

## **Simulation in the Enterprise Workflow: The Dawn of Workflow-based eLearning™**

“At a very fundamental business level, first-generation elearning content products based on courseware models are incompatible with real-time contextual workflow.”

Sam S. Adkins, Simulation in the Enterprise, Internet Time Group, 2003

Innovative next-generation workforce optimization products are displacing first-generation courseware-based eLearning products. The arrival of these products on the market marks the dawn of workflow-based elearning.

Learning technology is rapidly being assimilated into a variety of enterprise applications marketed by companies like SAP, HP, IBM, PeopleSoft, Oracle, Sun, Microsoft and Siebel. Real-time workflow is the most salient characteristic of these applications. The applications that enable workflow are known by a bewildering array of three-letter acronyms.

The purpose of this article is to provide a basic roadmap of these new technologies in a cohesive taxonomy. The goal is to help learning professionals understand that workflow-based products are rapidly displacing courseware-based eLearning products in the enterprise.

Enterprise technology is in the midst of an accelerating process of integration and convergence. Learning technologies such as Learning Management Systems (LMS), Learning Content Management Systems (LMCS) and Workforce Performance Analytics are being assimilated into integrated enterprise application suites. Business Process Automation, Workforce Optimization, Business Activity Monitoring and Presence are also being integrated into these suites.

***Real-time simulated workflow is the most salient characteristic of these integrated applications.***

Business Intelligence (BI), Business Activity Monitoring (BAM) and Business Process Monitoring (BPM) used to be confined to analyzing system processes. New applications from vendors such as Cognos, Business Objects, FileNet and Lombardi now track and interact with systems and human responses in the context of the workflow in near real time.

The Lombardi TeamWorks product features a coaching feature “inspired by Vince Lombardi of the Green Bay Packers. When a problem or exception occurs, a Process Coach goes to the relevant back-office systems to automatically collect the background data, present it to an employee and coach that person or several people through the process of remedying the situation”.

PeopleSoft's Intelligent Context Manager "proactively" prompts employees with relevant (role-based) information when they initiate transactions in enterprise applications. According to PeopleSoft, "contextual information is automatically displayed enabling users to intelligently navigate through the business process."

These new integrated enterprise application suites are the catalysts for two watershed developments in the enterprise. They include the:

- Migration away from courseware as a corporate performance improvement method.
- Adoption of true performance support embedded in workflow.

Customers are steadily migrating away from courseware-based elearning products and enthusiastically adopting next-generation, real-time, embedded workflow products. Those products include business process management (BPM), simulation, workflow automation, multi-user collaboration workspaces, instant messaging, automated expertise mapping products and most importantly, workflow optimization products.

These next-generation workflow products are characterized by:

- Task-specific, real-time contextual content and simulation embedded in the workflow.
- Real-time multi-user collaboration in virtual Workspaces

Rusty Gordon, CEO of Knowlagent, said in a January 2003 press release that, "we believe that simulation offers the answer to one of the key root causes of low user adoption rates - making the day-to-day tasks more productive for each individual user."

***Simulation is the most dominant characteristic of second-generation learning content.***

The integration of learning and analytics into broader enterprise suites has resulted in the ability to mitigate performance problems encountered in systemic workflow. This is quite distinct from discrete analysis performed on individuals in stand-alone workforce performance applications.

The distinction may appear to be subtle but it represents a fundamental shift in the way learning technology is used in the enterprise. Unlike specialized point solutions (best-of-breeds) which rightly focus on workforce performance, these hybrid suites have a higher order view into the integrated cybernetic flow of both workers and systems.

The performance (behavior) of the emergent system is ***workflow***. The optimization of that workflow can only be achieved by simulation.

Pure-play vendors sometimes say that the native learning technologies that are now part of these integrated enterprise application suites dilute the functionality of a robust best-of-breed solution. That is not completely accurate but it does reflect the recognition that something is indeed different about the learning technology in these suites.

That difference is present regardless of whether the learning technology is native or a best-of-breed solution integrated via Enterprise Application Integration (EAI).

Workflow is an emergent property that results from a wide and deep integration that enterprise vendors have just begun to implement. That emergent workflow is still nascent in today's solutions and the difference can be subtle.

For example, in the PeopleSoft enterprise suite, learning objectives can be created from anywhere in the greater application suite. At first glance, this may not seem overly important. The significance of this is that performance is now being modeled at the system level. Workflow is being optimized.

Business managers can mandate intervention wherever they find performance issues. That could be while analyzing financial data, while accessing HR systems or while modulating supply chain metrics.

Under these circumstances, the learning technology becomes just one of many system elements that can be brought to bear on the broader corporate performance.

The definition of an emergent property is that the sum is greater than the parts. The aggregation of those parts creates a fundamentally new entity that is unlike the sum of the parts.

An emergent system cannot be analyzed by breaking it down to its constituent parts. It has to be analyzed as holistic system. The only way to model and predict behavior in an emergent system is by simulation.

