

e-Learning: A Structured Approach

A White Paper

Abstract

Social, economic, and technological forces are coming together to fundamentally change the training and education worlds as we know them today. The merging of computer-based multimedia technology with the efficient delivery capability of the Internet is generating major shifts in the styles of education, both inside and outside the formal education systems.

This White Paper discusses some of the significant requirements of e-Learning programs today, and how The Biographix Corporation incorporates these components into its market offerings.

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Why e-Learning?

As organizations continue to manage broad-scale change, from corporate restructuring to shifting economies, people are required to adapt quickly, take on more responsibilities, and learn new skills, often without sufficient experience or background. To meet the challenges of bringing people up-to-speed with fewer resources and less time, organizations need skill development solutions that facilitate and improve the learning process, provide flexibility of use, and save valuable time and money.

To many organizations, the answer is interactive multimedia learning. The benefits of using the Internet to deliver skills to people when and where they need it are realized through increased retention, greater access to information, and a measurable return on investment.

- There are a myriad of applications where e-Learning dramatically enhances business and personal qualifications:
- Product and service training for remote employees including sales representatives and field engineers
- Formal certification of business partners including authorized resellers, training centers, and consultants
- Company-wide training on human resource programs (e.g. medical benefits and retirement plans)
- Occupational training for government regulated standards (e.g. workplace safety)
- Training or performance support on manufacturing processes
- College and university programs ranging from individual courses to complete accredited degrees
- Formal certification of professional organizations including health care, insurance, law and accounting
- K-12 educational programs making school work available to students, parents, and teachers



e-Learning Programs

The principal characteristic of any form of distance learning is that the student does not need to be present in a classroom in order to participate in the instruction. Broadly defined, distance learning is any approach to education delivery that replaces the same-time, same-place face-to-face environment of a traditional classroom.

Distributed learning is a type of distance learning that is defined as technology-enabled (i.e. computer) and delivered anytime and anywhere. e-Learning is defined as the use of computer and Internet technology to manage the delivery of training and education to employees and students – wherever they are and whenever they need it.

e-Learning is based on the benefits provided by traditional computer-based training, including lower training costs, decreased learning time, and higher retention rates. Using the Internet to deliver distributed learning provides additional benefits, including lower development costs, lower distribution costs, and easy assessment and certification.

Instructional Systems Design

Instructional Systems Design (ISD) is a systems approach to analyzing, designing, developing, implementing and evaluating instructional training systems. Instructional Systems Design (ISD) is important when competency and measured learning is the goal. The major components of the ISD process include:

- Analysis
- Design
- Development
- Implementation
- Evaluation

In close collaboration with a client, the initial analysis phase of the e-learning development process defines course content, structure and presentation. Full details of the course



structure are determined during the design phase that culminates in the production of a lesson specification document for each lesson.

The implementation phase has two primary elements: client lesson acceptance and installation.

The evaluation phase usually involves both formative and summative evaluation designed to assess the instructional effectiveness of the e-learning courseware. Summative evaluation is typically conducted at the conclusion of each phase for signature purposes.

The four major components of the evaluation are:

- Instructional Adequacy (design, content, remediation, language, scope etc.)
- Interface Adequacy (appearance, clarity, navigation etc.)
- Program Adequacy (simulation model design, procedures, efficiency etc.)
- Curriculum Adequacy (design, procedures etc.)

e-Learning Architectures and Tools

e-Learning Architectures address the development of the infrastructure required to deploy e-Learning courses.

Biographix defines the design and implementation of e-Learning Architectures as the framework for the design, presentation and tracking of students using online instructional modules. It can help to think of the infrastructure in terms of building a virtual school. We are concerned with the design and implementation of the virtual school.

e-Learning architectures are typically composed of the four core components:

- Learning Center for online (i.e. Internet) content presentation and student-facilitator interaction
- Development Center and supporting templates for the production, exchange, and management of instructional modules (i.e. the content)



- Facilitation Center, the online location for training the trainer
- Underlying Database(s) and Administrative templates

A technology base of e-Learning tools will dramatically reduce the time (and cost) required to launch sophisticated client specific e-learning architectures. Such tools include:

- Chat (allows you to conduct live text -based discussions, one2many)
- Audio Chat (allows you to broadcast Facilitator voice live, one2many)
- Instant Messaging (allows you to conduct private live discussions, one2one)
- Bulletin Board (posting content)
- Predefined Presentation (i.e. PowerPoint)
- Whiteboard (i.e. allows you to draw simple graphic shapes and text live)
- Multiple Choice Questions (allows you to conduct a poll)
- Web Site (allows you to show any HTML content)
- Record (allows you to store live session for later replay)
- ScreenCap slide (allows you to discuss a snapshot of any image on your desktop)
- ActiveApp (allows you to discuss any application running on your desktop)
- QuizWhiz (framework to format student input to Assessment manager)

Collaborative Development Environments

The major benefit of a Collaborative Development Environment is that it enables teams which are geographically separated to evolve ideas, post progress reports, query each other, share documentation, and improve information flow between group members. It will enable dialog and meetings among team members who cannot be in the same place, or even online at the same time. Members will become part of a collaborative learning and development process and gain from each other's questions and perspectives.



