be used in needs assessment as a root cause analysis technique. It can be an effective tool for increasing the chances of success for a specific system. The technical nature of the technique does, however,

likely require additional preparation beyond the process overview we provide here.

Advantages and Disadvantages

Advantages

- An FTA can be used with both a large and a small numbers of participants.
- The FTA displays information in a structured, graphic way that makes it easy to interpret and communicate.
- The FTA technique solicits input and insight from a wide number of experts.
- The focus in the FTA technique is on the system being analyzed, rather than on the individual people in the system. Thus, it may be easier to get a buy-in because people are less likely to feel threatened.¹
- Agreements and diverging views on system inputs are represented in the FTA.²
- An FTA can be used effectively for analysis of recurrent and persistent problems, because such problems are likely to have common causes and contributory factors.

Disadvantages

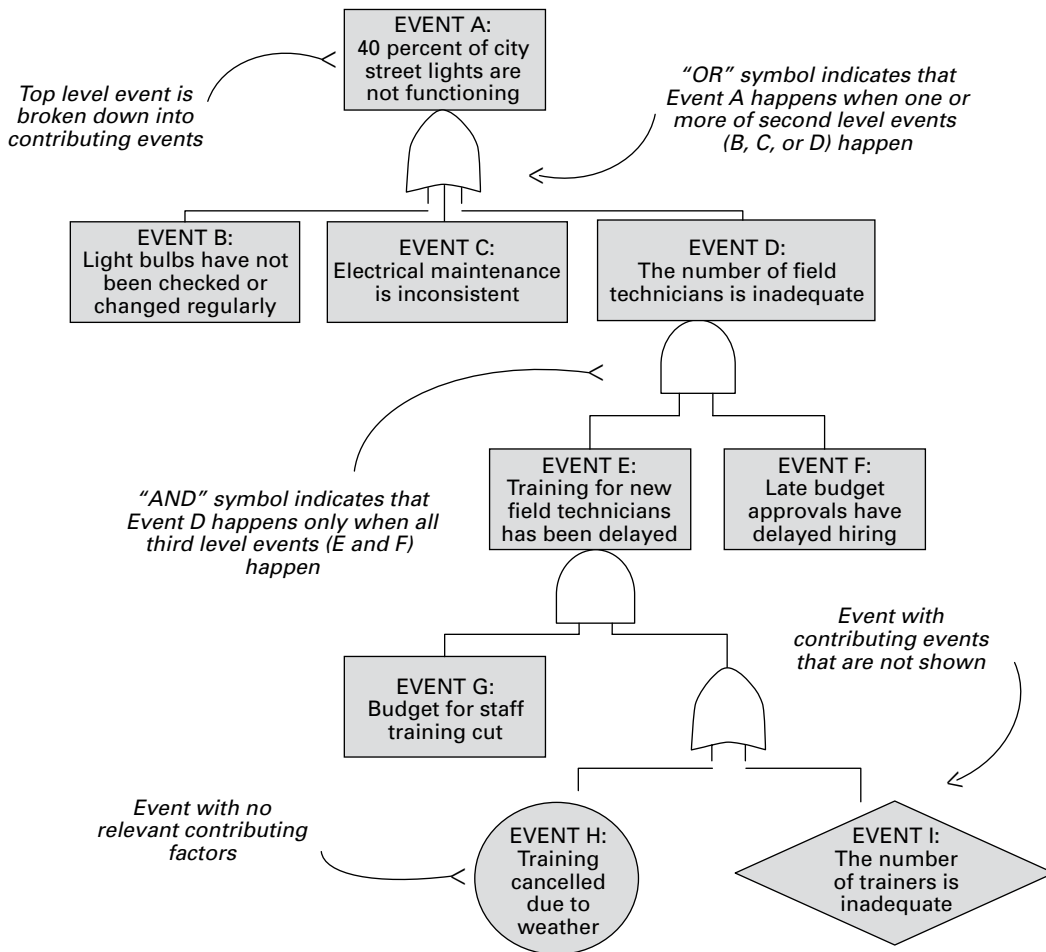
- Because this technique is highly reliant on judgment and insight that are based on subjective opinions, there is a risk of inaccurate information, which compromises the accuracy of the results.
- If the wrong failure sources are identified in an FTA, the subsequent results yielded may experience a ripple effect of this error. Results may, therefore, not be valid or accurate.
- FTAs may fail if the technique is not implemented in a disciplined fashion or if the system problem is so complex that multiple levels of potential causes exist for each problem type.³
- When the system of focus for the FTA is very large, quantitative analysis software may be required to analyze the results.

- FTA can be a relatively time-intensive and complex technique; in this book, we provide an overview of the process although additional readings are likely required for a successful application.

Process Overview

1. If the technique is being applied in a formal, scheduled session, take the necessary steps to prepare for conducting the FTA.
 - a. If technological methods will be used, acquire concept mapping software, a computer, a projection device (for example, a video projector), and a projection surface or screen.
 - b. If nontechnological methods will be used, ensure that you have access to a large surface area (that is, a whiteboard or chalkboard) on which you can create the concept map, as well as thick markers in various colors, tape, and so on.
 - c. If you are doing the concept mapping session with a large number of participants, consider identifying a colleague or assistant who is able to create the actual concept map while the facilitator mediates the session.
 - d. Identify and invite participants who are experts on the system that will be the focus of the FTA.
 - e. Schedule the FTA activity session.
2. Using your list of information required for the needs assessment, define the system that will be the focus of the FTA.
3. Identify the “what should be” for the system either by identifying the system’s mission, purpose, or goals, or by defining the criteria for what the “ideal situation” would look like.
4. Working with an expert on the system of focus, begin the process of building the fault tree (see figure 3B.3). Determine, in specific terms, “the top undesired event” for which you want to identify the underlying causes. Write the top undesired event at the top of the tree.
 - a. This undesired event will be the foundation on which the FTA will be constructed, so it is important that it be identified in clear terms.
5. Identify the factors (conditions) that are in the immediate vicinity of the top undesired event and that could be causing it. Write those key factors immediately below the top of the tree.

Figure 3B.3 Example of a Basic Fault Tree Analysis



Source: Based on examples from http://syque.com/quality_tools/toolbook/FTA/example.htm and http://syque.com/quality_tools/toolbook/FTA/how.htm.

