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Using a Group Process To Create Models and Matrices

Raynold A. Svenson, Karen M. Wallace & Guy W. Wallace

Have you been confronted with the difficult task of identifying all the critical component knowledge and skills required of your various training target audiences?

Have you ever had difficulty in gaining the organization's consensus on your priorities?

Have you had a hard time defining the parameters for a given project early enough to enable you to more accurately estimate the resource costs?

Are you struggling with the effort to keep the instructional objectives linked with the expected end-of-training performance?

Before you enter the realm of Instructional Technology it might be useful to borrow a page from the Performance Technology handbook to help in the identification, prioritization and direction of instructional development activities. The page to borrow is the one labeled "Conduct a Performance Audit/Front-End Analysis."

One approach to Front-End Analysis our organization has had great success with is to use a group process to develop both a Performance Model of a single job or a functional organization and a Knowledge/Skills Matrix. This group approach is relatively quick, involves the client organization, builds consensus, provides development parameters and directions, and creates support for the further required design, analysis and development activities.

A functional or job Performance Model identifies pertinent data regarding the performance. It may outline data including but not limited to:

- The Mission of the job or function
- The Major accomplishments or areas of responsibility
- Outputs per accomplishment
- Tasks per output
- Performance measures per output
- Typical deficiencies per measure
- Likely causes per deficiency

A sample functional/job model is shown in Figure 1.

A Knowledge/Skill Matrix identifies potential training topics by name, documents other needed data, and links this information back to the required performance via the model. The example

Draft
FUNCTIONAL/JOB MODEL
Service Account Engineers

Meeting Date: April 20-21, 1983

Mission: Administer, execute and oversee all business sold (product lines) by the Service organization:

- Service agreements (BEMA/PMA)
- Quoted service (PQ)
- Time and material (casual)
- Non-installed (NI)

Major Duties:

- I. Determine the scope of the work
- II. Engineer the design/work
- III. Administer the execution
- IV. Provide technical assistance to sales and the customer
- V. Service department administration

I. DETERMINE THE SCOPE OF THE WORK

Outputs

- Definition of the job
 - categories of the equipment/systems
 - product line
 - required specs
 - sale price/gross margin
- Re-estimate of work/bookings
- Identification of key customer contacts
- Letter of introduction/personal introduction

Tasks

- Review booking package
 - contracts
 - proposal package
 - estimate
 - plans and specs
- Meet with sales personnel/tech/fitters (as appropriate)
 - discuss specific details of:
 - verbal agreements
 - customer profile/expectations
 - Account Engineers, interpretation of the work's scope
- Job site "walk-through"/survey
 - customer introduction
 - determine equipment/system, condition and type
 - determine "potential" upgrades/revisions
 - validate the appropriateness of the work scope
- Re-estimate work/bookings (if needed)
 - evaluate and cost out material and labor needs
 - determine total work costs
 - approve "final" booking
- Schedule meeting with customer

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Measures

- Customer feedback
- Field feedback
- Review of the organization and completeness of work
- Financial feedback
 - gross margins/profitability

Typical Deficiencies

- Poor customer contact
- Poor estimate
 - incomplete
 - inaccurate
- Low profitability

Causes

- Phone interruptions
- Lack of knowledge of job duties/responsibilities
- Lack of communications skills
- Lack of self confidence
- Lack of knowledge of importance of customer contact
- Work overload
- Lack of technical knowledge
- Inexperience
- Lack of skills in estimating labor and materials
- Lack of knowledge of product line
- Lack of knowledge of materials pricing
- Lack of knowledge of information sources/resources
- Lack of control in administering work

Figure 1. Sample Functional/Job Model

shown in Figure 2 is a small subset of the usual matrix, which could have ten categories with many items in each category.

