

Elearning Implementation Process Manual

A product of the Unitas Knowledge Centre

22 July 2003
(Revised January 07)

Commonwealth Bank



UNIVERSITY
OF TASMANIA

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The Commercial Arm of the
University of Tasmania
Providing Total Knowledge Solutions

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Uritas Knowledge Centre project team

Anthony Baker — CEO, Uritas Company Ltd

Julianne Blackaby — Project Director

Authoring team

Dr Marcus Bowles (Author)

*Research Team Leader Learning to Elearn Project
Director, Institute for Working Futures Pty Ltd*

Beverly Goldfarb

Production Manager and Editor

Foreword

This Manual is an unabashed effort to provide a more strategic approach to implementing elearning. The perspective taken is of the organisation and learning community desiring not just to initiate an elearning intervention, but to implement elearning as an integrated, sustainable strategic activity. Unlike many elearning manuals, which espouse a set of logical implementation stages, this Manual covers much more than designing and developing tools, applications, systems and content. It also addresses enhancing elearning implementation through a systematic process that embraces production, instructional design and business improvement.

The Elearning Implementation Process (EIP) model advanced in this Manual is based on more than eight months' global research and studies on showcase approaches to elearning. The research and this Manual are outcomes of a larger *Learning to Elearn* project undertaken by the Unitas Knowledge Centre, a joint body sponsored by the University of Tasmania, the Commonwealth Bank of Australia and the State Government of Tasmania. The project commenced in September 2002 and continues until mid-2004.

Global research and literature on elearning, when examined from the perspective of maximising business outcomes, appear surprisingly obtuse. The great majority of the publications are either speculative undertakings or simply anecdotal reports on the art of elearning and do little to advance the applied science. This Manual is part of an ongoing commitment by the Unitas Knowledge Centre and its partners to translate Unitas' substantial elearning research and theoretical findings into actionable outcomes. While still a formative document that can be tailored to suit an organisation's individual circumstances, the Manual can also serve as a point of reflection for those engaged in elearning, or as a systematic guide for those new to the design and implementation of elearning.

We commend this Manual to you as a means to re-establish how your organisation or learning community can engage in efficient and effective elearning practices.

Anthony Baker
CEO, Unitas Company
& Commonwealth Bank Sponsored
Knowledge Centre

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Introduction

This Manual presents the foundations for establishing a systematic, robust and, ultimately, sustainable approach to the design and implementation of efficient and effective elearning.

It is written for use primarily by organisations and learning communities. While focused on implementation of elearning, the Manual is intended to assist those designing elearning services and content.

The Manual presents a four-stage process (Analyse, Build, Implement, Improve) that will seem very familiar to those used to working in quality improvement regimes. Each stage outlines suggested activities and basic tools that may assist implementation.

The Manual also lists some useful resources and a glossary covering key acronyms and terms.

What Do We Mean by Strategic Elearning?

This Manual reinforces a commitment to the individual as the major variable in the elearning process. It does so, however, against a backdrop of organisations and learning communities seeking to deploy elearning in order to enhance individual capabilities that can be tied to potential productive capacity or transformation to a desired future (agility).

Five key variables have been identified as consistently influencing elearning design and implementation:

1. Individuals involved;
2. Current level of transformation in both the organisations involved and the field of elearning;
3. Required outcomes;
4. Type of knowledge and learning being transferred and generated; and
5. Technology and infrastructure.

A parable may illuminate this situation. Imagine a lost hiker trying to triangulate her/his position from three main reference points (navigation stations). The hiker wants answers to a number of questions, namely: *Where am I? Where do I have to go? What is the best way forward?* In the process of answering those questions, the hiker can estimate what efforts have already been expended and determine whether s/he can reach his/her final destination. Finally the hiker learns how to avoid this situation in future and to reach the destination more effectively.

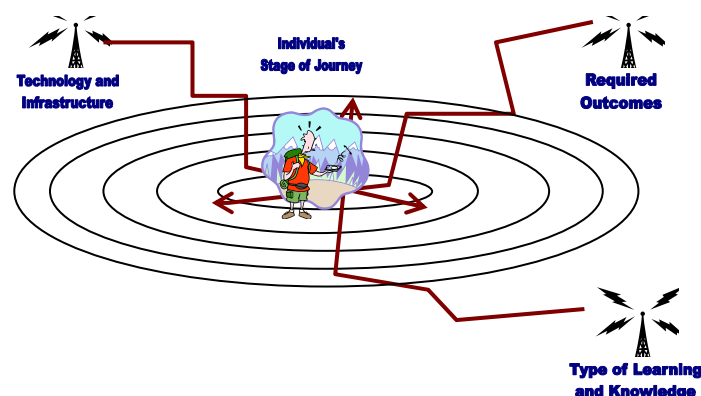
As the lost hiker tries to triangulate his/her position s/he needs to be sure that the navigation towers are actually fixed points and stationary and that all are communicating comparable information. Once the hiker knows the towers' position, s/he can determine the location and the relative effort to reach this destination and then set off with more confidence. As the hiker moves, the positioning needs to be updated as the journey progresses until s/he reaches the desired destination.

The hiker in this parable may represent an individual or many individuals. If more than one are travelling together, the triangulation must be specific to their context and journey. What is becoming apparent is that elearning is a journey by different individuals, at different levels of progress and in different directions (transformation and change), with different capabilities and very few common elements to allow comparative positioning for one journey, let alone cross-comparative tracking of progress of multiple individuals on different journeys.

Extensive research has made it apparent that effective and efficient elearning is contingent upon integrating any elearning strategy with:

- Organisational needs and preferences;
- Individual needs and preferences;
- The different needs and preferences of individuals collaborating or formed in a learning community and the elearning solution; and
- A realistic return on investment based on the organisation's actual capacity to either exploit or measure the impact of the intervention on business results and transformation.

Figure 1: The Lost Hiker Parable and the Variables Affecting Elearning



Principles of Elearning

Twelve principles support the design and implementation of effective and efficient elearning. These principles are not posed as absolute or final. Rather, they are presented as emerging ‘guidelines’ for stakeholders on the dynamics influencing elearning variables and the effectiveness of any elearning intervention. Elearning stakeholders are considered to include:

- Instructional and systems design personnel (instructional and graphic design and multimedia developers, etc.);
- Delivery organisation personnel (information system officers, project managers, coordinators, etc.);
- Learners; and
- Learning facilitators (instructors, trainers, teachers, mentors, tutors and employers).

The **twelve principles** that have emerged from extensive investigation of elearning research and best practice globally are as follows.

1. Elearning encompasses a wide diversity of practices in a dynamic, rapidly changing field. It must therefore be defined to encompass all learning experiences involving the acquisition or transfer of knowledge delivered or transacted through electronic means.

