



E-Learning

A White Paper from IsoDynamic

What is E-Learning?

The American Society for Trainers and Development (ASTD) defines e-learning as “instructional content or learning experiences delivered or enabled by electronic technology”. Electronic technology encompasses everything from Computer-Based Training (CBT), to compact disks (CDs), to Web-based applications. However, e-learning has increasingly come to mean “Web-enabled material deployed using the Net”.¹

E-learning can be delivered in two ways: synchronously and asynchronously. Synchronous e-learning takes place “live”—a virtual classroom of sorts. It may feature real-time, Web-based videoconferencing, audio conferencing with presentation material, and on-line chat. Some people refer to synchronous e-learning as “Distance Learning”². In contrast, asynchronous e-learning may take place any time, and is self paced. Because of its lower cost of development, reusable components, and convenience to the learner, asynchronous e-learning—sometimes called “Distributed Learning”—is receiving more attention in the e-learning industry today.

Revolution in the Making

Looking ahead, the magnitude of e-learning’s impact on the world seems difficult to overestimate. The ubiquitous, “always-on” characteristics of the Internet mean that learners will be able to acquire knowledge anywhere, anytime. This comes at a time when conducting business, as never before, demands the ability to change rapidly, and, consequently, a well-informed workforce.

The ability to parse information into smaller and smaller chunks—and “tag” those “learning content objects” with classification information—will produce two important results:

- Increased delivery of information “just in time”—on the job, when it is needed, even to mobile devices
- Reuse of learning material, within enterprises and in the public domain

¹ “Does E-Learning Make the Grade?”, *CIO Magazine*, January 15, 2001

² SCORM, Version 1.1, Advanced Distributed Learning Initiative

All of this will drive continuously lower the costs to produce and deliver instructional material . . . benefiting commerce, government, and education, in developed and developing countries. The individual worker or student will be increasingly empowered to take responsibility for acquiring the knowledge and skills he or she deems necessary.

E-learning will also stimulate changes in the measurement of both learning and performance. "Clock hour" measurements, typified by class time or number of courses taken, will gradually be replaced by more "outcome" measurements, requiring the demonstration of skills.

E-Learning Technology

Notable advancements in e-learning technology in the last five years have included the introduction of learning management systems and the development of standards promoting "sharable learning content objects", or "learning objects".

Learning Management Systems

The learning management system (LMS) is "the operating system" for e-learning in the enterprise. At a minimum, it automates the administration of training events: handling course schedules and registrations; delivering learning content; facilitating communication among learners and between learners and instructors; and tracking and reporting on learners' progress and test scores. It is designed to handle courses from multiple providers.

There are dozens of companies offering server-based LMSs. Examples of "pure play" providers (companies which do not develop content) are Saba, Blackboard, and Click2Learn. Companies providing content, in addition to their own LMS, include DigitalThink and SmartForce. In addition to licensing software and servers, many LMS vendors also operate as application service providers (ASPs). While the perfect LMS is still evolving, W.R. Hambrecht & Company states that, in order to be successful, vendors must meet the market demand for functionality, scalability, interoperability, customizability, and flexibility.

Systems are being developed which manage the actual content associated with e-learning. Specifically, they deliver and track the learning objects comprising courses or growing databases of "just-in-time" learning material. Some LMSs are being enhanced with "learning content management system" (LCMS) functionality. In other cases, the functionality is being offered on a dedicated server (Centra is a company offering such a product). All providers of LCMS functionality are developing compliance with the evolving content object standards, like AICC and SCORM (see below).

The next generation of LMSs is likely to contain some content assembly and authoring tools.³ "Adaptive learning" and "intelligent tutoring" functionality is also being gradually incorporated.⁴ Adaptive learning dynamically adjusts instructional content and tests according to the learner's proficiency. Still emerging, intelligent tutoring technology uses

³ *eLearning: 2001 Outlook for the Learning Management System Market*, www.wrhambrecht.com, W.R. Hambrecht, April 18, 2001.