6. Look at each of the key factors you have identified in the previous step. What subfactors could be causing the key factors? Identify the subfactors, and place them underneath the appropriate factor on the tree.
 - a. Do not move on to the next level of analysis until there is consensus that all factors at the current level have been identified.
7. Continue this procedure—building the tree-like graphic—until there is a general consensus that the tree is finished.

8. After the fault tree has been completed, work with experts to carefully and systematically analyze it for accuracy. Compare the fault tree's factors and structure against the actual system being analyzed.
9. Analyze the fault tree. This analysis can be done either statistically or through informal nonstatistical methods (such as brainstorming). To analyze quantitatively, use statistical analysis to determine the probability of all the contributing factors you have listed in the tree.⁴ This analysis can be complex, and we recommend doing additional readings before completing the analysis.
10. By drawing on your analysis, you should be able to identify the potential factors, as well as the sequences of factors, that may account for the performance problem that you identified as the top undesired event.
11. Focus particularly on the factors that appear lowest in the tree, because remedying or preventing these root causes is the most effective and efficient way to obstruct or eliminate the critical paths leading to the top undesired event.

Tips for Success

- The FTA technique works best for problems that have a medium level of complexity. For very complex problems, this technique can be difficult to manage or overwhelming for people to interpret.
- Remember that the expert insight that is used to construct the fault tree is generally of a very subjective nature. Take steps to consult as many experts as possible and to externally validate the fault tree and its outcomes. Both of these steps will reduce the subjectivity to some extent.

Notes

1. Based on Jonassen, Hannum, and Tessmer (1989).
2. Ibid.
3. Based on <http://www.greatsystems.com/rootcause.htm#FTA>.
4. Based on Jonassen, Hannum, and Tessmer (1989).

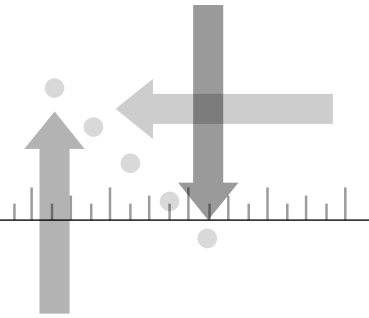
References and Resources

- Jonassen, David H., Wallace H. Hannum, and Martin Tessmer. 1989. *Handbook of Task Analysis Procedures*. Westport, CT: Praeger.
- Vesely, William E., F. F. Goldberg, Norman H. Roberts, and David F. Haasi. 1981. *Fault Tree Handbook (NUREG-0492)*. 1981. Washington, DC: U.S. Nuclear Regulatory Commission. <http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr0492/>.

Websites

- Detailed discussion with description of the meaning of each figure in an FTA graphic is available at <http://www.weibull.com/basics/fault-tree/index.htm>.
- Discussion of fault tree analysis with examples and how-to procedures is available at http://syque.com/quality_tools/toolbook/FTA/how.htm.

CONCEPT MAPPING



Purpose

Concept mapping is a method used to make a visual representation (that is, a picture or a map) of concepts or ideas and to illustrate their relationships. Terms such as *mind map*, and *idea map* are essentially synonymous with the term *concept map*. A similar method, *cluster mapping*, additionally uses statistics to define clusters of similar items.

Needs Assessment Applications

In the context of needs assessment, concept mapping can be used for various purposes, including data collection, consensus building, and decision making. Specifically, they can be used for the following:

- Facilitate discussion and data collection during interviews or focus groups.
- Support decision making between potential solutions for a given gap.
- Engage in pattern matching for the purpose of consensus building in relation to need identification.
- Identify organizational priorities.

Concept maps can be created by either a single person or a group of people. In the case of a single person creating a concept map, the purpose might be to identify the key ideas relative to a given problem. When concept mapping is used in a group setting, its purpose can be to identify and show the relationship between units within an organization, to brainstorm ideas or solutions, or to systematically identify priorities or plan new approaches.

The key purpose of a concept map is to visually represent key elements and their relationships. This visual representation can be especially useful when complex relationships exist between elements. Concept maps generate qualitative data, but the data can be interpreted using both qualitative and quantitative data analysis.

Advantages and Disadvantages

Advantages

- Concept mapping represents ideas or views from a large group of participants or stakeholders in an easy-to-interpret format.
- It generates data that can be interpreted qualitatively or quantitatively.
- It identifies complex relationships between issues, factors, and so on in a tangible, graphic format.
- Because it is participant focused, everybody can have his or her ideas represented.
- It shows at a glance specific performance areas, their interrelationship, and their strategic priority.
- It is simple to implement and understand for both you and the participant(s).
- Concept mapping uses a structured process that can be replicated easily and reliably.
- It enables the organization to create a shared vision of performance areas and goals.
- It promotes active participation and, therefore, ensures that participant(s) stay on task.
- It can be done using computer software or using paper.

Disadvantages

- In the absence of a structured approach for creating concept maps, this approach can become messy and hard to read.
- Concept mapping includes only a high level representation of the performance area that is the subject of the concept. This method does not easily allow for the inclusion of detailed information.

- In concept mapping, it may be hard to identify all the relationships between the concepts or ideas.
- Interpretation of the concept map data can be involved.
- The use of this method may require an experienced facilitator.

Process Overview

The three main phases of the concept mapping technique are planning, gathering information, and analyzing and interpreting.

Planning

1. Determine the focus of the concept map by using the list of information required for the needs assessment.
2. Identify the data analysis methods to be used after the concept map has been completed.
3. Identify and invite participant(s) to build the concept map.
4. Establish the schedule for the concept mapping session(s).
5. Acquire resources required to conduct the concept mapping session.
 - a. If technological methods will be used, acquire concept mapping software, a computer, and a projection device (for example, a video projector) along with a projection surface or screen.
 - b. If nontechnological methods will be used, ensure that you have access to a large surface area on which you can create the concept map, as well as thick markers in various colors, tape, and so on.
 - c. If you are doing the concept mapping session with a large number of participants, consider identifying a colleague or assistant who is able to create the actual concept map while you (or a hired facilitator) mediate the session.