Elearning should not be trivialised just to accelerate its adoption. Elearning is a complex endeavour. It is an integrated activity that spans huge fields of academic and business activity such as learning, performance, service, knowledge and human resource management. In the absence of an elearning theory, writers on corporate elearning have predominantly tried to ‘dumb down’ the concept, focus on only one applied aspect (i.e. online learning), or treat it as a logical extension to training. This has been done to accelerate adoption or to emphasise the role of elearning as a cost-effective and more rapid means to achieve skills development. This is a sub-optimal approach that develops neither the requisite cognitive model to understand elearning nor the frameworks to maximise the full impact on organisational and individual learning.

2. While global forecasts of the elearning marketplace have suffered from a lack of comparability and reliability, elearning seems poised for a major transformation driven more by learner and educator demand than by providers’ hype.

As more businesses deploy elearning effectively, one would expect the ‘bandwagon’ effect — doing it because competitors or other major companies are doing it — to be replaced by deployment based on real understanding of the available options. This usually occurs as technologies mature. However, when we examined the market view on what products and services constitute elearning it became clear that the absence of a clear definition of elearning precludes simple conclusions. As many predictions and data sets exist as there are market analyses around the globe. Each seems to measure and define what constitutes the elearning market using inconsistent parameters. Without consensus for the term elearning, the ‘market’ is demarked by inconsistent parameters and very broad descriptors of what technologies, content or services are elearning specific.

It is therefore very hard to define the current maturity of the elearning marketplace and accurately assess its long-term transformation.

3. The effective and efficient implementation of elearning relies on complex interactions between the needs and expectations of learners, facilitators and organisations, all of which must be understood in order to maximise systems-wide competitive outcomes.

Designing and implementing elearning effectively depends on understanding the dynamics of distributed learning that occur through a specific learning intervention for a given individual or audience. Within this context the individual is the single major variable. As such, elearning interventions should be developed to respond to different types of learning and knowledge, the situated outcomes sought, and the needs and preferences of the different individuals involved (including the designer, facilitator and student). In such a context the technology is the enabler or means, not the end.

4. Old paradigms based on e-training need to be revised to ensure that a focus on individual competence related to performance is augmented by targeting identity capabilities, which build purpose, shared meaning and a culture of collaboration.

This principle suggests that elearning is far more than online learning or e-training that delivers knowledge in pre-packaged learning objects and codified content across a Web network. Learning and the transfer of knowledge are essentially a social activity. To be successful, elearning processes must not only transfer competencies attached to explicit outcomes; but also build a process and environment that encourage the transfer of tacit capabilities associated with building a shared identity. This identity orients individual and group trajectories towards a collective purpose. The purpose provides a sense of meaning that motivates individuals to effectively deploy competencies within an organisation or situation. The true value of elearning over physical and distance learning is the dynamic capacity to integrate knowledge transfer in both the content delivered and the process of interaction.

5. The efficiency and effectiveness of elearning as a strategic activity should be measured not only in terms of performance and learning outcomes, but also in terms of its overall contribution to an organisation's potential productive capacity and ability to adapt to changing circumstances.

Elearning metrics must fully account for elearning's contribution to the construction of human capital and overall intellectual or knowledge capital within an organisation. Many early adopters in the U.S. corporate sector, investors and venture capitalists, and vendors reinforce the belief that elearning and existing classroom-based training and education are equal in their efficiency and effectiveness. This belief assumes that elearning augments and builds on a solid platform and must merely adapt existing practices rather than transforming them. By adopting this belief, however, the main advantages of new technologies may be missed, ignored or forgotten. Elearning should not be viewed as an extension of what is known and has already been done. Imposing such limitations would restrict possible outcomes and seriously distort investment decisions, especially with regard to elearning

technologies, infrastructure and the calculation of expected ROI.

One of the most important actions is to ensure a 'currency' is developed to make sense of the different outcomes that span learning, performance, knowledge and the like. This principle is advanced under a capability model whereby *Learning + Performance + Knowledge Management + Human Resources = Human Capital (HC)*. This can then be extended where HC is a component of overall *Knowledge Capital* and organisation or community may hold 'Total Potential Productive Capacity'.

6. Elearning has maximum strategic impact when it deploys pedagogies and assessment procedures appropriate to the individual learner while enhancing situated performance and strategic thinking.

To restrict elearning to a training paradigm is to vitiate its real potential for transforming the learning process and extending it far beyond the narrow band of skills traditionally associated with work-based training. Traditional learning processes tend to reduce learners to the status of passive recipients of information from on high, while evaluating 'achievement' through simplistic, standardised tests of knowledge retention and performance skills. By contrast, elearning that deploys learner-centred pedagogies and continuous self-evaluation can be used to transmit a far wider range of skills and knowledge while remaining relevant to organisational needs. Pedagogically innovative elearning can develop critical faculties that can be applied effectively in real-world situations.

Ultimately, effective elearning has the potential to raise the stakes for learning of all kinds by offering an unprecedented level of autonomy to self-paced and self-directed learners. If the outcome is a learning process that is led by learner demand rather than by supply-driven force-feeding, this will be to the benefit of all parties, from individuals to organisations to societies.

7. Effective elearning requires innovative approaches to the design and delivery of learning programs to accommodate individual differences and actively engage learners in developing their ability to acquire knowledge.

Just as individuals enter learning processes with pre-existing conditions that influence outcomes, so do past elearning experiences shape future learning processes. Learning is

just as much about the process as it is about the outcome being sought.

Completing an elearning process affects more than just learning and performance outcomes. Addressing barriers to individual learning prior to the learning transaction can alleviate anxiety and increase motivation, confidence and commitment. Addressing these issues and raising elearning effectiveness directly translates into a person's improved capacity to learn, improve future performance and adapt and effect change. Such findings are consistently reported across different organisations, locations and cultures.

8. Elearning can be intentionally designed to facilitate collaboration and build shared identity and meaning, thereby establishing a virtuous learning circle of knowledge transfer, innovation and adaptability to organisational change.

The design of elearning can build strong relationships between learners, organisational personnel and learning facilitators. Elearning can become a 'virtuous learning circle' where a mutually advantageous relationship between individual learning and group or organisational outcomes can be established.

Elearning needs to be a process that can encourage reflection and develop forms of knowledge that extend beyond mere information or content transfer. Meaning and motivation can be reinforced.

Networks of shared meaning and mutual responsibility between an organisation's employees and stakeholders — including its geographic and virtual communities — are crucial to producing virtuous circles with the capacity to generate sustainable knowledge capital. This suggests organisations, to maximise performance outcomes, may have to build capabilities (competencies, values, cultural attributes, behaviours, etc.) that are peripheral to the transfer of operational skills and knowledge.

9. A holistic elearning strategy can increase an organisation's responsiveness to change while also acting as an agent of continuous innovation and transformation.

