lean-ISD[SM]

Designing for the ISD Life-Cycle

as Measured by Return on Investment and Economic Value Add

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What Are the Typical Problems and Complaints About ISD?

The April 2000 issue of *Training Magazine* didn't start the whining and complaining about ISD; it only raised the complaints to another level of our consciousness. The following summarizes the complaints that the attack on ISD brought forth and our first response to each

- **ISD is too slow and clumsy to meet today's training challenges**
  Yes, ISD's pace is glacial in an Internet world demanding speed and adapting to constant change. Statements like "the analysis itself will take a month and a half" make our clients and critics lose patience. But ISD can move quickly, deliberately, and systematically. Our approach, and we are sure others', is very visible, predictable, repeatable, and systematic (after hundreds of applications that prove it). It is "lean."

- **There's no "there" there**
  This questions whether there is an instructional "technology" for training in the first place, because too often people have learned from "stuff" that was created in processes that didn't follow the ISD-ADDIE model. We disagree. What did they "learn?" Did they become aware? Were they entertained and slightly enlightened? Were their expectations low in regard to knowledge or skills to be transferred? Do you want your airline pilot or surgeon to be taught in a non-structured, non-systematic approach?

- **Used as directed, it produces bad solutions**
  Yes, too often ISD begins without a business purpose in mind, and therefore can be applied poorly. Or it overreacts to a fraud, like designing for "learning styles" (a concept easy to like but thoroughly debunked by actual research), resulting in wasted effort and time. Or it breaks the learning process into ridiculously tiny increments and forces unnecessary exercises and assessments.

- **It clings to the wrong world view**
  It suggests that ISD arrogantly assumes a "stupid learner" that needs constant handholding in learning anything, and then designs instruction to the lowest common denominator. But that's if the "product" was intended to teach to the lowest common denominator, either because that's where the bulk of the learners were, and/or the enterprise simply couldn't afford multiple versions, or the ISD'er didn't know how to chunk it and create multiple entry points in the "learning process," or the deployment method wouldn't allow for that. We don't think that "it" clings to the wrong world view.

While I disagree with most of these blanket statements, and because I know that not all ISD approaches and practitioners are truly alike, I also know there is some truth in these for many of the ISD approaches I've seen in action, or seen in the results thereof.

The author of this article has been in the T&D field since 1979 as an internal supplier, and then an external supplier, to fairly large enterprises. Those complaints in "The ATTACK on ISD" resonated with me, too, because I'd heard them before. And it wasn't always done politely or nicely by those bringing these issues to our attention. Sometimes it can be downright embarrassing, and it can often hurt. The truth can do that.

Other similar issues brought to our collective attention by meaningful ISD customers over the years include

- Content of the product line elements (courses, CBT, OJT programs, etc.) may be redundant across programs while still leaving critical gaps in other important content
- It is costly to produce the T&D in the first place, and even more costly to maintain
- T&D is costly to deploy
- It is impossible to predict development schedules and costs and then predict return on investment (ROI)
- The look and feel of the T&D varies across the product line, and chunks of potentially shareable T&D aren't designed with reuse in mind.

Again, I agree with much of what's been generalized about the majority of ISD methods. But this attack on ISD presumes that there is only one ISD model/approach being used. That, of course, is ridiculous! In a department of 10 ISD'ers, I too often have encountered 10 *different* ISD approaches in use.

These varied ISD approaches are typically not predictable in terms of the quality of the T&D outputs produced, or their costs and schedules, and they are not *in control*. They are often not very visible processes for T&D management or for T&D customers.

And therein lies the rub. Too much variation in the ISD processes being used, a bad thing we all should have learned from the ongoing global quality movement.

But I think that there is even more to complain and worry about than just these.

What Are the Additional Problems and Complaints About ISD?

I think that too often these typical complaints are only scratching the surface of the really big issues (problems/opportunities) that we ISD'ers, our functions, and our enterprise's face.

I, and others, see those "bigger fish to fry" being

- **Blanketing versus targeting ISD efforts** – Too often the focus is on providing T&D opportunities for everyone. By not getting aligned with the enterprise leadership and working on specific, critical strategic and operational needs, sharing with the customer and leadership stakeholders, and forcing the tough decisions regarding priorities and resource allocations, ISD efforts and resources are wasted on low-value projects, with little chance for significant ROI for the shareholders.