### **Enterprise Application Integration: The New Hybrids**

Vendors from several previously distinct industries are innovating extraordinary new convergent learning technologies and integrating them into product suites. The applications they develop are known by a bewildering array of three-letter acronyms.

Convergence vectors are the areas where the product lifecycles from these previously distinct industries intersect with each other. Innovation inflection points are the most prominent innovations coming from each sector.

One unmistakable pattern of convergence is the number of companies that already have products in the different competing industries and functionality quadrants. Each year, the larger companies add product lines to their suites to tap the revenues in the previously distinct markets.

REE Quadrant	Industry	Application Range	Convergence Vectors	Innovation Inflection Points
Resources	Enterprise Applications	HCM, HRIS KM, ERP, ERM, LMS, LCMS, EPM	Real-time Communication, Multi-user Collaboration	Cross-technology Integration, Presence Awareness, Transactional Portals, Wireless Connectivity
Resources and Collaboration	Enterprise Content Management	ECM, IM, Presence Awareness, Web Conferencing, Enterprise Collaboration Management (ECM) Expertise Mining	Multi-user Collaboration	Virtualization of WorkSpace, Portals
Resources and Collaboration	eLearning	LMS, LCMS, Simulation Tools, Web Conferencing	Simulation, Multi-user Collaboration	Simulation, Embedded Performance Support
Collaboration	Simulation & Training Industry	Asymmetric Collaboration, Simulation Engines, AI Tutors	Simulation, Multi-user Collaboration	Artificial Intelligence, Psychomotor Learning, Asymmetric Collaboration in BattleSpace
Collaboration	Enterprise Collaboration	WorkSpace platforms, Web Conferencing	Multi-user Collaboration	Asymmetric Collaboration in WorkSpace
Process	Business Process Management	BPM, BAM, CPM, BI, Workflow Management, Customer Analytics, Workforce Analytics	Simulation, Real-time Communication	Real-time Data Integration, Animation of Workflow
Products	Product Lifecycle Management	PLM, PDM, SCM, CRM, Enterprise Project Management, Salesforce Automation, WorkForce Optimization, WorkForce Management	Simulation, Multi-user Collaboration	Simulation, Embedded Performance Support, Rapid Prototyping

Source: *Simulation in the Enterprise: The Convergence of eLearning, Simulation and Enterprise Applications*, 2003, Internet Time Group.

These new product suites are being assembled from a variety of separate technologies and applications via an integration methodology known as Enterprise Application Integration (EAI). EAI is the first three-letter acronym that training professionals need to absorb. The dominant EAI technology is what is known as Web Services.

There are only two words that training professionals need to master when they deal with Web Services; “publish” and “consume”. Applications built with Web Services publish and consume small chunks of information to and from other applications that are built with Web Services.

Elearning platforms built on Web Services publish and consume information from Enterprise Application (EA) suites. VCampus and Element K are examples of vendors that are already Web Services-ready.

The recent integration of Element K’s technology with Saba’s Java technology at Kinkos used Web Services to rapidly tie the two platforms together. So Enterprise Application Integration (EAI) is important not just for integration with other business applications but also for the seamless integration between two (or more) learning technologies.

***Enterprise Application Integration (EAI) is the most dominant characteristic of second-generation learning technology.***

### Three Types of Integration

The Enterprise Application Integration (EAI) in second-generation learning technology is characterized primarily by three types of technical integration:

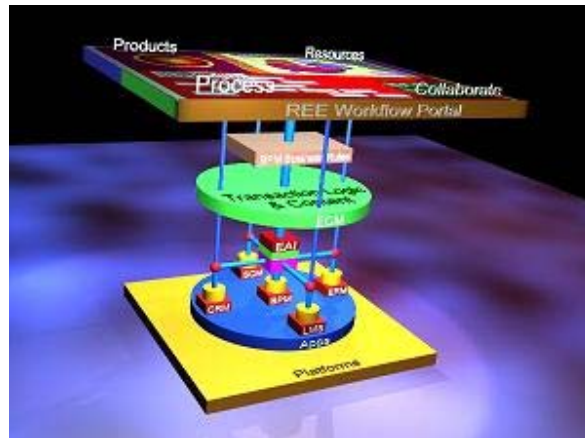
- Wide automated cross-business application integration.
- Deep super-stack or server-stack integration.
- Tailored presentation-layer integration in hybrid applications accessed via highly personalized portals (defined by business rules and personalized to a job role).

### Integration across Business Processes

The cross-business integration involves tight and loose coupling with other automated enterprise business processes defined by a slew of acronyms such as ERP, CRM, SCM, KM, CM and now LMS and LCMS. These acronyms are organized in four clearly discernable functional categories in the Real-time Extended Enterprise (REE) Taxonomy presented in this article.