This broad principle suggests awareness that just as web-based training has superseded CD-ROMs and computer-based training, so will web-based approaches to online learning be eclipsed in the near future by subsequent innovations.

It has taken more than ten years for elearning to reach a stage where we can fully appreciate

the scope of the transformations it makes possible. The functions and parameters of elearning will continue to evolve as it is deployed to support organisational and societal change and as elearning technologies themselves evolve.

Elearning can support an organisation's transformation. As electronically mediated interactions stimulate collaboration, old institutional and organisational barriers are being bypassed, producing an unprecedentedly rapid movement of knowledge. This can extend to promoting the convergence of industries, communities and whole societies to encourage massive innovation and change. To optimise deployment of elearning for strategic and competitive gains, however, organisations need to view elearning not as an isolated activity but as a catalyst and enabler of far wider change.

10. Elearning combined with capability reporting can strengthen organisational learning, help to establish a learning culture and facilitate the development of effective learning networks that extend beyond the boundaries of the organisation.

If elearning is to add value in terms of sustainable performance capability, it must be embraced as an integral part of an organisation's learning, knowledge and performance framework, encompassing the company, its employees and others outside the organisation's structure and sphere of operation. Organisational learning offers a means to enhance learning activities and underpin the construction of knowledge capital. Elearning is part of the ongoing reinvention of organisational approaches to learning. Supported by a strong system of capability reporting, it can be used to establish a learning culture that pervades the organisation.

The effectiveness and efficiency of elearning technology and systems must not be limited to managing and monitoring learning outcomes or the ability to design, deliver and assess learning and content. With the use of capability as a 'currency' the elearning systems can also be used to capture, report and analyse consistent and comparable metrics across business systems. This suggests elearning investment accountability must be placed on the same strategic scale as any other effort to improve business results.

11. By enhancing the elearning component of electronic service exchanges, businesses can build staff and customer capabilities and improve their own responsiveness to customers' current and future needs.

The study of elearning needs to encompass not only how it is completed but also where; that is, that it is resident in all forms of electronic transactions. This recognises elearning as an activity that inherently involves service exchanges between humans moderated by technology in an electronic context. As an eservice, elearning can be augmented by or be used to enhance quality service strategies.

Elearning is chartered not only with building performance proficiency, but also with ensuring that the service provider can continually adapt to meet customer needs and preferences.

Shaping expectations and being able to meet them influences service provision in both the physical and electronic environment. To be satisfied, customers need to be confident that their personal expectations will be met. Similarly, organisations do not want to have to continually re-engage online customers' attention. They want to develop a degree of comfort and brand identification that will encourage customers to return. This makes for loyal customers, the ultimate target of any service excellence strategy.

Elearning can thus enable individuals both inside and outside the organisation to provide an environment for communication, collaboration and commercial exchange

12. To implement elearning efficiently and effectively, a quality instructional design process (e.g. ABII) must ensure a continuous cycle based on rigorous evaluation at all levels.

Elearning is born of the coupling of learning and technology. If the initial focus was on technology, attention is now turning to the crucial issue of learning. The perceived potential for both technological and pedagogical advances has led to a great enthusiasm for exploring and investing in new applications and approaches.

Central to the deployment of efficient and effective elearning is the need to appreciate elearning's role not just in transferring existing knowledge but also as a value-adding process that can generate new knowledge: a process whereby analysing, building, implementing and improving elearning will hold and generate knowledge. This knowledge, as much as the outcomes resulting from elearning, will raise potential productive capabilities (performance and agility) and therefore build knowledge capital.

Elearning can achieve growth in knowledge capital by providing content, tools and an environment that encourage skills transfer as well as a converged sense of purpose that links individuals and groups inside and outside an organisational structure. Any elearning solution must maximise relationships across internal and external 'networks' that hold knowledge capital. All interactions represent opportunities for the organisation to learn and acquire valuable knowledge capital.

The Integrated Elearning Implementation Process Model

What is it?

Implementing elearning strategically requires a systematic focus on processes. Yet, within any organisation seeking to continuously improve outcomes, processes must involve more than just a set of tasks. The process of elearning should not be a ‘bolt-on’ training process. It needs to be systematic and replicable and form part of the organisation’s business systems. The elearning process must build a culture and a ‘way individuals think’ to ensure that processes, people and strategic frameworks are integrated within a continuous search for the means to improve customer satisfaction.

Structured elearning is ultimately aimed at using learning within an electronic context to achieve specific goals or outcomes. The elearning implementation process therefore needs systematic adherence to planned outcomes.

The integrated Elearning Implementation Process (EIP) model (see Figure 2) provides a systematic approach that combines the best of the current elearning models used around the

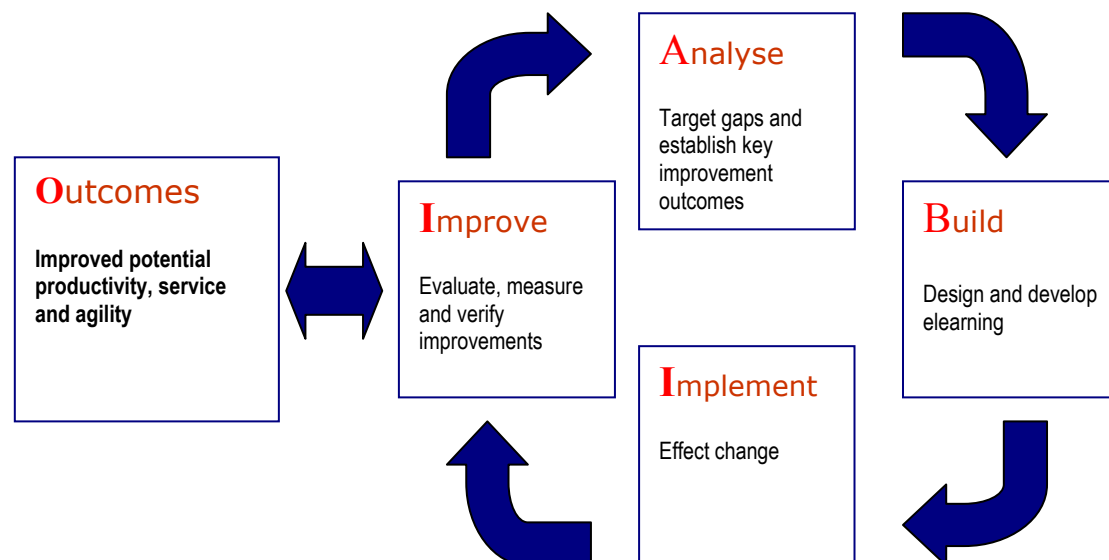
globe. It is based on extensive experience and research. The philosophy and actions involved span those typically found in Instructional System Design (ISD) approaches such as the ADDIE (analysis, design, development, implementation and evaluation) model, the Empathic Instructional Design (EID), and the Rapid Instructional Design (RID) or Rapid Prototyping Design (RPD) approach.