⁴ SCORM, Version 1.1, Advanced Distributed Learning Initiative

the science of human cognition to develop complex models and rules-based systems intended to provide more in-depth instruction to learners, including answering the learner's questions.

Interfaces from LMSs to human resource information systems (HRIS) are enabling more extensive evaluation and planning regarding employee learning and productivity. Tie-ins to enterprise resource planning (ERP) systems, like those from PeopleSoft and SAP, and customer resource management (CRM) systems, like Siebel, are also being developed. In addition, the future will see new interfaces with wireless and e-commerce applications.

Standards

Several emerging standards are expected to dramatically advance the e-learning industry. Central to these standards are the aforementioned *learning objects* (called "Assignable Units" or "lessons" within AICC's model, and "Sharable Content Objects" within SCORM's model). The smallest units of learning content tracked by LMSs or LCMSs, learning objects are labeled in a standardized way.

The combined effect of the evolving e-learning standards will enable:

- Learning objects to be easily reused, and handled interchangeably by various LMSs
- The accessibility of learning objects developed by any authoring tool
- Learning objects to be stored and easily accessed within databases
- The rapid construction of courses through easy sequencing of content
- New, more granular learner assessment models

Notable standards are as follows:

- SCORM (Sharable Content Object Reference Model)

SCORM is the standard that has emerged with the most momentum, and many vendors are adopting it. Its specifications are offered by the U.S. Government's Advanced Distributed Learning (ADL) Initiative, an organization formed jointly in 1997 by the White House Office of Science and Technology Policy (OSTP) and the Department of Defense. SCORM describes the ways in which learning objects relate to each other, and is intended to foster the portability of those objects from one LMS to another. It has included the best of the AICC and IMS specifications in its structure; and is being substantially adopted by the IEEE LTSC (see below).⁵

- IMS (Instructional Management System Global Learning Consortium)

Initiated by Educom and headquartered in Burlington, Massachusetts, the IMS Consortium has been developing open specifications for locating and using learning content, tracking and reporting learner progress, and exchanging records between LMSs. Its members are from educational, commercial, and government

⁵ *Getting Up to Speed on E-Learning*, Tom Werner, Brandon-Hall.com Publishers, 2001.

organizations worldwide.⁶ “Metadata tagging”—how content is identified and tagged—is the cornerstone of the IMS’s work.

- AICC (Aviation Industry Computer-Based Training Committee)

The AICC is an association of technology-based training professionals chartered over a decade ago with developing guidelines for the aviation industry. Because of its early leadership in e-learning, its guidelines have been adopted by makers of e-learning products serving many industries. Covering nine areas, these guidelines focus on how LMSs interface with learning objects and courses.

- IEEE LTSC (Institute of Electronics and Electrical Engineering’s Learning Technology Standards Committee)

Many believe the IEEE LTSC will have the final say as it endorses specific e-learning industry standards, and SCORM is one set of specifications receiving significant attention.⁷ IEEE LTSC’s working groups cover topics like “learning object metadata” (tagging information used to describe data), student profiles, course sequencing, computer-managed instruction, competency definitions, localization, and content packaging.”⁸ In 2000, it initiated the move of this work to the full International Standards Organization (ISO) Joint Technical Committee 1 (JTC1) Subcommittee 36 (SC36) on Learning Technology, for the highest level of global standards accreditation.

- XML (eXtensible Mark-up Language)

XML is a metadata (data tagging) standard developed by the World Wide Web Consortium (WC3). Platform independent, it is becoming the foundation for communication among Web-based applications. Many of the e-learning specifications mentioned above build on XML.

