

Building Capability

Volume 3, Issue 1

January 2007

LARGE-SCALE SYSTEM ARCHITECTURES

Greetings!

Welcome to the first issue of 2007! We have been making some changes...I hope you like them.

We're trying out Constant Contact for mailing. It is service that manages mailing lists, making it easier for readers to subscribe (or unsubscribe) and also protects the privacy of your email addresses.

You now also have more choice in how you access the newsletter. Depending on which link you click, you can read it as a web page, download it as a (printer-friendly) pdf, or browse for individual articles "ala carte."

This issue focuses on a topic that is very important to us—the design of large-scale architectures for human performance settings.

The lead story makes the case for the importance of these architectures. We think that sometimes the need to "go fast" or the apparent ease of computer searching gives people the impression that an overall organization scheme is not necessary. We disagree—in fact, the larger and more complex the domain of performance or content, the more important it is to organize it to make it useful.

The project profile focuses

on a recent large-scale architecture project that presented several challenges (and, which is not atypical in terms of business situation or complexity).

The List for this issue picks our top five questions to get answered when scoping a new project opportunity.

We are looking forward to a busy and enjoyable 2007—we hope you are too!

Pete

Peter R. Hybert
Principal
Consultant



Why Companies Need Large-Scale Architectures for Human Performance-Related Systems

The Future Will be Completely Different...Pretty Much

We often try to draw parallels between the field of Human Performance Technology (inclusive of Instructional Design) to other fields that employ a design/engineering process for doing work. Recently, while reading a book on architecture called "City of Bits" by William Mitchell we noticed one of those parallels. Though he takes awhile getting there¹, eventually the author arrives at the impact of digital technology on our buildings. He proposes that we may no longer require specialized facilities for certain activities—and mainly the types of facilities that require an architect to design them. Some examples include libraries (because you

will be able to download everything from the web), large offices (because information workers will be connected to each other and their data without being physically co-located), hospitals (because specialized expertise may be available through remotely operated robots), schools (because of distance learning), etc...you get the idea.

Of course we have all heard these kind of futuristic predictions, but we still aren't commuting to work in hovercrafts or wearing paper clothes. But what about human performance systems? Has digital technology changed the needs for large-scale plans? Has digital technology made it so easy to generate content and then search for it that you really don't need an organization scheme?² Are individuals

acting locally likely to evolve a better idea of what is needed than someone (or some group) trying to create a master plan?

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Why Companies Need Large Scale Architectures for Human Performance Systems, continued

We believe there is a greater need than ever to design before developing. A logical design structure will reduce costs in both generating and maintaining content. It will make it easier for the end users to find what they need. It will even help leaders to make informed decisions about priorities and resource allocation.

"All frameworks map a terrain so that you can find things, create things that fit."

What Kind of Large Scale Structures Do Organizations Need?

The table below describes four examples of large-scale architectures. All are frameworks for the design of solutions related

to the support of human performance.

All these frameworks map a terrain so that you can find things, create things that fit. And no one organization model fits every need. Each offers unique benefits.

In the case of a curriculum architecture, it will allow you to identify where new training products might be needed. You should be able to figure out where existing programs fit and which roles need to complete them. When something in the environment changes, you can figure out what training needs to be updated.

Content taxonomies perform a very similar function to a curriculum architecture. Specifically, you can use them

to manage the acquisition and storage of content. You might use the taxonomy to identify where you need to gain or bolster existing know-how to address a new or evolving business need.

Competency frameworks and capabilities architectures can help guide development planning for individuals so that they develop the capabilities needed for their current or next role. They can also help in designing succession or career progression plans. They can be used in reorganization efforts to guide decision-making about deployment of individuals as jobs/roles change.

In summary, all these frameworks help you figure out where you are vs. where you want to be and they help you build consensus for that vision.

How Can We Rationalize Designing For the Long-Term When We Need Results Now?

Just because we need a large scale structure doesn't mean that we need to take an extended amount of time to design it. The good news is that when you find the right architecture, a lot of other things fall in place. It becomes clear where things belong.

Success factors include a combination of know-how, tools, process, and attitude. Having worked in this area since 1984, we can say there are definite patterns for things. Just as a building designer knows to include bathrooms, halls, wiring access, and other features in a building, an experienced performance or content architect knows how to deal with performances that have a great deal of variation in different situations. Or

how to deal with performances that occur in "real-time" (e.g., sales) vs. "stop-time" (e.g., engineering). Or how to address multiple audi-

ences that have similar (but not quite the same) needs. Or how to deal with content that changes frequently. Etc.

Tools and process are an outgrowth of know-how and experience. Here is where digital technology can be a key enabler—we use a custom database to store and define relationships between a large amount of content, users, applications. We also leverage the internet to engage more participants in the design process (as contributors or reviewers).