### Deep Integration down the Stack

The deep super-stack (sometimes called the server stack) integration involves a layered “vertical” integration. From the bottom up, the layers of the super stack are platforms, application server and databases, enterprise application integration, transactional logic and content management, business process management (business rules) and the presentation layer known as the workflow portal.



The significance of this new “super-stack” environment is that learning technology and content must now adapt to this new technology and automated business process environment. Many vendors have recognized this and have begun to market products and services that map to this new learning world order. Plateau, Click2learn, Saba, Docent and Blackboard are just a few of the vendors that have upgraded their platforms to be very integration-friendly.

### Role-based Workflow Integration: Tailored Workflow in the Portal

Enterprise Application Integration (EAI), Enterprise Content Management (ECM), Business Process Management (BPM) and Portal technology are now being combined to create a fundamentally new type of application. These applications are not single products from a single vendor but rather snippets (IBM calls them portlets) or feature sets

of functionality that are woven together. They are presented in the workflow portal to workers based on their job role and their organizational status.

There is no static interface. The portlets are assembled on-the-fly, in real-time, in “customized” aggregate presentations in the portal. What workers see, access and manipulate is defined by user profiles (sometimes called schemas) and job-roles. The interface essentially morphs to individual employees based on their work tasks and security clearances.

The assimilation of several application features from different applications into a single portal is a fundamental shift in the presentation layer of business productivity software. These are not web portals that aggregate links. They are transactional portals that launch discrete feature sets and functions from many different applications in a hybrid presentation interface. What features are present is determined by Business Process Management (BPM) defined business rules.

One overwhelming and immediate consequence of the adoption of hybrid presentation portals is the demise of conventional application end-user training. Until now, end-user training was discrete vendor product training.



Discrete products have been superseded by an aggregation of product features from several different products from several different vendors. End-user training in a single product becomes useless to a business worker. There is no escape from this fact, even for field-based personnel.

Over half of the U.S. workforce are employed in field-based or floor-based (factory, retail, etc.) jobs. They do not spend their days sitting at a desktop

computer. Very recent (and rapid) adoption of wireless technology and embedded manufacturing technology is connecting these workers to enterprise technology. The vagaries and constraints of their interfaces to that technology are defining unusual and highly innovative performance improvement products that bear no resemblance to conventional elearning.

The footprint of the device, the context of the task, and the environment of the performance are all incompatible with courseware-based learning. They are all perfect conditions for real-time, contextual decision support. A similar phenomenon is sweeping the factory floors of the industrial sector. This entails embedded machine intelligence and predictive maintenance. Essentially, the machines “ask” for (if not demand) maintenance and operational tasks based on embedded intelligence.

**Simulation-Speak: The Language of Workflow**

Systems thinking frameworks advocate a holistic (cybernetic) analysis of all interconnecting conditions and admonishes against interventions that try to fix performance problems in isolation. It is quite possible (and common) to create more problems by implementing isolated interventions. Fixing one problem often creates others if analysis, design and intervention are too discrete and monolithic.

Systems thinking is one of Pete Senge's five disciplines. Systems thinking is often entwined (if not identical) with cybernetics, complexity theory and organizational learning. The original "worker-focused" concept of electronic performance support (EPS) was extended by Barry Raybould to incorporate system thinking.

This has effectively created the theoretical groundwork for second-generation EPS systems that map to workflow. The work of Geary Rummler stands out in this area. The implementation of those systems (so far) is not coming from the EPS vendors but rather from the BPM sector. Systems thinking identifies these properties of a system:

- A system is a set of interrelated elements that function in a structured aggregation.
- The aggregated elements are perceived as a whole with a purpose.
- A system's behavior cannot be predicted by isolated analysis of individual elements.
- The properties of a system *emerge* from the interaction of its elements and are distinct from the properties of the individual elements.
- The definition of the elements and the system boundaries is a simulation-based modeling behavior.

Applied to organizational learning, these are the properties of workflow. Workflow is the aggregation of automated business processes of the emergent entity known as the organization. According to John R. Anderson, "Cognitive and situative perspectives view these processes differently, with cognitive analyses attributing the processes to individuals and situative analyses attributing them to systems that include individuals."

In the presence of workflow, the individual adapts in real-time to the contextual performance demands of the eco-system. It is immediate, direct construction (adaptation) of contextual compliance. It is the experience of collaboration not the act of learning (that requires a subsequent skills transfer to the workplace).

"In the situated learning approach, knowledge and skills are learned in the contexts that reflect how knowledge is obtained and applied in everyday situations. Situated cognition theory conceives of learning as a socio-cultural phenomenon rather than the action of an individual acquiring general information from a de-contextualized body of knowledge" (Kirshner and Whitson 1997).

The cybernetic approach is entirely dependent on iterative feedback loops. In the absence of those feedback loops, the system cannot function. Modern courseware design is almost always performed as a linear assembly line process.

