Project Profile: Competitive Learning Curve Cycle Time

by Peter R. Hybert; president, PRH Consulting
Kelly R. Smith: performance consultant, The Hobson Group

The Business Situation

The market was growing rapidly for the integrated, distributed digital control systems used to manage heating, ventilation, air conditioning, fire and smoke, and access in commercial, industrial, healthcare, and educational facilities. In particular, the information technology revolution was making it affordable to do more to make buildings work smarter, whether you are trying to reduce energy use, offer more flexibility to tenants, or better control the environment. But to succeed, a great deal depended on the capability of the field personnel to engineer, install, and service the system that has been customized to specific customer and facility requirements.

One of the leading providers of these systems was faced with a difficult challenge—how to recruit and "spin up" new people quickly enough to take advantage of the growth opportunities without risking their customer satisfaction rating, currently the highest in the industry.

There were some barriers in the way.

- Since the industry as a whole was growing, there was a very limited pool of experienced people who could be hired and brought on-line quickly—simply "hiring in" the necessary expertise was not an option.

- The company was in the midst of developing and releasing a significant number of new products and data management tools to the field to improve ease and consistency of performance. Each change generated a training requirement for existing employees. This learning load bordered on overwhelming for some locations.

- The staffing and culture in most branches at the start of the project offered only limited guidance in the supervision and development of new people—formally managing the planning and assessment of skills/capabilities would be a significant change.

- The decentralized branch structure tended to foster a healthy skepticism for home office initiatives in general and standardization in particular—we, along with our client, would have an uphill battle to gain field participation and support for any kind of standardized qualification/learning/development process.

Two things were needed to achieve competitive learning curve cycle time. The first was simply a way to track and measure progress—you don't know if people are "spun up" unless you know what "spun up" means and how to tell when people get there. At the start of the project, it became evident that employees in many branches were in a sink or swim environment with no structure or method for development planning. Record keeping was limited to course attendance and did not track work experience or actual qualification.

The second thing we needed was a way to develop people more quickly. In spite of a selection of multimedia and print self-study options, most home office training was available only in a group-paced format. Most courses were a week long, and learners often had to wait several weeks to two months to get into a high-demand course. In the field organization, branches were inclined to hire people only after sufficient project work was booked to justify the hiring, which left little or no time to train the new employee before sending him or her out to the job site. To achieve optimum learning curve cycle time, we would need to create a more distributed system of training and information to give people access to the learning resources more quickly.

We did have a few things working in our favor.

- Leadership from the CEO for more standardization across the branches—this direction was also the basis for the development of several process tools
- Project sponsorship from the Human Resources vice president to move to a more objective approach for defining roles and training
- Widespread use and reliance on a companywide intranet, providing the branches with more rapid access to new information (and vice versa)
- Implementation of a "balanced scorecard" for measuring company performance—one of the dimensions on the scorecard was a measure of employee "Learning Curve Cycle Time"

With the above in mind, we crafted an approach.

The Project

Where Should We Start?

Though there are a number of roles in each branch, the most critical to the project in the near term was the individual who performed on-site installation, start-up, and service of the system. A building control system consists of sensors, controllers, and software programs that run the building equipment (from boilers, fans, and pumps to vents that supply individual rooms with air conditioning to card readers that control building access). The on-site system technician role is broad, spanning

- On-site installation of the control panels, etc.
- Development and/or debugging of custom programs designed to operate the equipment efficiently
- Creation of dynamic control graphics used by the customer operator to command and monitor the equipment and setpoints within the system
- On-site and remote access technical support services

In addition, the on-site system technician was often the primary customer point of contact and, as such, was expected to be able to understand and solve the customer's technical problems.

Finally, the technician was often expected to work independently with little supervision at the customer's site.

If the on-site system technicians cannot perform well, they risk overrunning the project estimate, possibly causing customer dissatisfaction and even triggering penalty clauses for project delays. Ultimately, as the last link in the chain in a new building, they have a high impact on the perceived value of the entire company. The challenge: company estimates for growth in this job category ran as high as 15 percent. This translates to a potentially big risk if development and capability assessment processes are left unmanaged.

Project Phases

At a high level, the project consisted of the following phases:

1. First we created a high-level conceptual design of a qualification and training/development system and approach. This step enabled us to establish some initial expectations and test our assumptions about the solution and potential risks.