The Underlying Theory

A group process somewhat similar to a Nominal Group Technique (NGT) is used to achieve consensus. But, unlike NGT it forces discussion and achievement of group consensus in less time and without a rigidly pre-prescribed process. The group decides the internal parameters of the process given only a set of guidelines regarding the outputs to be produced. The NGT process requires pre-prepared specific data gathering instruments which are completed in isolation by each participant before group discussion. The process we facilitate is more flexible but requires design of the specific questions to be addressed based on the previous answers obtained.

Although this does not avoid potential dominance by the stronger personalities of the group it will probably create the political buy-in required to sell the validity of the final outputs. Validation and additional data gathering can be accomplished in later phases of curriculum/course designs, task analysis and course development.

Draft SERVICE ACCOUNT ENGINEERS Knowledge/Skill Matrix											
Meeting Date: April 20-21, 1983											
* learning difficulty 3 - high 1 - low											
** delivery priority 9 - high 1 - low											
Knowledge/Skill Category:	Job Model Major Duties					Environmental Equip. Model			L.D.*	Est Hrs	Del** Pri
	I	II	III	IV	V	A	B	C			
EQUIPMENT/TOOLS											
1. Pneumatic Test Equipment			x	x				x	2	4	9
2. Electric Test equipment			x	x			x	x	2	4	7
3. Terminal	x				x				1	8	4
POLICIES/PROCEDURES											
1. Work/Paper Flow/Branch Structure/Job Duties	x		x		x						
2. Profitability Handbook (local)		x	x		x						
3. Standards Practice Manual		x	x		x				1	2	5
4. Union Policies	x		x		x						

Figure 2. Sample Knowledge/Skill Matrix

The group facilitator must possess the skills to manage a dynamic group situation. The group participants should include:

- Subject-Matter Experts
- Master Performers
- Management of the target performers
- New hires from the target performer group

Each of the above participant group brings a unique and valuable perspective to the analysis meeting. Subject-matter experts can tell you almost everything you need to know (and more) about a given topic. Master performers can temper those ideals with the realities of day-to-day performance. Management can tell you what is important, what performance they really want, how it can be measured, and what they want in the way of training formats, delivery methods and flexibility, maximum lengths, and anything you choose to ask them while you've got them. New hires can provide a perspective on what prerequisites should be and can provide input on what things are the easiest and the most difficult to learn.

The group process forces a consensus on what the desired/ideal performance is. This is especially useful for complex work environments with multiple jobs such as Design Engineering or Manufacturing Engineering. Creating this consensus via a group of the right people will create organizational buy-in. This form of needs analysis should be performed at the Organizational level to determine where within the organization training emphasis can and should be placed. Starting off down the road of Training Development with this kind of credibility can lead to greater support for your activities in both the development and implementation phases. The field will have a greater comfort level because you've been set off on the right path, and it is one that's directed at performance first and subject matter second.

The trade-off made with the group process is in the depth and accuracy of the data, given the typical time constraints. Even a group made up of varied and knowledgeable people can cover limited territory in a 2 or 3 day meeting. Of course with more time this is easily resolved.

Because the organization has probably never put itself down on paper in black-and-white as this process will, it has probably not got a consensus view of what it looks like, what it does. Each person involved probably looks at the job or organization quite differently. This is the charge of the facilitator—to build a consensus model of the performance in a potentially difficult situation. But

once the group has this common reference framework established, the continued analysis of training knowledge and skill requirements becomes easier to do and easier to sell later.

Applications of the Output

The data gathered via this process have many uses, some of which include:

- development of job descriptions and selection instruments
- development of support materials and tools for new hire orientation and induction to the job and organization
- design of training curriculum architectures for multiple jobs and organizations
- development of training delivery strategies
- development of project plans for individual courses including scope, schedules and resource requirements; detailed analysis instruments and methodologies; end-of-course objectives and conceptual/broad design specifications; and end-of-course evaluation measures.

Limitations

The data resulting from this process do not typically provide a level of detail allowing immediate development of enabling objectives, content, or detailed design specifications. It is not generally a method of gathering detailed task analysis data—given the usual time constraints.

