

Project Profile: Developing a Qualification Catalog for an Engineering Organization

by Peter R. Hybert

The Business Situation

A large aerospace engineering firm had a problem. They have a complex product and service line that requires a large number of technical specialist resources. They have a large organization, with people in a number of locations. They work on a project basis, which means that they pull teams together quickly to complete the project and then redirect the resources when the project is over. The problem? How do you find the people with the right mix of skills and experience when you need them?

The Solution

The answer seemed simple on the surface—put everyone’s résumé in a database for project leaders to search by location or expertise (or both). As people complete training or accumulate project experience, they can update their résumé. It is in the employee’s interest to keep their own biography current, but the organization can control “expertise inflation” by requiring their manager to sign off on any changes.

Even better, the organization was undergoing a SAP initiative. SAP has a qualifications database as part of the HR module that could serve this very purpose.

There were some snags, however.

- Managers didn’t want other managers to steal their good people—they didn’t *want* the data available to everyone.
- People entering their experience and capabilities on their own will put in apples, oranges, and bicycles of data. For example, one person might enter “project management,” another might call the same capability “leading project teams,” and a third might list three or four component skills, such as “project planning, CPM techniques, conflict resolution, etc.” There would be no consistency without putting some guidelines or menu choices in the system first¹.

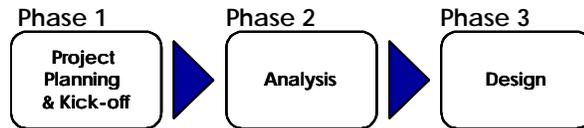
We were brought in to help put together a performance-based menu of capabilities; for this project, they were called “qualifications” (as in, “what are your qualifications for this job?”).

¹ A few years back, someone convinced one of our clients to allow individual employees to enter in their own skills data. They spent several million dollars worth of man/woman-power getting it in the system, only to decide that they couldn’t use it once it was in because there was too much data with no organization scheme. They called us in afterward to help build a skills menu, but by the time we got involved, they had spent their budget and couldn’t bear to invest any more.

The Project

Project Phases

The project followed a three-phase process. The project planning phase consisted of a group planning session to scope and schedule the project. The analysis phase consisted of a series of meetings to analyze job performance and knowledge/skill requirements. The design phase was where we specified the individual qualification items.



The Team

To get started, we formed the following project teams.

Team	Role Description	Notes
Project Steering Team	This team set the priorities and direction for the project.	The Project Steering Team was chaired by the HR VP. The project sponsor was the director of the Engineering Resource Management organization. The champion was a senior consultant on the SAP R3 project. The project manager was a manager from the Engineering organization. Overall oversight was provided by the chief engineers.
Analysis Teams	The Analysis Teams' role was to define the performance and the enabling knowledge/skills.	There were four Analysis Teams. These teams consisted of experienced practitioners representing the primary engineering disciplines and organizations.
Design Team	These team members worked with the designers to organize the analysis data into the appropriate "chunks" for the qualification database.	This team consisted of one representative from each of the Analysis Teams.
Project Work Team	This team conducted all meetings and documented the project outputs.	This team was a partnership between the consultants, the project champion, and the project manager from our client's training organization.

Team Roles and Descriptions

Following is a summary of the project and the key “aha’s” and challenges that arose in each phase.

Project Planning & Kick-off

The first step of the project was actually a combination sales call and Project Steering Team meeting. Through previous contacts, the project champion had decided that this work should be done and that our organization was the likely candidate for the work. My role was to come to a meeting, explain our process and capabilities, and then (if they chose to continue) facilitate the group through a project planning session.

The clients did have some pointed questions about our methodology and experience; however, the biggest stumbling block was whether we were resourced sufficiently to handle the project—in other words, were we a big enough company to get everything done? My answer was to agree that yes, we were a small company, but we had a solid track record that proves we meet our deadlines and we had references they could call to verify this. The clincher was when I suggested that they would be able to tell for sure when we mapped out the project tasks and resource requirements—we wouldn’t commit to a Project Plan that we couldn’t fulfill, because it wouldn’t be good for us or our clients. As they are a project-oriented company, they understood and valued the discipline of project planning.