It has been prohibitively expensive to implement iterative design until now. The irony is that while workflow modeling with BPM tools now enables this iterative feedback loop, it also makes the need for courseware-based products and manual instructional design redundant.

The emphasis shifts from the delivery (and consumption) of content to the experience of collaborative workflow in the real or virtual workspace. A situated learning *experience* is characterized by authentic, immediate and direct context. That authentic, immediate and direct context is the workflow in the Real-Time Extended Enterprise.

### **The Real-time Extended Enterprise (REE)**

The Real-time Extended Enterprise (REE) is a holistic system that is “aware” (via analytics) of the sum of all its parts. Learning technology is activated when analytics indicate that human performance remediation and intervention are required.

The characteristics of the workflow in the Real-time Extended Enterprise are:

- Deep and wide technical integration.
- Business process automation and extension (across and outside the enterprise).
- Zero latency.

The natural result of this pervasive integration and assimilation is the emergence of next-generation performance improvement content that is embedded in the Real-time Extended Enterprise (REE) eco-system.

***In the context of this new “zero-latency” and workflow-oriented corporate environment, there is literally no time or place for courseware.***

This content is woven tightly into the fabric of the automated workflow. It is not courseware. There is no time or place for conventional “events of instruction” in the automated workflow. Learning is now a core collaborative business process integrated with several other business processes. Learning is experienced as a by-product of real-time collaboration with people and machines in the context of the workflow.



Gagne-like events of instruction now become cumbersome, inefficient and costly (in terms of time and money). In particular, the sequential transfer process that requires skills and knowledge transfer followed by a subsequent learning transfer to the job is now seen as quite inefficient. It is not a question of instructional effectiveness, but rather a question

of compatible product design. It is not that Gagne's method doesn't work in general. It is just incompatible with the real-time workflow in the workplace.

The demand for compatible learning products has sparked a wave of innovation. These new innovations are occurring in many industries. Unencumbered by the constraints of conventional learning theory these companies are pioneering extraordinary real-time performance improvement products.

The enterprise customer demand for integration, optimization, real-time collaboration and embedded business alignment has created an emergent technology and business process methodology. This is referred to as the "Real-time Extended Enterprise" (REE).

### **The Real-time Part: Just-in-time is too Late**

According to the December 2002 Database Development Survey by Evans Data Corporation, 48% of the companies surveyed provide real-time data feeds to decision makers. Nearly a third of the 600 database developers surveyed indicated that they updated their analytic databases on an hourly basis. This is now known as the "zero-latency" trend.

In the context of this new "zero-latency" corporate environment, there is literally no place or time for courseware or the concept of "taking a course". Two enabling technologies that are becoming integrated with these real-time workflow applications are Instant Messaging and Presence Awareness.

Instant Messaging (IM) has begun to proliferate rapidly in the enterprise as an instant performance support technology. Once the domain of the consumer, it is becoming integral to corporate workflow, knowledge management and collaboration technology. It is the core technology used in the "Find an Expert" feature found in most of the enterprise application suites. PeopleSoft calls theirs "Resource Finder".

The elearning vendor Hyperwave has integrated IM and Presence Awareness technology from Bantu into their knowledge management and elearning platforms. Bantu is already used in the U.S. Navy's Knowledge Management Portal known as Navy Knowledge Online (NKO).

According to Bantu, "a sailor at sea with a complex electronics repair project searching the portal for the engineers at the design facility on shore can then see their on-line availability and immediately communicate with them to obtain critical repair information". Bantu is also integrated into the web conferencing technology of WebEx. This allows corporate users to call ad hoc virtual meetings based on the real-time availability of online workers.

IBM claims they achieve \$400 million in annual savings by using collaboration technology for e-meetings, elearning and instant messaging. Lotus Sametime Everyplace 3 is a new wireless instant messaging (IM) product. It is specifically designed to extend

Sametime's IM and presence awareness to wireless devices, mobile phones, smartphones, and handhelds.

Microsoft's PlaceWare RapidMeeting is one of the first hosted web conferencing services to provide customers with "one-click" instant meetings. PlaceWare customers can initiate instant web conferences using Microsoft Windows Messenger.

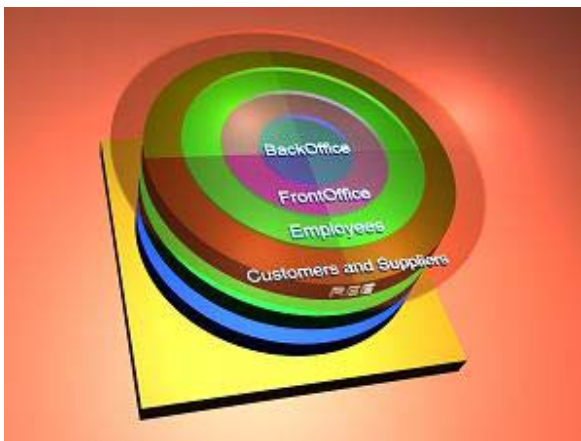
Advanced Logic Systems, or ALSI, sells a product called WorkQuick as part of their Collaborative Work Environment architecture. It creates and tracks workflow with real-time collaboration and 360° communication.