Advantages Over Traditional Classroom Instruction

Many leading-edge companies, like CISCO and IBM, as well as numerous government agencies, are developing in-depth, enterprise-wide e-learning programs. This does not mean they see no place for “face-to-face”, group learning experiences. Increasingly, however, such group experiences are reserved for participants who have mastered basic information beforehand through e-learning.⁹

⁶ *All About Learning Technology Standards*, www.learnativity.com; re-published from article “Everything You Ever Wanted to Know About Learning Standards But Were Afraid to Ask”, by Wayne Hodgins with Marcia Conner, *LINE Zine*, Fall, 2000.

⁷ *Getting Up to Speed on E-Learning*, Tom Werner, Brandon-Hall.com Publishers, 2001.

⁸ *All About Learning Technology Standards*, www.learnativity.com; re-published from article “Everything You Ever Wanted to Know About Learning Standards But Were Afraid to Ask”, by Wayne Hodgins with Marcia Conner, *LINE Zine*, Fall, 2000.

⁹ *Getting Up to Speed on E-Learning*, Tom Werner, Brandon-Hall.com Publishers, 2001.

Why is e-learning increasingly considered the medium of choice for delivering instructional material? Evidence suggests that it contributes to superior retention of knowledge; and is more quickly, conveniently, and economically delivered.

Better Retention

According to the Gartner Group, the retention of e-learning is twice as high as that of traditional classroom instruction, at half the cost.¹⁰ W.R. Hambrecht & Company reports: "Whereas the average content retention rate for an instructor-led class is only 58%, the more intensive e-Learning experience enhances the retention rate by 25% to 60%." IBM, after rolling out an e-learning program for managers, found that "participants learned nearly five times more material without increasing time spent training."¹¹

Several factors account for these surprising results:

- Learning at the learner's pace

In most learning environments, the speed with which individuals can progress through instruction varies by factors of three to seven.¹² Since e-learners are able to proceed through courses at their own pace, they are apt to learn the material more thoroughly, or less likely to become bored.

- More interactivity with the learner

The interactivity typical of e-learning tends to captivate the learner. In the traditional classroom environment, a student asks about .1 questions per hour.¹³ Studies show that students in e-learning environments can interact with courseware via question and answer up to 120 times per hour.

- Comprehension enhanced by graphic representation

According to the American Society for Trainers and Development (ASTD), "numerous studies have shown that workers learn faster with *multimedia content*; they more accurately recall what they learned over a longer period of time; and they are better able to transfer what they learned to actual performance."¹⁴

- Greater relevance

The high retention of small modules of e-learning information provided "just in time" in support of on-the-job activity is attributed its perceived higher relevance and "digestibility", as compared to lengthier, traditional, "just-in-case" training. The Research Institute of America found that, over time, the retention of knowledge

¹⁰ "Market Trends and E-Learning" white paper, MindLever.com, 2000.

¹¹ *Getting Up to Speed on E-Learning*, Tom Werner, Brandon-Hall.com Publishers, 2001.

¹² *SCORM, Version 1.1*, Advanced Distributed Learning Initiative, quoting M. Gettinger (1984) "Individual Differences in Time Needed for Learning", *Educational Psychologist*, Vol. 19

¹³ *SCORM, Version 1.1*, Advanced Distributed Learning Initiative, quoting A. Graesser & N. Person (1994), "Question Asking During Tutoring", *American Educational Research Journal*, Vol. 31.

¹⁴ *A Vision of E-Learning for America's Workforce*, American Society for Trainers and Development (ASTD), www.astd.org, 2000.

from classroom lectures dissipates, with only 15% of such knowledge being retained three weeks after the course.¹⁵

Learner Efficiency and Convenience

E-learning is generally absorbed in less time than the same instructional material delivered in the classroom. By enabling learners to navigate through material at their own pace, e-learning minimizes the time that knowledgeable learners must spend in such training activity. And, for all learners, graphical presentation of material leads to faster comprehension. These two factors help to explain the results of several studies, cited below, showing significant time saved per course:

- Brandon-Hall, an e-learning market research company, reported that e-learning typically requires from 40% to 60% less employee time than the same material delivered in a traditional classroom setting.¹⁶
- The Advance Distributed Learning Initiative cited two studies indicating that, on average, “reduced time to achieve given instructional objectives (30%)—or increased student skills and knowledge (30%)—depending on whether achievement or time was held constant.”¹⁷

