

# Simulation in the Enterprise:

## The Convergence of eLearning, Simulation, and Enterprise Application Suites

By Sam Adkins

In late 2002 and early 2003, research analyst Sam Adkins<sup>1</sup> interviewed executives of the leading enterprise application vendors and eLearning companies. He gathered information from SEC filings, product descriptions, vendor press releases, industry association information and interviews with vendors, industry experts, buyers and customers. He documented his findings in an unprecedented series of reports, which are currently available from Internet Time Press. A high-level overview of the series follows.



## Executive Overview

*"It is not the strongest species that survive, nor the most intelligent, but the ones most responsive to change."*

Charles Darwin

Recent advances in enterprise technology from several industries make the "learn first, perform later" process, inherent in conventional training and elearning, costly and inefficient. New innovations in enterprise technology can measure performance skills and provide remediation in real time, on the job, and in the context of an employee's workflow.

Enterprise technology is in the midst of an accelerating process of integration and convergence. Previously distinct product categories are being assimilated into integrated enterprise application suites. Learning technology is one of those product categories being drawn into the suites. SAP, IBM, Oracle, Sun, Siebel and PeopleSoft have all added new elearning modules to their Enterprise Application (EA) suites in the last year. They have redefined elearning as a business process and assimilated learning technology into their ebusiness suites. Those suites are tightly integrated with business process management technology.

The consequence of this inexorable convergence and assimilation is the emergence of next-generation performance improvement technology, content and services. Large and small enterprise application vendors from several industries are innovating completely new product lines that have a direct and immediate impact on performance improvement. These innovations are characterized by:

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

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These new technologies are the catalysts for four 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 applications.
- Adoption and automation of Situational Learning and Situational Awareness for performance improvement design, development and delivery.
- Emergence of a fundamentally new type of elearning product called Workflow-based eLearning

Vendors like SAP, Epiance, Knowledge Products, XStream, Lombardi, Nobilis, Ultimus and Knowledge Impact, are providing tools that embed performance support and simulation directly into applications. These tools are not designed to create courseware. They are designed to create and embed simulation-based performance support objects directly into business applications.

Business Intelligence (BI), Business Activity Monitoring (BAM) and Business Process Monitoring (BPM) used to be confined to analyzing system processes. Now they are being used in convergent workforce optimization applications. Products from vendors such as Cognos, Business Objects, FileNet and Lombardi now track and interact with systems *and humans* in the context of the workflow in real time.

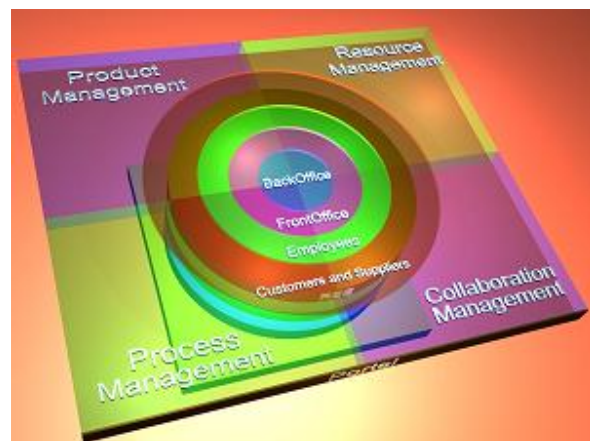
Business process management is being tightly integrated with learning technology. Docent's new workforce analytics product is an example of this trend. Indeliq and Hyperwave integrated ILOG's business rule management technology into their product suites. Hyperwave has gone a step further and integrated a robust workflow and business process management functionality into their Hyperwave eKnowledge Suite.

PeopleSoft's Intelligent Context Manager "proactively" prompts sales people in the field with relevant information. According to PeopleSoft, "contextual information is automatically displayed enabling users to intelligently navigate through the business process." Information provided by employees in the field is used to update CRM and SCM systems in near real time (field personnel refer to this as "feeding the beast").

Situated Learning is a recent iteration of the relatively new Constructivist learning theory. Situated Learning is gradually replacing "instructivist" design models that are inherent in courseware-based products. It stresses authentic context as the primary design criteria and challenges the notion that learning takes place as a result of instruction.