The concept of 360° communication and collaboration extends the real-time metaphor to include the idea of "real time, all the time". Just-in-time is too late.

All these technologies are now undergoing intense convergence with integrated application suites. It is this integration that is enabling the extension of the enterprise and the subsequent emergence of pervasive workflow.

### **The Extended Part: Integration Across and Beyond the Enterprise**

This extension across other business applications, down through the stack and around tailored portals is the attempt to bridge the islands of automation inherent in legacy solutions and even best-of-breed solutions. Applications in any business family of applications should play nice together.



The integration of that technology with a company's vision or business strategy is also vital. The current wave of business process automation is extending that concept one step further and trying to literally (and physically) link systems and strategy with the daily work performance of employees. That is now made possible by ubiquitous workflow.

ERP and HR systems developed as BackOffice applications, internal to an enterprise. CRM and SCM systems developed as customer-facing, FrontOffice applications. These applications are now being integrated to create a workflow that not only integrates autonomous business units inside a company but also weaves in the customer and supplier interactions in outward-facing applications.

The need to optimize workforce performance and supply chains is extending the user-base outside the enterprise to include not only employees but customers and partners. The Partner Relationship Management (PRM) vendors such as ChannelWave and Alegis have

already integrated learning delivery and management into their platforms. They are finding a ready customer base for solutions that have native partner and supplier training technology.

Workers across vertical industries who do not sit at computers all day are now being connected to enterprise applications via wireless handheld technology. Wireless technology is being used to extend the enterprise beyond BackOffice and FrontOffice to employees in the field. Those field workers are being provided with real-time performance support in the form of augmented reality, collaboration with experts, and automated contextual coaching.

The Real-time Extended Enterprise (REE) has created the conditions necessary to allow the emergence of a fundamentally new type of working dynamic known as workflow.

### **Real Time plus Extended Integration Creates Workflow**

Workflow is an emergent property that results from the combination of these new real-time technologies embedded in integrated enterprise application suites.

The dynamics of cybernetic workflow can only be analyzed and visualized by simulation. No static or linear analysis can capture the breadth of the workflow. One key principle of emergent systems is that their behavior cannot be predicted or managed by analyzing individual parts. Simulation is the only way to visualize “as is”, “to be” and “what if” scenarios.

***Workflow is an emergent property of the Real-time Extended Enterprise.  
Simulation is the only way to optimize workflow.***

That emergent workflow is still nascent in today’s solutions and the difference can be subtle. For example, in the PeopleSoft enterprise suite, learning objectives can be created from *anywhere* in the greater application suite. At first glance, this may not seem overly important. The significance of this is that performance is now being modeled at the system level.

As real-time workflow becomes the dominant working environment (inside the office and out in the field), workflow modeling tools are replacing traditional learning content design and development tools. Traditional authoring tools are designed to generate courseware. BPM and workflow modeling tools are designed to model, automate and simulate workflow. The difference is fundamental.

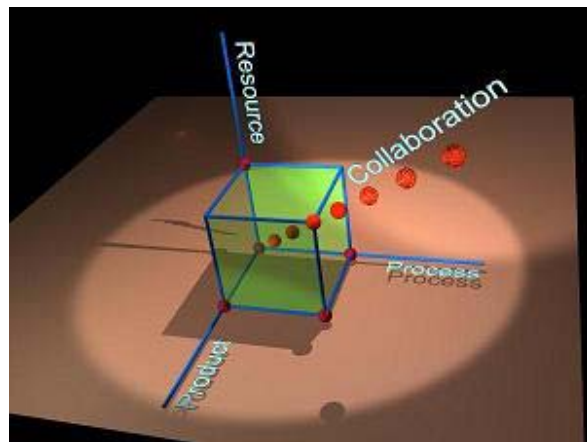
Geary Rummler and Alan Brache are perhaps the strongest advocates for this type of modeling in the learning industry. They have been advocating this approach for many years. The Kirkpatrick analysis defines training as a process, not a discrete event.

Workflow analytics, sometimes called workflow process analysis or workflow modeling, is an efficient method used to map performance. It is identical to traditional task analysis performed by instructional designers but it is done with very sophisticated methodologies

and tools. The difference between traditional task analysis and workflow analysis is that workflow analysis measures performance in the context of the integrated business process matrix. It is a system-wide analysis.

This system-wide workflow analysis models the system dynamics of the people and machines that are now co-participants in the enterprise workflow. The analysis provides a clear snapshot of what is known as the “as is” condition. The process improvement (workflow optimization) modeling defines the “to be” condition. Workflow modeling tools can simulate a variety of “to be” and “what if” conditions to determine the optimal “to be” state.