In practice, more rapid learning translates to millions of dollars saved for a large organization. For instance, reducing by 30% the time to train just 40% of all Department of Defense (DoD) students in specialized skills training—which excludes other categories such as recruit training, pilot training, unit training, and field exercises—could potentially save the DoD over \$500 million annually.¹⁸

E-learning is more convenient. Unlike traditional classroom training, which is sometimes scheduled at a time inconvenient to the learner, in a location requiring travel, e-learning offers the learner more flexibility with respect to time and place.

Faster Roll-Out

Due to the ubiquity of the Internet and scalability of servers, e-learning can be delivered immediately to thousands of learners worldwide. “Training that used to take six to nine months will be compressed to just two to three weeks,” predicted *Fortune Magazine*, “assuring faster time-to-market with products, and greater productivity.”¹⁹ Technology giant CISCO reported that e-learning programs

¹⁵ Special E-Learning Section, *Forbes*, Summer, 2000.

¹⁶ *Return on Investment and Multimedia Training*, Brandon-Hall, 1995.

¹⁷ *SCORM, Version 1.1*, Advanced Distributed Learning Initiative, quoting J.D. Fletcher (2001), “Evidence for Learning from Technology-Assisted Instruction”; H.F. O’Neil Jr. and R. Perez, “Technology Applications in Education: A Learning View”, Hillsdale, NJ, Lawrence Erlbaum Associates.

¹⁸ *SCORM, Version 1.1*, Advanced Distributed Learning Initiative, quoting J.D. Fletcher (2001), “Evidence for Learning from Technology-Assisted Instruction”; H.F. O’Neil Jr. and R. Perez, “Technology Applications in Education: A Learning View”, Hillsdale, NJ, Lawrence Erlbaum Associates.

¹⁹ *A Vision of E-Learning for America’s Workforce*, American Society for Trainers and Development (ASTD), referencing “E-Learning: Leading Strategies for Executive Education and Corporate Training”, *Fortune Magazine*, 2000.

produced a savings of \$1 million in manufacturing costs in a single quarter, due to improved processes, as well as an “80% increase in speed-to-competence.”²⁰

Traditional classroom training does not always guarantee that the same information or quality of instruction is provided to all students. *Training Magazine* reported 50% to 60% improved consistency using some form of e-learning. Furthermore, the ease of updating e-learning material, as compared to classroom instructional material, should be discounted.

The new-generation LMSs offer companies the opportunity to disseminate product and other training information not only to employees, but also to customers, suppliers, and other business partners. For example, Eastman Software, a subsidiary of Kodak, found that it could not only improve its training of distributors, but more accurately gauge their product knowledge.²¹

Costs Savings to Enterprise

Undisputed are the dramatic cost savings to both industrial and governmental enterprises from adopting e-learning. Some examples:

- *Training Magazine*: A study across industries found that corporations saved 50% to 70% of their overall training cost by replacing traditional training with on-line delivery.²² W.R. Hambrecht & Company reported similar savings.²³
- Advanced Distributed Learning Initiative: Enterprises’ deployment of LMSs, and worldwide adoption of standards like SCORM, which promote the use of sharable content objects, will compound savings already realized from e-learning efficiencies. Content object sharing is expected to reduce training development costs by 50% to 80%.²⁴
- Brandon-Hall: A study of a large company over a three-year period determined that the cost to develop and deliver a course in “technology” mode was about half that of the “lecture/lab” mode.²⁵
- IBM: One year after launching comprehensive, on-line management training in 1999, IBM reported that it was able to deliver five times the training at one-third the cost. Estimated cost savings was \$200 million.²⁶
- Oracle: The rapid adoption of e-learning strategies enabled Oracle to cut internal learning costs by 40%, while increasing net student enrollments by

²⁰ *A Vision of E-Learning for America’s Workforce*, American Society for Trainers and Development (ASTD), www.astd.org, 2000.