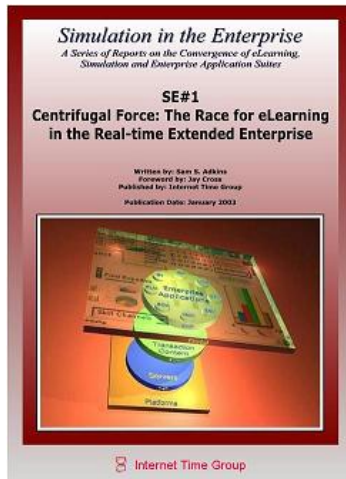
Field-based certification, virtual lab and simulated lab products are indications of this move away from instructivist models in the IT training market. Simulation-based contextual curriculums and game-based business simulations such as those developed by Socratic Arts and games2train.com are examples of this type of product in the broader education and training market.

Products like these reduce the need for conventional training and certification, since an employer can assess, train and track employees while they work.



In today's economic climate, customers want immediate, measurable and observable workforce improvement results (concepts familiar to both performance technologists and CFOs). The customer demand for optimization is driving the demand for real-time technology. This is what is now known as the Real-time Extended Enterprise (REE).

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



The **first report** in this series describes the market factors and the economic conditions that are driving elearning and performance improvement technology into enterprise suites. It describes the “pain points” of vendors, customers and users.

This report highlights the vendors from several previously distinct industries that are now focusing on a single convergent performance market. Along with the enterprise vendors, the vendors discussed in this report include: Simulation and Training, Product Lifecycle Management, Business Process Management, Collaboration, Enterprise Content Management and Enterprise eLearning.

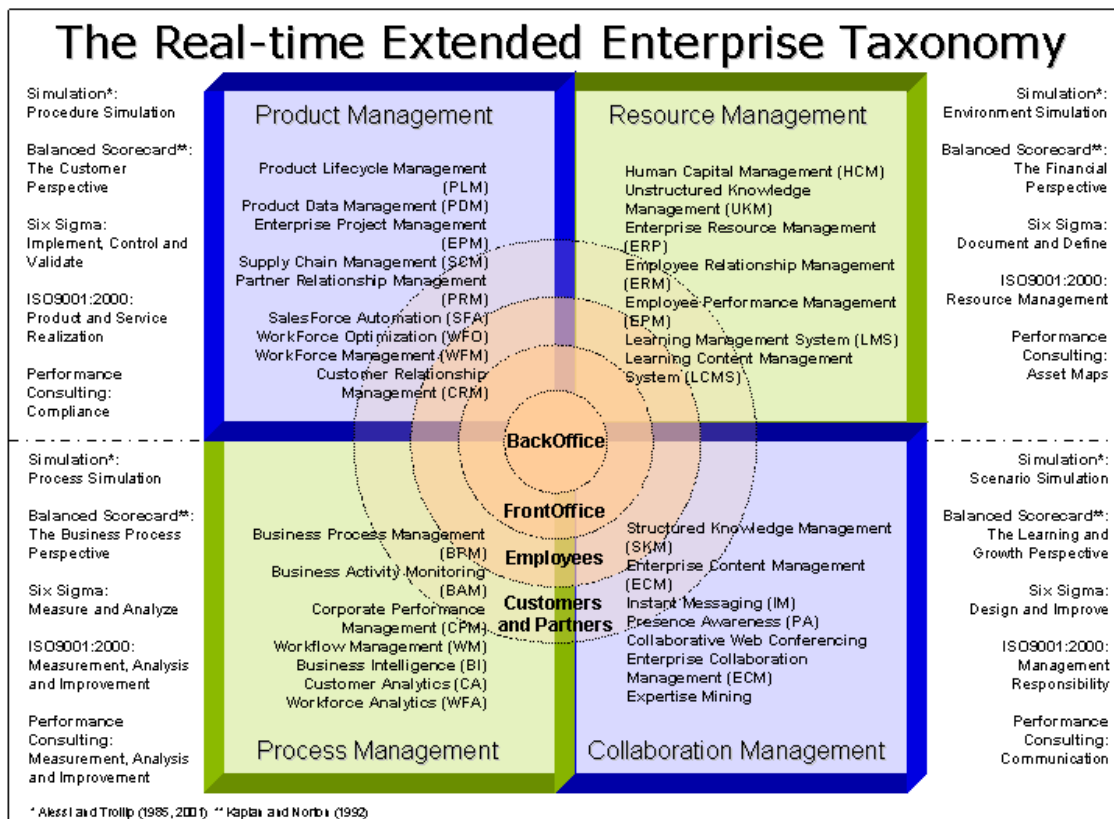
Each of these industries has experienced failures with first-generation products. Those failures have become the design criteria for second-generation product development. The “lessons learned” have been carried forward into innovations in new product lines. Second and third-generation product cycles

are now being launched by all of these industries.