- **Performance Impact** – performance is often understood in the most generic terms, perhaps driven by a generic competency model, which is true enough on the surface, but won't get most people to superior performance levels. Generic models cause ISD'ers to create generic products, with little chance at real impact back on-the-job. Communications skills, presentation skills, or problem solving skills apply very differently for shop floor workers, their bosses, the sales force, the process engineers, the ISD'ers, and the company lawyers and accountants. One-size-fits-all products don't have a prayer of impact compared to targeted content (with perhaps some shareable components/objects). The costs of lost opportunity of really impacting on-the-job performance, because the content and design did not focus ultimately on someone's real job performance requirements, can be significant.

- **Reuse of content** – too often instructional content is not designed to increase sharing where appropriate, *and* for nonsharing when unique content is needed. Even in multiple targeted communications skills training products for varied audiences there are common content pieces/chunks/objects. The costs for not improving reuse capability due to how T&D gets designed; and to do so without "watering" the content down to some vanilla extract that again, doesn't duly impact performance, are also significant and can result in significant additional costs to the enterprise. Imagine if your car didn't share any components with the cars built by your manufacturer; you wouldn't be able to afford it because their cost to produce it would be significantly higher. Remember the "platform" design approach that helped save Chrysler in the 1980s?

- **Development** – the costs for developing content are artificially too high due to a lack of available, or reluctance to use, standard but flexible rules, tools, and templates, and to employ a rationale content reuse strategy and approach. The end result can be redundant content that will cause higher "first costs" than necessary and will lead to higher "life-cycle costs," some of which are explained next.

- **Inventory** – the costs for storing and retrieving content are too high due to lack of a rational, logical "Dewey decimal system" for products and their subassemblies, much like the bar coding SKU (stock keeping unit) schemes in place everywhere in our daily, personal lives. If content exists within your current, total product line, can anyone find it quickly for reuse or maintenance?

- **Administration** – the costs are too high for communications/marketing, registration, scheduling (for those T&D products needing to be scheduled), or ordering (for those T&D products that need to be ordered) because the product line of T&D for any target audience is overlapped, gapped, and a mess in general, and it is hard to present as a unified system of instruction.

- **Deployment** – the costs to deploy the T&D are often too high given the probable returns; and recently when the cheaper, total "e" learning strategy has failed to produce results (for the buyers)

we now find ourselves back to a more blended approach, that still too often focuses on low-hanging fruit content that won't move performance levels higher at an adequate ROI.

- **Maintenance** – the de-centralized ISD systems and processes that typically exist, including the lack of design rules and tools, and the lack of a rationale inventory scheme, will drive up the costs for keeping content up-to-date. But if the content isn't really improving performance anyway, maybe it's better left hidden with the hope that any subsequent effort may get luckier; just don't share that with the shareholders.

These issues greatly impact the "life-cycle costs" for ISD products: T&D/learning products/ knowledge products (which we will refer to as T&D).

While there is "a bevy" of IT tools in the marketplace today to address some of these ISD issues (such as LMS, CMS, and LCMS) they are too often "open data warehouses" for data that you can configure anyway you want to. Again, this permits wide variation to exist, and can ultimately destroy projected ROI.

"Having it your way," for each ISD'er with their unique approach to ISD, keeps the barn door open and the horses running free. The engineering community addressed this decades ago and "closed the barn door" with CAD/CAM systems (computer aided design/computer aided manufacturing). Additionally, standard parts inventories, design rules, and other tools and templates helped them speed design and ensure greater quality of those designs.

Life-cycle costs include "first costs." T&D first costs include those costs incurred for developing T&D. And we mean "all costs" associated with T&D development. "All costs" are the incremental costs incurred for "having done something" and take away from the profit on the bottom line. Build it and they will come, but at a cost.

Life-cycle costs include the costs for administering, deploying, and maintaining T&D. These can be significant. And if your up-front ISD processes allowed you to inadvertently build redundant content, then the life-cycle costs multiply even faster and deplete the bottom line greater. Remember, a dollar not spent falls directly to the bottom line.