Integrating RID and EID has resulted in some experts and major corporations, both vendors and users, advancing modified Instructional Design/Information Systems Design processes based on ADDIE. Many companies, including PricewaterhouseCoopers, Cisco and Woolworths Australia, have used a four-stage process with variations as follows:

1. Assess/Analyse/Research;
2. Build/Design and Develop;
3. Implement/Deliver/Operate; and
4. Improve/Review/Evaluate.

Figure 2 illustrates the four-stage EIP model adopted and presented in this Manual.

Figure 2: An Elearning Implementation Process (ABII)



Why do it?

Organisations implement elearning processes in a number of ways and for reasons that vary enormously. Core imperatives include the following.

Control. For learners and managers the most intimidating issue in elearning is the confusion over options and making the ‘best’ choice. Elearning involves many types of technologies, content and services, all of which vary in terms of complexity, cost and purpose. Humans tend to be adverse to risk. Early adoption of elearning is therefore often focused on costs of an elearning solution. This includes costs associated with training people to promote and use elearning technologies, cost of content conversion and development, and overall cost of technologies associated with implementation. While some individual learners also embrace the ability to control their own learning process, others prefer to be in a ‘controlled’ learning environment led by instructors.

Rapid scalability. Learning is dynamic. One of the unquestionable advantages of elearning is the ability to rapidly repurpose content and learning architecture to accommodate or facilitate change. Elearning solutions at all levels must be scalable. This becomes a major consideration for an organisation as more content is developed, numbers of learners increase, and system architecture has to manage learning, content, reporting and interfaces with other IT systems (e.g. customer relationship management, personnel reporting, payroll).

Integration. Integration is a key issue in elearning implementation. The search for seamless integration touches on:

- Individuals’ prior learning and capabilities and the elearning plan;
- Back-end (human resource, knowledge, performance and financial) management systems and front-end delivery systems;
- Elearning technologies and tools within the learning environment (i.e. whether the elearning environment can accommodate certain ‘plug-and-play’ devices or assessment models);
- Relevance of learning content to real-world performance;

- Global delivery across cultures and national regulatory jurisdictions;
- Content and its ability to be transferred across converging technologies (i.e. television, Internet and computer);
- Individual and collaborative learning methodologies; and
- Data collection and reporting.

Packaging: modularised or object-based.

Packaging ‘courses’ to individual and situational needs is of paramount importance to elearning sponsors. The dilemma is how to create elearning ‘courses’ and ‘programs’ that can be disaggregated into smaller ‘bite-sized’ learning modules while controlling and reporting the learning and information objects in use. All learning is composed of learning objects that not only can be packaged into personalised modules relevant to an individual’s needs and completed as required, but also can maintain their relationship to a recognisable program or course. Recognition relates to a qualification, vendor certification or organisation-endorsed professional development pathway.

Transferability and portability of learning.

Recognition processes for capabilities required by individuals enable transferability of acquired learning as learners move from one level to another, from one education or training program to another, or between occupational areas. All results are recorded and formally reported.

Personalisation and prior learning.

This refers to consistent tools and frameworks for recognising each individual’s prior learning and personal learning attributes. Credit for workplace elearning is linked to formal qualification frameworks, and individual learning plans reflect their learning styles, their self-efficacy and the learning needed. Content can be contextualised and customised to individual learners’ needs and preferences. As the learners’ ability to learn and perform evolves, the learning outcomes can be reported and content presented in a manner that best accommodates learners’ capabilities.

Assessment, testing and recognition. Recognition involves the formal issuing of a qualification or part of a qualification for capabilities as they are completed. Assessment and testing processes are linked to agreed recognition for formal qualifications, vendor or employer certification regimes, or informal learning outcomes. Unless elearning employs fingerprint access or retinal scans, photo ID or 'live' synchronous exchanges between parties who know each other, it cannot accurately verify that the learners being assessed really are who they say they are. Tracking and reporting of individual learning, on the other hand, work effectively. Results from learning can be reported to facilitators, learners and managers.

Access. Elearning and assessment can be built into what individuals do on or off the job. The technology facilitates greater access to learning and overcomes limitations experienced by instructor-led training (for example, timing, location and availability to individuals such as shift workers and people with disabilities). Barriers such as bandwidth requirements and lack of technology (hardware and software), and firewalls remain issues for content delivery.

Timeliness and relevance. Timeliness impacts both the user and the elearning content developer. Existing systems promote structured classroom-based delivery or hardcopy and video-based distance learning. Timeliness and relevance are built into how, when and where elearning content is delivered. Elearning can be provided in multiple modes and accessed on demand by the user. Once developed, elearning content can also be more flexible in how it is provided or accessed. Individual learners can select the information and learning needed. Content can also be tailored or customised not only to their personal needs and preferences, but also to the timeframe they have available. Concepts such as modules of full qualifications are now being even further disaggregated to accommodate 'bite-sized' learning with durations of less than five minutes. Equally, the cycle time for the development and replacement of such content is shortened. Content for knowledge workers and those typically accessing online learning has a very short life cycle. Where content for classroom-based learning may have taken months to develop and been updated in timeframes

often measured in years, elearning content has to be developed rapidly and updated or replaced in cycle times usually measured in weeks.

Equity. Structural barriers such as age, gender, ethnicity, access, arbitrary prerequisites, location and other such barriers previously limited equity in learning. Elearning offers new tools and technologies that address equity issues. Content and learning environments can for instance be customised for individual learners' preferences, including different languages, text and appearance to suit individuals with visual disabilities, and so on. Content can also be packaged and transmitted in ways that enable individuals with low-bandwidth connections to access digital materials (i.e. sending content as smaller packets of data over dial-up connects at off-peak times).

Stage 1: Analyse

What needs to be achieved?

The Analyse stage is undertaken to ensure that elearning strategy or activity can successfully target and achieve the desired outcomes.

Why do it?

Appropriate emphasis on analysis and planning is required if elearning is to be treated as delivering strategic value-add that can be continuously improved.

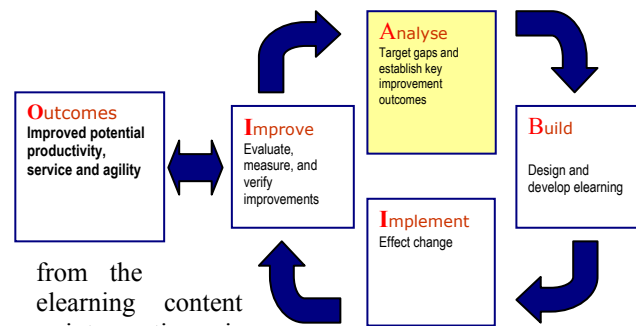
As the Alice in Wonderland parable goes, ‘If you don’t know where you are going any road will get you there.’ Elearning is both a direction and a road to get you to a destination (see the lost hiker parable in section What Do We Mean by Strategic Elearning?). You need to be sure of your destination and the speed at which you are capable of travelling.