Gathering Information

1. Start the concept mapping session by introducing the purpose and focus of the concept map to the participant(s).

- a. If the concept mapping session is being conducted with a large number of participants, then identify “rules of play” and other information related to the group process.
2. Begin the brainstorming process, encouraging participants to identify as many performance areas as possible related to the focus topic. Emphasize that this is the brainstorming phase of the process and, therefore, that all reasonable contributions are of value.
3. After brainstorming is completed, invite participants to identify redundant information in the list (for example, two contributions that refer to essentially the same thing). Merge and synthesize those instances to create a final list.
4. Begin the structuring process. The process can be started individually, at first, or as a group from the start.
 - a. Ask participants to work individually to sort (group or cluster) these performance areas into clusters of their choosing (or use an individual card sorting technique). Beginning the structuring process individually offers individuals a chance to identify relationships among the performance areas before collaborating with the group to come up with a shared sorting of the listed items.
 - b. Ask participants to work together to sort (group or cluster) the performance areas into clusters (or use a group card sorting technique). Beginning the structuring process as a group promotes a mediated process of consensus building to identify relationships between performance areas.
5. Items from the list are placed on a “map” (for example, drawn on a big piece of paper, or written on sticky notes that are placed on the wall) to illustrate their relationships. Clusters can be maintained from the previous list, or new clusters may be formed in keeping with the visual map that is developing. More complex maps can be created using statistical techniques and software; in those instances, you should consult the resources that follow.
6. Ask participants to work either collectively or individually to restructure the concept map by hierarchically laying out the concepts or clusters on the basis of one or more dimensions relevant to the focus statement. For example, arrange the items within each cluster by their feasibility within the organizational context. Work to build consensus among the group members on a final map that represents their shared perspectives.

Analyzing and Interpreting

There are different points at which the information captured in the concept map can be analyzed and interpreted. It can be interpreted during the actual concept mapping session (through the active involvement of the participants), after the completion of the concept mapping session (by you or by an external data analysis expert), or at both points. The timing of the analysis and interpretation of the concept map information depends on the purpose and nature of the concept map.

You can interpret data from a concept map in innumerable ways, ranging from “eyeballing” the concept map to determine key trends or priorities, to performing thorough statistical analysis to assess construct validity. For this reason, restrict yourselves to identifying just a few ways you can go about using your concept map data for needs assessment purposes.

Interpreting in-session data

When the concept maps are interpreted during the concept mapping session, consider actively involving the participants in the decision-making process. However, the extent to which in-depth statistical analysis can be done during the concept mapping session is very restricted. Most of the analysis you would do in session will fall into categories such as the following:

- ***Coding:*** Participants work with the facilitator to set up a simple coding scheme that is related to the focus area of the concept map. The group then works together to code concepts or clusters on the concept map according to the coding scheme. Trends in the concept map data can be analyzed by doing frequency counts on the prevalence of each of the code categories.
- ***Rank ordering:*** If participants have been asked to use a predetermined scale to rate concepts or clusters of concepts, then you may consider using rank ordering. In this case, you would ask all participants to report the rating they assigned for each cluster or concept. Add up the total rating values per cluster or concept (depending on the unit of analysis), and place the values in rank order according to a dimension relevant to the focus statement for the concept map.

Interpreting post-session data

Multidimensional scaling and hierarchical cluster analysis are two statistical analysis methods that are often used when a thorough understanding of the information in the concept map is required. In addition to those

approaches, however, several simple analysis approaches can be used after the concept mapping session has wrapped up.

Here are two examples:

- For decision making between alternate approaches for addressing a performance gap, you might ask participants to rate the cluster on the basis of feasibility or desirability. Then set up your own system—after the concept mapping session—to rate the clusters while using your expertise in the area of need (see figure 3B.4). By comparing the ratings you have given with those given by participants (that is, patterning), you can rank order the various approach clusters to determine the solutions that are most likely to succeed and to match the organization’s preferences.
- To compare the views or insights of two different groups of stakeholders, again use an approach to identify patterns. In this case, you would ask the stakeholder groups to separately rate the clusters related to the concept map focus area. You would then analyze the concept maps by comparing how different stakeholder groups rated each of the clusters (see figure 3B.5). Clusters that are generally rated at the same level by each of the cluster groups would indicate a high degree of consensus between stakeholder groups. Clusters where ratings are very different would indicate divergence between stakeholder groups.

Examples

Figure 3B.4 Example of Basic Concept Map to Illustrate Relationships

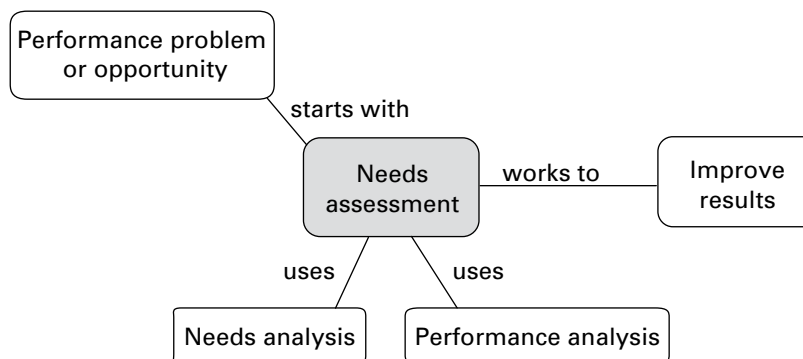
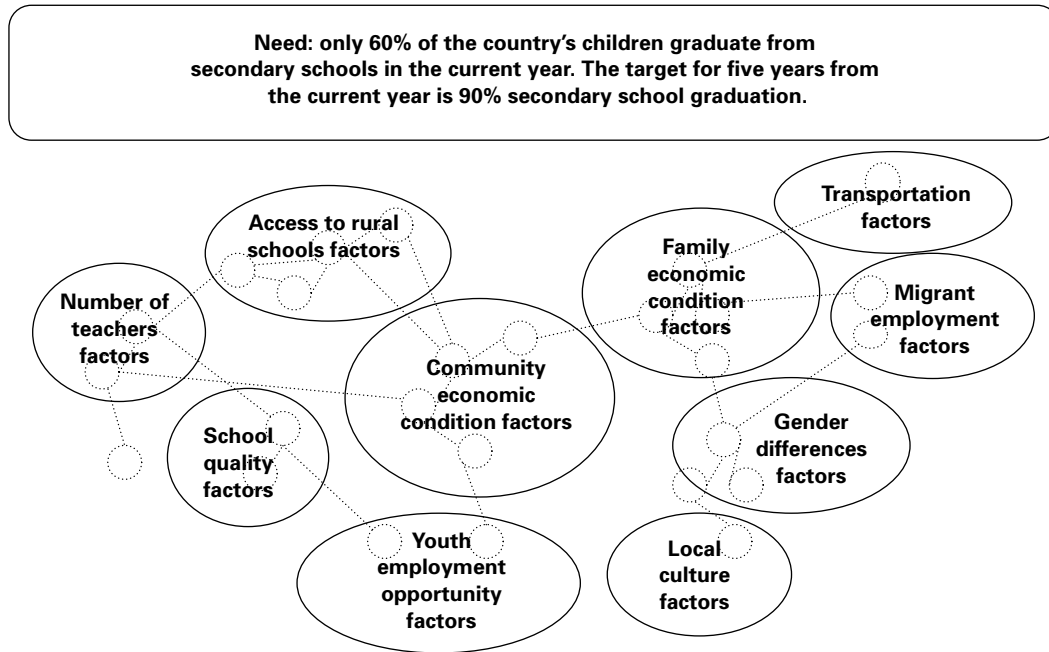