From a shareholder perspective, this is an ugly reality. It gets even worse if you look at "total" costs.

Total life-cycle costs include "all costs" paid for with shareholder equity that are incurred both inside the T&D organization, and outside the T&D organization for doing "something" T&D-wise. There is the overhead covering the costs for buildings and facilities, utilities, furniture, equipment, phones, etc. And then on top of that, there are the T&D management layers to pay for.

Then there are the "outside of T&D" costs to pay for all T&D participants and their management time, for any time spent in development, deployment, administration, and maintenance; as well as their benefits and all the costs of their management for when they are not doing the jobs that they are on the payroll to perform. There are their costs for planning T&D to meet their performance-related needs, registration and ordering, and participation via classroom T&D and/or via the Intranet.

These costs are incurred because someone made T&D available (inside or outside the enterprise), and someone from the enterprise participated. The shareholder/owners pay for it all. They demand a return, in the short-term, the medium-term, and/or the long-term. You would, if it were all your personal equity that's being "invested."

What Are the Opportunities In Addressing Those Problems?

Why address these obvious and not-so-obvious problems/opportunities? For a better return on investment and economic value add for the shareholder equity invested in learning. There isn't any other "business worthy" reason to do so. If you aren't sure, ask a business owner.

If you could use an ISD process to reduce cycle-times and costs while increasing quality, would that "ring your bell?" It's the "better, faster, cheaper" goal-set from the quality movement, the new-engineering movement, and the new-finance movement, among other movements attempting to do smart things smarter.

It's just simply time for ISD to catch up and benchmark these efforts to learn lessons from those who have blazed the trails. Many organizations have a significant opportunity in recovering and reducing resource expenditures for their ISD processes for producing T&D. They need to re-engineer their ISD processes.

I, and many of my clients, have. It's reflected in my approach to ISD; proven in more than 200 projects since 1982.

My efforts over the past 20 plus years to improve an ISD process were driven by the same need that has driven many businesses to first model and then re-engineer their core processes—to improve quality and reduce both cycle-time and costs. Many T&D organizations have undertaken efforts to re-engineer their ISD processes to make them common across the organization, predictable in their schedules and costs, and ensure that the T&D produced is effective. I began my quest in the early 1980s, and in 1989 coined the term "PACT[SM] Processes for T&D."

The ultimate goal of the T&D and the ISD process is improved performance by the learners. That is how T&D product and product line quality is best measured. The ISD process goals are to create this quality T&D in a reduced cycle-time and at reduced life-cycle costs.

The T&D products must have the desired effect in terms of the incurred learning in the learning environment (whether classroom, CBT, or on-the-job) and, most importantly, the ability to apply those learnings back on the job. The ISD processes must get this job done quickly and cost-effectively.

What Is Our Approach For Dealing With Those Problems/ Opportunities?

My ISD methodology-set is labeled The PACT Processes for T&D . . . which I see as a "*lean*-**ISD**" approach.

The concept of lean comes from the M.I.T. study in 1990 that looked at the worldwide automotive industry and practices and compared them all to Japan's lean production system, in the book *The*

Machine That Changed the World. The lean approach is most prevalently applied to, but not limited to, engineering and manufacturing processes. The goals in these lean applications are to

- Use the best of mass *and* craft production methods
- Reduce costs and cycle-times
- Improve product and process quality and customer satisfaction

The application of lean to the world of ISD should create a set of common, effective, and efficient processes for the entire ISD process that spans project planning and management, analysis, design, development, pilot-test deployment, and evaluation of T&D.

These lean-ISD processes would allow for

- Dividing the ISD project efforts across multiple T&D organizations, locations, and personnel while ensuring that all of the T&D pieces will fit together for a *seamless* learner experience (and for improved "back office" management)

- Planning and managing predictable projects with predictable schedules and resource consumption (peoples' time and out-of-pocket costs)

- The development of both shareable and unique T&D Modules (T&D product subassemblies) that are components of a systems view of the entire T&D product line

- The reuse (with little or no customization required) of the T&D products and subassemblies for various target audiences from across the organization

- The involvement and collaboration of both upstream suppliers and downstream customers

Our PACT Processes for T&D operate at three levels of design, much as many engineering design methods operate for any "engineered product." We see T&D, learning ("e" or otherwise), and knowledge products for knowledge management systems (KMS) as "engineered products."