They decided to proceed with the planning process. We used a simple (low-tech) method that seems to work well in a group setting because it is quick and it allows everyone to understand the tradeoffs (and why their original preferred delivery date may or may not be feasible).

The process begins with laying out a calendar on large flip chart pages and then placing the key milestones on the calendar. Once you factor in things that naturally limit lead times, such as resource availability, existing deadlines/commitments, or holidays (for example, once you decide to start a project, you usually cannot start analysis meetings for at least two weeks—it would be next to impossible to get on the participants’ calendars more quickly) and then include reasonable task completion cycle times, you arrive at the first view of the project. This process is naturally iterative and took a little over an hour working with a group of about ten people.

During the planning process, a number of key strategic decisions were made for the project.

- The list of qualifications would need to be fairly detailed to be useful. If you are searching the database for an engineer for a project, you don’t just need someone with programming experience. You might really want to search for someone with programming experience in a specific software language and, even better, with experience working on avionics systems rather than engine systems.
- The target audience population had a large number of job titles associated with engineering roles. In addition, for the SAP initiative, they had reduced the number of classifications but had not yet specifically figured out exactly which engineer roles fit in which bucket. We ended up with four segments for our analysis meetings: hardware engineers (including mechanical and electrical engineers), software engineers, system engineers, and project managers/team leaders.

Then, we performed a quick assessment of project risk. This means looking at where unknown factors could impact the plan. In our case, the primary items were the following:

- Availability of Analysis Team participants
- Data format required for input into the SAP system
- How and to what degree to incorporate participants from all the locations²
- Some political issues—for example, some managers did not really want their engineers' qualifications to be published to the rest of the organization because it could mean that they would lose their good people to other projects if their skills weren't being fully utilized
- There would need to be an initial investment of engineer and manager time to make the first assessment and entry of qualifications into the system—it was clear at this point that the qualifications would have to be a fairly long list—would the organization be willing to make the initial investment to populate the system?

The Project Steering Team took on several of the issues to address off-line. They chose to deal with managing the expectations of the key engineering leaders about resource requirements, level of detail, and inclusion of the various organizations.

The SAP project rep would work with the consultants off-line as the project progressed to make sure our data would eventually be able to be moved over to the SAP HR module with minimal rework.³

We added a little cushion to the Project Plan to allow for slip in getting the key resources lined up for the analysis meetings.

As often happens, our team's resources ended up not being the primary bottleneck after all.

The next step, analysis.

Analysis

We used a group analysis process that defines the work outputs, measures, and tasks (as well as typical gaps and obstacles) and then defines the enabling knowledge/skills that support that process.

² They had several locations in one city that held about 90 percent of the target audience population. They had two other locations in two other cities that had the remainder of the population. The Project Steering Team decided to focus on the primary audience concentration but to try to incorporate people with some exposure/experience working with the other locations to help better round out the data.

³ At the initial meeting, there was concern that they would have to retype the data from our outputs into the system until the HR VP pointed out that, worst case, there *was* redundant data entry, the cost of hiring some temps to enter the data was a drop in the ocean compared to the other resources involved in the project. (As it turned out, we were able to put the data in a Microsoft® Access® database that could be electronically transferred to the SAP R3 database.)

The first challenge arose when we discovered that the SAP team already had documented work processes⁴. We were able to incorporate this data into our Performance Model and use it as a starting point for the analysis sessions. The first step in the analysis meetings was to walk through and either validate or modify the data, and then to derive the enabling knowledge and skills⁵.

The Analysis Teams were well-chosen and, though there was often debate about specifics, they were able to reach consensus on the meat of the jobs quickly and without much controversy. Because we were using a common process, the consultants were able to divide and conduct the analysis sessions separately and then combine the data in the Design Phase with no difficulty.

The most challenging role for this portion of the project was played by the internal project manager who had to brief/sell engineering managers on the project and the need for their best people. This is always difficult but, when you have had a SAP project underway for 12 months that has already been regularly pulling key resources off-line, the level of difficulty goes up exponentially.