Process Overview

This process employs three major steps:

1. Establish a steering committee or council to oversee the project, set project scope, and select participants for analysis meeting(s).
2. Conduct 2-3 day analysis meetings with experts and managers to develop the Performance Model and K/S Matrix.
3. Conduct 1-2 day review meeting(s) with new hires to gain additional input.

Step 1. Establish Steering Committee

The steering committee should meet twice during the project, once to review the plan put together by the training organization, and select participants for

the analysis meetings. The second meeting is to review and critique the results.

The first order of business is to establish the parameters for the Performance Modeling project. Using a group of upper or middle level managers acting as representatives of your organizational clients, you should identify the work environments and jobs to be addressed. Depending on the mix and complexity of the jobs and the level of detail you are looking for from the analysis meetings, the various jobs may be sorted into like work functions. These will sometimes parallel the existing organizational structure (or its natural sub units).

Next, participants for each job or function should be selected. These representatives should ideally be personnel with broad credibility across the organization.

Step 2. Conduct Analysis Meeting with Experts/Managers

This meeting begins with an overview of the project's purpose and the specific objectives for the meeting. Next, the participants are shown the data-gathering instruments (typically charts on double-wide flip chart paper) and the structure for the information to be gathered. It probably should be stressed to this group that although the goal is to identify training topics related to the job under study, that step will not be started until after they have built a model or picture of the work required. Only then are we interested in what training is required to support that work.

Performance Modeling. To begin the analysis, ask the group for a Mission Statement: "In 25 words or less, what is the performance mission of the job (or function)?" Document the response on the flip chart. Allow a discussion and make any appropriate revisions before posting in a visible spot. Ensure that you have a consensus. Charge the group with the responsibility for keeping the data accurate. If a consensus is impossible, note the group's alternatives and go on. It is always possible to take a fresh look at any issues later during the meeting.

The next data to collect and post are a list of Major Accomplishments or Areas of Responsibility for that performance. A brief 2-4 word statement is all that is required. Examples include:

- Sales calls planned
- Work assignments made
- Files updated
- Technical support provided

It's sometimes helpful to begin with a noun and end with a verb. This is not

critical, and an attempt to stick to that method may anger your group. You need to portray your flexibility and willingness to go with what the group says. This is the tough part of facilitating the group—gently leading them, getting the data you need, but allowing them to word it in a way familiar to them. Most likely they've never done anything like this before, and the way you're asking them to look at their performance is probably quite alien.

Begin a new flip chart page and head it with the first Accomplishment. Label the accomplishment with a Roman Numeral. Below that create 2 columns and label them left to right—OUTPUTS . . . TASKS. If this model is functional rather than for one single job you may also want to leave a wider space on the right for the latter addition of a third set of columns—a matrix of all the jobs within the function.

Ask the group for a list of the major outputs produced during the performance indicated by the accomplishment. Next, get them to identify the major tasks associated with each of the outputs and list them on the chart. Letter the outputs and number the tasks. Post this sheet in a visible spot and begin the next page.

Number the new sheet with the number of the accomplishment and create 3 columns from left to right labeled—MEASURES . . . TYPICAL DEFICIENCIES . . . CAUSES. Then ask for the measures of the outputs—how can they tell a good one from a bad one? After you have listed the group's measures, ask them per the measures listed what deficiencies are most common. Finally, have them identify the probable cause for the deficient performance. Asterisk or circle those that seem to be due to a deficiency of knowledge or skill versus those that seem to be due to a lack of environmental supports/resources such as information, tools/equipment, materials, time, etc.

Identify the outputs, tasks, measures, deficiencies and causes for each of the Accomplishments or Areas of Responsibility originally listed. Sometimes the original list will have been shortened as the group proceeds through the process, and some items incorporated within others. Review the Mission statement. Does the group like it the way it is, or do they now see it differently?