What's an engineered product in the more sophisticated engineering enterprises today? It is one that is designed to meet the customers' functional requirements and uses, meet or exceed customer expectations, is robust to use and misuse (within limits), and is designed for lowering the "total costs to produce" over it's entire life-cycle. It is designed for "the x's" in the life-cycle." What are "the x's" the life-cycle? They include

- Performance impact
- Manufacturability
- Reuse
- Inventory
- Administration
- Maintenance
- Discontinuance
- "Total" return on investment (ROI) and "total" economic value add (EVA®)

The value for designing for the "x's" includes

- Improved instructional relevance and job performance
- Reduced cycle-times and costs to produce instruction
- Increased common-ization of communications, language, models, culture, etc.
- Reduced cycle-times and costs to administer, maintain, and manage the instructional products, subassemblies and components (instructional objects)
- Increased shareholder value due to improved "total" return on investment (ROI) and "total" economic value add (EVA)

What is a non-engineered product? It is a "one-off" product design where the designer was not concerned with any or many of the "x's." It is more of an "artistic" effort than an "engineered" effort. Is it always inappropriate? No. Think of "chia pets" and "pet rocks" and "fad-du jour." Think of some (not all) corporate communications, and local, short-term/low-impact issues. Think of fun stuff. Silly stuff. But don't apply this artistic, one-off approach to critical enterprise needs. Not where health, safety, or the future viability of the enterprise and employees are concerned.

Our PACT Processes for T&D are for serious needs, not one-off communications. That would be overkill in the extreme. When appropriate, we apply the three levels of our engineering process for ISD. The three levels of PACT are

1. CAD - Curriculum Architecture Design[SM] - *the rough equivalent of* . . . Systems/Architectural Design
2. MCD - Modular Curriculum Development[SM] - *the rough equivalent of* . . . Product Design
3. IAD - Instructional Activity Development[SM] - *the rough equivalent of* . . . Component Design

Not all three levels are used in every ISD endeavor; as always, it depends.

1 - Systems/Architectural Design is where the entire product line is designed (based on appropriate analysis) to work as a system. It is at this level the product line is optimized and where critical trade-off decisions are made. Segmenting the system into pieces is but one end goal among many for the systems engineer; segmenting it so that it lowers costs over the entire life-cycle. Sometimes you need to actually invest more for your "first costs" to lower "total life-cycle costs."

Systems design of a campus works this way; so does the overall design for the entire "product line" for an auto manufacturer, for a software applications suite, and for a set of curricula for the electrical engineers, etc. The original concept for a "curriculum architecture" came from the Information Technology world.

At the Bell System Center for Technology Education (BSCTE) in the 1970s, the IT representatives on advisory panels, providing a forum for the voice of the customer to the BSCTE development community, saw it desirable to create an architecture of courses to deploy awareness, knowledge, or skill-developing products for their key target audiences. They were simply applying a concept now generally known as "platform design" and "object oriented design" way back then to this world of ISD.

2 - Product Design is where a product, a subset of the system targeted for its predicted value or return, is designed and developed to work as a component of the system. Product design of a building works this way; so does the design of an automobile, a word processing program, and an engineering course on radio frequency.

3 - Component Design is where the subassemblies of the product are designed. Component design of a classroom works this way; so does the design of an automobile engine, the copy and paste function, and the overview of systems and products were radio frequency engineering techniques are applied.

What is the value of designing T&D products for the "x's?" Or "e" learning or knowledge products? The same as for any other engineered products that have a reasonable "life-cycle" and little for those of a short life expectancy. In some cases, certainly not all, the value can be enormous. For some cases, it is negative; negative when the return is exceeded by the investment.

History of the PACT Processes Approach and Methods

I've been evolving this lean approach to ISD in our PACT Processes for T&D since 1982. The first Curriculum Architecture Design project was for geologists and geophysicists for a major oil company's exploration division. Today someone would claim it to be a Knowledge Management effort. Others would say it was an ISD effort. They would both be right.

