



e-Learning

the future of learning

White Paper

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Table of Contents

TABLE OF CONTENTS	2
EXECUTIVE SUMMARY	3
WHAT IS E-LEARNING?	4
DEFINING E-LEARNING	4
EXAMPLES	5
BENEFITS	5
WHAT NEXT?	6
MAKING E-LEARNING SUCCESSFUL	7
INTRODUCTION	7
UNDERSTANDING LEARNING REQUIREMENTS	7
E-LEARNING DYNAMICS MATRIX	8
CRITICAL SUCCESS FACTORS	9
BUILDING E-LEARNING SOLUTIONS	14
INTRODUCTION	14
TECHNOLOGY TO SUPPORT LEARNING	14
E-LEARNING TECHNOLOGY FRAMEWORK	14
LEARNING PORTALS	15
LEARNING DELIVERY ENVIRONMENTS	19
CONTENT	24
ENABLING TECHNOLOGIES AND INFRASTRUCTURES	25
E-LEARNING STANDARDS	26
DEVELOPING AN E-LEARNING STRATEGY	28
AGGREGATING LEARNING REQUIREMENTS	28
AN ENTERPRISE E-LEARNING ARCHITECTURE	28
STRATEGIC E-LEARNING ROADMAP	30
FUTURE DIRECTIONS	33
APPENDIX A - ABOUT ELEARNITY	34
ABOUT THE AUTHORS	34
APPENDIX B - ABOUT THINQ	35

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Executive Summary

Corporate e-Learning, whilst currently a relatively small part of the overall training and education marketplace, is in the early stages of development and growing very rapidly. In a recent study of large corporates ¹, 66% of respondents reported they were using, or were planning to use, a learning portal in the near future. The on-line training market is forecast to double in size for each of the next 3 years, reaching approximately \$11.5 billion by 2003 ².

In this paper we discuss:

- An overview of dynamics of e-Learning including critical success factors
- e-Learning as the “combination of learning services and technology to provide high value *integrated* learning; anytime, anyplace”
- A methodology for designing e-Learning programmes to ensure business and learning value
- A framework for supporting technologies including learning portals, learning management systems, synchronous and asynchronous learning delivery environments, and content authoring and management
- A roadmap for developing an e-Learning strategy

The frameworks and methodology developed by eLearnity provides the foundation and models to allow the rapid development and implementation of your corporate e-Learning solutions.

The primary benefits of e-Learning are:

- Increased quality and value of learning achieved through greater student access and combination of appropriate supporting content, learner collaboration and interaction, and on-line support
- Increased reach and flexibility enabling learners to engage in the learning process anytime, anyplace and on a just-in-time basis
- Decreased cost of learning delivery, and reduced travel, subsistence costs and time away from the job
- Increased flexibility and ability to respond to evolving business requirements with rapid roll-out of new and organisational-specific learning to a distributed audience.

In Summary

e-Learning represents a significant opportunity for all organisations, but delivering the benefits requires skilled people who understand e-Learning models and specialist products. Experience indicates that success is about much more than putting content on-line.

eLearnity has a significant track record and understanding of these issues and welcomes further discussion on how to ensure your future in e-Learning is a success.

¹ Learning Decisions, Masie Center, 2000.

² International Data Corporation, 1999

What is e-Learning?

e-Learning is being presented in the marketplace as the next evolution of the training and education industry and the next phase in the digital revolution. However, the e-Learning market is very embryonic and although evolving very quickly, very fragmented. With many different perspectives and many different organisations positioning their e-Learning solutions, there are some key questions you need to answer as you venture into this brave new world:

- What really is e-Learning?
- How does it differ from existing Technology-based training?
- Is it more effective than existing Computer-based training?
- Can we replace some of our Instructor-led classroom training?
- What kinds of e-Learning tools and technologies should we be looking at?
- How do I develop a coherent strategy for e-Learning?

The purpose of this white paper is to help you start to answer these questions. The paper contains a summary of our understanding of what is happening in this emerging market place, and the key issues you should consider.

Defining e-Learning

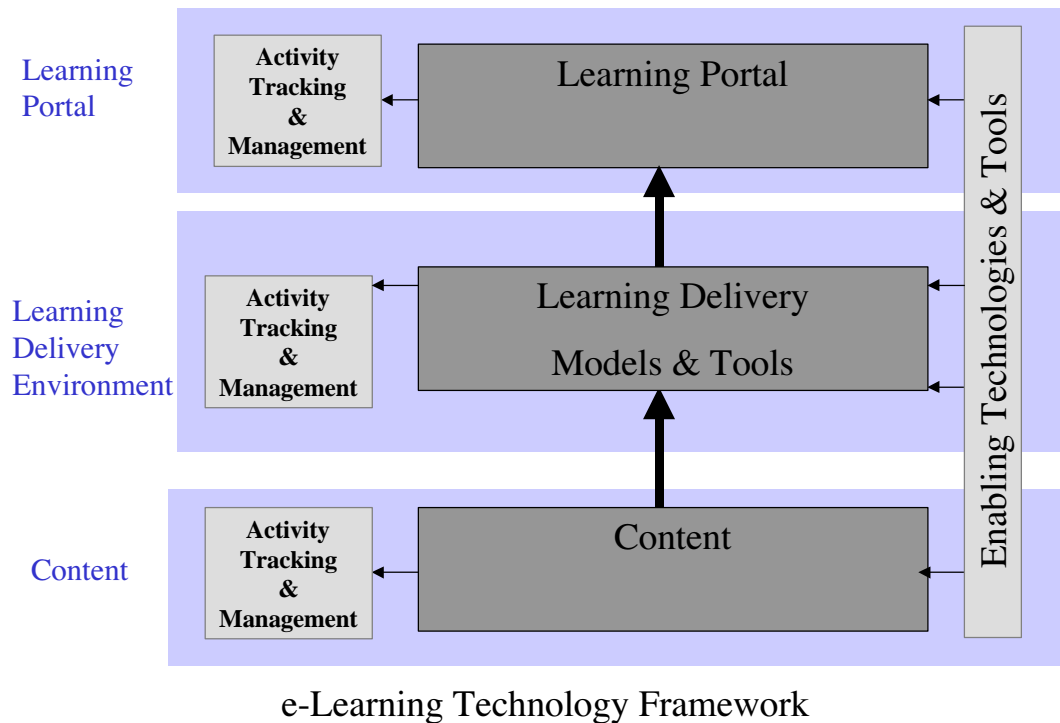
As with many evolving technology-related terms, especially “e” terms, e-Learning encompasses many different things. The term “e-Learning” has really emerged in the last two years and is being used to cover almost any technology-supported learning initiative.

Elliot Masie, a leading e-Learning guru in the USA, supports this view of e-Learning: “On-line learning is not about taking a course and putting it on the desktop. It is about a new blend of resources, interactivity, performance support and structured learning activities.” www.masie.com

eLearnity has been working within the e-Learning market-place since 1996 and has extensive experience of corporate and academic projects in this field. In our view, e-Learning needs to be thought of as the

“combination of learning services and technology to provide high value *integrated* learning; anytime, anyplace”.

Our definition can be illustrated using the following framework diagram:



e-Learning Technology Framework

Examples

To illustrate, here are some examples of where e-Learning has been successfully applied.

- A major corporation uses interactive web-based courseware with integrated instructional support and on-line forums to deliver a large-scale Enterprise Resource Planning (ERP) rollout programme.
- A British business school introduces on-line MBA programmes for its key corporate clients using Lotus LearningSpace with a strong mix of tutor-facilitated forums, on-line content and access to external resource libraries.
- An insurance company uses Centra Symposium to interactively train their field sales force at home using monthly synchronous sessions with supporting on-line materials, instead of quarterly classroom training in hotels.
- A pharmaceutical company re-engineers its induction programme to reduce classroom time and increase levels of learning by using an on-line learning environment with a new employee discussion forum.
- A management consultancy uses an e-Learning environment supported by on-line coaching to improve the quality of sales proposal writing.

Benefits

The above examples are typical of the type of learning requirements we encounter on an everyday basis. All of them are using technology to enhance or transform a learning process, achieving real business and educational value, and reaching a larger, more diverse learner population.

The key benefits from these kinds of solutions include:

- Increased quality and value of learning achieved through greater student access and combination of appropriate supporting content, learner collaboration and interaction, and on-line support
- Increased reach and flexibility enabling learners to engage in the learning process anytime, anyplace and on a just-in-time basis
- Decreased cost of learning delivery, and reduced travel, subsistence costs and time away from the job
- Increased flexibility and ability to respond to evolving business requirements with rapid roll-out of new and organisational-specific learning to a distributed audience.

What next?

There are enormous benefits to be achieved from e-Learning, the question is how do you achieve them?

In order to start to answer this question, you should consider the following:

- How do I determine whether e-Learning is applicable to my requirements?
- How do I construct an e-Learning programme?
- What are the issues associated with designing and developing a solution?
- What products and tools do I use to support the delivery of the programme?

The rest of the white paper will focus on these issues.

Alternatively you can contact us to discuss your requirements in more detail.

Making e-Learning Successful

Introduction

Before we dive too deeply into the issues and technology concerned with implementing an e-Learning solution, it is important to review some fundamental issues associated with constructing the e-Learning process in order to deliver real learning. As has been already introduced in the previous sections, on-line learning is not new. We have been using CBTs in various forms for over 10 years. However, experience from CBT and more comprehensive e-Learning projects indicates clearly that success requires more than just putting content on-line, be it CBT or HTML pages on a corporate web-site.