2. We then analyzed the job to define the work performance and enabling knowledge/skill requirements.

3. Next, we focused on the more detailed design of the qualification system. Based on the job analysis, we defined a set of Qualification Instrument Specifications and an approximately sequenced path for completion.

4. A team of developers created the individual Qualification Instruments and process documentation needed to introduce the above into the branches. This version was then pilot tested with key branches before finalizing it for general release.

5. The last step (which actually began while the instruments were being pilot tested) was to convene a team to redesign the training into a modular content architecture to align the training with the Qualification Path. This would also result in making the training available to the employee earlier in the development process. It would also allow components of training to be shared across multiple audiences (which would speed development, improve consistency, and make it easier to make future updates).

6. Throughout the project, the team communicated with the field and home office organizations via a Web page, E-mails, and on-site briefings.

The Team

The success of the project depended on all the primary stakeholders playing a role in the process. Key stakeholders included field master performers, field managers, Human Resources, Training,

home office subject matter experts (SMEs), and process owners. These stakeholders were organized into teams that could influence certain project decisions at the right times. The teams and roles are described in the table below.

Team	Role Description	Tips/Issues
Project Steering Team	Set the priorities and direction for the project. Obtain resources for the project (funding and members for other teams).	This team needed to make the business decisions—they represent the primary stakeholders for the project. The steering team was led by the Human Resources vice president for the organization—the project sponsor.
Analysis Team	Contribute real-world experience to the description of the job performance and knowledge/skill requirements.	This team needed to be both knowledgeable and credible, so that the results would be accepted by the rest of the organization.
Qualification Design Team	Work with the designers to group outputs, tasks, etc., into performance assessment instruments and sequence them according to how they are needed on the job, in addition to a logical learning sequence.	This team was a subset of the Analysis Team.
Curriculum Architecture Design Team	Work with the designers to group outputs, tasks, etc., into Training Event and Module Specifications and sequence them to align with the Qualification Path.	In some cases, the Qualification and Curriculum Architecture Design was conducted simultaneously using the same team.
Project Work Team	Conduct and document all the project activities. Provide expertise from the supplier perspective—training and testing approaches that will be effective and feasible to administer.	This team was a partnership between the consultants and two key managers from our client's T&D organization.