The company saw that its exploration geologists and geophysicists were about to retire en masse. The bulk of the incumbents were hired in the years immediately after WWII and were about to retire in the next few years. As it took about 10 years to develop a good "explorationists" using current methods (unstructured OJT), the company could see the rapid depletion of a community of their key "knowledge workers." And given the high costs of being wrong about "where to drill for oil," they had to do something and do it quickly. And it had to work well.

Once they had the master plan they were able to hand off the entire curricula's piece parts (modules), and via a "divide and conquer" approach build the "chunks" quickly. If the effort had been done today, most of the content would be "e" learning. Then it was paper-based modules for use by an expert, a master performer, to guide a learner in mastering oil exploration. There were both shareable and unique modules; because there are common and unique aspects and knowledge and skills to exploring for oil in "the sands of west Texas," "the Rockies," "the tundra of Alaska," and "off shore."

Subsequent applications of CAD, more than 125 to date by myself and many others whom I have developed/trained, have addressed target audiences within almost every enterprise function/department and target audience, including leadership, finance, marketing, engineering, manufacturing, merchandising, operations, sales, service, and human resources; and across an entire spectrum of government, service, and manufacturing entities.

MCD, the product design development methodology component level of PACT, has designed and built performance-based T&D, including web-based training, CBT, and group paced, for

- Labor Relations for Supervisors
- Product Management Basic Skills

- Call Center Agents (sales and service)
- Research Chemists
- Sales Engineers
- Installers/Service Technicians
- Brand Managers
- CAD/CAM
- MRP II

IAD, the component or subassembly level of PACT has developed performance-based content, job aids, and qualification/certification systems and instruments.

Results Achieved in Client Projects

You might ask, to what end? Aren't the costs of conformance (COC) for this highly structured, data-driven approach sometimes quite large? Isn't the "means" of PACT approach a lot of rigmarole for something as simple as "the ends" of training and education?

Yes, for "low-hanging fruit" efforts, certainly. But for critical target audiences performing in mission-critical business processes where the risks and costs of nonconformance (CONC) are too high to leave to chance, PACT's "learning by design" approach and methodology are not only desirable, but necessary.

But doesn't it take "forever" to follow this approach.

In one telecom effort it took less than six months to redesign 380 days of T&D down to 187 with a very visible performance-orientation that enthusiastically increased support by the client—which resulted in their participation in the development and deployment. The client now saw the T&D as seemed relevant to the job and saw the promise of its implementation.

In a product management development effort, the total ROI was calculated by the customer at more than 475 percent.

In a metal stamping division of an auto maker, an 18 month-long set of curricula not only enticed people into the job in greater numbers, the project was one of the few T&D efforts to ever win the Chairman's Quality Award.

An automotive engineering organization redesigned their new product development process and redesigned two jobs into three jobs. The forecasted ROI estimated by engineering leadership was 360:1. When you factor in $500,000.00 as the investment cost, may send chills up and down your spine when you see $180M on your calculator.

In one manufacturer's franchisees' operations, volume went up 30 percent and costs went down 20 percent on day one of the implementation of what was learned in a four-day workshop.

If we can do this with our detailed, planned, highly structured, data-driven, team-based, collaborative set of methods, so can anyone with the right knowledge, skills, attributes, and values. It isn't for everyone. Neither are systems engineering, or strategic planning, or creative writing, or skydiving.

We aren't all wired for some of the approaches that provide benefits in some circumstances. That's just life on the planet.

Implications for the ISD Professional, Their Function and Their Enterprise

What if you wanted to embrace a more structured, data-driven, team-based, collaborative set of performance-based ISD methods? What are the implications?

For the ISD professional it means being more of an engineer than an "artist." It means focusing on the design for "x's." It means moving beyond a personal, *special* brand of ISD or personal preferences for look, feel, and instructional sequence. It means systematically practicing a stable, predictable methodology – rather than doing the next project differently than the last one, just to keep yourself amused/stimulated/fresh.

Being the artist would derail things like increasing the shareability of content components across many more audiences, and miss the opportunity for reducing total life-cycle costs. You'll be in an engineered product business, where things like that are important.