Understanding Learning Requirements

There are many different kinds of learning requirements as well as many different subjects. These requirements vary significantly, and may be outside what historically has been known as 'training'. Some diverse (and very common) examples could include:

- A company announcement following a corporate takeover, explaining the rationale and impact of the change
- Training an experienced field sales organisation in new products or legislative revisions
- Developing senior management programmes to enhance business performance and stimulate business creativity.

e-Learning can have a role in fulfilling any or all of these requirements, and in some cases could provide the complete solution.

Understanding the underlying dynamics of the learning requirement, and being able to map them into a viable learning approach which can then be implemented, is fundamental to any success. Taking our examples further:

The logistical demands (lots of people, very short space of time) of the company takeover announcement probably mean that a pre-written presentation and a Frequently Asked Questions (FAQ) document need to be distributed to everyone quickly. But this solution never answers all the questions or gets feedback from the organisation. More importantly, it doesn't allow the employees to feel part of the change process. Implementing a controlled forum to support the information transfer and answer key questions would increase effectiveness considerably.

Training a field sales organisation is a constant requirement, but has a very high opportunity cost if attending classroom training is involved. Pushing information out to the already-overloaded sales staff does not provide an effective learning approach, as there is no way of tracking what they have absorbed. In this case, creating an on-line (e-)learning community which the sales team can access from their laptops, wherever they are, would provide a better environment to manage learning and improve sales effectiveness. Specific product or legislative training can then be delivered in a controlled way on an ongoing basis. However, given the nature of the training and the audience, it is critical that this education isn't just information push. The sales team needs the chance to discuss and understand the implications of the new products: how do they compare to the existing range or that of the competition? This e-Learning environment needs to be actively facilitated to manage discussions and gather feedback. It also needs subject experts to provide direct support and answer questions. It needs some content too – everything from product specifications and presentations to industry analysis, external references and specific customer experiences. This integrated environment then becomes a highly effective learning and development solution for the sales force and an on-going reference tool.

In the case of the Senior Management programme, there are likely to be key components which need to be done face-to-face in a facilitated workshop environment, probably including peer review and input from

external industry experts. The trouble is, to do this properly you probably need 10 or more days, and that's just not feasible. However, if this process is restructured as an *integrated* e-Learning programme, the face-to-face time can be reduced significantly, maybe to a 2 day initial session, followed by a month of facilitated on-line collaborative and coached development, followed by a final 2 day session. In this case, whilst there might be some pre-defined materials, much of the structure will develop during the workshops and on-line coached and collaboration sessions. Resources of all kinds, particularly documents and references to external resources are critical, and are probably added as the specific context is developed through the learning process. Neither the audience nor the subject lend themselves to fixed structures or to lots of "click-and-turn" content. The on-line environment is discussion and action-centric not content-centric. The focus is on outcomes not structure.

All three of the above examples represent a very different approach and a very different e-Learning experience. The design, the level of importance attached to core components of the learning structure, the nature of the content, participation and instruction/facilitation, are all specific to the context in which they are found. Applying the same approach to each of the above situations would be disastrous, resulting in very poor outcomes and low e-Learning value.

e-Learning Dynamics Matrix

By evaluating many e-Learning scenarios, we have developed models to enable us to better map the types of learning requirements to the critical learning dynamics – the structure, content, participation and instruction/facilitation elements. This information can then be constructed as an e-Learning programme model and used to help us identify associated technology support.

We represent this mapping process using an e-Learning Dynamics Matrix. The version below is greatly simplified, with a restricted set of e-Learning characteristics and learning models.

	Structure	Content	Participation	Facilitation
1	Fixed	Fixed	Solo	None
2	Flexible	Flexible	Supportive	Directed
3	Dynamic	Dynamic	Collaborative	Facilitated

	Structure	Content	Participation	Facilitation
Information Transfer	1	1	1-2	1-2
Basic Skill Acquisition	1	1-2	2	2
Advanced Skill Development	2	2-3	3	3
Adaptive Expertise Development	3	3	3	3

Simplified e-Learning Dynamics Matrix

This matrix can be applied to the defined learning requirements and gives us a clear understanding of the relative role of the different components and determine the nature of them. For example, it can tell us

which fixed learning structures are appropriate, whether content needs to be flexible in form (multiple types), the degree of collaboration required, or if instruction is needed and what form it might take.

Here are some examples of the application of the e-Learning Dynamics Matrix, including our three specific examples discussed above.

Scenario	Learning Model	e-Learning Outcomes	Sample Duration
Company Takeover Announcement training for existing employees	Information Transfer Corporate message and reasoning. FAQs.	Intranet-delivered interactive presentation, explanation and FAQs. Optional Forum.	2 hours over 5 days
ERP Application Rollout Rapidly deliver core user skills for discrete communities	Basic Skills Acquisition Core skills and custom process implementation	Interactive hands-on learning and practice with inter-user discussion and directed instruction	1 day over 5 weeks
Induction Programme Gain competency in core company processes and systems	Basic Skills Acquisition Broad use of company systems, processes and organisation	Mix of interactive and exploratory learning with extensive supporting content, active discussion, role play and directed facilitation.	5 days over 6 months
Field Sales Training Expanding knowledge to cover new products and selling models	Advanced Skill Development Detailed selling techniques based upon new product directions	Heavily facilitated and interactive participation with mix of supporting content and subject expertise.	Recurring 2 hours per month
Strategic Management Development Increasing competitiveness and improving performance	Adaptive Expert Development Evolving strategy and plan with peer-level review and support from key industry experts	Coached collaborative sessions with structure and content dynamically generated by participants.	Recurring 5 days over 1 year

Example Scenarios with e-Learning Outcomes

As you can see from the table, the application of the simplified e-Learning Dynamics Matrix enables us to map from a Learning Model to an e-Learning Outcome which outlines a learning approach. This approach can then be mapped into an e-Learning Solution (see later in section on “Building e-Learning Solutions”), which defines the characteristics of the underlying e-Learning platforms and helps to determine the types of products we need.

Of course, this mapping process is not the whole answer. As well as these considerations there are other important factors, including the specific subject matter itself and how that lends itself to on-line representation. Also we need to consider the students themselves, delivery logistics, technology and infrastructure, longer-term strategy and so on.

But, by understanding the underlying nature of the learning requirement and the key dynamics of learning associated with it, we can at least start to map out a sensible way of delivering it, and ensure that we are constructing an e-Learning approach where we deliver real learning value.

Critical Success Factors

Too often people consider e-Learning as a straight replacement for classroom training or as an implementation of a Web-based CBT course. In fact, the most common approach is to select a tool or product and plan to implement existing material in that product. Often these approaches fail to achieve the expected benefits. Why? A whole segment of the learning experience has been omitted – the Learning

Delivery Environment. In this area the learning context, the approaches to learning, human interactions amongst participants, and the fitting of tools and processes to learning needs are particularly critical in order to make the learning a valuable experience. The Learning Delivery Environment will be discussed in more detail in the “Building e-Learning Solutions” section.

An e-Learning programme should be designed from scratch. This does not mean that existing course material has to be abandoned totally, just considered from a different perspective. Developing an e-Learning solution does not need to take a long time either, so long as the initial analysis is done well and the right approach is adopted.

There are a number of critical success factors involved in producing a successful e-Learning programme, and many of them focus on the Learning Delivery Environment. They are discussed below.

Getting started

Firstly, like all major projects that involve organisational and process change, it is important to treat the effort as a formal programme. It is critical to have senior management support, as the programme can have impacts far beyond that of the implementation of new training courses.

Many e-Learning ventures fail because they have been regarded merely as a small project in the Training Department to convert training material to an on-line form. Others have been driven as a technology project, with learning coming secondary. The programme should be managed by an overall programme manager with real accountability and visibility, and should produce documented deliverables. It should be given budget and staffing, including full-time people where possible to ensure focus on the project is maintained. The scope should encompass business strategy, organisational change and technology support as well as learning design and development.

It is critical to match the plans for such a programme to the available resources and to other activities within the business. Many people overestimate their capabilities, and underestimate the time involved when planning their first e-Learning programme.

Incorporating business plans and constraints

The e-Learning programme must enable and support existing business objectives and plans, otherwise it will not be seen to add value to the organisation.

No programme can be contemplated without also considering the implications on the organisation and the effect of organisational culture and constraints on the programme. Often the culture of the organisation will dictate an approach to the learning.

In practical terms, all constraints acting on the programme must be recognised – everything from budgets to skill shortages. Plans must be developed to manage within these constraints or to remove them.

Defining the learning objectives

It is important to understand the true learning objectives, both of the design team and of the potential audience for this learning. Time and money can be wasted if the learning objectives are not clearly understood by the design team from the beginning. Classic errors in designing e-Learning programmes are made by comprehending the objectives for teaching, but failing to understand the objectives of the students.

Understanding the audience

A clear picture of the students themselves must be gathered – everything from the basic demographic profile to the likely motivation, computer literacy and hours of study. In many cases of classroom training, a teacher can adjust the approach to the course ‘on the fly’, as reaction to audience needs is immediate. However, if learning is to be achieved from a distance over a longer period of time, often with a larger

audience, using mixed methods of delivery, then the course must be carefully designed to meet the needs of the students before it is implemented. Last-minute additions can certainly be made, but should only be done to make the learning experience a richer one.

Using appropriate design models and approaches

When the context in which the programme is to operate is fully understood, then the appropriate model of learning needs to be selected. An overall integrated programme may involve many different modes of communication, and will often be more successful than a monolithic single-method programme. This process has already been discussed earlier in this section (see “e-Learning Dynamics Matrix”).