Elearning, Enterprise Collaboration, Product Lifecycle Management, and Enterprise Content Management have just entered a distinct second-generation stage. The Simulation and Training, Business Process Management and Enterprise Application product lifecycles are more mature than the others. They are entering third-generation product phases.

<b>Industry</b>	<b>Convergence Vectors</b>	<b>Innovation Inflection Points</b>
<b>Simulation &amp; Training Industry</b>	Simulation, Multi-user Collaboration	Artificial Intelligence, Psychomotor Learning, Asymmetric Collaboration in BattleSpace
<b>Enterprise Collaboration</b>	Multi-user Collaboration	Asymmetric Collaboration in WorkSpace
<b>Product Lifecycle Management</b>	Simulation, Multi-user Collaboration	Simulation, Embedded Performance Support, Rapid Prototyping
<b>Business Process Management</b>	Simulation, Real-time Communication	Real-time Data Integration, Animation of Workflow
<b>Enterprise Applications</b>	Real-time Communication, Multi-user Collaboration	Cross-technology Integration, Presence Awareness, Transactional Portals, Wireless Connectivity
<b>Enterprise Content Management</b>	Multi-user Collaboration	Virtualization of WorkSpace, Portals
<b>eLearning</b>	Simulation, Multi-user Collaboration	Simulation, Embedded Performance Support

The Real-time Extended Enterprise taxonomy below is the first cohesive map to incorporate all the rapidly emerging technologies into a single schema. It is organized around the functional quadrants of workflow. The functional quadrants are subsumed under the mnemonic rubric of “*People and technology in the workspace collaborate in a process to produce products*”.



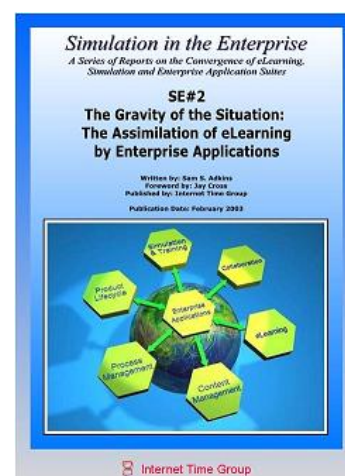
With the advent of workforce analytics and embedded performance technology it is now possible to see the shape of best-of-breed learning solutions. Topics covered in the first report include:

- Feel The Burn: Vendor, Buyer and User Pain Points
- The Dawn of the Real-time Extended Enterprise
- When Galaxies Collide: The Seven Industries on a Collision Path
- The Economy of Fusion: Convergent Technology, Tools, Content and Services
- The Convergent Application Interface: The Enterprise Portal
- The Convergent Enterprise Taxonomy: Overview of Enterprise Application Suites
- Best-of-Breed: The Real-time Extended Enterprise Learning Platform

The **second report** highlights the vision of the large global enterprise software vendors like SAP, IBM, Oracle, Microsoft, PeopleSoft, Siebel and Sun. IBM has been an elearning leader for many years. The others have all added elearning functionality to their ebusiness product suites in the last year.

The dominant theme in their marketing positioning and product strategy is the clear message to customers that learning is a core business process and needs to be integrated in enterprise business application suites. Once learning is integrated with other business processes, it becomes possible to analyze the impact of learning on productivity. In that context, learning becomes a Key Performance Indicator (KPI).

There are three primary reactions from the elearning vendors in response to the encroachment by enterprise vendors. Vendors are:

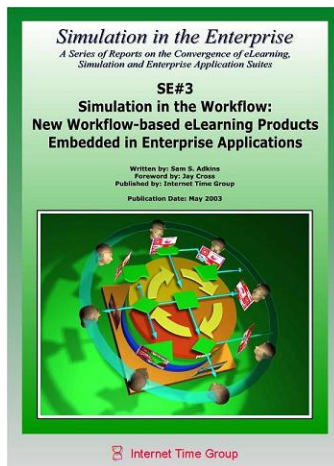


- Building out their brands as a best-of-breed solution.
- Upgrading their learning product suites to facilitate integration.
- Upgrading their products with workflow technology and Workforce Analytics.
- Integrating Enterprise Application Integration (EAI) technology.