²¹ Special E-Learning Section, *Forbes*, Summer, 2000.

²² Special E-Learning Section, *Forbes*, referencing *Training Magazine*, March, 2000.

²³ Special E-Learning Section, *Forbes*, Summer, 2000, referencing “Corporate E-Learning: Exploring a New Frontier,” by W.R. Hambrecht & Company, March, 2000.

²⁴ SCORM, Version 1.1, Advanced Distributed Learning Initiative

²⁵ *Return on Investment and Multimedia Training*, Brandon-Hall, 1995.

²⁶ *Getting Up to Speed on E-Learning*, Tom Werner, Brandon-Hall.com Publishers, 2001.

36%; and to “compress the knowledge supply chain”, building and deploying new courses in weeks instead of months.²⁷

- Cisco: To keep its business “running fast”, the company is moving 100% of its courses on line. On-line training is considered essential to its acquisition strategy, which resulted in the purchase and integration of 50 new companies in two years.²⁸

Although a higher initial investment is usually required to implement e-learning across the enterprise, this investment is quickly offset by tremendous savings in the delivery of the material developed. While traditional classroom training is associated with 20-to-1 student-teacher ratios, only one e-learning course can be used to train thousands of students. The decreasing cost of network bandwidth and computers, as well as the growing libraries of high-quality, off-the-shelf content, add to this savings.

Besides more efficient delivery, the ASTD attributes cost savings largely to employee time saved.²⁹ Another key source of savings is travel, since training is no longer offsite. In 2000, two-thirds of the \$66 billion total corporate training budgets were devoted to employee travel.³⁰

Exploding E-Learning Market

Business Week proclaimed, “Web training is exploding.”³¹ Below are some data describing the phenomenal growth of the e-learning market:

- U.S. training and education market

W.R. Hambrecht: In 2000, \$772 billion (9% of GNP) was spent on training and education. Of that, corporate training constituted \$66 billion (8.5% of total spending), and continuing education, \$12 billion (1.5% of total spending).³²

ASTD: The percentage of organizations (outside the education sector) using the Internet for training grew from 3% in 1996 to 38% in 1999. For intranets, the growth rate was higher: from 3.5% to nearly 40%.³³

U.S. Bancorp Piper Jaffray: In 2005, total spending for e-learning could exceed \$46 billion.³⁴

²⁷ “The E-Learning Curve”, *Profit Magazine*, May, 2001.

²⁸ Special E-Learning Section, *Forbes*, Summer, 2000.

²⁹ *A Vision of E-Learning for America’s Workforce*, American Society for Trainers and Development (ASTD), referencing *Corporate E-Learning: Exploring a New Frontier*, W.R. Hambrecht & Company, 2000.

³⁰ Special E-Learning Section, *Forbes*, Summer, 2000, referencing “Corporate E-Learning: Exploring a New Frontier,” by W.R. Hambrecht & Company, March, 2000.

³¹ “Web Training Explodes”, *Business Week On-line*, May 22, 2000.

³² Special E-Learning Section, *Forbes*, Summer, 2000, referencing “Corporate E-Learning: Exploring a New Frontier,” by W.R. Hambrecht & Company, March, 2000.

³³ *A Vision of E-Learning for America’s Workforce*, American Society for Trainers and Development (ASTD), referencing ASTD’s “State of the Industry” Report, 2001.