Attitude is important too—to paraphrase Yogi Berra, designing a content architecture is 90% mental and the other half is attitude. You have to believe it is possible to design a workable structure for your situation so you don't quit the first time you run into a difficulty. You have to be willing to push yourself and your team to get to a comprehensive and comprehensible design. You have to be willing to teach your client or team as you go so they can take over and build (and maintain) the solution set over time.

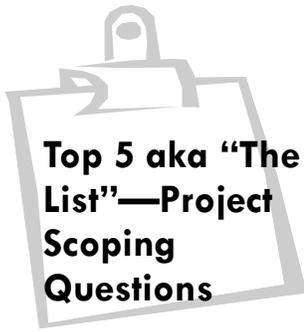
Conclusion

The good news is that technology may drive a lot of change but technology is an enabler, not the essence of human endeavor. Organization schemes, such as the types of architectures described here, allow individuals to understand a given domain of work. They can put details into a context.

These are things that we believe people will always need to be able to do. Creating useful architectures requires understanding the work and what it takes to perform it and then careful planning of tools and interventions that both fit the need and support each other. We believe that these structures will stand the test of time, in spite of external changes, if they are based on the fundamental characteristics of the business.

Structure	Description
Curriculum Architecture	Structure for the organization of training <ul style="list-style-type: none"> • Inventory of training courses and materials • Learning paths for each role
Content Taxonomy	Organization of content (i.e., concepts, rules, information) related to a particular discipline or subject
Competency Framework	Organization scheme and hierarchy for skills and, sometimes, tasks that are "mixed and matched" for individual tasks/roles.
Capabilities Architecture	Logical grouping of tasks, skills, characteristics used for development planning, recruiting, and career path design (among other things).

For more detail, please check out the extended version of this article in "the library" on our website!



Project scoping is arguably the best part of any project—after that, it degenerates

into work! It was tough to pick the “top five” questions to ask (we use a five page checklist for real scoping discussions) but here goes...

What is the problem (or opportunity)?— This question has to include what is happening vs. what you want to happen. And it has to include what work is affected (tasks, outputs, roles).

What do you think is causing the problem and why?—Though you should always do your own analysis, it is always insightful to find out what the project requester is thinking. If nothing else, it is an opportunity to help them think systematically about the problem.

What do you see as the solution to the problem?—Again, at minimum you need to understand assumptions and expectations in order to manage them. Their ideas about the solution will give you a good read on how serious they think the problem is and how much resource (attention, energy, etc.) they are willing to invest in solving it.

What have you tried already?— Though reinventing yourself is hip nowadays, it is still un-cool to reinvent the wheel. If something didn't work before, you want to know why so you can avoid the same mistakes. You should also find out who was involved and follow-up with them to gain their perspective. The beginning of a project is best time to ask obvious questions.

Why, why now?—Once again, try to understand the context. What has raised this need to the radar screen? Did something happen? Is something planned that depends on solving this problem? In the vast majority of situations, people underestimate the time needed to do things. If trade-offs are needed, what will need to be scaled back? Can the end date be moved out or will you need to reduce scope?

Did we miss one? Tell us your favorite scoping questions!

Project Profile: Designing a Performance Support Architecture for Multiple Target Audiences

The Business Situation

Our client had an interesting challenge. They are a consulting firm that counsels their clients (from here forward, “customers”) on their employee benefits and pension plans. They also design and administer those plans for their customers. They have developed a proprietary data-management system which they customize to fit each customer’s specific plan.

The target audience for the project was systems analysts, programmers, testers, and project managers. Business challenges included rapid growth, technology changes, and how to shift work offshore.

Their goal was to create a structure for their training so that it would be as current, organized, and cost-effective to deliver and maintain as possible. They wanted logical learning paths. They wanted to clarify what should be learned across the organization vs. segments of the audience. They wanted to use design templates where practical so that an off-shore development house could create the training, guided by a small internal training design and project management staff. It was a tall order...

Designing the Architecture

After detailed analysis of the performance and supporting capabilities and resources, we worked with a smaller team of top performers define “instructional objects”—that is, small pieces of content that logically went together. And we defined the overall organizing principles (for example, do we group similar topics or group by line of business or...).

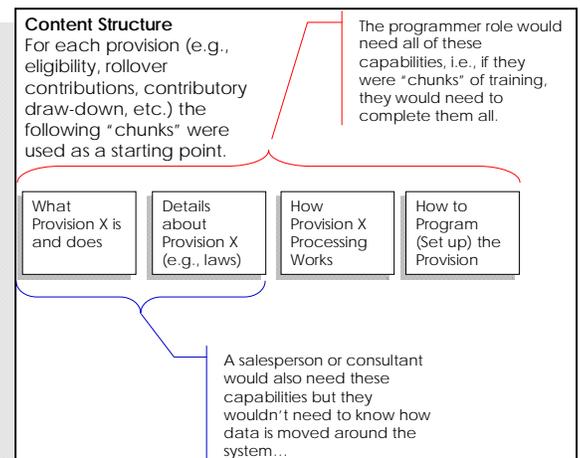
One of the biggest challenges was carving up the technical content. Primarily, this consisted of plan provisions (e.g., medical benefits, pensions, IRAs, etc.). There were laws, policies, pre-existing programming events, industry standards for each. Just to give you an idea of the scale, we ended up with over 1,000 instructional objects in the curriculum, not including tests. The key to managing that

volume of data is the organization scheme...the architecture.