Customers are steadily migrating away from courseware-based elearning products and enthusiastically adopting next-generation, real-time, embedded workflow products. Even at the height of the recession, vendors of these new products experienced unprecedented revenue growth.

Best-of-breed vendors are developing performance-based products that support extensive integration with workflow processes across the enterprise. They are migrating away from courseware-based product models. At all costs they must downplay the "point solution" status of their products. Topics covered in this second report include:

- Web Services and eLearning
- The Emergence of Workflow
- The Assimilation of Elearning into Enterprise Point Solutions
- The Assimilation of Elearning into Integrated eBusiness Suites
- Snapshots of Solutions from IBM, Sun, Siebel, Microsoft, Oracle, PeopleSoft and SAP
- The Impact on the eLearning Industry
- The Emergence of Best-of-Breed Workflow Products
- Systems Thinking and Situated Learning: Workflow Trumps Courseware



The **third report** describes the impact that this application convergence and assimilation is having on corporate performance improvement methods and technology.

The single most prominent characteristic of next-generation learning technology is simulation. Simulation also happens to be the most prominent characteristic of the product enhancements to first-generation collaboration, product lifecycle and business process management products. Workflow is the most salient aspect of post-simulation products.

Vendors from several previously distinct industries are marketing products that use simulation and behavior modeling to improve human performance. Content management vendors are buying collaboration companies and enterprise vendors are integrating performance support, simulation and virtual classrooms into their product suites.

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, field force automation and automated contextual coaching. Topics covered in the third report include:

- The Definition of Workflow-based eLearning
- The Extent of Workflow: Wireless Workflow Support in the Field
- Modeling Workflow-based eLearning with the Real-time Extended Enterprise Taxonomy
- Managing Granular Node of Performance using Workflow
- Profiles of workflow-based solutions from Knowledge Products, Nobilis, Lombardi, XStream, Ultimus, Knowledge Impact and Hyperwave
- Measuring Performance in the Workflow: Performance Monitoring in Dashboards and Portals
- Modifying Performance in the Workflow: Top-down, bottom-up and egalitarian collaborative modifications

The **final report** highlights advanced learning technologies emerging from the Real-time Extended Enterprise and identifies the top pioneers of innovation.

They have a direct impact on performance improvement but are completely different from conventional approaches to elearning or performance support. Intelligent graphics, interactive technical manuals, and new innovations derived from complexity theory are highlighted in this section. Extraordinary innovations in automated content categorization and automated content generation are described in this section.

Another innovation discussed in this section is machine-based embedded performance support. Predictive and adaptive performance support is being embedded in industrial and consumer devices. This is part of the rapid evolution of ubiquitous and pervasive computing.

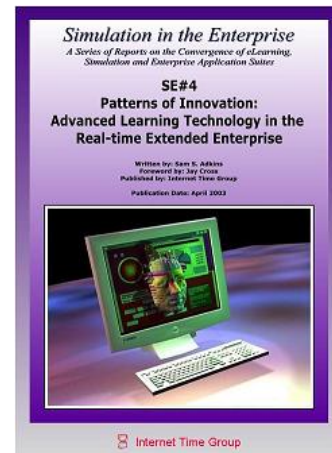
Perhaps the most interesting innovations discussed in this section are the new breed of virtual subject-matter experts. School children are adding virtual homework helpers to their buddy lists and workers are consulting virtual coaches and mentors for assistance on job tasks.

Cognitive Science has experienced an exponential growth in the last ten years. Findings from this research are starting to filter into the product designs of new human behavioral simulations. For example, the astonishing discoveries in research areas such as Change Blindness and Social Mirroring are beginning to influence the way learning content is designed, delivered and experienced. Topics included in the fourth report include:

- Intelligent Graphics and Interactive Electronic Technical Manuals
- Modeling Complexity to Generate Efficiency
- Automatic Categorization, Automated Content Creation
- Real-time Behavior Modification: Embedded Predictive Analytics
- Low Tech, High Touch: Mentoring and Coaching Applications
- Embedded Learning: Walls (and Machines) can Talk (and Think)
- Artificial Experts: Agents, Automated Learning, and Artificial Intelligence
- Business Savvy eLearning: Business Process Modeling and Performance
- Beyond Organizational Learning: The Heuristic Enterprise
- Expertise Modeling, Mapping and Mining
- New Cognitive Science Meets New Performance Technology

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