- Enterprise e-learning market

IDC and W.R. Hambrecht: In 1999, \$550 million was spent by corporations. Their total expenditure is expected to grow to \$7.1 billion in 2002, and \$11.4 billion in 2003—representing a compound annual growth rate of 98%.³⁵ Electronically delivered training will constitute about 30.1% of all corporate training in 2001, up from 8.5% in 1998.³⁶

Merrill Lynch: Expenditures by corporations in 2001 are forecasted at \$1.2 billion, to grow to \$7 billion by 2003.³⁷

Forbes: “The potential for online learning could top \$10 billion a year.”³⁸

CIO Magazine: E-learning will constitute at least half the projected \$16.9 billion expenditure for business skills training by 2004, with a very high portion of that outsourced (annual growth rate of 13%).³⁹

W.R. Hambrecht: Sixty percent of corporations will have an LMS deployed by 2003. The average implementation size tripled in three years, reaching 116,000 learners in 2000.⁴⁰

Forbes: In 1988, there were approximately 400 corporate universities. These grew to 1,600 by mid-2000. In addition to employees, they now deliver information to customers, suppliers, and other partners—with many having become profit centers.⁴¹

Mindlever.com (now Centra): Despite the availability of high-quality, third-party content from a wide range of sources, corporate purchasing of this “off-the-shelf” content constitutes only 53% of total spending for e-learning content. The reason for the high level of spending on custom content--47%--is that the latter is “immediate, important, and valuable to [companies]”.⁴²

- Higher education market

³⁴ U.S. Bancorp Piper Jaffray, 2001.

³⁵ “The E-Learning Curve”, *Profit Magazine*, May, 2001, referencing *Information Week*, quoting IDC and W.R. Hambrecht.

³⁶ “Market Trends and E-Learning”, a white paper by Mindlever.com. 2000, referencing IDC.

³⁷ *A Vision of E-Learning for America’s Workforce*, American Society for Trainers and Development (ASTD), referencing Moe, Michael, and Henry Blodgett, *The Knowledge Web*, Merrill Lynch & Co., Global Securities Research & Economics Group, 2000.

³⁸ “Master of the Knowledge Universe”, *Forbes*, Sept. 10, 2001.

³⁹ *CIO Magazine*, January, 2001, referencing Cushing Anderson, Program Manager, Learning Services Research, IDC

⁴⁰ April 18, 2001 *E-Learning Newsletter*, W.R. Hambrecht, referencing the Gartner Group

⁴¹ Special E-Learning Section, *Forbes*, Summer, 2000.

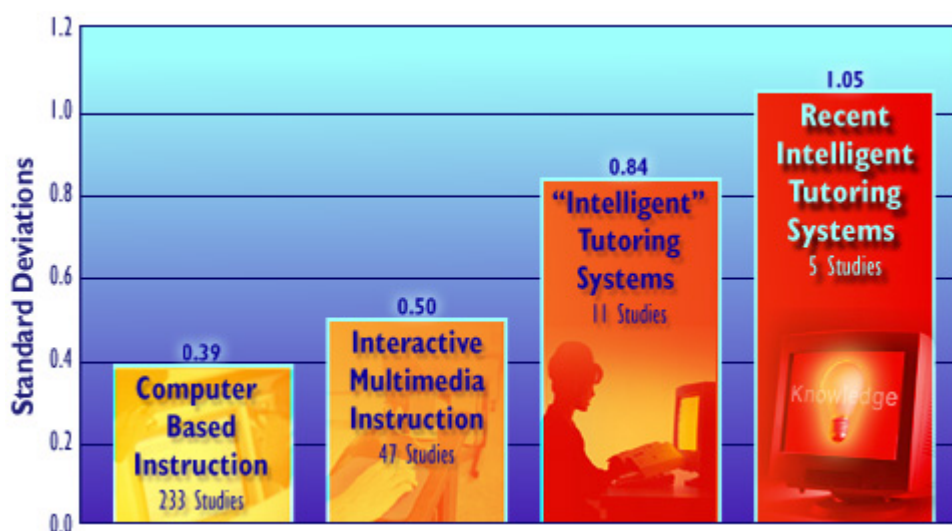
⁴² “Market Trends and E-Learning”, a white paper by Mindlever.com. 2000.