How to do it?

Establish project plan and timetable. Beyond the budget and outcomes to be achieved, the process of elearning design or implementation requires strict planning parameters and allocation of resources.

Analyse capabilities to be targeted and learning, performance and individual outcomes. The outcomes to be targeted should use consistent terms or possess a basis for comparison. There are many definitions or ‘currencies’ for the learning and performance outcomes to be targeted by a learning intervention. These currencies include skills, knowledge, competencies, cultural factors, roles, values, behaviours and other attributes. The currency used should be consistent when reporting outcomes across learning, performance and knowledge management, and should provide a basis for comparison across different vendors and their respective courses and content.

Allocate capability outcomes to learning process. Following on from the point above, it is strongly recommended that a ‘capability’ lexicon be developed. This will ensure consistency in the terminology used to measure the performance outcomes achieved from attainment of learning outcomes. A consistent ‘currency’ needs to be extended to avoid the assumption that learning outcomes deliver performance. This clarification necessitates defining outcomes to be achieved



from the elearning content or intervention using such common language as learning outcomes, competency standards, performance indicators, job specification and so on.

Confirm change context and transformational impact on the organisation. Elearning is not just an isolated business activity conducted at an interpersonal level between individuals within and outside the organisation. Of greater impact is the ability of elearning to be used as a flexible strategic tool. It can be harnessed by the manager and the organisation to orientate and motivate employees towards long-term productive ends while also promoting the individual’s capacity to learn. It is this capacity in conjunction with competent performance that increases the organisation’s capacity to respond flexibly to change while harnessing and orienting staff commitment.

Agility is enabled when the organisation is conscious of its capability to learn and to seize new opportunities. Elearning is a process of transferring learning and communicating critical knowledge. Improving this capacity improves how organisations learn and how well they can encourage individuals (staff, customers and external partners) to learn and to rapidly capture and transfer knowledge necessary to achieve mutual advantage.

Identify audience and individual learning and capability profiles. Elearning is a form of exchange that can hold meaning, and positively reinforce identity and performance capabilities. Elearning has great flexibility and can be harnessed to ensure that individuals receive both explicit knowledge (known purpose, codified into such things as manuals and curriculum) and tacit knowledge (unwritten understandings, uncoded and shared within interpersonal exchanges). Individuals requiring the identified capabilities will have varying needs and preferences. Some may already hold the required capabilities but not have them formally recorded. As such recognition of current capabilities needs to occur. Others will hold formal qualifications that may align to the elearning outcomes. These individuals need recognition of prior

learning and credit transfer into the new course.

Importantly all individuals learn differently. Research shows that it is as important to identify and profile an individual's learning style, multiple intelligences, emotional intelligence, cognitive attributes, anxiety with technology and so on, as it is to confirm their existing learning and performance capabilities. These so-called identity attributes all influence the individual's ability not only to complete elearning, but also to learn with others and transfer learning into performance.

Analyse type of learning required. With the outcomes known, the audience confirmed, and the individual needs and preferences and the individuals' prior learning and capabilities confirmed, a pedagogically sound approach to the type of learning can be determined.

The type of learning can vary enormously. It may vary by approach:

- On-the-job versus off-the-job learning;
- Classroom-based learning or instructor-led learning;
- Distance learning;
- Flexible learning;
- Online learning; and
- Learning communities.

Or it may vary across the pedagogies adopted, for instance:

- Constructivism;
- Action, experiential or problem-based learning;
- Collaborative learning;
- Scenario-based learning;
- Situated learning; or
- More innovative approaches such as serendipitous learning.

The type of learning itself may be a mix of the above and result in a blended approach to learning (for instance, blending instructor-led classroom-based learning and collaborative problem-solving learning in an online environment).

Complete a content audit on existing content and support resources. Given the existing performance and learning capabilities of the organisation and individuals involved, preferred learning outcomes, and preliminary

understanding of the tools and technology that may be used, it is important to audit if any existing content or support resources can be used. This audit may be completed on all available materials that reference when any elearning initiative is being devised, or completed, as suggested in this four-stage approach within the design and implementation process. As content is audited it should be incorporated into a knowledge and content management regime.

Establish architecture required to deliver outcomes. Having determined why, to whom and what type of learning is to be delivered, it is important next to ensure that the correct tools and mix of technology are selected, i.e. authoring/media tools.

Establish storage and infrastructure requirements for hosting and distributing content. To maximise its efficiency, electronic content requires sophisticated content management and storage solutions. Learners and elearning planners need to be able to search and navigate content storage devices to get appropriate learning at the right time. Efficient storage and management also permits collaboration between different content developers and assists with the knowledge transfer not only between developers and management, but also between learners. Many wait to implement effective learning content management systems (LCMS) until the Implementation stage. However, the most appropriate storage and management solution can enhance design, and build and promote cost savings throughout an Integrated Elearning Process. Equally, making incorrect choices or no choice at all can result in exactly the opposite and impede the advancement of an efficient and effective elearning strategy.

Elearning should not be seen as hardcopy text merely transferred onto static web pages. With appropriate learning and content management systems, it is now possible to manage learning objects. Learning objects have been defined as modular digital resources, uniquely identified and meta-tagged, which can be used to support learning. Once meta-tagged, learning objects can be stored and accessed in a manner that permits learning to be customised for each specific learner on demand. There may even be consideration of a learner's experience, capabilities and learning styles. In addition the objects can be disaggregated to permit the same objects to be used for different modules and courses, or to be reusable to accommodate how different individuals access the same content.

The degree to which the content or architecture will permit learning objects to be repackaged or repurposed for learning or knowledge outcomes is an essential consideration when choosing the design of a content/knowledge repository and the content management system. Such systems may be determined, sourced and hosted by a third party or maintained internally in the organisation.

Disaggregating learning objects to form new or repurposed content can advantage outcomes outside learning. It is important to note that well designed elearning architecture can positively influence the management of knowledge and performance. However, it should not be assumed that learning objects and content once repurposed will still hold the same relevance to the learning outcomes or how it is packaged into a module, program, short course or course.

Develop metrics to assess report and evaluate impact on business and process changes. At the earliest possible stage of an Elearning Implementation Process it is important to design an elearning activity to measure not only learning outcomes but also its value-add to core services, supply chains and business processes. Evaluation of elearning should be embedded throughout the EIP; measurement and contribution to an individual and an organisation's development should be able to be analysed and reported even before implementation.