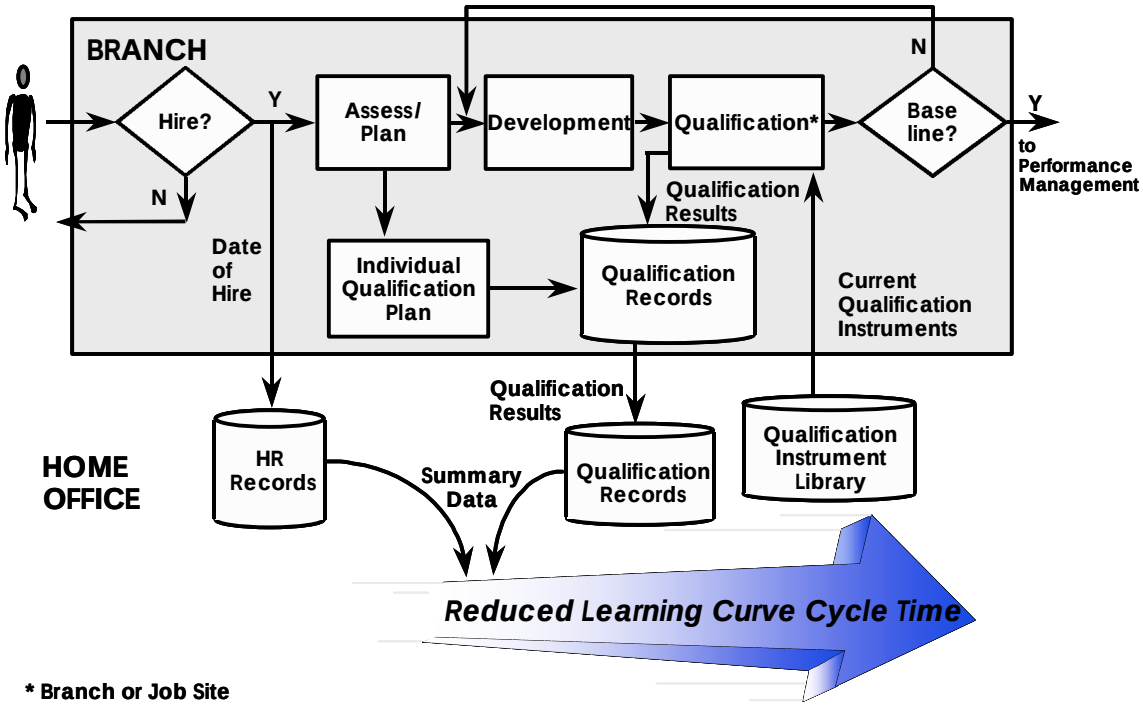
Project Challenges—Framework

As we got underway, it became clear that there were a number of challenges involved. The first was the conceptual definition of the solution or "the framework." Our goal with the qualification system was to be able to tell, based on work output, what tasks people were capable of performing. We didn't want to base qualification solely on the training an employee has completed because someone could have gone through a training program but still be unable to perform (or, more likely, someone could be able to perform even though they had never been to any training).

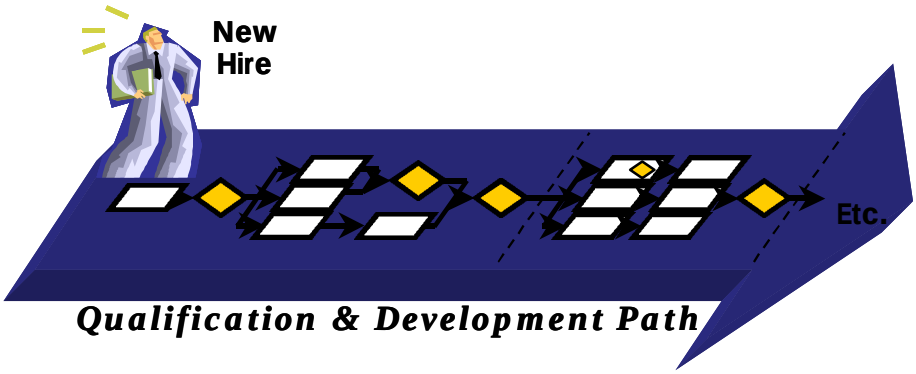
How Will the System Work?

The diagram below illustrates how the system works. There are key branch processes for planning, completing development activities, and assessment. There are support processes for tracking results, which would be managed out of this home office. This map enabled us to explain the overall system and to test ideas, procedures, etc., to make sure they would work when implemented.

As shown in the diagram below, the local branch management team has ownership of each employee's individual development and qualification plan—home office would provide the system and tools to support it.



The initial goal in the design of the development path was to define Qualification Instruments that employees would complete over the course of their career—in effect, we would establish the hurdles (illustrated as diamonds in the figure below) and let the learner and his/her manager decide how to clear them. The learner might get some local coaching/tutoring, attend a home office course, read technical manuals, or some combination of the above. (Development alternatives, e.g., training, are illustrated as rectangles in the figure below.) Once the hurdles were in place, existing training (or new training) could be configured to make it more accessible and to fit the path sequence.



Performance-based versus Skill-based Qualification

Not only did we want to assess performance based on a person's demonstrated capability rather than recall of knowledge, our bias was to assess performance based on actual work performed where possible (rather than just looking at whether someone attended a training course). If someone can do the job task(s), then they must also possess the necessary enabling knowledge/skills. Tests of enabling knowledge/skills become necessary only as diagnostics or on an exception basis (such as when required by a regulatory body).

"But, doesn't that mean extra overhead if somebody has to come check my work to 'qualify me'?" This question came up often. After wrestling with this issue, our Design Teams (which included master field performers) decided that, if supervisors or lead on-site system technicians are to verify that new hires (or less experienced performers) are actually doing their work correctly, a quality check should be performed early to avoid rework. (True, many of them *were not always doing this* at the beginning of the project, but it was an *acknowledged gap* in supervisor performance.) So, by defining standard "chunks" of work and assessment criteria, we could actually qualify people based on performance of real work. The time the supervisor needed to spend to assess the employee was no greater than the time that was already (or at least should have been) being spent. This minimized incremental overhead caused by the qualification system and helped evolve a standardized view of the work in the bargain.