In a non-integrated configuration, learning technology is confined to mapping and managing isolated workforce performance relative to the enterprise eco-system. This is not a weakness of the technology; it is its core functional purpose. It was not designed to be aware of the systemic aspects of the integrated enterprise eco-system. It was designed to focus on workers and not the combination of workers and systems in the context of a holistic system. This is true for all dedicated business applications.



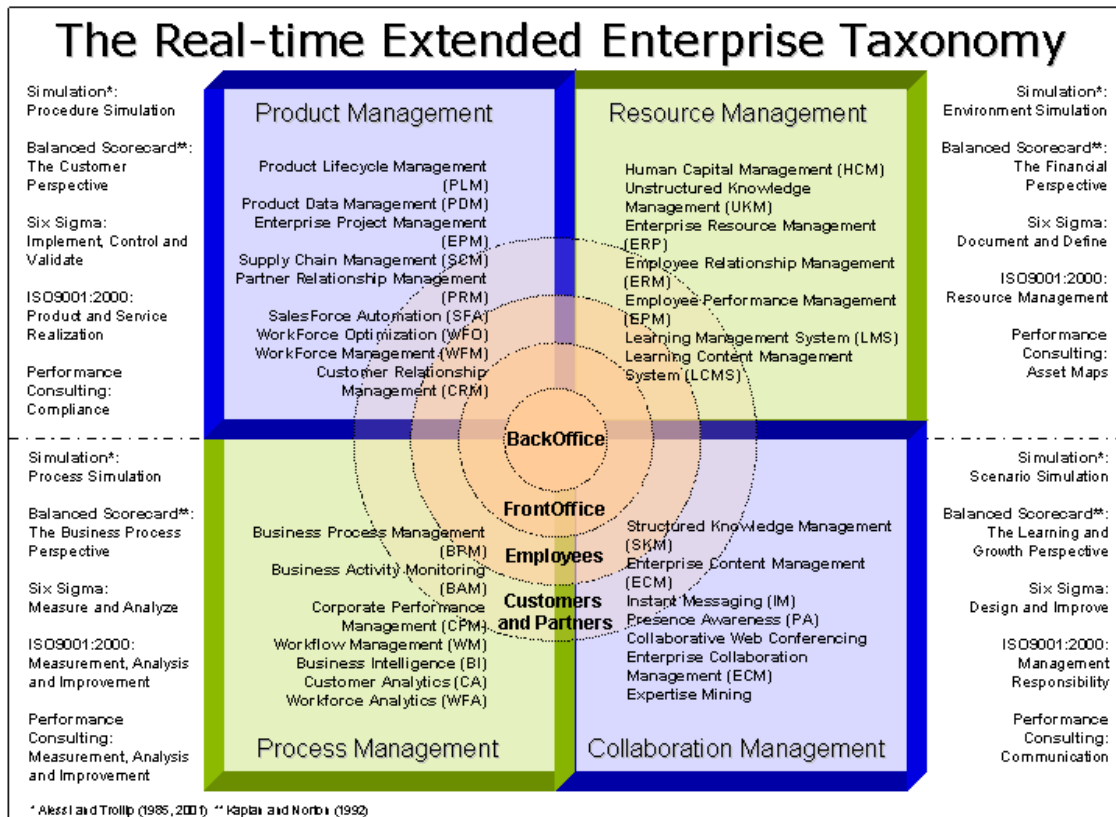
Once that technology is fully integrated, it can still function as a dedicated workforce performance management technology (it can be accessed in isolation) but it now becomes a component of an eco-system that maps, models and manages workflow. As defined by workflow management principles, participants in the workflow include people *and systems*.

The Workflow Management Coalition defines WorkFlow Management as “the automation of business procedures or ‘workflows’ during which documents, information or tasks are passed from one participant to another in a way that is governed by rules or procedures.” In the WFM model a participant can be a person or a system component.

### **The Real-Time Extended Enterprise Taxonomy**

The taxonomy presented here is the first attempt to model the apparent complexities of the convergent enterprise application landscape. It is a method to pare down that complexity into manageable mind-maps.

The following quadrant system segments the applications in four primary functional areas. It is a function-centric model designed to map to the dynamics of the workflow in the Real-time Extended Enterprise (REE).



Source: *Simulation in the Enterprise: The Convergence of eLearning, Simulation and Enterprise Applications*, 2003, Internet Time Group.

These quadrants of enterprise applications suites will converge into a single enterprise suite within a very short time. Most analysts, while not identifying any standard taxonomy, still expect a single convergent application category to emerge very rapidly over the next 2-3 years. The four functional segments of the Real-time Extended Enterprise (REE) are:

- Resource Management
- Collaboration Management
- Process Management
- Product Management

These quadrants map to the four simulation categories defined by Alessi and Trollip. They map to the four components of the Balanced Scorecard System and the four phases of the new process-centric ISO9001:2000. They also correspond to several iterations of the various Six Sigma systems.