Deliverables

- Elearning readiness (organisation)
- Capability target and elearning delivery plan
- Individual learning profiles ('trajectory maps')
- Content audit (existing legacy and required digital content and hardcopy to be converted, priorities and plans)
- Metrics and reporting frameworks

Useful Tools

Tool 1

Elearning Transformation and Business Integration Capability Benchmarking Index

Tool 2

Elearning Capability ROI Benchmarking Calculator

Tool 3

Analysis of Elearning Needs (Actual and Future)

Tool 4

Profile the Audience/Learner(s)

Tool 5

Implementation Plan

Tool 6

Taxonomy of Learning Objectives

Stage 2: Build

What needs to be achieved?

The Build stage integrates many of the activities that in traditional approaches tend to be placed in separate design, development and prototyping stages. The integrated Build stage develops and confirms the correct configuration of the elearning intervention (content, technology, infrastructure, services or such like) necessary to achieve the outcomes established in the Analyse stage.

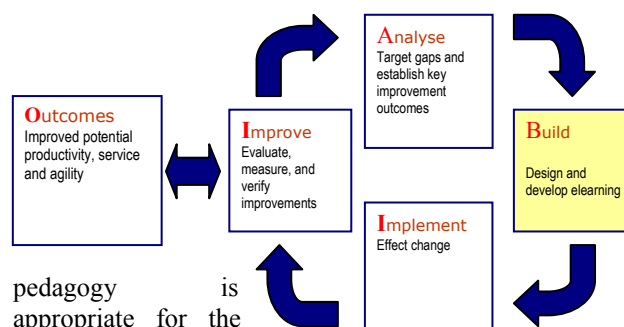
Why do it?

The Build stage is a critical component in the overall process. It is the stage between targeting what needs to be done and actually achieving the agreed outcomes. While organisations may become more proficient in the overall elearning implementation process and increase the speed with which they complete the process (i.e. reduce cycle times), progress is very much contingent upon excellent management of the Build stage.

How to do it?

Test learning components and objectives against individual/group learning profiles ('fit'). The Build, proposed to achieve the desired learning and performance outcomes, has to be reality tested. First, contrast the learning and performance capability profiles of individuals in the audience against the known combination of the type of learning and knowledge being covered, the available technology and infrastructure to be used, the desired outcomes and the current capacity to resource this intervention. This should answer the most fundamental question, *Will the planned approach enhance the individuals' capabilities?* An example of errors encountered later because this step was not undertaken properly could be as follows: where online learning architecture and content was built for a collaborative learning environment when most of the users had low levels of online learning experience and exhibited behaviours unsuited to the form of collaboration and some were lacking access to sufficient bandwidth to achieve the outcomes required by the learning design (i.e. the pedagogy required collaborative exchanges).

Confirm mode of learning/delivery options to satisfy outcomes. Given the previous steps it is important next to confirm that the



pedagogy is appropriate for the technology and tools chosen. Even if learning outcomes and the point of accessing learning are the same, how individuals access the content to satisfy performance and learning outcomes may vary (e.g. bandwidth, synchronous or asynchronous communications capability, computer platform, applications). Therefore, the pedagogy may also vary.

Design and develop learning instruments.

This step includes three essential tasks:

- Write instructional strategies and lesson designs;
- Determine assessment and reporting systems (administration and delivery); and
- Develop individual learning plans.

Specify and build technology and tools.

Having confirmed learning instruments and possessing a complete analysis in the previous step, a design or build specification can be drafted. This step includes the following tasks.

- Confirm interaction design and media treatments;
- Configure architecture (i.e. authoring/media tools selection); and
- Set data reporting (evaluation design).

Consolidate content. This step includes the following tasks:

- Decide whether to modify or renew existing programs (content and services). Repurposing existing content can be a major error undertaken with the best intentions. Because of apparent cost savings and familiarity with existing content and its efficacy, many use extant materials only to end up with inappropriate elearning, including content that has many problems. Converting existing content to elearning may produce content that does not work as effectively with the new media (wrong content, right learning outcomes); fails to deliver the required interest and thence learning outcomes

from students (right content, wrong pedagogy); or is simply inappropriate for the technology being used (wrong content, wrong technology).

- Write content. This task may be completed in-house, outsourced to a third party or completed in partnership with an elearning vendor or strategic partner. An important consideration is not just the cost of creating such content but also the value of the knowledge in terms of developing a unique competitive advantage. While many forms of pre-packaged content abound and developers can be sourced, often the solutions are generic and based on knowledge shared by many companies. By contrast if the knowledge is tacit or unique to the organisation's own context it may be valuable to build a highly contextual solution and not disclose it to others.
- Develop learning support resources. These include appropriate tests, assessment tools, case studies, experiential exercises and such like.
- Apply standards to learning content and technology. Throughout all the above tasks in this stage it may be important to ensure compliance with some of the key elearning regimes. For instance, the Sharable Courseware Object Resource Model (SCORM), Instructional Management System (IMS), Institute of Electrical and Electronics Engineers (IEEE) and Aviation Industry Computer-Based Training Committee (AICC), Advanced Distributed Learning (ADL) initiative, and the Information Technology for Learning, Education and Training (ITLET).
- Apply standards for Digital Rights Management and accessibility. While linked to the above point this relates to such matters as legal and moral obligations to manage Intellectual Property and copyright in the digital world, and access and equity issues.

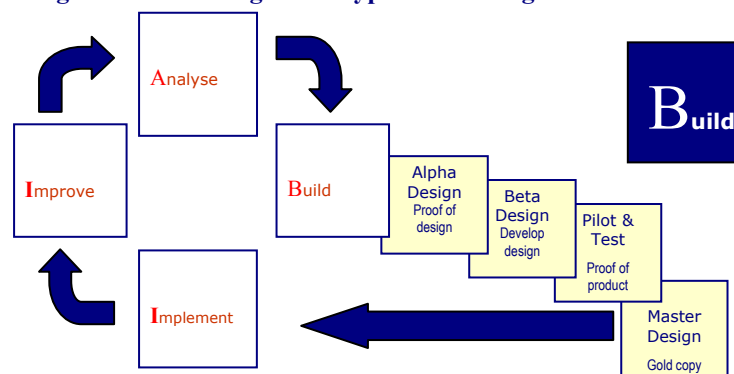
(N.B. For a list of compliance and standards organisations see Table 1.)

Build and test pilot content and delivery architecture. Building and testing may be completed as a rapid prototype process whereby an initial test is made of a beta version of the build (see Figure 3). This exercise may be completed in-house or sourced externally. A test plan should be devised for

this process. Benchmarking other companies undertaking similar elearning or directly assessing the capacity of vendors of elearning content, technology and services to meet the design or build specification may be necessary at this stage. However, the development and initial compliance testing of elearning content and architecture will likely encompass:

- Media production/sourcing;
- Programming/coding;
- Importing of content or learning objects;
- Authoring; and
- Integration of media elements.