We documented the meeting results and sent them around for review by the Analysis and Project Steering Teams. We copied the SAP team on any modifications or issues that arose regarding the work processes during the analysis session.

Next, the Design Phase.

Design

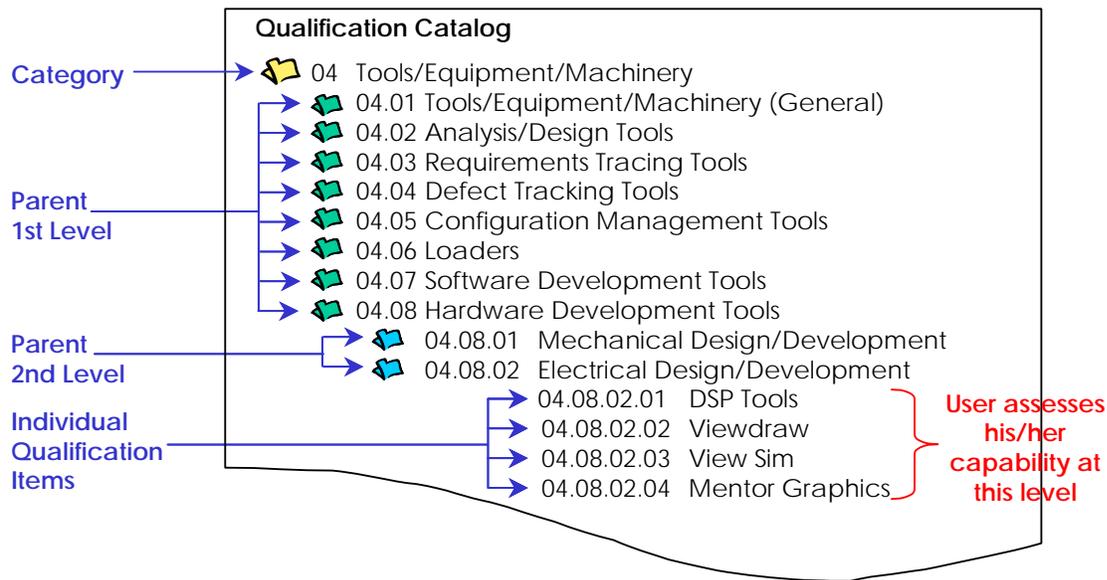
The first challenge of the design process was to “chunk” the data in a way that would meet the needs of a number of users.

- Managers and team leaders needed to be able to search for team members based on the needs of their project.
- Employees needed to be able to define their capabilities accurately and completely.
- Executives and strategic planners would eventually want to be able to identify strategic areas of expertise the organization would require to be competitive in the future and “sum up” the level of capability in house.
- The HR/T&D function may want to be able to access the data to plan new training course development priorities or to schedule deliveries of existing training.

It goes without saying that people generally hate lots of detail, until you need it! We had to find a way to store the information in a hierarchy so that you could scan the qualifications quickly at the high level and “drill down” only where needed. On the other hand, we didn’t want too many levels—we settled on four as the maximum, with many items only requiring three levels. See the diagram below for an example.

⁴ You never know if starting with existing information is going to speed up the analysis process or slow it down. In this case, the likelihood of it slowing us down was great—the processes had been developed using individual interviews by a SAP team member. They had not had time to review or validate them with the audience segments.

⁵ There was also a partial list of skills from a prior project. These were used as prompts/ideas for the Analysis Teams to consider during the Knowledge/Skill Matrix portion of the meeting.



Example Qualification Item Hierarchy

Another design challenge was deciding what constituted a “useful chunk.” Was it better to have the information grouped by work product (such as “radar system”), by discipline (such as “programming”), or by audience segment (such as “software engineer”)? Because organizing by content, rather than application, promotes sharability and is most robust to future changes, we used “what is ___?” as the key question for organizing the qualification items. This chunking scheme allowed qualification items to be listed only once but makes them available to all relevant audiences.