Figure 3B.5 Example of Basic Concept Map with Clusters Overlaid on Individual Statements



Tips for Success

- Be sure that you have clearly spelled out the focus area for the concept map prior to the concept mapping session.
- To increase the comfort level of the participants,
 - Explain the concept mapping process to them.
 - Reiterate that their names will not be directly tied to their contributions to the concept map (if applicable).
 - If the participant(s) in the concept mapping session have never worked with concept maps before, consider illustrating the process with a simple example.
- During the initial brainstorming session, include all contributions in the concept map.
- Do not worry about the look or structure of the concept map until the “structuring” phases of the concept map come around.

- Verbally repeat participants' contributions to the concept map as they express them. Doing so will ensure that the concept map is the most accurate reflection possible of the participants' contributions.
- If all participants will collectively work on clustering concepts, use simple strategies to make it visually easy to identify which concepts are being assigned to which clusters. For example, use the same color for all concepts assigned to the same cluster.

References and Resources

- Jackson, Kristin M., and William M. K. Trochim. 2002. "Concept Mapping as an Alternative Approach for the Analysis of Open-Ended Survey Responses." *Organizational Research Methods* 5 (October): 307–36. <http://www.socialresearchmethods.net/mapping/mapping.htm>.
- Trochim, William. 1989. "Concept Mapping: Soft Science or Hard Art?" *Evaluation and Program Planning* 12: 87–110. <http://www.socialresearchmethods.net/research/epp2/epp2.htm>.
- Trochim, William, and Mary Kane. 2005. "Concept Mapping: An Introduction to Structured Conceptualization in Health Care." *International Journal for Quality in Health Care* 17 (3): 187–91. <http://intqhc.oxfordjournals.org/cgi/reprint/17/3/187.pdf>.
- Weller, Susan C., and A. Kimball Romney. 1988. *Systematic Data Collection*. Newbury Park, CA: Sage Publications.

Websites

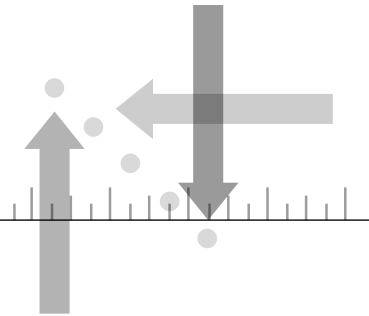
- "The Complexity of Concept Mapping for Policy Analysis" by Trochim and Cabrera is available at http://www.isce.edu/ISCE_Group_Site/web-content/ISCE_Events/Cork_2005/Papers/Trochim.pdf.
- "Using Concept Mapping to design an indicator framework for addiction treatment centres" is available at <http://intqhc.oxfordjournals.org/cgi/content/full/17/3/193>.

Additional Tools

Information on statistical analysis of concept maps can also be found in the following sources:

- Free software for creating concept maps is available at <http://cmap.ihmc.us/>.
- "Q & A: What Is Concept Mapping?" is available at <http://www.socialresearchmethods.net/tutorial/Katsumot/conmap.htm>.

FUTURE WHEEL



Purpose

The future wheel is a future-oriented technique. Future wheel activities are conducted to help participants analyze and explore effects of a trend, event, circumstance, or issue. As such, this technique can be a useful tool for conducting structured brainstorming, determining needs, planning strategically, and building consensus.

Future wheels are laid out as graphic depictions with the future event in a circle in the center, the first-order effects in the first circle out from the event, the second-order effects in the second circle out from the event, and so on. Future wheel activities can potentially be used to explore effects of many different things (issues, trends, and events), so they can be used in virtually any setting (organization, community meeting, school, and so on).

Needs Assessment Applications

The future wheel has a variety of different needs assessment applications, as follows:

- Forecast potential future scenarios.
- Project future trends.
- Systematically explore the possible effects from a current situation or trend.
- Analyze the possible pattern of effects for a potential future event or trend.
- Forecast implications for a variety of alternative circumstances.

- Determine the potential effects of a variety of potential performance solutions.
- Collect data on a group's perspectives on current and future situations and trends.

Advantages and Disadvantages

Advantages

- The future wheel is easy to use and does not require extensive training for the facilitator.
- It is resource lean and, therefore, can be done anywhere, anytime.
- It supports structured brainstorming.
- It is intuitive to the participants.
- It is not time-intensive and can be conducted in one, relatively brief, group session.
- The future wheel can be used at any time in the needs assessment or strategic planning process.
- It can be adapted for use in virtually any context: business and industry, community, personal.
- It promotes systematic thinking about complex relationships between causes and consequences.
- Through the use of concentric circles, it clearly identifies the common bond that all identified effects have to the topic at the center of the future wheel.

Disadvantages

- Because future wheels are laid out in a sequential structure around a central topic, they may be too superficial to identify the complexities of a series of contributing factors that may all have differing levels of influence on the effects identified.
- They may not clarify whether effects are related to each other by causality or by correlation. Indeed, because of the use of the concentric circles, a future wheel may lead individuals to incorrectly believe there

is a causal relationship between two effects, when those effects are, in fact, linked only by correlation.

- Future wheels present the potential risk that one or more individuals will believe that effects identified through a future wheel will, in fact, happen when in actuality they are merely “hypotheses” or “best guesses.”
- The relatively rudimentary nature of future wheels makes it hard to represent projected time lines associated with the effects added to the future wheel. Such time lines can be an essential ingredient for problem and solution analysis.
- Because participants engage in subjective and projective thinking to create it, a future wheel should be used only as one of many sources of information for more systematic and empirical analysis. It cannot, by itself, be used for coming to conclusive decisions.