This was something design engineers had to adjust to in many engineering companies. It's been done. That doesn't make it easy, just easier with the "lessons learned from being burned."

It means enterprise, and ISD leadership providing all of the enabling processes and assets to make this optimally hum like the shops in the best-in-class, high-value add, manufacturing world. That doesn't happen by chance; it happens by design. ISO and the Baldrige Award have been setting standards for many to follow to drive revenues up and costs down resulting in increased profits, for that is how score is kept in the business world.

For the enterprise it means being data-driven, systems and process oriented, and putting the asset resources in place to get the critical things done – instead of working on the low-hanging fruit. How do you keep the squeakiest wheels from hogging the grease, ensuring that you are targeting programs and projects and deploying resources to achieve the strategic intent? Unless your organization is "self-actualizing," you can't afford it. And if you are indeed self-actualizing now, history will show you that it is a temporary condition; and that too will pass.

It's More Than ISD – It's Also the Other Processes and the Enabling Infrastructure

This more structured, data-driven, team-based, collaborative set of performance-based ISD methods won't work in a vacuum. Other processes, enabling assets, and infrastructure need to be put into place, and that's just not a slam dunk. The ISD function needs better alignment, targeting the improvement of its own systems and processes.

First of all, there are many processes that need to be put into besides a better ISD process-set (T&D development, acquisition, and maintenance are but a few). There are other non-ISD processes, too. Our T&D *Systems View* model sorts them all into three major groups of systems and processes

- Leadership Systems and Processes

- Core Systems and Processes
- Support Systems and Processes

The model has 12 T&D systems across these three groupings, with 47 distinct T&D processes that enable a high-performing T&D system (or learning or KMS) to run both efficiently and effectively.

Too many? Don't bet on it. ISD is but one set of core processes needed to run "T&D like a business." That would be the equivalent of a new product development (NPD) process being the only process in an auto company. It's just not that simple in the real world where "everything is a process" and getting your arms around them to manage them is literally a difficult "hands full" task.

The right human performers with the right awareness, knowledge, skills, attributes, and values for the more critical processes are crucial. The right environmental assets are crucial, too. But the systems and the process are just as critical. Remember the words of Geary A. Rummler, "Put a good performer in a bad system and the system will win every time."

Make sure your systems and processes are those that enable high-level performance and not those that disable or hinder.

Additional Benefits for the Enterprise

Additionally, a data-driven ISD approach should generate data that can have a meaningful impact to other systems and their processes, such as

- Organization and Job Design Systems
- Staffing and Succession Planning Systems
- Recruiting and Selection Systems
- Performance Appraisal and Management Systems
- Compensation and Benefits Systems
- Rewards and Recognition Systems

The enterprise today is concerned with driving its costs down so that it can lower its prices and/or increased their profits. Information Technology is one key enabler that we are all somewhat familiar with. Enterprise Resource Planning (ERP) systems are the "mother-of-all-databases" that house the data of the kingdom in an organized, systems/architectural manner; each with their own sublevels and components. These systems are populated with the same sets of data used to drive the Human Resource systems listed above.

What Should You Do Next?

If you are intrigued with an approach for performance-based ISD that is mindful of the "total returns on total investments," and the "economic value that can be added to the bottom line and balance sheet," you need to become more aware, knowledgeable, and skillful in many non-ISD matters.

We think you need to look elsewhere, outside of T&D and ISD, and benchmark other engineered product business operations. Learn about

- Business financials
- How engineered products are designed for life-cycle issues/needs
- ERP – Enterprise Resource Planning systems (and their parent MRP II, and grandfather MRP)
- Value chains
- Lean thinking
- Total Quality Management/Variability Reduction/Six Sigma

Also, you might wish to read

- "The Goal" by Elliot Goldratt
- "The Machine that Changed the World" by Womack, Jones and Roos
- "*lean*-**ISD**" by Guy W. Wallace
- "**T&D** *Systems View* [SM]" by Guy W. Wallace
- "Improving Performance" by Geary Rummler and Alan Brache
- "Conquering Organization Change" by Pierre Mourier and Martin Smith

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