ASTD: Eighty-four percent of two- and four-year colleges expect to offer distance learning courses in 2002. In 1998, only 58% of colleges reported offering these courses.⁴³

Credit Suisse First Boston: The percentage of adults enrolled in distance education is expected to triple from just 5% in 1998 to 15% in 2002.⁴⁴

Better Learning

There is ample evidence that people learn best when they are engaged--by content which is sensorially appealing; personalized (i.e., adjusted for the learner and offering opportunities to make input); and novel, humorous, or relevant.



ADL reports the results of multiple studies comparing e-learning infused with varying amounts of engaging content to traditional classroom instruction.⁴⁵ As the graph below shows, 233 comparisons of basic computer-based instruction (containing little or no graphical content) indicated an average improvement over classroom instruction of .39 standard deviations. Adding multimedia capabilities (e.g., pictures, sound, and animation) added effectiveness, raising the improvement to .50 standard deviations. Intelligent tutoring systems intended to more directly emulate one teacher interacting with one student, and allowing either the student or computer to ask questions, increased improvement to .84 standard deviations--roughly equivalent to moving a student in the 50th percentile (i.e., in the middle of the "bell curve") to the 65th percentile. More advanced intelligent tutoring systems, featuring more adaptive learning, yielded improvements averaging about 1.05 standard deviations. This improvement enables a student in the 50th percentile to move to the 75th percentile (half-way

⁴³ "A Vision of E-Learning for America's Workforce", report of Commission on Technology & Adult Learning, ASTD, June, 2001, referencing U.S. Department of Education.

⁴⁴ "A Vision of E-Learning for America's Workforce", report of Commission on Technology & Adult Learning, ASTD, June, 2001, referencing "Testimony to Web-Based Education Commission" by Gregory Capelli, Credit Suisse First Boston Corp., September 15, 2000.

⁴⁵ SCORM, Version 1.1, Advanced Distributed Learning Initiative

down the right slope of the bell curve). No e-learning module studied has yet produced the 2.0 standard deviation improvement which has been attained by some professionally tutored individuals; but the trends are promising.

Sensory Appeal

Specific examples of content intended to appeal to multiple senses are:

- Audio modules
- Graphics
- Animation
- Video modules

Personalized Learning

Personalized learning may involve the application of “high technology” or “high touch” (i.e., lots of opportunity for human interaction):

Learner-Driven Learning

- Learner-determined navigational path through material
- Content adjusted for learner’s bandwidth
- Instructional material or tests adjusted for learner’s familiarity with material
- Ample questions directed to learner
- Learner may pose questions to program, or to designated human “subject matter expert” (by telephone, e-mail, or on-line chat), and receive timely response
- Search capability
- Learner may communicate with other classmates (by telephone, e-mail, or on-line bulletin boards or chat)
- Help desk support for technical questions
- Privacy, in cases where learner not required to take or pass a course—IBM calls it “safety” (assurance that learner will not be assessed or tracked)⁴⁶—to encourage employees or partners to try new learning offerings
- Learner given meaningful opportunity to evaluate learning module

Meaningful Measurement of Learner Progress

- Ample questions directed to learner throughout the course
- Measurement of “learning outcomes”, i.e., measurement of learner’s *application of knowledge* gained—not rote testing of instructional material memorized

Novel, Humorous, or Relevant Content

Examples include:

- Games

⁴⁶ *Getting Up to Speed on E-Learning*, Tom Werner, Brandon-Hall.com Publishers, 2001.

- Role playing
- Simulations
- Material delivered “just in time” for use on the job
- Rewards for correct answers to questions
- In cases of incorrect answers, provision of correct answers, with appropriate explanation
- Recognition for completion of course

About IsoDynamic

Based in Silver Spring, Maryland, IsoDynamic is a premier developer of custom e-learning content, Web sites and Web-based e-business applications, and provider of branding services. Since 1997, IsoDynamic has delivered over 100 Web- and CD ROM-based educational and promotional packages for customers like Sprint, American Farmland Trust, and bigchalk™, the Education Network.

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