Creating quality content

Once an overall learning model and approach have been determined, then the content design can take place. Each individual component of the learning programme should be designed in a way to suit its delivery mechanism. On-line learning must be designed to work as on-line learning, not as presentation slides forced into an on-line environment.

In many cases, the on-line portions of e-Learning courses contain far less content than their equivalent classroom courses. The content needs to be designed to work in an on-line mode, and must be easy to read and use. It has to be consistent throughout and divided into sections of the right size for learning and concentration. Often the navigation path through the content should be designed so that it may be determined by the learner, rather than being set by the instructor or tutor.

Content and activities within the course should be engaging and motivating to the students, and high levels of interaction planned where appropriate to ensure consistent contribution from the students. Without periods of active learning the students will lose interest and may leave the course altogether.

Selecting the best delivery method

The right activities need to have the right delivery mechanism and a mapping of the learning objectives and activity definitions to delivery mechanisms is critical. Many people assume that classroom training should not be considered as part of an overall e-Learning programme, but it is often an invaluable component for items such as introductions, and for practice on specific physical or human-interaction skills. On-line delivery mechanisms can range from a text-based facilitated discussion to an interactive simulation exercise, and could include audio or videoconferencing. Each has its strengths and appropriate uses for different types of learning activity. See the “Building e-Learning Solutions” section below for more detail.

Setting standards for productivity gains

Often an e-Learning programme will involve development by a number of people simultaneously and design and development standards need to be put in place to ensure consistency and transferability of skills. Students are also far less forgiving in terms of inconsistency of user interface and ease of use than with classroom material.

Management and change control standards and processes often have to be altered to accommodate an e-Learning programme. Changes can be completed far more quickly, and it is possible for many more people to have access to make those changes. Tracking of changes becomes more complex and the whole change control process usually needs to be reviewed.

Project management considerations

Developing e-Learning solutions for the first time is a learning experience in itself for the team, and success is more easily achieved if the programme is divided into small achievable segments to minimise risk. Each of these segments should produce measurable deliverables and be seen to deliver visible business value, so that the overall programme justifies itself to the business and to the participants.

Prototyping is essential, as is selecting the appropriate audience for giving feedback. The first project should be considered as a pilot, not only for students but also for the whole design, development and delivery team. Multiple iterations of the content and approach may need to be made, responding to feedback, and based on the practical experience gained through the process.

Defining a support model

The support model for an e-Learning programme will often involve far more people with a wider variety of skills, compared to a traditional training programme. The staff will need to understand their new roles, be trained in the support process, and understand the change in support needs over time which inevitably occur in a major e-Learning programme.

Making delivery work

Delivery of an e-Learning programme is often very different from methods used in face-to-face situations. The instructor needs to be more of a facilitator rather than a knowledge-transmitter. The students will need more process guidance but less content support. Student support needs will vary depending on the maturity of their experience of e-Learning, and may need to be particularly heavy during their first course. There are a number of key behavioural transformations that will need to occur in order to ensure successful learning delivery from both the instructor/facilitator and student perspectives.

Recognising changing organisation needs

If instruction or tutoring is now to be from a distance and spread over longer hours then the rewards systems for the tutoring staff need to be re-evaluated to see if they are now appropriate. The staff with the subject knowledge may end up taking a much more removed but focused role in the teaching of a programme, which may cause some concern initially.

'Training days' are likely to be less formally defined, and recognition of educational time needs to be built into the standard working timetable for employees.

Working hours for support staff may need to be extended, and an understanding of the needs of remotely located learners built into the support processes and service level agreements.

Throughout the organisation, roles and responsibilities may have to change, and completely new roles defined.

Evaluating effectively

E-Learning programmes will need to be evaluated in a different way. Without constant visibility of the students, it is more difficult for a teacher to evaluate performance, or even to ensure that the student who has completed the work was actually the student named on the course. Group work is common, and different evaluation criteria will need to be devised for team activities.

Apart from an evaluation of the students' performance, there are a number of other areas that need to be considered. The quality of support of the students by the facilitators and subject matter experts, as well as Help Desk staff is a key area in the success of an e-Learning experience and must be evaluated critically with improvement plans implemented. The process of design and development of each new learning programme can generate areas for improvement that can help subsequent development teams and increase efficiency in the development process. Feedback should be gathered both during and after the completion of a programme and recommendations made available for future programmes.

Learning is an ongoing process

It is natural to consider that an e-Learning programme results in one or more finite events from which students have achieved set learning objectives. However well-designed learning programmes develop strong learning communities which can persist beyond the formal learning sessions. Many e-Learning programmes can in fact develop into networks and discussion groups, as well as spawning new and more advanced programmes for the participants.

In summary:

- Formally define the programme.
- Understand the context in which the programme will exist.
- Be prepared to look from a different perspective.
- Review organisational changes and alterations in motivation, rewards and roles.
- Design the programme to meet student learning needs.
- Model the learning before considering tools and products.
- Match learning components to the most appropriate delivery mechanism.
- Prepare for a different type of support and teaching model.
- Develop and implement new evaluation methods.
- Prototype and pilot.
- Allow plenty of time for a learning curve on your first project.
- Consider the learning programme to be the start of a broader ongoing learning experience.

Building e-Learning Solutions

Introduction

We have discussed the primary factors to be considered when implementing e-Learning solutions including learning requirements, learning models, business context and implementation approach. We will now look in more depth at the technology side of the e-Learning equation.

The successful implementation of an appropriate technology foundation is fundamental to any e-Learning solution. However, as has already been discussed, the e-Learning market place is currently very fragmented and evolving rapidly. With new products arriving, existing products being positioned as “e-Learning” tools, and different vendors using different terminology, you need a more objective view of the role and suitability of products against identified e-Learning needs.

Technology to Support Learning

As the e-Learning market place evolves so will the understanding of the kinds of technology solution required to really support and enable e-Learning.

If we review what is currently available we will find a combination of “niche” technology-based products and generalised “content-based solutions”.

The niche products come in many forms, including learning management systems, collaborative learning tools, synchronous tools, assessment products, content development tools and so on. These vary hugely in terms of role, user, underlying infrastructure requirements, scalability and implementation approach.

The content-based solutions are largely from ex-CBT vendors who have historically delivered CD-ROM based solutions, and who have recognised the potential of the Internet and corporate intranets as a delivery platform. These solutions are based around a pre-existing content library that is now delivered to web browsers rather than via CDs. Content is generally accessed and managed via a “learning portal” which increasingly provides support forums or instructional services as well as the catalogue of content. The content may be downloaded in small objects or accessed directly from the vendor’s dedicated server.

A variant of the content-based solution is the custom CBT example. Historically, this would have involved development of organisational-specific content using a multimedia development tool, again often delivered via CD-ROM. In the e-Learning model, this material is increasingly being delivered to web browsers and developed using extensions of the multimedia tools, plus standard web tools such as HTML and Flash.

In all of the above scenarios, we need some mechanism to assess whether the proposed solutions will actually deliver real value. We also need to provide a more coherent approach to assessing technology products and to better understand their role in meeting identified learning needs.

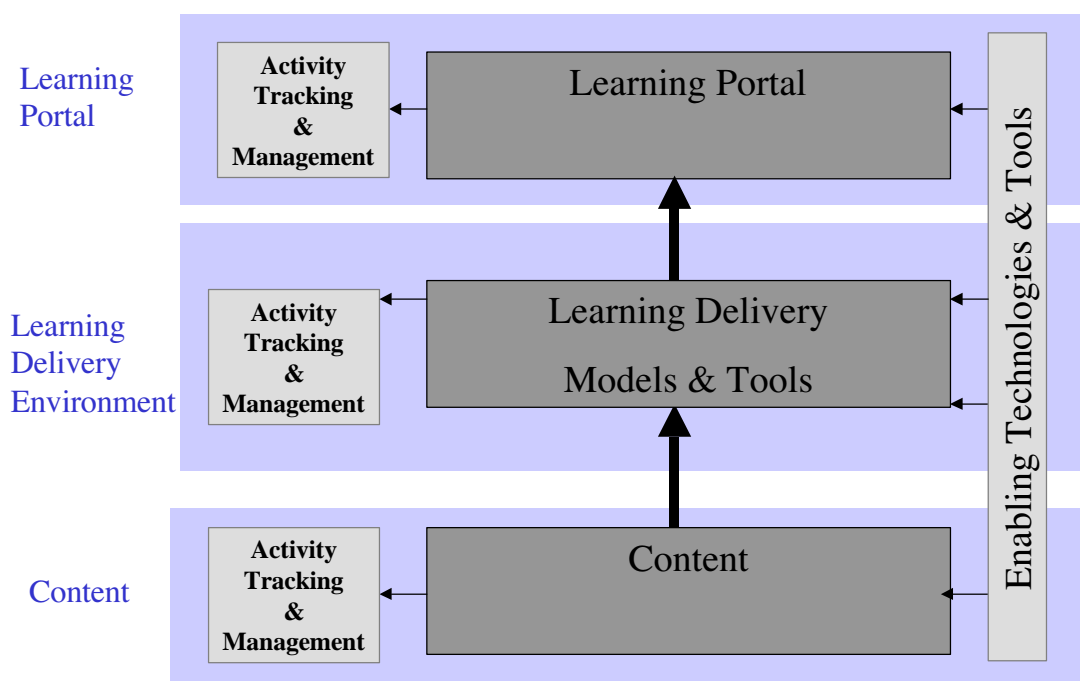
e-Learning Technology Framework

eLearnity has developed a model for classifying and evaluating e-Learning products. The e-Learning Technology Framework helps us understand the role of products and the kinds of products required to fulfil specific needs. It also provides us with a means of assessing individual products.