Process Overview

The procedure for conducting a future wheel activity is fairly simple and easy to implement. It consists of two key phases: preparation and implementation.

Preparation

1. From the list of information required for the needs assessment, identify a trend, event, or question for the future wheel activity. This trend, event, or question will be the future wheel’s main topic. A question might be “What is the result if you continue doing as you are doing?” and an event might be “Effect of talent loss on organizational productivity.” The topic should
 - a. Focus on current or anticipated future events and their consequences.
 - b. Be suited to exploration through a small group interactive session.
2. Invite a small group of people (preferably between 8 and 12 individuals) to participate in the activity. If you intend to use this exercise with more than a dozen or so people, it is recommended that you run the activity multiple times.
3. Determine whether the topic of the future wheel merits the use of outside resources during the actual activity. If so, search for resources that provide key information on the theme or question that you have identi-

fied as being the subject for the future wheel activity. Those resources will be shared with the group of participants during the actual activity. For example, you may want to gather the following:

- a. Descriptions of future events or trends from the professional literature
 - b. Results from future or projection studies
 - c. Results from other trend analysis or future scenarios
 - d. Data that provide insight on current or alternative future scenarios
4. Gather the resources required for conducting the activity.
 - a. Flip charts (or confirm that you will be in a room with a whiteboard)
 - b. Markers in a variety of colors

Implementation

Preparing participants

1. Begin by warming up the group. Introduce participants to the concept of the future wheel, and explain the process for the activity. Emphasize that all participant contributions are considered valuable and that group members are encouraged to participate actively. Explain that the future wheel is laid out by order of consequences:
 - a. Primary (or first-order) effects: The most immediate consequences of the future wheel's key topic.
 - b. Secondary (or second-order) effects: The most immediate consequences following from the first-order consequences. Depending on the topic, you may also opt to include third- or fourth-order effects in the future wheel before continuing.
 - c. Implications or opportunities: The final wheel of the activities focuses on the implications or opportunities that come from the identified effects.
2. Tell the participants the approach that will be used to add an effect to the future wheel. Some options include the following:
 - a. Asking participants to brainstorm ideas for effects and adding those effects as they are being identified and without evaluating them first.
 - b. Discussing each idea and evaluating the plausibility of the idea. If there is a general consensus that the potential effect is plausible, it is added to the concept map.

3. Introduce participants to the key topic for the future wheel activity. Discuss the relevance and importance of understanding the key event. If you are using supplementary resources, provide all the group members with copies of the background resources that you have prepared, and give them time to review the resources.

Creating the future wheel

1. Write the future wheel's key topic (for example, youth unemployment, aging populations) in the center of your drawing space, and place a circle around it.
2. Ask the group to identify the first-order effects. As first-order effects are identified, draw lines out from the center circle (the lines are referred to as "spokes"), and write the first-order effects at the end of the lines. After all key first-order effects have been identified, draw a circle that encloses all the first-order effects.
3. From here, tell participants to shift their focus away from the future wheel's key concept and to instead focus on the first-order effects that were identified. Ask participants to identify the key potential results from the first-order effects. Add those effects to the future wheel by drawing spokes from the circle around the first-order effects and by writing the second-order effects at the end of each of those spokes. After all key second-order effects have been identified, draw a circle around all of them.
4. Continue this process until there is a consensus that the sequence of implications for the key topic is evident.
5. Finally, identify implications or opportunities that emerge from the identified effects, which could include, for example, new programs or policies that will improve performance in relation to the identified issues. The key to this final step is to introduce activities (or solutions) into the discussion.

Discussing and interpreting the future wheel

1. After the future wheel has been completed, give the participants an opportunity to look it over and to synthesize the information in it.
2. Initiate a discussion on the key topic of the future wheel by asking questions targeted to the purpose of the needs assessment. Themes you may want to use to guide the discussion are the following:
 - a. Evaluation of the implications of the future wheel's key topic

- b. Desirable vs. undesirable primary, secondary, or tertiary effects
- c. Effects of the present situation on potential future events
- d. Approaches to avoiding negative outcomes

Examining alternative approaches to using future wheels

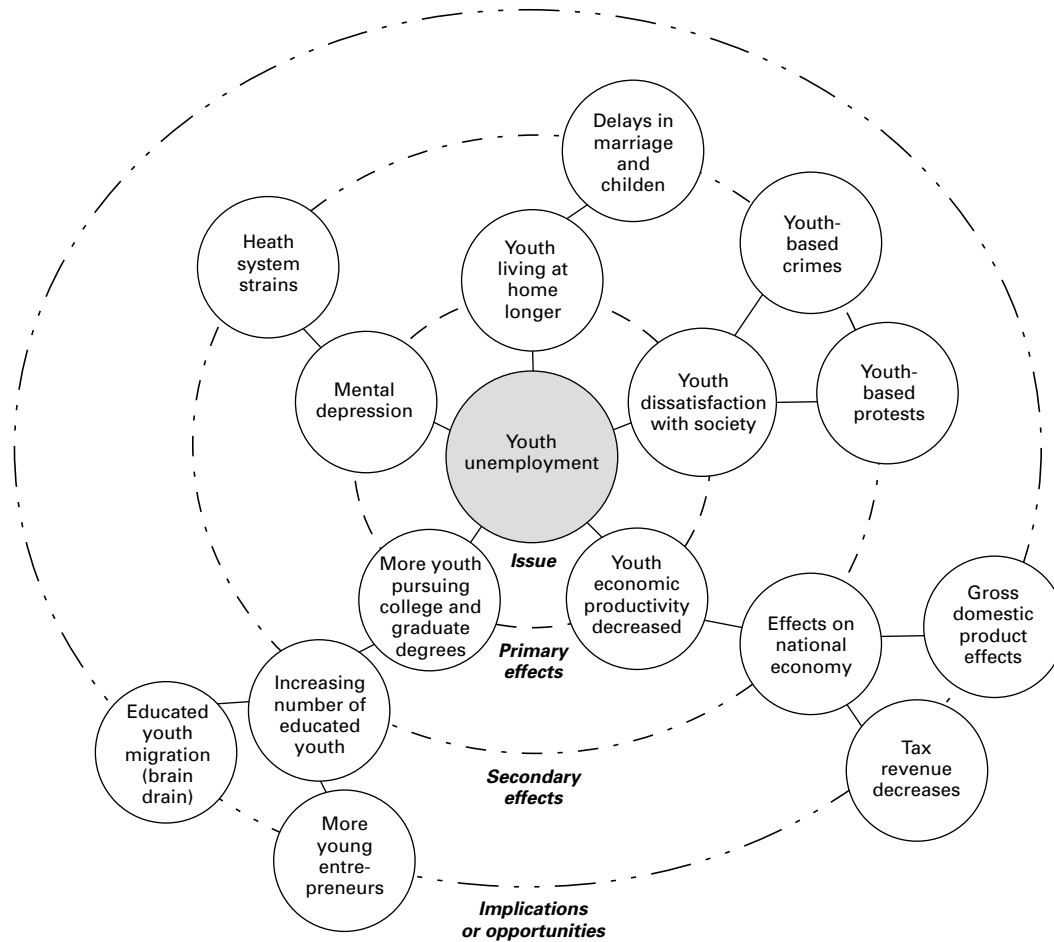
Future wheel activities can be used in many different ways. Here are some alternative approaches:

1. Invite a panel of experts to participate in the future wheel activity. After the key topic of the future wheel has been identified, the panel should discuss how the key event may affect a variety of themes (for example, recruitment, talent management, profit margins, and so on). Each panel member then should work individually to write down ideas related to the themes raised in the discussion. Use a round-robin approach to ask panel members to contribute their ideas. After a comprehensive list has been created, they should place their ideas in labeled categories. The future wheel can be created by adding the labeled categories as primary, secondary, or tertiary effects.¹
2. The future wheel activity can also be used as an approach for forecasting the implications of alternative solution scenarios. To use this approach, generate a scenario (for example, the implementation of performance-supporting solutions to improve customer service), and select one aspect from that scenario to explore (for example, an electronic performance support system, or EPSS). Ask participants to identify the specifics of what the selected item can achieve (that is, what functions the EPSS can perform in light of the need), and add those participant contributions as primary effects. Next, ask participants to identify what is required for them to make the items in the “primary effects” section of the future wheel a reality (for example, what resources and applications are required to create and implement the functions of the EPSS). Add this information as the “secondary effects.” The future wheel is then elaborated with additional effect levels.² (See the example in figure 3B.6.)

Tips for Success

- What key topic you select for the future wheel activity is a critical issue. Make sure that you thoroughly evaluate potential key topics (and how they are formulated) by looking at the information required from the

Figure 3B.6 Sample Future Wheel



Source: Based on <http://www.knoke.org/lectures/futureswheel.htm>.

needs assessment, analyzing those requirements, and potentially soliciting feedback from outside experts.

- Carefully select participants for the future wheel activity on the basis of the activity's goal. For example, the purpose of the activity is to gather expert insight about the potential implications of a current situation or trend; therefore, select participants who can knowledgeably contribute to such an analysis.

- In a clear way, tell participants the approach that will be used for adding information to the future wheel. If the future wheel is being used for anything other than general brainstorming, it is essential to evaluate ideas carefully before they are added to the future wheel.
- Take the time to thoroughly discuss the future wheel after it has been created. At this point, you can stimulate a creative and informed discussion that will be based on a common source of information (the future wheel).

Notes

1. Based on Witkin and Atschuld (1995).
2. Adapted from <http://abhijitkohli.googlepages.com/futureswheel>.

Reference

Witkin, Belle Ruth, and James W. Altschuld. 1995. *Planning and Conducting Needs Assessments: A Practical Guide*. Thousand Oaks, CA: Sage Publications.

Websites

A four-step example of a future wheel is available at <http://www.knoke.org/lectures/futureswheel.htm>.

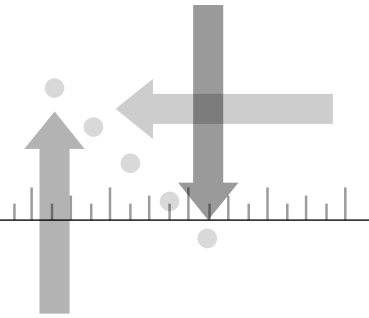
“Future Wheels: Interviews with 44 Global Experts on the Future of Fuel Cells for Transportation and Fuel Cell Infrastructure” is available at http://www.navc.org/Future_Wheels_I.pdf.

A short description and examples of future wheels are available at <http://jcfowers1.iweb.bsu.edu/rlo/tarelevance.htm>.

Additional Tools

A downloadable template of a future wheel is available at <http://www.globaleducation.edna.edu.au/globaled/go/cache/offonce/pid/1835;jsessionid=050A14CB101EAF863AE979C80461FCB3>.

PERFORMANCE PYRAMID



Purpose

The performance pyramid is a framework for ensuring that your needs assessment addresses each component's underlying performance.

Needs Assessment Applications

The performance pyramid (see figure 3B.7 in Process Overview) by John Wedman (2010) is a valuable tool that can be applied throughout a needs assessment to ensure that all aspects of the performance system are considered. Use the performance pyramid to provide structure when you are identifying needs, analyzing needs, and deciding what to do to improve performance.

During your analysis, for example, use the pyramid to determine how each element of the pyramid framework relates to the identified need. Some elements (such as rewards, recognitions, and incentives) may be hindering current performance, whereas others (such as knowledge and skills) may be concurrently supporting the achievement of desired results.

Likewise, use the performance pyramid again when deciding how to create a complete system for improving performance. For example, recommendations coming out of your assessment may include improvement activities related to three elements of the pyramid framework: (a) tools, environment, and processes; (b) rewards, recognition, and incentives; and (c) knowledge and skills. At the same time, you might recommend monitoring the other elements for possible suboptimization (that is, when improvements from your activities have unintended, negative consequences in relation to other elements of the performance system). (For helpful sample templates of improvement activities to use as job aids, see pages 242–244.)

Finally, the pyramid framework can be an effective tool for communicating the results of your assessment with partners and stakeholders. The framework, as a visual, illustrates the relationships among key components in accomplishing desired results; at the same time, it is flexible enough to apply in a variety of contexts.