Where Should We Set the Bar?

The intent of the project was to build a performance-based qualification system that would be managed primarily at the branch sites. It had to be flexible enough for each branch to define and assign the on-site system technicians' work in whatever way best fit their situation (there are good business reasons for this). On the other hand, home office wanted some consistency (there are good business reasons for this, also). Our solution was to establish a definition for "base line" performance. This would be a minimum standard for performance expectations that branches could exceed if they desired but would at least serve as a benchmark for getting their new people developed. The cycle time from hiring to completion of base line would be tracked for the "Learning Curve Cycle Time metric" in the balanced scorecard. Easy to say but hard to do.

Base line can be defined by a time frame ("how far you should be after nine months on the job"), as lowest common denominator capabilities ("the bare minimum everyone needs to be able to perform"), as a desired set of capabilities ("able to handle the following tasks in most common situations"), or even as generic "core" knowledge and skills ("the stuff everybody needs to know").

The definition of base line was made more difficult by the difference of perspective between the employee and manager. In general, the manager wanted someone who can do chargeable project work. The employees wanted development and/or technical challenge that will help them get promoted.

We decided to focus base line around the work performance, rather than on time frame or on "core" capabilities. We worked with the Analysis Team to define both the employee and manager perspectives (at a high level) and then detailed it later with the Qualification Design Team. Detailing it was relatively straightforward—once we had specified the Qualification Instruments, we simply asked, for each one, if a "base line" on-site system technician should be able to perform it or not. Once the base line set of instruments/capabilities was defined, there was actually minimal disagreement about it on the Qualification Design Team and in downstream field review sessions.

Our last step was to estimate a time frame based on consensus as a generally agreed-upon desirable and yet reasonable time frame from the perspective of a sampling of field managers. Ultimately, the actual data will show what the typical Learning Curve Cycle Time is and will enable us in the future to learn the key variables in the process and how to optimize the cycle time.

How Will the Assessment Be Performed?

If the person making the assessment needs to evaluate real work, they need to be positionally and technically authorized to do so. This means that the evaluators need to be qualified and that the process of conducting an assessment needs to be controlled. The processes for this are contained within two administrative systems—one for the branch and one for the home office administrator.

The Qualification Instrument is a simple form that makes it easy for it to be used in the assessment process and also for record keeping afterwards. In addition, candidates can use it to prepare for an assessment session without being given the answer.

To *define* the instruments before diving into the details involved in actually *developing* them, we created a specification template to define quickly individual instruments based on a few types/parameters.

Assessments would be designed around the parameters below.

Assessment of	Description	An Everyday Example	A Project Example
Real work	Observation of the candidate performing the task and/or producing the output in a real situation	Watching your teenager fill the car's gas tank and check the oil	Program and start up a control cabinet in the field
Simulation	Observation of the candidate performing an approximation of the task or producing a limited output in a situation similar to the real job	Watching your teenager change the tire in your driveway (instead of waiting until they have a real flat tire)	Creating a control program
"Talk-through"	Evaluation of the candidate's capability to "find their way" through a process with many dependencies or that would be impractical to simulate	Having your teenager describe what they would do if they saw another car with flashers on late at night on a deserted road	Troubleshooting an equipment failure
Other	Any other method, typically pencil and paper (or computer-based) testing	Passing the written driver's license test	Passing a written test on the fire code

Assessment instruments would focus on the following.

Assessment of	Description	An Everyday Example	A Project Example
Outputs	Evaluating the result or product of a work process/task based on defined criteria *(Note: the performer does not necessarily need to be present for this evaluation to take place)*	Deciding if a turkey is cooked based on a temperature reading, the color of the skin, etc.	Reviewing the printout of the control software program
Processes	Observing the work while it happens and evaluating the process steps according to defined criteria *(Note: the performer and the evaluator need to coordinate their schedules—the evaluator has to be present when the performance happens)*	Watching someone stuffing a turkey to ensure that they are using safe food-handling techniques	Observing the technician starting up and testing a cabinet in the field
Customer Feedback	Asking people involved in the process/task or users of the end product for feedback according to specific criteria	Asking family members if they enjoyed the turkey dinner	Interviewing the project manager about technician performance on the job

Note: Often, combinations of one or more of the methods above are used.