Specifically, the objectives of the e-Learning Technology Framework are to enable us to:

1. Classify products based on role
2. Assess specific solutions and products
3. Match products to specific e-Learning requirements
4. Design an overall architecture or design a framework for a combination of products.

At the highest level, the e-Learning Technology Framework is about understanding which types of product exist, and their role in building an e-Learning solution. The following diagram summarises the e-Learning environment.



e-Learning Technology Framework

To better understand the framework, we will now discuss each of the product types in more detail. We will then review some other critical issues including standards, scope of deployment and underlying infrastructure.

Learning Portals

The term “portal” is a relatively recent addition to Internet terminology. Although definitions vary slightly between organisations, in essence a portal is an access-point to a set of services via a web-browser.

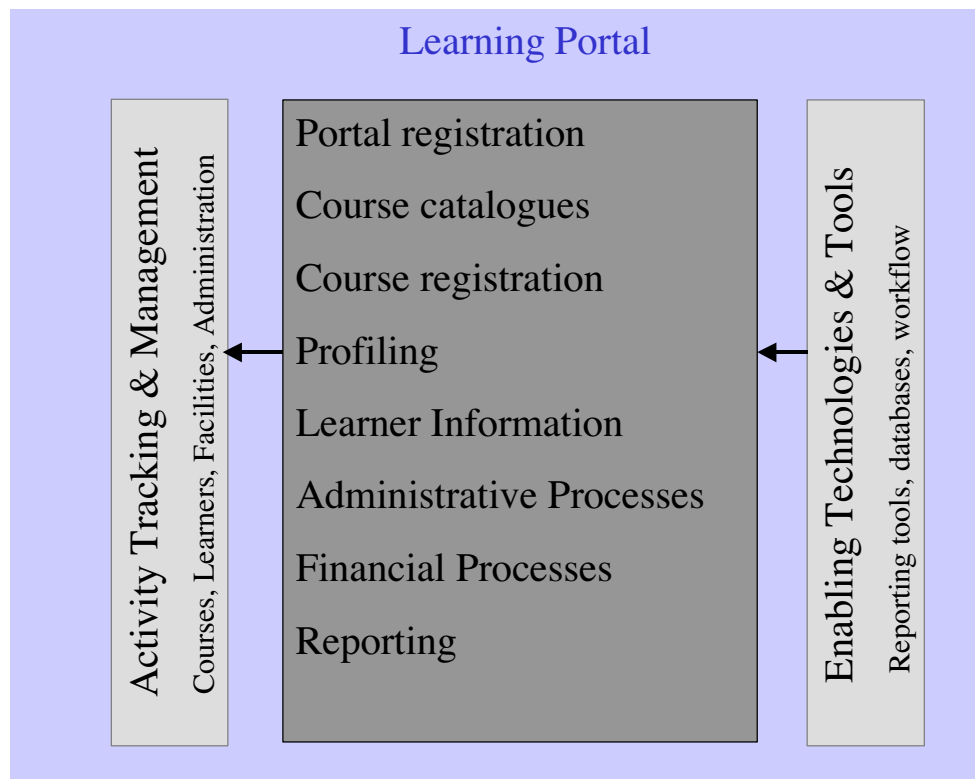
A Learning Portal is really a concept rather than a specific product. It is an aggregation of learning services and associated products into a single (hopefully) coherent access point. Typically this will include course catalogues, course registration, need assessment, instructional support, learner forums and so on.

Brandon Hall (www.brandon-hall.com) refers to Learning Portals as

“..web sites that provide a combination of courses, collaboration and community. Initially set up with e-commerce for the individual purchaser with a credit card.”

Whilst there are some historic examples of Learning Portals, most organisations have only recently started focusing on them and their potential to transform the way the learning services are delivered within a company.

A recent 'Learning Decisions' survey from the Maisie Center, (February 2000), reports that approximately 12% of respondents are already using a Learning Portal, 22% building one, 32% investigating and 34% not yet "on the radar screen".



e-Learning Technology Framework - Portals

Portal Functionality

Portals are really a set of products to support the learning services provided. The products can range from a Learning Management System (LMS) to manage access to a course catalogue, through to collaborative tools to support discussion forums, and content tools to create and manage specific content. Access for on-line courses can be directly managed via the LMS component of the portal.

The following is a list of functionality that a Learning Portal could provide:

- Catalogue of courses and learning available
- Registration and enrolment services
- Personal activity tracking
- Organisational tracking
- Personal profiling
- Personal information storage areas
- Learning forums
- Instructional support
- On-line course/learning fulfilment

There are two pretty distinct types of portal – Internal Portals and External Portals. Internal Portals are private, organisation-specific environments. External Portals are public environments accessed by many organisations.

External Portals

Many of the external portals currently “aggregate” course schedules for the purposes of supplying a single point of booking and confirmation. They may also provide access to discussion forums and other learning management services.

Whilst an External Portal can be tailored to specific organisations, it is likely to contain a subset of total learning services needed within an organisation, or be used as a purely public learning environment. An External Portal by definition cannot be closely integrated into internal HR or ERP systems.

Examples of External Portal providers include THINQ, Click2Learn (formerly Asymetrix), SmartForce (formerly CBT Systems), SmartPlanet.com (formerly ZDU), Learn2.com and many more. Other related products include BlackBoard.com

Internal Portals

An internal portal is generally available on the corporate intranet, and may provide access to the “Corporate University”, internal courses, forums etc. It is usually integrated with the internal Human Resources (HR) or Enterprise Resource Planning (ERP) systems. Whilst the portal may be internal, some of the courses could in fact be external, such as public courses running on the Internet. An Internal Portal can therefore be completely unique to a specific organisation, and is custom-developed for that organisation, often being closely integrated into other key corporate systems. The design and architecture will vary significantly based on learning service requirements, scale and underlying infrastructure.

It is also possible that an Internal Portal could be hosted externally via an External Portal provider. In this case a customised External Portal is provided, including organisational-specific content in a secure environment. The external hosting probably limits the kind of private information on the portal, and limits the integration into internal systems and information.

Learning Management Systems

As well as now being provided via an integrated portal, learning management and administration has historically been provided by specialist tools - Learning Management Systems (LMS) or Training Management Systems (TMS). Sometimes they have also been referred to as Computer Managed Instruction, or CMI tools.

An LMS typically incorporates functionality for

- Managing courses and course registration
- Tracking student registration, access and progress
- Managing course information
- Course scheduling and administration including instructors and physical facilities
- Reporting

An LMS developed originally for management of classroom-training will include more functionality around the management of physical training assets including classrooms, course materials, joining instructions etc. An LMS originally developed for management of CBT will include less or sometimes no functionality for managing physical facilities but include more functionality for tracking access to content and different mechanisms for launching content including web-based, network-based or CD-based content.

Clearly it is important to understand primary usage requirements when selecting between these different kinds of LMS.

Another significant factor will also be the scale of usage and integration. The number of courses and students, their location and access to the system all effect the kind of LMS which may be appropriate. The ultimate requirement would be for an enterprise-level application and associated data resilience in very large corporations providing company-wide access.

All LMS environments require underlying databases for recording and tracking activity. The scale of access and mode of access will dictate whether these can be small local environments or high-end “industrial strength” systems. User and course data also needs to be integrated into HR or ERP environments. For example, a training catalogue and registration system managed through an LMS will contain cost information which needs to be passed to internal finance systems and user information which needs to be integrated with HR systems. The LMS may also contain varying degrees of workflow functionality for managing registration and administration processes.

To simplify the detailed tracking of on-line courses, standards have been developed to allow an LMS to interact with CBT or Web-Based Training (WBT) modules. These current standards are referred to as the AICC standards (developed originally by an aviation industry committee), although new and more comprehensive standards are being developed by the IMS (Instructional Management System) project. See the “e-Learning Standards” section for more detail.

The LMS is a critical component of any full-service environment or Learning Portal. The selection of an LMS requires careful consideration for an appropriate tool in terms of functionality, scalability and integration. The implementation of an LMS is typically a large project.

Example vendors and products include Saba, KnowledgeSoft (now KnowledgePlanet.com), Lotus’s PathWare, and Click2Learn’s Ingenium (and historically Librarian), IntraLearn’s Icosa, PathLore, PTS Learning Systems’ PTS, John Matchett’s Registrar and Learnframe’s (ex-Pinnacle) Learning Manager.

Profiling or Competency Systems

Profiling provides a different and complementary approach to determining potential learning requirements. Instead of providing a catalogue of courses and letting the individual or a management process determine requirements, profiling focuses on mapping someone’s skills against defined job roles and identifying learning needs through gap analysis.

Job roles are profiled in terms of detailed skill, knowledge and experience including standard levels of competency. A person will similarly profile himself or herself with the system, identifying comparative deficiencies and proposing a learning plan which can then map onto specific courses or learning opportunities which are requested via an LMS.

The benefit of profiling is that it provides a more comprehensive and less arbitrary approach to identifying learning needs. It also puts the individual more in control of determining his or her own direction and learning requirements, making it an ongoing process rather than a one-off annual review. It enables us to break down the learning delivery into smaller more flexible units, assuming the logistics of delivery allow it to be done.

The downside is the work required to define and maintain meaningful role profiles, and the additional work required to map and maintain individual profiles, which can be very significant.

We expect to see increasing adoption of profiling in Portals and in Learning Management Systems.

Example products include Click2Learn’s Ingenium and KnowledgeSoft.