Advantages and Disadvantages

Advantages

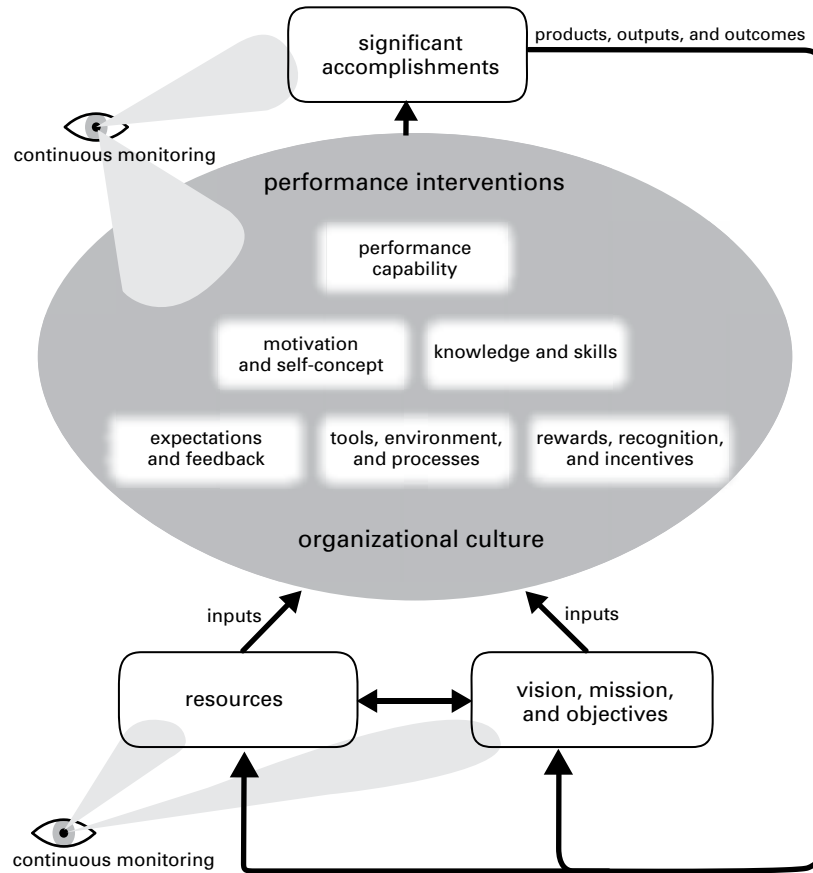
- The performance pyramid provides a valuable framework that ensures that each foundation component of a performance system is addressed in all phases of a needs assessment.
- The performance pyramid offers an easy tool for communicating the systemic characteristics of performance with assessment partners that are internal or external to the organization.
- Relationships between the elements of the pyramid framework (for example, the relationship between the organization's capacity to achieve desired results and the alignment of vision, mission, and objectives required to accomplish results) can provide necessary links for ensuring that improvements in one area don't lead to new performance challenges in others.

Disadvantages

- The pyramid, as a visual, can be misinterpreted as a hierarchy. The six blocks in the inner pyramid image are, in reality, interchangeable. For example, motivation and self-concept can be illustrated as the top component of the pyramid—as could any other elements depending on the context.
- The pyramid does not provide a process for conducting a needs assessment or for improving performance; rather it is just a framework for aligning the elements that support the achievement of results.

Process Overview

Figure 3B.7 Wedman's Performance Pyramid



Source: Adapted from Watkins and Leigh (2010). Wedman (2010) has granted permission for use herein.

Needs Analysis Applications

For each identified need, complete an analysis of the need to identify the contributing factors that are leading to the discrepancy between current and desired performance (results). Use the performance pyramid as a framework for planning your analysis, collecting information, and then analyzing the findings so you can make recommendations.

1. Begin by clearly stating the need in terms of what desired results are not currently being accomplished. Use this precise definition of the need to drive your needs analysis; otherwise, you will typically drift from the performance gap into symptoms of the problem or preferred fixes. Remember, a needs analysis is a systematic process to break apart a need and to determine what components are leading to the performance gap.
2. For each element of the performance pyramid framework, collect information regarding its potential relationship with the identified need. It doesn't matter which element you start with (culture, capacity, feedback, and so on), but by the end of the analysis, you should examine each element for its potential role in relation to the need. Here are some sample questions for each element of the pyramid framework:
 - **Motivation and Self-Concept**
 - Are people motivated to achieve the desired results as specified by the need?
 - Are people motivated to accomplish the goals of the organization and its partners?
 - What factors may be reducing motivation?
 - **Performance Capability**
 - Are the "right" people available to do the work?
 - Do the best performers stay with the organization or leave?
 - Does the organization have adequate capacity to take on new projects?
 - **Expectations and Feedback**
 - Do people know what results are expected?
 - After people have completed a task, are they told what they did well and what they can improve in the future?
 - **Rewards, Recognition, and Incentives**
 - Are there incentives for people to accomplish desired results?
 - Are there disincentives for performing well?
 - Are people recognized or rewarded for their performance?
 - **Tools, Environment, and Processes**
 - Do people have access to the resources (equipment, time, software, and so on) that are required to meet performance goals?

- Does the organizational environment (or culture) support the achievement of desired results?
- Are there systematic processes in place to guide performance?
- **Knowledge and Skills**
 - Do people know how to do what is asked of them?
 - Are people given (or do they come with) the necessary skills to achieve desired results?
- **Organizational Culture**
 - Does the organization’s culture support the achievement of desired results?
 - Are there norms within the culture of the organization that hinder any other component of the pyramid framework?
- **Resources**
 - Do people have the necessary resources (time, money, and so on) to achieve desired results?
 - Have the resources required for achieving desired results been identified?
- **Vision, Mission, and Objectives**
 - Are people aware of how their work contributes to the team, organization, clients, and larger society?
 - Is there a clear strategic plan that can be used to guide decisions at all levels of the organization?
 - Are people able to be “proactive” because they know where they want to go, or do they always have to be “reactive” to changing events?
- **Significant Accomplishments**
 - Are the desired results aligned with the vision, mission, and objectives of the organization?
 - What is the return on investment for accomplishing desired results?
- **Continuous Monitoring**
 - Are there monitoring (or evaluation) systems in place within the organization that can measure performance in relation to each component of the pyramid framework?