Finally, the assessment would be designed to be conducted either on the customer's site, at the branch, or at another location. (Knowing this information would allow the evaluator to schedule his/her time more efficiently.)

Legal Due Diligence

Though it was tempting, we tried to resist linking the completion of Qualification Instruments to progression up the compensation ladder. For one thing, promotions and raises should be based on a number of factors, only one of which is pure work performance. (For example, time in grade, general level of teamwork, etc., are all valid considerations for promotion.)

Another potential legal risk area had to do with the validity of the assessments. One way this risk was addressed was by basing the Qualification Path on a detailed job analysis. Another was to leave all ownership of compensation and progressive discipline decisions clearly in the hands of local management. For example, an employee may fail to qualify on a given task as many times as local management is willing to allow.

We made sure the system would be fair by defining the criteria for selecting and qualifying evaluators and by putting an appeals process in place so that candidates can request a second evaluation by another evaluator if they believe the results were inaccurate.

As a last line of defense, the system requires that supervisors document key decisions and data so that, in the unlikely event of a legal challenge, the exposure is limited.

Project Challenges

Scope Creep

The project soon expanded into specialty lines of business and into some of the other field roles, including project managers, sales engineers, service account engineers, and design engineers. Although the expansion strained our ability to support the initial implementation for the on-site system technicians, it was also an opportunity to increase the leverage of the project on overall business results.

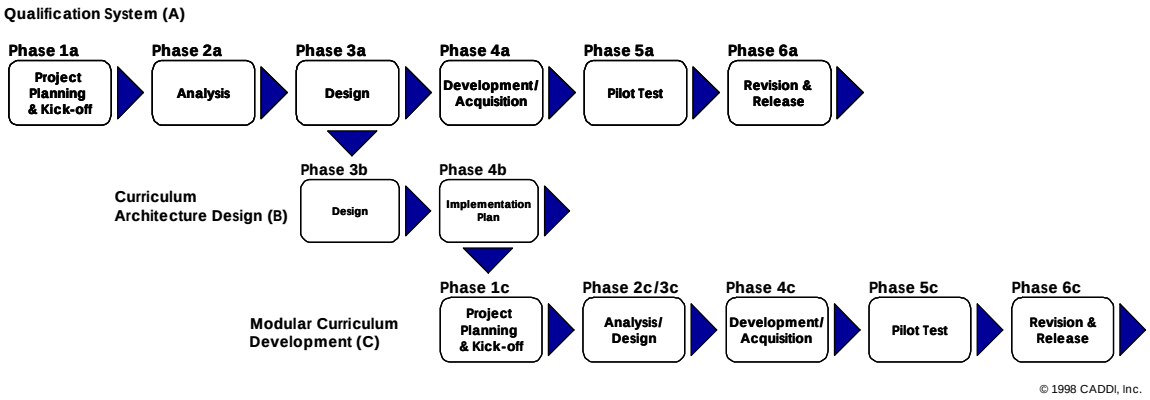
Today's To-Do's

The branch workload made it very difficult to get people to take two to four days off the job to work in analysis and/or design meetings. We sometimes ended up traveling to the branches (even though it was more expensive) rather than trying to bring people in to a meeting at the home office because going to them enabled us to fit into their schedule. We were also able to promote the program to other branch personnel while we were there.

Complexity

It doesn't take long for the number of products, tasks, customer facility types, branches, and perspectives to become overwhelming. To manage the complexity, we used a number of tools (some computer-based and some not). For example, we used a database to track the relationships between the various Qualification Instruments, training/development modules, and roles/tasks. However, we used a simple diagram to plan/track project activities that is sort of a combination of PERT and Gantt charts. (The diagram is a PERT chart arranged along a time line.)

The most important means of managing the complexity was having a structure for the data and the work process. Each audience group became a "project," and each project was structured as shown below. Coincidentally, this process was compatible with the client's internal quality process for evaluating change projects and other initiatives, which helped us to clear the internal hurdles.



The Results

It is still too early to obtain utilization and satisfaction data on the system itself. It is also premature to assess learning curve cycle time. However, the process has been piloted in approximately ten branches, and we have had anecdotal feedback in four key areas.