We then had to decide on levels of capability. For example, I could have done some radar system code development but under the direction of an experienced engineer, whereas someone else may have spent their career in that area and was an acknowledged industry expert. The SAP team provided the guidance on this decision—they wanted to limit the number of choices to three. Unfortunately, the Design Team just couldn’t live with that, so we created a five-level scheme (along with a plan for reverting back to three if we were overruled by the SAP team).

Level	Definition
1	No experience beyond awareness
2	Basic or beginner, "used to have" or only on a limited scope/scale
3	Perform/apply/use fairly often, familiar with most situations
4	Very experienced, wide/varied applications
5	"Super expert"

Five Levels of Capability

In addition to assigning a level, we also created descriptors for each item, similar to high-level objectives in a training course. We were also able to use "templating" to keep items consistent across each category.

For example, if an engineer was trying to decide on his/her level of expertise on "glass" as a material, they would see that this is a "knowledge item" and rate their experience and ability to

- Describe/explain glass
 - Principles/theories/concepts
 - Industry standards
 - Trends
- Apply knowledge of glass

A different example would be an item that defined the performance of a task or process, such as "software statement of work and requirements traceability." Here they would rate their experience and ability to

- Describe the process
- Define/create the software requirements and traceability matrix
- Conduct and document a review of the requirements⁶

Our project champion did come through with the specifications on how the data had to be formatted to be input into the SAP HR module, and our database programmer created a simple database that would enable it to be easily transferred. In addition, it would allow for (fairly) easy edits if tweaks needed to be made before moving over the data.

Next, getting it tested and rolled out.

⁶ Each of these bullets had a few subpoints for detail that have been omitted in this article.

Implementation Planning

After the design was completed, our portion of the project was concluded. Our clients planned to complete the implementation after the initial SAP “go live” effort. The following key issues remained to be addressed.

Verification and Completion of the Qualifications

We were able to get the lion’s share of the qualifications defined but, during the Project Planning Phase, the Project Steering Team had decided to eliminate/defer review meetings at the remote sites in order to accommodate the project engineer audience and still stay within budget.

In addition, we were unable to gather all the input data we needed in some knowledge areas due to the limitations on the Analysis Team size. For example, our client does business in a number of countries. Knowledge of each particular country’s government, procurement process, import/export laws, etc. was important to identify as part of someone’s qualifications. But, our team wasn’t confident that they were able to generate a complete list of all the countries they worked with, so they elected to create a starter list and complete it during the review process.

Initial Assessment Pilot Test

Though we continually “self-policed” to make sure our qualification titles, chunking, and hierarchy would meet stakeholder requirements, we still felt that it was important to test this with engineers who had no prior exposure to the project. If they could easily complete the self-assessment, it would prove two things. The first was that the system really fit the way they understood their knowledge/skill inventory.

The second was that it was really not that difficult to complete the initial assessment. One of the complaints that the Project Steering Team had to deal with in meetings with the executive level was the number of items in the qualification list—they felt there was just too much in there. But, any less detail would not have enabled the system to do what it was intended to do. We believed that the debate would become a moot issue if we could demonstrate that the initial assessment could be done fairly quickly and, once done, would be even easier to update.

Conclusions

Deciding to manage your inventory of human resource capabilities is a significant strategic decision. Doing it right means additional work to first build the system and then maintain it so that it continues to be a tool that the organization can use to match people to job assignments/opportunities and to develop the right capabilities for the future. As with everything, you must assess the costs and the benefits and make a business decision. For many businesses, the cost of *not* managing this asset may be hidden but, if examined, represents a sizeable opportunity.

With this project we believe that we have proven it can be complex but workable. It does take some effort but, with focus, it can be done quickly (in this case, we held the initial scoping meeting in March, the first analysis meeting in mid-August, and delivered the final report in mid-October). A practical conceptual framework is needed to ensure that the data can be expanded in the future to include additional audience groups over time. The real challenge is implementing the system—it needs to be made part of the way people operate on a daily basis. That may take some time. But, you have to *build* the system before you can start *using* it.

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