Figure 3: Build Stage Prototype and Testing



An integrated and strategic approach to elearning must ensure that the content being packaged is consistent with the type of knowledge and type of learning while maintaining its appropriateness to the learner's needs and preferences. Different approaches may be required for the same content and learning outcomes as learning technologies and electronic environments vary how the pedagogies can:

- Balance learning to enable different learners to achieve the required attitudinal, cognitive and psychomotor outcomes;
- Break learning into more effective sequences or pathways to capability attainment;
- Deal with class size and resource limitations (i.e. remove time and spatial constraints facing classroom delivery);
- Enable collaboration across time and spatial (location, cultural, etc.) constraints;

- Provide opportunities for applications that translate into the real workplace;
- Enhance the effectiveness of the content available (i.e. audio, visual, text, web-based tools); and
- Permit evaluation of individual and collective learning through use of more effective feedback and assessment mechanisms.

Test interactivity and integration of architecture. Integration of elearning with other business processes has resulted in contemporary approaches emphasising the metric of human capital value. A human capital emphasis links elearning with technologies, processes and practices supporting the drive to expand the overall capital value of the human resources within the organisation. This is often represented by the formula:

$$\begin{aligned} &\text{Learning + Performance + Knowledge} \\ &\quad \text{Management + HR} \\ &= \text{Human Capital Management.} \end{aligned}$$

Elearning intersects all the components in this formula. Fortunately, elearning can usefully contribute as an integrated strategy for reporting and analysing outcomes across all dimensions of the human capital management equation. Reporting metrics have to identify not only an individual's precise learning requirements, but also outcomes in terms of organisational learning, knowledge, performance and HR issues such as human capital and overall knowledge capital gains. Where consistent metrics exist, elearning can target outcomes and be evaluated to determine their direct contribution to an organisation's potential productive capacity and agility.

In measuring the effectiveness and efficiency of elearning, the common 'currency' as discussed in the Analyse stage can be used to judge success. A capability approach can provide an integrated 'currency'.

Capabilities are defined as a combination of the factors included in a study of competence and identity. As depicted in Figure 4 a 'single' comparable currency permits elearning to target, transfer, generate and enhance outcomes that can be reported against learning, performance, HR and knowledge management outcomes.

The architecture and systems developed for the elearning intervention need to manage elearning outcomes as part of a capability

analysis, mapping and reporting system. Data-collection systems — that can map the development of skills, educational qualifications, experience and expertise gained externally to provide information on individual and group capability to reach outcomes within the organisation — provide an analytical framework to link learning outcomes with an individual's and organisation's capacity to meet performance outcomes. Any elearning intervention and related content design can therefore be managed within an integrated learning and knowledge system. These can also enhance not only how data is stored but also how it is assessed as part of the organisation's overall knowledge capital value.

Deliverables

- Individual learning plans
- Requirements specification
- Repurposed existing content and learning support resources
- Tested (instructionally and technically valid) courseware ready for implementation
- Integrated and functional architecture (technologies and tools)
- Best technology for mode of learning appropriate to outcomes to be achieved by individual learners

Useful Tools

- Tool 7*
Type of Knowledge
- Tool 8*
Type of Performance Capability
- Tool 9*
Type of Learning
- Tool 10*
Mapping Elearning Approach to Prevalent Attributes
- Tool 11*
Selecting Instructional Strategies (Design and Treatment)
- Tool 12*
Course Structure/Content
- Tool 13*
Selecting Media to Be Used in the Course
- Tool 14*
Confirm Source of Course Materials
- Tool 17*
Evaluating Elearning — Some Links

Figure 4: Integrated Capability-Based Analysis, Reporting and Management Inventory

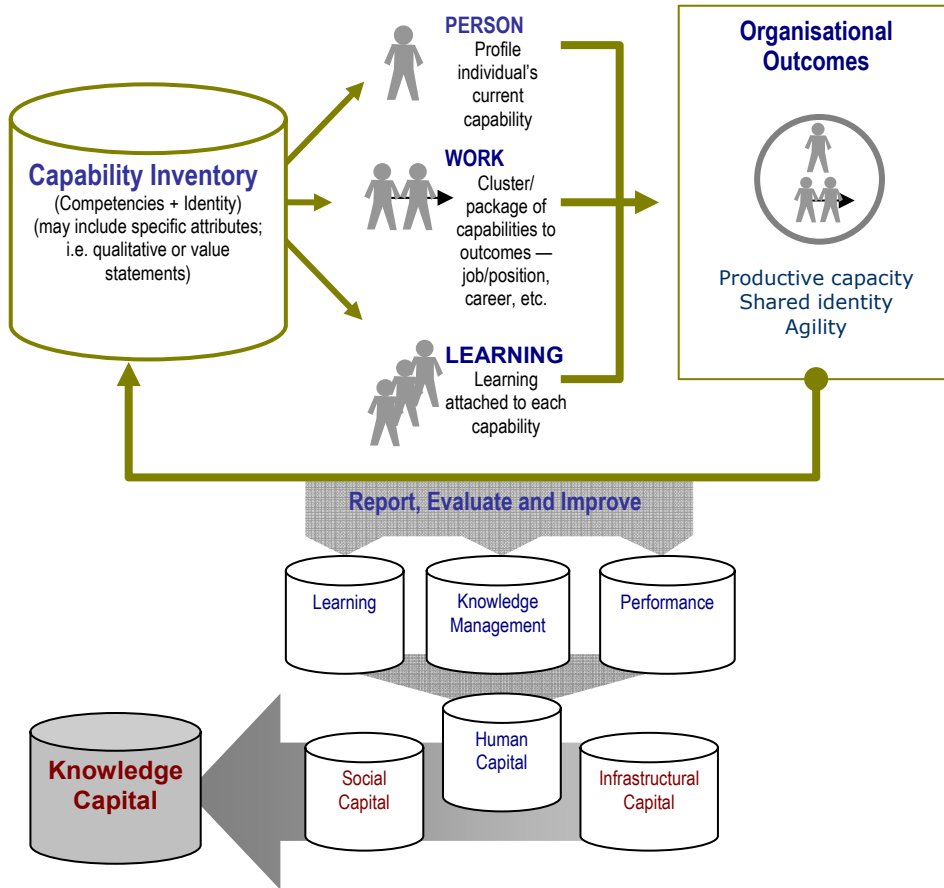


Table 1: Key Groups Involved with Setting Elearning Standards

IMS (<http://www.imsproject.org/>). The IMS Global Learning Consortium is involved in developing and promoting open specifications for facilitating online distributed learning activities such as locating and using educational content, tracking learner progress, reporting learner performance, and exchanging student records between administrative systems. IMS has two key goals: defining the technical specifications for interoperability of applications and services in distributed learning, and allowing distributed learning environments and content from multiple authors to work together.