But at the object level, we also used a structure to accelerate data-collection and development. Below is a diagram illustrating how we “chunked” the plan provision knowledge. Using this structure offered a number of benefits.

- Developers could create their chunks rapidly—they could use templates and they could tell “where to stop”
- The content could be shared appropriately—for example, new sales reps could complete the concept pieces without the programming details
- Learning paths could be customized depending on which provisions the new hire would be working on first

“Their goal was to create a structure for their training so that it would be as current, organized, and cost-effective to deliver and maintain as possible.”



To us, however, the client’s comment that “this is the type of breakthrough thinking we needed” was the biggest payoff. A simple idea that enabled a lot of people to be productive rapidly.

For more detail, please check out the extended version of this article in the Project Profile section “the library” on our website!

News and Events...

Below is an update on what we have been doing and what is coming up in the near term.

What Happened in 2006...

Projects kept us busy the majority of last year. We developed custom training on lean manufacturing concepts and tools for a diversified manufacturing company. We designed and built several training and qualification programs for pharmaceutical process operators. We designed and built web-based training for product design engineers in how to translate customer requirements to product specs. In all of these projects we continued to use and refine our capability and object-based design approach to accelerate projects while targeting performance needs.

What's Coming Up in 2007?

This year Pete will be presenting at the ISPI conference again, to be held in San

Francisco. Check out the conference at www.ispi.org and, if you can make it, we would love to see you at one of the sessions.

- Craig Burton (Eli Lilly) and Pete will be presenting on “Building Capability, Ensuring Compliance.” This presentation will summarize a multi-year effort to transform training and qualification in a regulated environment from a compliance exercise to one that truly impacts performance.
- Dottie Soelke (Soelke Consulting) and Pete will present a case study called “A System for Developing and Assessing Performance.” They will walk-through the decisions and trade-offs at key points in a performance-based qualification project

in the face of multiple, and often conflicting, requirements.

- Pete will present a session on “Test Strategies—Verifying Capability to Perform.” This session will address how to think through the when, where, and how to test capability.

Our other marketing efforts include giving the website a fairly significant makeover. We hope the new design will offer more for client projects as well as making it easier to navigate and view the content.

Last but not least, we are jumping on the blog bandwagon (admittedly, a little late.) Stay tuned for more on this activity when we figure it out.

Visit “*the library*” on our website for past presentation hand-outs and related articles!

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For Fun—Surely You Must be Joking, Mr. Feynman!

Richard Feynman was a physicist who worked on the Manhattan Project. One of his many contributions (pre-computer) was to speed up large calculations by breaking equations into small pieces and working the pieces out in parallel using a team of lower level workers. He is considered the father of nanotechnology for suggesting it in a speech he made in 1959. He won the Nobel Prize for a series of diagrams (that many of us would not understand). But he may be best known as a member of the Rogers Commission that investigated the Challenger explosion—he made the news by dipping an “O” ring into ice water to show how it lost flexibility when cold.

There are several books about him or containing essays and lectures he has written. They are well worth the time, even for non-physicists. One idea: his father taught him that knowing what something is called doesn't mean you know anything about the subject at all—you have to look at what it

does, how it behaves. Another: his semi-inadvertent discoveries about how some cognitive processing interfere with each other. To him it was a “throwaway” idea (like, seeing if he could count socks while reading the paper at the same time) but there are insights there that can help inform the design of computer interfaces and learning activities.

By the way, in our last issue we suggested reading small books as a way to deal with today's hectic workload. Mark Bade, from Glen Ellyn Media (and a preferred team member when we can get him) had a few additional suggestions which we are happy to pass on.

- Best American Short Stories 1998; that particular year's edition was edited by Garrison Keillor

- A collection of short stories set in Louisiana by Timothy Gautreaux, *Welding with Children*
- *Holidays in Hell*, by PJ O'Rourke (yes, the ex-liberal turned unashamed conservative); accounts of some of the places he went to get a story
- *18 Stories* by Heinrich Boll; they're set in early post-WWII Germany

Thanks Mark! And, if there are any other readers with comments, please don't hesitate to send them to us.

Are your resources bogged down in ongoing content changes and unable to get in front of key business needs?

Give us a call...we have some ideas.



leveraging know-how for performance!