Forums in Portals

One of the primary areas that differentiate Portals from Learning Management Systems has been the addition of user forums and instructional services. These forums are used to provide generalised or subject specific support to individual learners, by giving them access to other students and instructors/tutors. Typically forums are asynchronous environments (students access them at different times to each other), with text-based discussions. The instructional tools vary from asynchronous environments to synchronous tools (accessed at the same time), generally based around Chat sessions.

Whilst these forums clearly add some value to the learner, providing an environment for them to interact with other people, this approach to collaboration and instruction primarily reflects a CBT approach to learning. Here the student essentially learns in a self-paced mode accessing interactive learning content. The forums then provide a support environment outside the content.

As we will discuss in the next section on “Learning Delivery Environments”, and previously in the “Making e-Learning Successful” section, this model of collaboration and instruction/facilitation is limited and, in our view, is restricted to the basic skills transfer learning model. To be really effective, collaboration, instruction and facilitation need to be tightly integrated into the learning process itself, i.e. integrated into the content, not bolted on afterwards.

Learning Delivery Environments

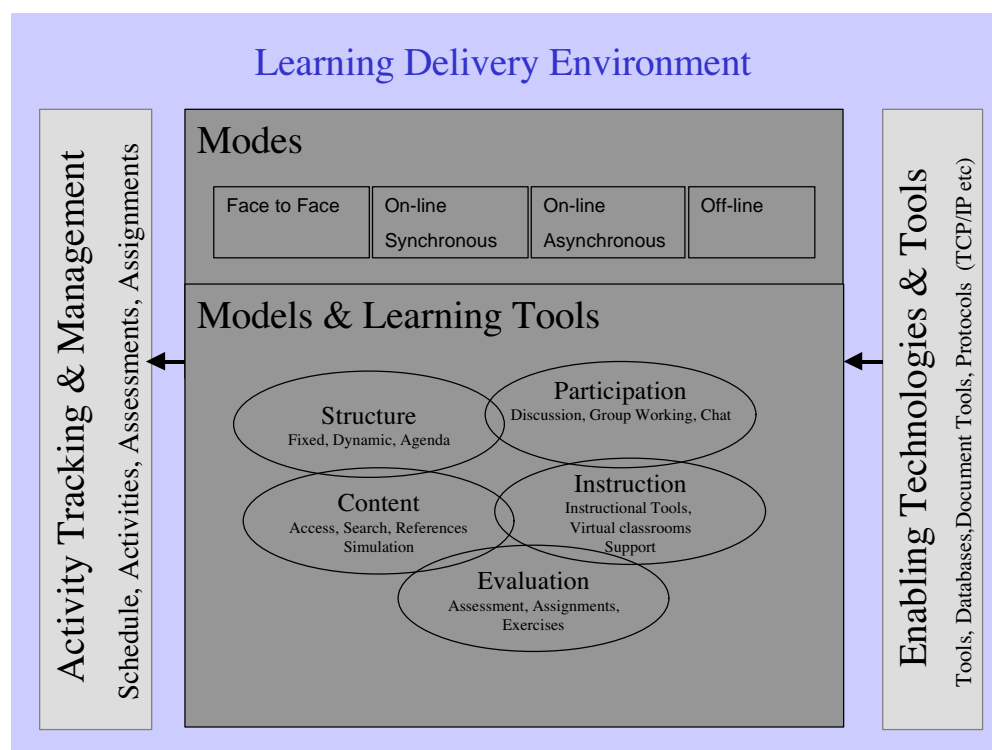
Having described portal environments for determining what learning is available, how to register or access it and the processes for managing and tracking it, we must now focus on the actual process of the learning itself.

It is a common misconception that having done the above, all that is needed is to point someone to some interactive on-line web content and the learning will be successful. As we discussed in “Making e-Learning Successful”, this is very simplistic approach and is not effective for most learning requirements.

Hence the most critical component of the e-Learning Technology Framework is the Learning Delivery Environment, within which the actual learning takes place. This is the environment that contains and manages the learning process and integrates together the content, collaboration, instruction, facilitation, assessment and so on. Content may be of many types including documents, web references, references to physical media including books, interactive media, video, audio etc. We will discuss content types and tools in more detail in the next section.

Depending on the specific learning requirements and the associated learning model, the relative mix of content, collaboration and instruction/facilitation varies enormously. (See the simplified e-Learning Dynamics Matrix in the “Making e-Learning Successful” section). The role of the Learning Delivery Environment is to tightly integrate these components of learning together for the student in a transparent way. It should enable them to move between the activities of accessing detailed content, discussing it, collaborating on projects based on it, assessing it or submitting assignments or test work in a seamless way.

It is important to note that it is this close integration and transparent combination of learning components that enables real learning value to be delivered.



e-Learning Technology Framework - LDE

Key Functional Components

The key functional components of a Learning Delivery Environment (LDE) include the following (not all products will include all components):

- A way of structuring the detailed learning processes and activities
- A library of supporting resources or content
- Integrated collaboration tools – potentially both synchronous and asynchronous
- Tools for assessment and work assignments
- Personal profile information and activity tracking
- Instructional support tools for use by instructors/facilitators
- Potential integration between learning events and personal diaries.

Learning Structure and Process

Applying structure to the learning process and activities is sometimes more contentious than might be generally perceived. With classroom training or book-based learning we tend to adopt a fairly linear structural model. Courses are divided into modules or chapters, modules consist of a sequence of learning activities which relate to content resources, assignments, collaborative events and so on.

Most LDEs allow this sequential structure to be represented directly. However, more advanced learning models including collaborative learning, coaching or project assignments, may not fit well into a simple linear structure. In these cases we need the ability for the learning structures to be more flexible, more networked, more dynamic (defined as the course develops by the instructor/facilitator) and ultimately individual to the learner.

Resource or Content Library

Anyone evaluating e-Learning is immediately aware of requirements for content. We shall discuss content in more detail in the next section, but it is critical for the LDE to provide us with easy mechanisms to assemble and navigate any relevant content relating to the learning need. This typically includes content of many types including documents and web references as well as interactive content.

In addition to accessing resources and content via the learning structure, it is also imperative that they can be accessed in more direct ways based on the learner's or instructor/facilitator's requirement. The methods used mainly involve a search mechanism, by text, keywords or subject area, but can include simple navigational moves. For example, a common limitation of accessing content contained in interactive/CBT style modules is the inability to jump in part way through with a "How do I ...?" style of question. This is a limitation of the singular type of learning resource and the hard-coded nature of the learning paths.

Integrated Collaboration Tools

There are two primary ways of delivering collaboration or instructional services within a Learning Delivery Environment (or within loosely integrated forums, such as in a portal) - synchronously or asynchronously.

Synchronous and Asynchronous Collaboration

Synchronous interaction involves the parties (students, or student and instructor) being on-line at the same time and communicating in real-time. This interaction can be supported by a range of synchronous communication tools including voice, chat, shared whiteboards, application sharing etc. These methods are discussed in more detail in the "Virtual Classrooms" section.

The benefits of synchronous interaction are that learning and feedback are immediate and therefore happen in shortened elapsed time. The downsides are logistics and the limitation of time. Logistically delivering synchronous learning can be difficult. All parties must be on-line at the same time, regardless of location. This can work well for short sessions – maybe 1 hour maximum, but is problematic for longer periods with individual attention and learning value decreasing rapidly. It is also difficult to schedule times when such sessions can happen, and therefore synchronous events tends to be relatively sparsely scheduled, often only a few times a month. Another potential consideration in synchronous communication is language. Real time interaction is most easy in your native language, and therefore it is common to find that non-native language speakers (or typists!) take on a much more passive role, with activity being dominated by native language users. These constraints need to be considered when planning the role of synchronous learning events.

Asynchronous interaction involves the parties communicating over elapsed time, not real time, usually in a typewritten format. The most common examples are forums or discussion environments where topics are raised and responded to in the user's own time, where discussion threads build up over time. As well as straightforward discussions, asynchronous interaction could also include group project activity, assessments, surveys, votes etc. These activities may be completely open-ended or may be constrained with a defined start or end time.

The benefits of asynchronous interaction are its flexibility and ability to fit into everyone's working day. You engage with the system when it suits you, and information of all kinds including documents and file attachments can be shared, not just text in discussions. The downside is that it occurs over longer elapsed times and does not support live activity.

Predictably maybe, this is clear case of "horses for courses", in other words, understanding the specific requirements and mapping appropriately on to the right delivery mode.

Any-time e-Learning

Increasingly we expect to see synchronous tools to be integrated into asynchronous environments to allow for an “Any-time” learning model. This environment would be primarily asynchronous with background discussion, assignments and assessment taking place, but with pre-defined/pre-scheduled live events managed through synchronous tools that integrate into the asynchronous environment, schedule and resources. Some tools have now started to appear that provide these facilities within one environment, such as Lotus LearningSpace. The alternative is to integrate synchronous tools within an asynchronous Learning Delivery Environment. Some vendors are working on this approach including IntraLearn and Centra (see below).

Integrated Collaboration within an LDE

It should be clear however, that in all the above discussions on synchronous versus asynchronous, the interaction is fundamental to the learning process itself, and needs to be tightly integrated into the content and other tools being used. Subject content is intimate to the interaction vehicle and we should move transparently between content, structure and collaborative tools in order to provide immediate context for associated discussions and collaborative activities.