- Managers stated that the path and instruments wouldl be very helpful in planning and managing the development of their people.
- Candidates stated that they believed the path will help them expand their capabilities and see a progression to their career.
- Candidates and managers believed they need the flexibility to create truly individual development/qualification plans based on unique local needs.

- Candidates and managers were uncomfortable with setting a time line for reaching base line—their advice was not to manage the time line but, instead, manage the development process (e.g., make sure development plans are completed, that progress is being made, etc.)—too much emphasis on the time line would lead to people taking shortcuts to meet a metric.

Key Learnings

There Is a Limit

There really is a limit to the amount of change that an organization can absorb. Even though the client is implementing a "change calendar" to coordinate the multitude of home office visits to each branch, branches were often overwhelmed by the sum total of new products, tools, and initiatives coming from different organizations from within home office. (The change calendar is still a new discipline there.) In addition, some branches turned out to be "early adapters," while others wanted to wait until all the bugs are worked out. We found that we had to use more of a "pull" system than initially planned. The results were fine, but it took longer than estimated.

The KISS Principle

Keep everything as simple as possible, and then simplify it. We thought we did, but there was still room to improve.

Tell 'Em, Tell 'Em, Tell 'Em

Communicate everything through multiple channels multiple times. We tried but could have done better. We used an intranet Web page, memos in the company weekly electronic newsletter, on-site implementation kick-off meetings, and presentations at key management events. Still, whenever we visited a branch, there were misconceptions (or even a lack of basic knowledge) about the learning curve cycle time project. Nobody was at fault—the branches were just so overwhelmed by programs and information from home office that, mixed in with the workload, it occasionally all became noise.

Logic Can Beat Politics (Sometimes)

Have a sound business rationale that can stand up to close scrutiny. We had high-level sponsorship and support. The project was even initiated from the executive level. Though we probably could have gotten by without one, we put together a simple business justification for the project. This step was critical because it established the merits of the project. Regardless of who requested/initiated it, the project could be defended rationally, which greatly improved field receptivity (and it improved our confidence that the project was indeed worth the effort).

Think Long Term

We built everything as if it would be in operation forever. We designed the system to handle future expansion and changes in the work, roles, tools, and products/services. If the system was not built for maintainability, it would collapse under its own weight.

Future Plans

There are a number of possible future enhancements planned for the system. One is the installation of a much more automated administration process that would allow a branch employee to enter a development plan or check their progress on-line. This system could prompt employees and supervisors when due dates for key qualifications are approaching. It could generate real-time measures for the balanced scorecard. These plans are in the works, but the systems are not yet in place.

Another planned future effort is the development of new training programs to address performance gaps and the reconfiguration of some existing training to make it more accessible to a branch performer early in their learning cycle. This training may make use of computer delivery technology, or it may simply allow people to complete training at their own individual pace, rather than waiting until they can get into a scheduled classroom course.

Finally, the data generated through the project will be used in a number of related human resources applications. Some potential uses include

- Augmenting job descriptions with the Performance Model and Knowledge/Skill analysis data and/or Qualification Path
- Using the performance analysis data to generate criteria and interview questions to support the recruiting and selection process
- Using the qualification data to help make decisions about career path development and evaluating candidates for promotions or moves into related roles

One of the most exciting potential future applications of the qualification data is the possibility of using it to help with business planning in the branch. If a manager can forecast the number and types of projects the branch is likely to have, then they can estimate labor requirements. Based on their employees' qualification records, they can begin to develop or recruit people proactively to make sure the branch has the capabilities they need to deliver on the customer expectations. People they are considering recruiting can be assessed against the Qualification Path, and gaps can more easily be identified and addressed.

Of course, our next big task is to align the training and development product line (including Web-based information sources, CBT, classroom/lab training, and even locally available materials) to support the Qualification Path. Once we have actual learning curve cycle time data and can offer development options to enable people to access the learning products more quickly, we can truly optimize learning curve cycle time.

Ultimately, we believe that this project is the start of a migration from an employee development process centered around home office training to a structured development process managed locally. The bottom line is that as work becomes more complex and individual employees are expected to perform more independently, it is increasingly necessary to manage the human performance capacity of the organization. The system we put in place with our clients provides an important foundation for them to improve their competitiveness through reduced learning curve cycle time.