Collaborative Development Environments allow members with a standard web browser to post and view messages on that site. People can post messages to the web site, and respond to postings made by others. This interaction allows them to respond to each other's ideas, contribute their own ideas, and build on the stored knowledge contained in the discussion database. Typical elements of a collaborative work site are:

- Guest/Registration
- Structure
- Interface Appearance
- Message Board
- Search
- Chat
- News Groups
- List Servers
- Document posting

Instructional Simulations

e-Learning simulations approximate, replicate or emulate the features of some task, setting, or context. Typically, simulations are used when the costs of alternative teaching systems are prohibitively high, when it is impossible to study the concepts of interest in real-time, or when the risks are considered sufficiently high to require demonstration of competence in a controlled, relatively risk-free setting.

Examples include expensive environments such as automotive electronics fault diagnosis, dangerous environments such as power station operation training, and ethical environments such as training in the use of anesthetics.

In its most basic form, a simulation is a model of reality. Biographix defines an instructional simulation along three dimensions: the breadth, the depth and the fidelity. The breadth generally refers to the scope or number of sub-systems comprised by the total simulation (i.e. the more sub-



systems the greater the breadth). The depth of the simulation refers to the level of detail incorporated into each of the sub-system models. Although not immediately apparent, the depth of a simulation will be variable and could change from sub-system to sub-system. Finally, the fidelity refers to how close the simulation "imitates" the visual, audible and other sensory queues found in reality.

The Biographix Corporation

At Biographix, we bring instructional content to life – interactively! Our mission is to design, build and support content-rich instructional programs built around complex real-life simulations where traditional CBT (computer-based training) systems reach their limits.

Our core business is the design and development of custom e-learning architectures and programs. Biographix has developed skills and special technologies to rapidly deliver training programs where students interact with complex virtual systems in real-time and gain an operational knowledge only otherwise available using a costly and often unavailable real environment.

Instructional Systems Design and Design Resources

For all e-learning projects, Biographix uses a formal Instructional System Design (ISD) approach based on its ten years experience supplying e-Learning programs to industry and non-profit organizations.

Biographix provides a full range on instructional design services including: Needs Assessment, Task Analysis, Test design, and summative evaluation. To complement its design services, Biographix has developed a full suite of e-learning and collaborative development tools that include or interface to all of those described above.

Biographix e-Learning services include:

- Project management
- Course and content development



- Multimedia production programming (i.e. Toolbook, Flash, Director, Java, XML, etc.)
- Internet, Intranet and Connected CD-ROM deployment and support
- Rich media (i.e. audio and video) production services

In addition to the custom e-learning solutions, Biographix offers a complete line of Support, Training and Consulting services.

Instructional Simulations

Access to complex systems for training is usually limited, dangerous and costly. Biographix has solved many of these training problems with the Interactive Simulated Learning Environments (ISLE) technology which provides a rich, interactive, real-world setting to practice expensive, difficult and hazardous diagnostic and operational actions.

Typical applications include any complex system with physical components connected together to make a functional mechanism or system. Examples include:

- transportation (automotive, aviation, marine, rail),
- industrial (plastics, manufacturing, petro-chemical),
- health sciences (nuclear medicine, surgical equipment, magnetic resonance),
- home entertainment and appliances.



Case Studies

The Biographix Website (www.biographix.com) contains a number of case studies describing how past and current projects have demonstrated the delivery of e-Learning requirements to real customers.

	<i>e-Learning Courseware</i>	<i>e-Learning Architectures and Tools</i>	<i>Instructional Systems Design</i>	<i>Collaborative Development Environments</i>	<i>Instructional Simulations</i>
Canadian Bankers Association			X		X
The Canadian Professional Logistics Institute		X		X	
The Canadian Foundation for Economic Education				X	
Centennial College	X				X
CIBC Securities Inc.			X		X
Investors Group			X		X
Toronto Dominion Bank			X		
TVO	X				X