Assessment Tools

Ways of assessing whether the learner has learned as a result of the learning activities are important in most situations. This assessment could be personal, as in a self-assessment, or formal, as in an exam. Common types of assessment include questions such as multiple-choice, true/false etc., or could involve performing specific tasks using an application or simulation, or by submitting work to be assessed by the instructor/facilitator. The exact needs will differ depending on the learning model. Multiple-choice testing is more common in basic skills acquisition, work assessment more common in more advanced learning requirements. Assessment can also be a group or peer activity. Again, this is more common in more advanced learning requirements such as management development.

Assessment is a complex area in its own right and a detailed discussion is outside the scope of this document. Assessment tools may be a component of the LDE or be specialist assessment tools that are integrated into the LDE.

An example of a specialist assessment tool is QuestionMark Perception.

Personal Information and Activity Tracking

Whilst information relating to the learner will also be stored within any controlling Learning Management System, learner details are required within the learning process, and therefore the LDE. Any environment allowing collaboration or instructional interaction needs some basic information about the learner to be available to the other parties. This is commonly achieved through the use of a personal profile form. The contents of this form will vary from environment to environment but should include basic public domain information on the student, such as an e-mail address, and may include additional information including a photograph or pointers to other information sources. Note: different countries and organisations will have different rules regarding what information can legally be made available in this way. These rules may have significant implications on a multi-geography student population such as one attending an Internet-based e-Learning course.

As well as basic information on the learner, the LDE will need to keep more private information regarding the learner’s progress and results through the learning process. This could include information on what has been completed, test results, assignment grades etc. This detailed tracking information could also include information accessed via AICC or IMS related standards for integration with interactive content.

Again there will be legislative requirements which may need to be complied with regarding how the learner, the instructor/facilitator or the learning provider can access this information. We would typically

expect a subset of this detailed information to be passed back to the Portal or Learning Management System for permanent recording on completion of the course.

Instructional Support Tools

As well as tools for collaboration and interaction (synchronous, asynchronous or both), instructors/facilitators need additional tools to help them:

- Manage group and individual learning processes
- Manage large-scale interaction including asynchronous discussions or live events
- Report on individual and group progress and completion
- Manage the assessment or assignment process
- Manage/facilitate team activity.

Example Learning Delivery Environments of varying functionality include Lotus LearningSpace (Forum, Anytime), IntraLearn, Blackboard.com, many academic systems including TopClass, FirstClass, WebCT.

Virtual Classrooms

Virtual Classrooms are specialist synchronous Learning Delivery Tools designed to support live on-line presentation and training. These products are completely focused on live delivery and include a variety of functionality and tools to support a live instructor. These will include some or all of the following:

- Voice conferencing
- Video conferencing
- Shared whiteboards
- Live presentation tools
- Application sharing
- Live tests
- Audience control tools including microphone/camera control
- Hand raising
- Chat
- Live voting
- Web Safari (leading a live web browsing session)
- Breakout rooms

These tools can be particularly effective for short-timescale information transfer requirements, or to support other asynchronous learning processes or for regular scheduled update sessions.

The degree of interactivity within an actual live session is controlled by the instructor and will be more limited for larger audience sizes as the interaction processes become harder to manage. Also the performance of the products depends on the size of audience as well as the media being transmitted. It is important to consider bandwidth issues when designing content for use across this medium.

Example virtual classroom products include Centra Symposium, InterWise Millenium, Ilinc. Another leading product, Databeam's LearningServer was acquired by Lotus in 1998. This technology then formed the basis of Lotus Sametime and underpins LearningSpace Anytime 3.0 and the forthcoming LearningSpace 4.0 ("Athena").

Face-to-Face

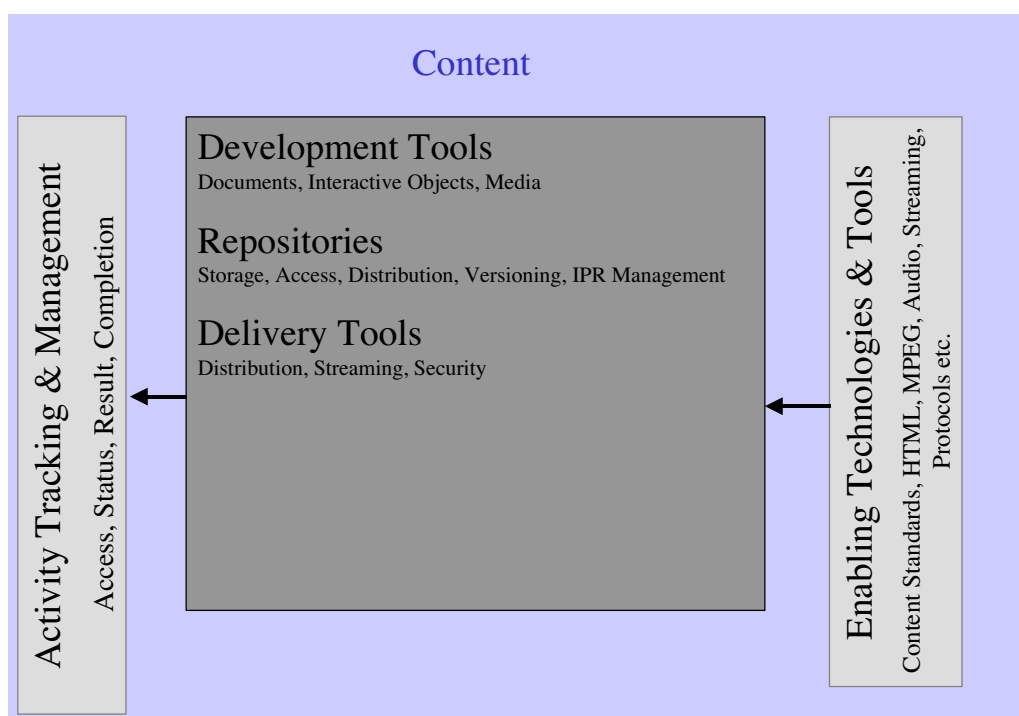
The classroom can also play an important part in an integrated e-Learning programme. Such sessions can make use of equipment or services that may not be available electronically. They can be used as an introductory session for an e-Learning programme, where electronic access can be tried, and key issues can be aired and resolved quickly. Introductory classroom sessions also allow the participants to build a sense

of 'community', so that they feel more comfortable about participating on-line. Face-to-face sessions in the middle of a programme give the learners a goal on which to focus, ensuring work is completed on time. They can be used for rapid decision-making activities, team exercises and meetings, and to exploit opportunities to meet with people outside the e-Learning programme.

The key to using face-to-face learning sessions is ensuring that the timetable is consciously designed around activities that are appropriate for that situation. It may be very expensive to bring the participants together, and other alternatives should be used unless there is a genuine reason why face-to-face is the answer.

Content

Course and learning content comes in many forms. This section focuses on understanding the different kinds of content that can support an e-Learning process and to discuss certain classes of tools that can be used to create and manage it. Currently this is the most fragmented part of the market with many products and many types of content.



e-Learning Technology Framework - Content

Types of e-Learning Content

The natural assumption when considering e-Learning is that content consists of computer interactive media. Actually this is probably not the case, with the bulk of content currently being used to support on-line learning being document-based. Much of this is re-purposed classroom training materials or existing word processing documents or presentations. Some of this material has simply been translated into HTML.

In addition to the “legacy” content, there is of course newer content including web media, interactive media, video, audio and so on. Interactive content includes content originally delivered as CBT courses, as well as specially delivered interactive learning objects, created using Flash or HTML. Video and Audio can be attached, downloaded and played or streamed.

Document-based content probably represents the bulk of historical content and may still have an important role to play in an e-Learning solution. Many of the learning models need a variety of supporting content, and document-based content is often the most available and descriptive material. Whilst it may be appropriate to redevelop some of this material into more interactive media, other materials are still likely to be relevant in their original form. When considering redeveloping materials, individual learning styles and objectives need to be considered. It may be easier for many of the learners to get answers through searching documents, rather than going through a structured click-and-turn approach.

Given the size of video files, the technical decision about how they are delivered to the user is critical. If delivering to a web browser it is unlikely to be feasible to download video data unless it is either a) very short, b) already on the user’s file system (and launched locally), or c) streamed. Streaming video can still take significant bandwidth and needs to be carefully considered - even on a corporate intranet.

Content Management and Delivery

As the level of e-Learning activity scales, so do the problems of content management and distribution. Accessing individual content objects or documents as URLs or from the file system is only sustainable for small amounts of content – typically individual courses. As the number courses and the amount of content grows, it becomes critical to implement some form of controlled management process. This should include consideration of:

- The location and storage of the content including repositories or libraries
- Version control and management
- Security
- Distribution

Given many e-Learning projects are delivering to a distributed audience, the problem of distribution management can also become very significant.

Specific media types such as video or audio may also require special delivery servers which need to be integrated into content repositories or into the Learning Delivery Environment.

Enabling Technologies and Infrastructures

We have focused on the learning tools and applications. However, these tools require an underlying infrastructure and other enabling technologies to function. This includes:

- Internet and Intra-networking and associated protocols (e.g. TCP/IP)
- Databases (relational and document-stores such as Lotus Notes or Microsoft Exchange)
- Application Tools and Development Languages (Java, Javascript, Lotus Notes, Microsoft Development Tools)
- Specialist Protocols and Tools e.g. video (H.323), NetMeeting, Synchronous (T.120) etc.
- Other HR/ERP applications

Consideration of these requirements is important when determining a potential e-Learning technology solution. Network bandwidth is always identified as a significant concern when evaluating a proposed approach. But scalability of the solution including server platforms, database sizes and content distribution are also key factors.

e-Learning Standards

e-Learning, like almost every other technology-related issue these days, has a number of evolving standards which are relevant.