- Are performances routinely monitored across the organization?
 - Are monitoring results and reports used to improve performance?
3. Ask questions related to each element of the pyramid to both internal and external partners in the needs assessment. Often, external clients and partners can identify contributing factors to performance problems more easily than those on the inside of the organization.
 4. Analyze responses to your analysis questions so you identify which elements (or sub-elements) are most closely related to the need; those elements will typically include causal factors contributing to the need as well as other factors that are leading to current successes. You can also use fault tree analysis (see page 214), root cause analysis (see page 207), concept mapping (see page 220), and other tools to support your analysis within the pyramid framework.
 5. Move the elements of your pyramid around to illustrate the relationship you have found during your needs analysis. For instance, for the need, you might determine that the expectations and feedback element of the pyramid should really be placed at the top to illustrate its critical role in relation to the need within the organizational context. Then the supporting elements—such as motivation and self-concept or incentives, rewards, and recognition—can be used to illustrate the foundations that must be built to ensure the success of the entire performance system. After all, no single element of the pyramid is more important than the others; for successful performance, you must have all elements working together.

Solution Identification Applications

1. Remember that your needs analysis identifies factors contributing to the performance gap for many of the pyramid's components (for instance, motivation and self-concept or capacity or skills and knowledge). Likewise, you will frequently find several causal factors within a single element of the pyramid (for example, two or three factors with the element of expectations and feedback may be contributing to less-than-desirable performance).
2. Working with your needs assessment's internal and external partners, establish a rough priority of the factors leading to identified needs on the basis of their relationship—positive or negative—with the accomplishment of desired results. Precision is not required, but a rough prioritization can help you focus time, effort, and other resources.

3. For each identified causal factor, pinpoint at least two potential solutions that could help improve the achievement of desired results (for examples, see the Job Aids section that follows). Having choices is important to quality decision making; therefore, it is important to identify at least two options for each factor. One option might seem to be clearly the better choice at first, but that decision is best left until after you have identified a variety of alternatives.
4. Before selecting any of the identified solutions, determine what criteria will be used to weigh your options, thus ensuring that each alternative gets a fair appraisal of its potential.
5. Judge each potential solution for each causal factor on the basis of the criteria established in the prior step. It is frequently useful to apply a systematic process, such as multicriteria analysis (see page 171), to assess each option.
6. When you have selected a variety of activities to address the factors leading to the need (performance gap), use the performance pyramid again to verify that you are addressing all components that (a) support performance and (b) ensure that the complete performance system will benefit from the improvements.

Job Aids: A Sample of Improvement Activities to Consider

Expectation Feedback

Possible improvement activities include clear performance guidelines, reference manuals for processes and procedures, realistic job previews, managerial coaching, quality assurance programs, quality on-boarding or orientation programs, benchmarking, performance appraisals, upward and peer evaluations, identification and documentation of performance indicators, goal setting, routine one-on-ones, and individual improvement plans.

Tools, Environment, and Processes

Possible improvement activities include electronic performance support, job aids, performance aids, process reengineering, knowledge management, process improvement, ergonomics, workstation design, warning systems, labeling and color coding, safety planning, social networking, quality management, team colocation, and six sigma.

Rewards, Incentives, and Recognition

Possible improvement activities include bonus systems, commission systems, profit sharing, merit award systems, annual awards ceremony, employee of the month, job sharing, flex hours, job enrichment, telecommuting, education benefits, personnel in the spotlight, empowerment, and delegation.

Organizational Capacity

Possible improvement activities include recruitment programs, retention programs, early retirement, phased retirement, interviewing, job rotation, mergers, acquisitions, crowd-sourcing, outsourcing, succession planning, affirmative action programs, outplacement centers, cross training, internal recruitment programs, interview standards, and competency models.

Knowledge and Skills

Possible improvement activities include classroom training, e-learning, team learning, mentoring, coaching, quality on-boarding or orientation programs, on-the-job training, brown-bag lunch sessions, webinars, podcasts or vodcasts, and tuition reimbursement.

Motivation and Self-Concept

Possible improvement activities include job crafting, job sharing, flex hours, education benefits, career mentoring, career ladders, job rotation systems, and motivational communications.

Resources

Possible improvement activities include restructuring, supply chain management, cash flow analysis, budgeting and accounting systems, career management programs, career ladders, outplacement, and cost reductions.

Continuous Monitoring

Possible improvement activities include performance monitoring, quality management, six sigma, program evaluations, training evaluations, goal/question/metric programs, financial analysis, client surveys, balanced scorecard, key performance indicators, managerial dashboards, and needs assessments.

Vision, Mission, and Objectives

Possible improvement activities include mega planning, strategic planning, future search, SWOT analysis (see page 127), appreciative inquiry, scenario planning, workforce planning, job forecasting, tabletop analysis (see page 180), values identification, and risk management.

References and Resources

- Gilbert, Thomas F. 2007. *Human Competence: Engineering Worthy Performance*. Tribute ed. San Francisco: Pfeiffer.
- Watkins, Ryan, and Doug Leigh, eds. 2010. *Handbook for Improving Performance in the Workplace*. Vol. 2: *Selecting and Implementing Performance Interventions*. San Francisco: Wiley/Pfeiffer, and Silver Spring, MD: International Society for Performance Improvement.
- Watkins, Ryan, and John F. Wedman. 2003. "A Process for Aligning Performance Improvement Resources and Strategies." *Performance Improvement Journal* 42 (7): 9–17.
- Wedman, John F. 2010. "Performance Pyramid Model." In *Handbook of Improving Performance in the Workplace*. Vol. 2: *Selecting and Implementing Performance Interventions*, edited by Ryan Watkins and Doug Leigh, 51–80. San Francisco: Wiley/Pfeiffer, and Silver Spring, MD: International Society for Performance Improvement.
- Wedman, John F., and L. Diggs. 2001. "Identifying Barriers to Technology-Enhanced Learning Environments in Teacher Education." *Computers in Human Behavior* 17: 421–30.
- Wedman, John F., and S. W. Graham. 1998. "Introducing the Concept of Performance Support Using the Performance Pyramid." *Journal of Continuing Higher Education* 46 (3): 8–20.
- Wedman, John F., and M. Tessmer. 1993. "Instructional Designers' Decisions and Priorities: A Survey of Design Practice." *Performance Improvement Quarterly* 6 (2): 43–57.

Websites

Many resources (including podcast interviews) on how to use the performance pyramid in a needs assessment are available at <http://www.needsassessment.org>.

Website and manual for using the performance pyramid are available at <http://needsassessment.missouri.edu/>.