These four quadrants are subsumed under the mnemonic:

***People and systems collaborate in a process to produce products and services.***

**People and Systems...**

Resource Management includes applications that are designed to map tangible assets (resources) and to create inventories. The resources include people, property, machines, systems and data assets (such as elearning content).

Unstructured Asset Maps and inventories are the primary output of these systems. They are unstructured in the sense that there is no context or temporal aspect integrated with the data in these systems. They are repositories and file storage systems.

First-generation HR systems are silos of basic employee information. Competency mapping and skills management features in these point solutions are “laundry lists”, simple inventories of skills and certifications usually self-reported by employees.

This quadrant includes a growing list of asset mapping applications that include:

- Human Capital Development (HCM)
- Unstructured Knowledge Management (UKM)
- Enterprise Resource Management (ERP)
- Employee Resource Management (ERM)
- Employee Performance Management (EPM)
- Learning Management System (LMS)
- Learning Content Management System (LCMS)

A robust process of micro-convergence is occurring within this quadrant. This is clear in the recent inclusion of LMS products into the product suites of Sun, SAP, Oracle, PeopleSoft and Siebel. The skill inventories are increasingly becoming iterative when linked to suites that include automatic skill indexing. Business managers are the primary users of technology in this quadrant.

***People and systems collaborate in a process to produce products and services.***

**Collaborate...**

Collaboration Management includes structured events, processes and experiences. Simply put, it is work. This includes synchronous and asynchronous events but it is increasingly moving towards synchronous experience in light of the proliferation of Instant Messaging and Presence Awareness.

Enterprise Content Management is included in this quadrant because new products in this industry are highly collaborative. New automated content creation features of products from vendors like AskMe, Tacit Knowledge, and Autonomy. Stratify, H5Technologies, Applied Semantics, Mohomine also fit in this category.

They create taxonomies and semantic contexts by analyzing content in structured processes like email and phone conversations. This quadrant includes applications that include:

- Structured Knowledge Management (SKM)
- Enterprise Content Management (ECM)
- Instant Messaging (IM)
- Presence Awareness (PA)
- Collaborative Web Conferencing
- Enterprise Collaboration Management (ECM)
- Expertise Mining

Collaboration is the exchange of information and knowledge. This can be structured or unstructured knowledge and collaboration. Unstructured knowledge is the domain of traditional content and knowledge management systems and considered part of Resource Management in this taxonomy.

Structured knowledge and collaboration is what is captured in the analysis of expertise automation, data conferencing, elearning and people-to-people communication. Collaboration participants (employees, customers and partners) are the primary users of technology in this quadrant.

***People and systems collaborate in a process to produce products and services.***

**In a Process....**

Process Management is dominated by analytical functions. Analysis is the prime output of these applications. Metrics and indexes are evaluated. The primary analysis target is the workflow itself. As defined by workflow management principles, participants in the workflow include people and systems.

Business intelligence mined from the workflow is the most significant nuance of this quadrant.

This analysis includes interactions with customers. Customer analytics is a rapidly maturing technology and expanding to include employee and partner analytics.

This quadrant has an unambiguous correspondence to the Measure and Analyze components of the various Six Sigma systems. Decision makers are the primary users of technology in this quadrant.

This quadrant includes:

- Business Process Management (BPM)
- Business Activity Monitoring (BAM)

- Corporate Performance Management (CPM)
- Workflow Management (WM)
- Business Intelligence (BI)
- Customer Analytics (CA)
- Workforce Analytics (WFA)

All these systems measure and analyze workflow. The output of that analysis is primarily displayed as simulated data visualization in dashboards. These dashboards display simulations that are essentially identical with process simulation as defined by Alessi and Trollip.

*People and systems collaborate in a process to produce products and services.*

### **To Create Products and Services**

Product Lifecycle Management is the link between employees, products, partners and customers. It is the actual compliance with business strategy and adherence to defined (sometimes very rigid) work tasks embedded in the workflow.

This quadrant includes:

- Product Lifecycle Management (PLM)
- Product Data Management (PDM)
- Supply Chain Management (SCM)
- Salesforce Automation (SFA)
- WorkForce Optimization (WFO)
- WorkForce Management (WFM)
- Customer Relationship Management (CRM)

Workflow participants (employees, customers and partners) are the primary users of technology in this quadrant.

Based on this taxonomy it is now possible to see elearning as just one of the functions of the extended enterprise. It can also be viewed as a system that weaves the quadrants together as a process-oriented learning methodology.