AICC

Historically the most common specific learning standards are the AICC standards for interaction with CBT. The AICC (Aviation Industry CBT Committee) developed guidelines for the aviation industry in the development, delivery, and evaluation of CBT and related training technologies. The objectives of these were to improve the effectiveness and interoperability of CBT. The AICC has developed a number of “AICC Guidelines & Recommendations” (AGRs) covering a range of topics including interaction between CMI (Computer Managed Instruction) and CBT content, and standard navigation for students of CBT. For more information see www.aicc.org.

IMS

Founded in 1997, and originally focused on higher education, the IMS project (IMS standing for Instructional Management Systems), has broadened its focus to a range of initiatives relating to standards for learning servers, learning content and the enterprise integration of these capabilities. Consisting of many sub-committees and sub-projects, the IMS consortium is in the process of developing:

- The Learning Resources Meta-data Specifications to create a uniform way for describing learning resources so that they can be more easily found
- The Enterprise Specification, aimed at administrative applications and services that need to share data about learners, courses, performance, etc., across platforms, operating systems, user interfaces, and so on
- The upcoming Content & Packaging Specification, which will make it easier to create reusable content objects that will be useful across a variety of learning systems
- The Question & Test Specification, which addresses the need to be able to share test items and other assessment tools across different systems
- The IMS Learner Profiles Specification, which will look at ways to organise learner information so that learning systems can be more responsive to the specific needs of each user.

These specifications have already received a high degree of market interest and many e-Learning product and content vendors are intending compliance for future releases of their products.

For more information see www.imsproject.org.

Other standards initiatives include:

Advanced Distributed Learning Initiative (ADL)

ADL is a program from the US Department of Defense and the White House Office of Science and Technology, to develop guidelines needed for large-scale development and implementation of efficient and

effective distributed learning. It is a forum which provides requirements input into the IMS specification process. See www.adlnet.org.

ARIADNE

This is a European Union project focusing on the development of tools and methodologies for producing, managing, and reusing computer-based pedagogical elements and telematics-supported training curricula. To this end, they are involved in related technical specifications efforts, most notably in the area of meta-data. As part of a memorandum of understanding, ARIADNE and IMS have jointly developed a meta-data specification for submission to the IEEE. See ariadne.unil.ch.

Developing an e-Learning Strategy

In the preceding sections we have:

1. Discussed what e-Learning is about with examples
2. Looked in more detail at how to design a successful e-Learning approach, and
3. Reviewed the kinds of tools and technologies involved in delivering e-Learning solutions

Hopefully this will have answered many of your specific questions when considering e-Learning for your organisation. However, there is a big difference between looking at these issues to solve a specific e-Learning problem, and in developing an approach that works in the generic, across many or all of your learning needs. This section focuses on the generic; developing an e-Learning strategy that will allow you to meet many learning requirements.

Aggregating Learning Requirements

In “Making e-Learning Successful” we discussed understanding specific learning requirements and mapping to learning models which can help structure a viable e-Learning approach. This approach and the associated guide to the relative roles of structure, content, participation and instruction/facilitation also help define requirements of the tools and technology needed to deliver the e-Learning requirement (particularly the Learning Delivery Environment).

In order to create a strategic approach to e-Learning within an organisation we now need to aggregate these differing requirements with their different recommended approaches. We need to be able to develop an e-Learning environment, infrastructure and processes that can be used to support a broad range of e-Learning needs and approaches, and flexibly provide the appropriate tools to deliver them. We call this aggregated environment an Enterprise e-Learning Architecture and the aggregated e-Learning provision is often now referred to as a Corporate University.

Corporate Universities

Formal discussion of Corporate Universities is outside the scope of this document, but in considering the development of a strategic environment for e-Learning, development of a Corporate University is clearly a relevant discussion.

Corporate Universities comprise an aggregated set of learning services and will often utilise e-Learning and Learning Portals as key components to support them. However, the considerations and issues associated with a Corporate University are clearly much broader, including many strategic organisational and business issues. For the context of this document we will assume that a Corporate University would result in:

1. Development of a strategic e-Learning solution platform and services
2. Those services needed to support the complete range of learning requirements within the corporation.

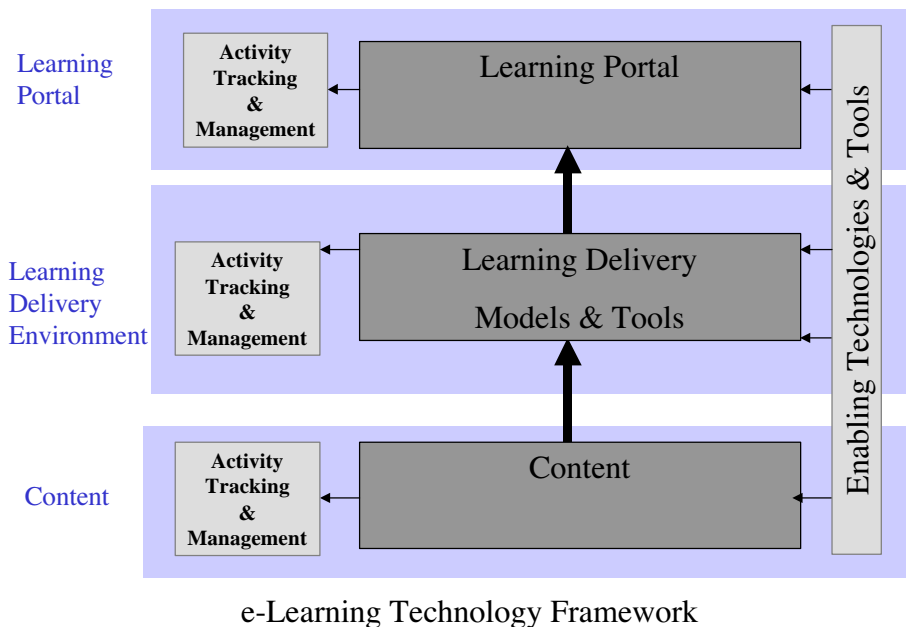
An Enterprise e-Learning Architecture

In essence, an Enterprise e-Learning Architecture (ELA) needs to provide an aggregated set of capabilities as defined in the e-Learning Technology Framework. This includes:

- Portal services including Learning Management
- Learning Delivery services to support many learning requirements

- Content services to support many learning delivery requirements
- Aggregated tracking and management at all levels

as outlined in the e-Learning Technology Framework diagram.



e-Learning Technology Framework

Strategic Learning Portal

For an Enterprise e-Learning Architecture the Learning Portal must be able to:

- Support all kinds of learning provided and all learning programmes
- Be accessible and usable by all employees across the organisation
- Be integrated into core HR/ERP processes and system.

The Portal is almost by definition a singular centralised environment, accessed across the corporate Intranet. Because it includes organisation-specific learning, and needs to be integrated into other corporate systems it will tend to be an Internal Portal (as defined previously).

Integrated Learning Delivery Architecture

The Learning Delivery Environment is a more complex picture as specific learning needs and programmes need different approaches and tools. In order to build an Enterprise e-Learning Architecture we therefore need to build an integrated Learning Delivery Environment which:

- Integrates into Portal services
- Supports a range of primary learning delivery requirements
- Provides a range of e-Learning tools and approaches which can be flexibly used

- Be capable of use in a range of learning modes and access points

Therefore the ELA needs to contain a set of tools which are sufficiently integrated to be an aggregated e-Learning service, but sufficiently powerful to meet learning needs and the learning techniques defined by their associated Learning Model. The solution is highly unlikely to be a single product, but could consist of a small number of core products that can be flexibly applied.

Whilst the Portal is by definition centralised, e-Learning is by definition decentralised, happening from wherever the learner is. With the likely need in any large company to deal with remote staff and distributed offices, the ELA has to be able to operate in a similar distributed environment. In one of our examples earlier in the document, our field sales organisation needed to be integrated into the e-Learning process anytime anyplace. As well as from the office and from home, we most importantly want to be able engage them when they are on the road, using laptops in hotels and airports. Until we have unlimited virtually free access to the Internet in these environments, a process of managing disconnected use in these circumstances would seem to be a necessity.

Strategic Content Management and Distribution

The management and distribution of content to a large distributed audience becomes paramount. It is one thing for individual course content to be accessed via a URL or from the network, but how do we manage when we have thousands of content objects or documents? How do we control distribution of the content across many offices with restricted communications between them? We are all aware of the restrictive nature of corporate network bandwidth. Add to this distribution to remote and mobile users, and disconnected access and we have a significant challenge.

In summary,

in developing an Enterprise e-Learning Architecture we need:

- A Portal approach that can support the full scale and range of learning services, and integrates into core HR and ERP systems
- An integrated Learning Delivery Environment encompassing a range of delivery tools and learning modes, including asynchronous, synchronous and anytime learning engaging remote, mobile and office-based learners
- A viable approach to Content Management and Distribution across a large and distributed infrastructure including connected and disconnected use.

Strategic e-Learning Roadmap

Having discussed the nature of a strategic e-Learning environment, we should now consider the roadmap to implement it. An Enterprise e-Learning Architecture is a very large undertaking, and will require significant investment, time and resources. There are generally many steps leading up to this scale of activity and commitment. These are outlined in simple terms below:

e-Learning Opportunity Review

Developing an understanding of where and how e-Learning can be applied in your context is an obvious starting point. An Opportunity Review could be “strategic”, in other words, look for opportunities across the range of learning within the organisation, or be more focused on a specific area, department or need. The review typically mixes together face-to-face workshops and interviews, and on-line collaborative processes. The outcome from the review is a prioritised list of prospective e-Learning applications ready for detailed analysis and planning.