Knowledge/Skill Matrix. Developing a knowledge/skill matrix is a fairly simple procedure. You can begin this by reviewing with the group a list of potential knowledge/skill (K/S) categories. These categories are used only to stimulate the group's thinking, not to restrict them to an arbitrary categorization scheme. The advantage of keeping mul-

iple groups for a broad functional analysis within a more strict and logical use of the categories you list is to enable you to quickly analyze all required training topics to determine whether similar labels between jobs will indeed have the same content. The identification of these core needs will probably impact your structuring and sequencing of content for delivery.

The following list of potential categories can be revised or edited to suit the group's needs and comfort level:

- Introduction and Background
- Policies and Procedures
- Tools and Equipment
- Information Sources
- Materials
- Theories and Concepts
- Technical Skills
- Personal Skills
- Etc.

The group should then be asked to list the training topics within each category. This should be done via a systematic review of the outputs, tasks, and causes of the Performance Model.

Begin by heading a new flip chart page with the first K/S category. Under the category on the extreme left list all responses from the group. Keep approximately the right two thirds of the page blank. This space will be used for a matrix later.

Continue through all the K/S categories. Ask the group for their comfort level regarding the lists they have just created. Determine any weak areas and revisit. Ensure that the group feels at least 75–90% comfortable that all the major items have been identified.

To create the matrix you need to determine the dimensions you require. If the data is for a function you will want to matrix the lists of training topics against the jobs within the function. If the Performance Model is for one job, the lists can be matrixed against the accomplishment and tasks. The following additional data can be gathered depending on your needs and desires:

- A rating on the learning difficulty of the topic
- An estimate of the hours required to deliver the topic
- A desired delivery strategy, e.g., CBT, Self-paced, Group paced, etc.
- Desired depth of coverage, e.g., conceptual overview, applications overview, hands-on applications, practice exercise with feedback, etc.
- Priority rating via a vote by the individual participants
- Sources of content and performance expertise
- Existing training programs covering the topic
- Etc.

Step 3. Conduct Review Meeting with New Hires

This meeting is simply a review of the outputs of the first group. Walk this group through the data in a manner similar to the sequence in which it was originally generated. The purpose is to capture a consensus of their perceptions regarding the:

- Importance/priority of having the training available to new hires
- Difficulty of learning
- Estimated length
- Depth of coverage

Summary

This data, although somewhat limited due to the data gathering method and sources employed, should help you to quickly and efficiently:

- Identify all the critical component knowledge and skills required of your various training target audiences.
- Gain the organization's consensus on your priorities.
- Define the parameters for a given project early enough to enable you to more accurately estimate the resource costs.
- Keep the instructional objectives linked with the expected end-of-training performance.

Many of our clients have used this process to help them identify and organize their work efforts. One division from a major oil company had a group of key professionals and managers working for over six months trying to get agreement on the training requirements of all professional geologists and geophysicists. They were not able to come to any substantial agreements. This process enabled them to identify a training and education curriculum with over 250 training topics and to link them specifically to the work being performed. This allowed them to identify the specific training requirements for individuals by geographical location, and to establish course development priorities and delivery strategies.

The resulting training curriculum allowed the organization to identify required resources leading to the start-up of a centralized training development organization of 5 people and a field delivery organization. The support of key field managerial and professional individuals throughout the planning and implementation stages was most likely the result of their earlier direct efforts. It makes sense that a client involved in the design of products and/or services for themselves will be more responsive and supportive in making them happen.

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Create Models and Matrices**
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About the Authors

Ray Svenson is president of a management consulting firm specializing in training management systems. Ray, a former Bell Labs Design Engineer and AT&T Engineering Manager, spent 6 years as the Dean of Planning, Methods and Results of the Bell System Center for Technical Education in Lisle, Illinois. Current clients include Baxter Travenol, Alcoa Labs, General Motors, General Electric, and Motorola. Address: R.A. Svenson & Associates, Inc., 2100 Manchester Road, Suite 103, Wheaton, IL 60187.

Karen and Guy Wallace are principals of The Wallace Works, a management consultant company specializing in the analysis, design and development of performance systems, training systems and courseware. Address: 140 Abbeywood Circle, Streamwood, IL 60103.