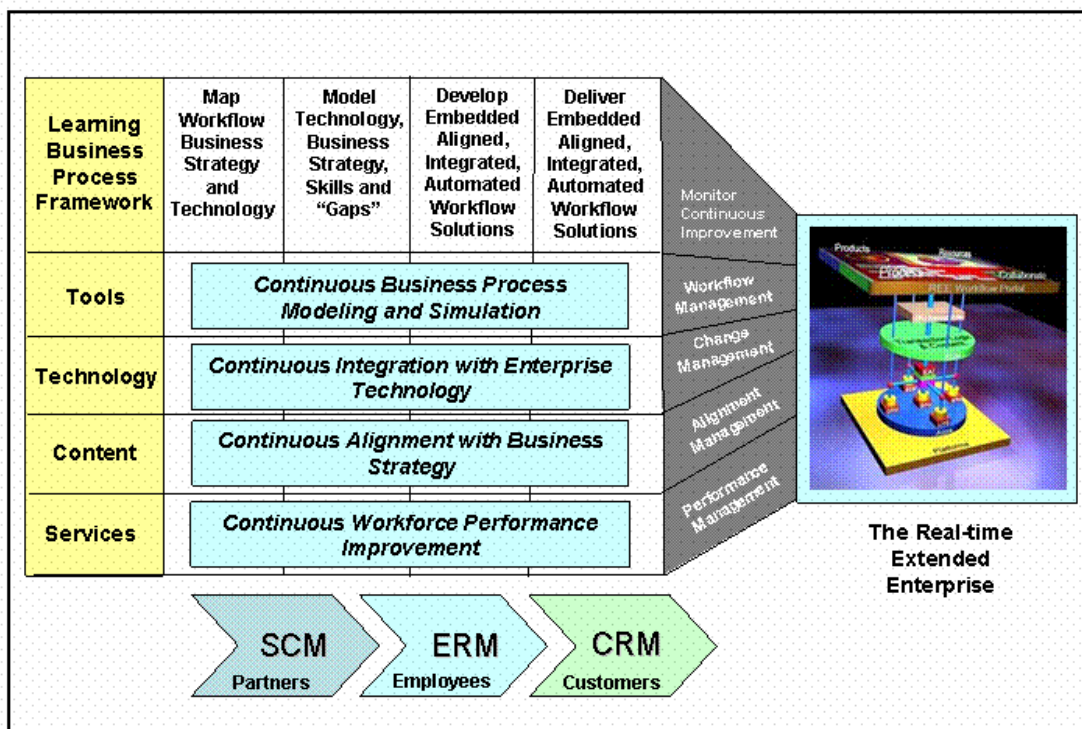
In the Real-time Extended Enterprise (REE), business processes (a.k.a. workflow) are paramount. Integrated business process management creates a dynamic workflow matrix in constant flux, flowing in real time.

This is fulfilling the promise of organizational learning. Organizational learning and workflow optimization are essentially identical.

**Workflow-based eLearning Makes the Grade: Learning is now a Core Business Process**

SAP, IBM, Oracle, HP, Microsoft, Sun, Siebel and PeopleSoft have all added new elearning functionality to their product lines in the last year. They have redefined elearning as a core business process that must be automated like any other business process. They contend that like the other automated business processes, learning must be integrated into enterprise application suites.

**Learning as a Core Business Process in the Value Chain**



Source: *Simulation in the Enterprise: The Convergence of eLearning, Simulation and Enterprise Applications*, 2003, Internet Time Group.

Enterprise Application vendors have redefined learning as a core business process. Their product positioning statement is that learning is a core business process and should be automated like any other business process. This redefinition represents a new phase in learning technology and enables a whole new spectrum of business opportunities. It is a watershed event that will have a positive effect on the learning industry.

Vendors expect (if not lead) customers to conclude that automated business processes require product modules integrated into enterprise application suites they already own.

Customers still wonder if elearning is a fad or if it is a true business need. This is common with first-generation product lines. The large vendors have surmounted the

pitfalls of that question by explicitly and implicitly positioning learning in general as a primary and absolutely necessary business process. They have broadened the workforce-centric elearning focus to include learning at the organizational level. Workflow optimization is identical with organizational learning.

This will actually help the industry in general. The first thing it does is raise the ROI question out of obscure instructional metrics to bottom-line business productivity measurements. For the first time, customers can actually measure the impact of training on productivity. This is not achieved with any traditional training analytic framework but is accomplished by the integration of learning with a broad range of enterprise applications, business analytics and business process analysis.

Training professionals need to have a basic understanding of the range of applications that are being integrated with learning and performance technology. They need to understand the performance improvement benefits that are available to them in the goldmine of data assets that reside in these applications. In particular, they need to have a firm grasp on the emergent property that results from the integration of these technologies. **This emergent property is workflow.**



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More recently, he wrote the 2002 Market Analysis series of reports for [brandon-hall.com](http://brandon-hall.com) and the 2003 series of reports entitled, "Simulation in the Enterprise: *The Convergence of eLearning, Simulation and Enterprise Application Suites*" published by Internet Time Group. **Reports in the "Simulation in the Enterprise" series can be purchased at:** <http://www.internettime.com/store>

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