Proof of Concept

Having identified one or a number of specific target areas for e-Learning, the next logical step is generally to progress into some form of Pilot. However, for some organisations it is sometimes necessary to take an interim step in order to secure Senior Management sponsorship for the pilot. We call this step “Proof of Concept”. A Proof of Concept is an organisational-specific demonstrator of the potential application area, developed to make the concept more tangible and easier to sell internally. This demonstrator can be used to gain commitment and funding, and support an internal communications process. By being specific to an organisation it avoids problems of “not applicable to us”.

Pilot Definition and Planning

Assuming commitment has been gained to progress, the next stage is to define and plan proposed pilots in more detail. This planning process needs to include a more detailed analysis of the learning requirements and mapping to learning models. It should also identify the value and risks of each proposed pilot. The detailed planning then enables proper qualification of each proposed pilot. This process can be fast-tracked through the use of standard templates and tools.

Having qualified potential pilots, we need to determine priorities and whether multiple pilots are appropriate. Multiple parallel pilots are generally a better approach if an organisation is developing a strategic approach to e-Learning rather than solving a specific learning requirement. Multiple pilots enable us to diversify risk and prove different kinds of value, such as reduced cost for one and learning enhancement for another. Multiple pilots also force us to develop common approaches to infrastructure and core learning support processes.

Pilot Implementation Project(s)

Pilot implementations should be run as discrete projects. The critical success factors identified in “Making e-Learning Successful” should be considered in-depth and each pilot project needs to be properly managed and executed. If multiple pilots are being developed in parallel, there may well be a common infrastructure or learning support component which will increase efficiency, but the organisation must be capable of supporting and managing parallel projects as well as the inevitable rework associated with any pilot process.

A pilot is completed when the learning process has been completed, not when the “course” has been developed. It is not uncommon to find an initial plan that focuses on content development and application implementation, missing off the actual learning activity – having students finish the course and evaluating the results in basic terms.

Strategy Development

Depending on the specific circumstances, an e-Learning strategy can be developed in parallel to piloting or follow it. We tend to prefer a more parallel approach as it allows a strategic plan and a business plan to be prepared in parallel to the actual act of proving it works. The plan and the evidence can then be presented together.

An e-Learning Strategy needs to define the broader approach and model within an organisation. Some of the strategy may have already been defined, but experience from pilots plus a deeper understanding of the potential, requirements and issues will result in an evolving approach. The Strategy must include a strategic business or justification.

Note: If the organisation is developing a Corporate University this plan will need to be far more extensive and incorporate much more in the way of business and organisational content.

Architecture Definition and Planning

One outcome of the strategic plan should be the definition of needs and requirements which can be input into the process to define the strategic e-Learning technology platform, the Enterprise e-Learning Architecture. The architecture needs to be capable of supporting the defined e-Learning needs and be flexible enough to evolve to support future needs. This latter statement may be simple, but has huge implications. Predicting future requirements is obviously challenging, but throwing away an architecture is unlikely to be an option, so getting it right first time is important. Hence the focus in the previous steps on understanding the broader requirements.

Another key factor in determining a proposed architecture is the broader technology context within an organisation. IT Strategies in terms of networking, operating systems, databases, application tools, vendor choices, the use of the Internet etc. all have a significant bearing on the shape and nature of a proposed architecture. Vendor strategies also have a major effect on potential products chosen.

Strategic Implementation Programme

We are now down to the strategic implementation project. Given the likely scale of the project, with large service development, content development, infrastructure development and organisational development components, the strategic implementation needs to be managed as a programme, with many defined sub-projects and steps. As with early stages, we must ensure we focus on organisational and service development as well technology and content. Experience indicates in spite of the technology challenges, the people and service issues are often the killers.

A Strategic Implementation Programme will typically consist of a number of key stages or phases of its own. The programme is likely to stretch over a duration of 2 to 5 years, and involve many members of staff as well as external resources. A complete life-cycle is required.

Effectiveness Review

Implementation is not the end of the process. As well as evolving business and learning requirements, technology and organisation are also moving targets. Evaluating current e-Learning activities, outcomes and strategies allows for a more objective measure of real effectiveness and potential for further development. The areas reviewed could include strategy, organisation, architecture or services or any other relevant parts of the process.

Future Directions

Bandwidth will continue to increase to allow more media-rich and interactive content to be delivered (e.g. synchronous streamed video and complex simulations). However, as users become ever more demanding, the debate on whether there will ever be enough bandwidth will remain to be seen.

The wireless WAP-enabled device age should mean that we will be able to access e-Learning content anywhere we can take our mobile devices.

The real future lies not just in the technology, but in the potential to integrate several key areas:

- Knowledge management of intellectual capital
- e-Learning to develop this capital
- Web-enabled electronic performance support systems to use this capital more productively.

The vision of the future will be discussed in more detail in a forthcoming white paper. Other white papers from eLearnity include a survey of vendors and products in the e-Learning world. The papers will be published on our web site at www.elearnity.com.

Appendix A - About eLearnity

eLearnity is a specialist in e-Learning solutions. Formed in 1996 by David Wilson, eLearnity has developed an in-depth understanding of the e-Learning market place and has a strong track record in successful corporate and academic implementations. Customers include: Deutsche Bank, Granada Learning, Henley Management College, IBM, Lotus Development, Niels Brock (Denmark), PricewaterhouseCoopers, UNext.com (Chicago) and many more.

We provide in-depth skills and understanding of e-Learning strategies together with a complete range of implementation services including course design and development; technical customisation and integration; and implementation support. eLearnity works with a range of market-leading products including e-Learning technologies from Lotus, Microsoft, Macromedia, Asymmetrix and Centra.

eLearnity and LearningSpace

We have been working with LearningSpace, under the company name of LearningConnect, since it was a research project in 1996. We have an unrivalled experience of corporate and academic implementation projects in the UK and Europe, and have supported Lotus EMEA in many of its major implementations.

In addition to implementation projects, we were contracted by Lotus Development in the USA to develop tools for the LearningSpace product family. Code-named LearningSpace Campus, these tools were designed to manage large-scale LearningSpace deployments or hosted solutions.

The development of Campus for Lotus has given us a unique insight into the internals of LearningSpace as well as developing approaches for management and integration of large-scale deployments or hosted solutions.

About the Authors

David Wilson, Managing Director

David founded eLearnity in 1996, and the specialist Lotus LearningSpace company, LearningConnect, in 1997. Prior to this, David was the Principal Consultant for the Groupware and Internet businesses of QA Training, the largest independent IT training company in the UK. As part of this role, David sat on Lotus's world-wide Education Advisory Council.

Tony Callaghan, Commercial Director

In April 2000, we were joined by Tony Callaghan, ex-Managing Director of QA Training. Tony brings 10 years of experience in sales, marketing and management in the Training industry. Prior to leaving QA, Tony was responsible for developing QA's plans and capabilities for an integrated e-Learning business.

Sue Honore, Learning Development Manager

Sue joined us in April 1997 and is responsible for eLearnity's learning development organisation and services including methods, educational design, standards and guidelines. Prior to joining eLearnity, Sue was the European Training Manager for Intel and has significant experience in training and project management.

Trademarks

eLearnity acknowledges the trademarks and trade names of their respective owners.

Appendix B - About THINQ

THINQ Learning Solutions is a group of companies, in the UK and North America, dedicated to helping employers manage Corporate Learning in an E-Learning environment. Our origins, on both sides of the Atlantic, lie in assisting training departments in the selection, purchase and management of all types of learning programmes and training providers.

In the UK the National Training Index (NTI), now THINQ Ltd, has provided this service for over thirty years. The NTI database carries detailed information on over 40,000 quality-training courses and interactive products, supported in many cases by confidential evaluations.

This is matched in America by a similarly comprehensive database owned by the leading US electronic training marketplace, THINQ Learning Solutions, Inc. - formerly TrainingNet. Over the past two years THINQ has developed Web-based applications software that enables corporate clients to:

- *Select and purchase from our unique catalogue of training programmes and products.*
- *Add to this catalogue their own internal courses, and those of preferred suppliers.*
- *Evaluate and record all learning activity processed by their employees through the unique Learning System that THINQ provides and manages.*

Our clients achieve these objectives through Corporate Learning Gateways on their intranets.

These enable employers with Intranets to achieve the benefits of an E-Learning System at a fraction of the cost, and time, they would normally have to spend.

An additional benefit to the client is that the THINQ Solution enables them to constantly monitor training spend and the associated ROI.

THINQ and eLearnity working together

THINQ and eLearnity have signed a strategic alliance and consulting agreement for eLearnity to provide a range of expert e-Learning consulting services to THINQ customers.

The combination of eLearnity's strategic e-Learning consultancy and THINQ's Learning Solutions enables companies to maximise their e-Learning investment by changing the way business views training and the way it manages it.

Companies will achieve immediate benefits from using THINQ Solutions, but these benefits will be magnified many times if the Solutions are part of a more strategic shift to a broader, more integrated e-Learning approach.

Range of Services

Services provided include initial audits and workshops, through to more comprehensive strategy and consulting engagements. e-Learning Audits will help you quickly assess the opportunities, impacts and issues of e-Learning within your organisation. They will also help build the right business case and gain executive commitment. Other service areas include Learning Management Systems, e-Learning programme design, and developing a complete enterprise architecture for e-Learning. All of these services will help you rapidly develop an effective strategy for e-Learning and to maximise the value of your investment.