The Advanced Distributed Learning (ADL) Initiative (<http://www.adlnet.org/>). ADL, sponsored by the Office of the Secretary of Defense (OSD), is a collaborative effort between government, industry and academia to establish a new distributed learning environment that permits the interoperability of learning tools and course content on a global scale. ADL's vision is to provide access to the highest quality education and training, tailored to individual needs, delivered cost-effectively anywhere and anytime. The Sharable Content Object Reference Model (SCORM) from the ADL initiative specifies how you can build a course by aggregating content objects as a course tree, what those content objects are, how the content objects are launched and interact with a learning management system, and what kind of data content objects exchange with a learning management system.



Internet Digital Rights Management (IDRM) (<http://www.idrm.org/>). IDRM is one of the leading developers of Digital Rights Management (DRM) on the Internet and is an Internet Research Task Force (<http://www.irtf.org/>) established as a sister organisation to the Internet Engineering Task Force (IETF <http://www.ietf.org/>). DRM is about systems that are being introduced to manage Intellectual Property and Copyright in the digital world. It seeks to ensure that owners of works can track and monitor the use of their works. Digital Rights Management is about rightful owners being accorded their rights in relation to what is genuinely their works.



(<http://www.ariadne-eu.org/>). The ARIADNE Foundation was created to exploit and further develop the results of the ARIADNE and ARIADNE II European Projects, which created tools and methodologies for producing, managing and reusing computer-based pedagogical elements and telematics-supported training curricula.



IEEE: The Learning Technology Standards Committee (LTSC) (<http://ltsc.ieee.org/>) is chartered by the IEEE Computer Society Standards Activity Board to develop accredited technical standards, recommended practices and guides for learning technology. The LTSC coordinates formally and informally with other organisations that produce specifications and standards for similar purposes. Standards development is done in working groups via a combination of face-to-face meetings, teleconferences and exchanges on discussion groups.



The Aviation Industry CBT (Computer-Based Training) Committee (AICC) (<http://www.aicc.org/>) is an international association of technology-based training professionals. The AICC develops guidelines for aviation industry in the development, delivery and evaluation of CBT and related training technologies.



W3C Web Accessibility Guidelines (<http://www.w3.org/WAI/Resources/#gl>). The World Wide Web Consortium (W3C) develops interoperable technologies (specifications, guidelines, software and tools) to lead the Web to its full potential. W3C is a forum for information, commerce, communication and collective understanding. It has developed guidelines to enhance access and equity issues for users of the Web.



(<http://www.dublincore.org/>). The Dublin Core Metadata Initiative (DCMI) is an open forum engaged in the development of interoperable online metadata standards that support a broad range of purposes and business models. DCMI's activities include consensus-driven working groups, global workshops, conferences, standards liaison, and educational efforts to promote widespread acceptance of metadata standards and practices.

Stage 3: Implement

What needs to be achieved?

The Implementation stage is where elearning designs, strategies and interventions are delivered. While the Build stage may test or pilot such interventions and seek to confirm learner or customer satisfaction, the implementation stage is the formal transformation of the existing practices through delivery of elearning improvements.

Why do it?

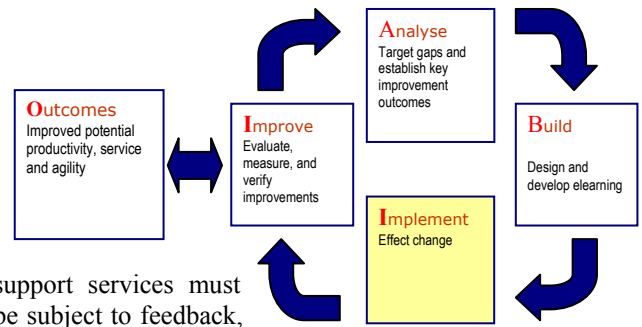
Implementation effects the transformations desired through use of elearning content or strategy effectively and efficiently delivered to the target audience.

How to do it?

Allocate sufficient resources. This step must include delivery and support staff to effectively implement the elearning. It also should include executive support and allocation of both the budget and resources necessary to achieve the elearning outcomes.

Provide learning support. Critical to elearning, especially online, is the development and maintenance of a well defined learner support strategy. Ideally, learners are self-directed. For most learners self-direction and regulation has to evolve or develop. Strategies need to be implemented to respond to different learners' support needs. This goes beyond providing access to content (loading, duplicating, distributing) in a mode appropriate to the learner's technology; it is about support throughout the implementation process.

Provide ongoing maintenance and logistical support for program/content. Once delivered, learning content, resources and



support services must be subject to feedback, adjustment and maintenance. These have to be determined during the delivery process in terms of the requirements to support different technology and infrastructure, learners and learning outcomes.

Complete ongoing reporting and tracking.

Implementation requires ongoing reporting, analysis and evaluation. This is not just about assessment of formative, diagnostic and summative outcomes for individuals and groups of learners; it is also about program evaluation and improvement to the delivery process.

Deliverables
<ul style="list-style-type: none"> • Implemented learning program • Report on student learning • Qualification or mapped capabilities for all individuals, groups or entities

Useful Tools
<i>Tool 5</i> Implementation Plan
<i>Tool 15</i> Pre-Session Checklist
<i>Tool 16</i> Provide Learning Support
<i>Tool 17</i> Evaluating Elearning— Some Links
<i>Tool 2</i> Elearning Capability ROI Benchmarking Calculator
<i>Tool 4</i> Profile the Audience/Learner(s)



Stage 4: Improve

What needs to be achieved?

Evaluation of a company's elearning and related strategies should verify the total contribution that these strategies make to improvement as determined by the measurement of current and potential business performance and individual development.

Why do it?

The evaluation process occurs throughout the elearning implementation process. It determines the value-adding effectiveness and efficiency of a strategy and program. The Improvement stage delivers the evaluation, review and valid insights necessary for a community, an organisation or the individuals involved (learners, facilitators/teachers, supervisors, designers, etc.) to determine whether their investment not only has been engaging, but also has generated the desired result. Reporting and recording attainment of capabilities to fill a known 'skill' deficiency is one approach to mapping and reporting that the investment in learning has resulted in tangible improvement. However, the larger challenge for the instructional designer, learning manager or elearning provider is to demonstrate that this value-add has occurred within an efficient and effective elearning strategy that can continuously improve.

Proficiency at the Improvement stage means locking in enhancements to the overall Elearning Implementation Process and generating reliable data that in turn can improve the Analyse, Build and Implement stages when they are reviewed.

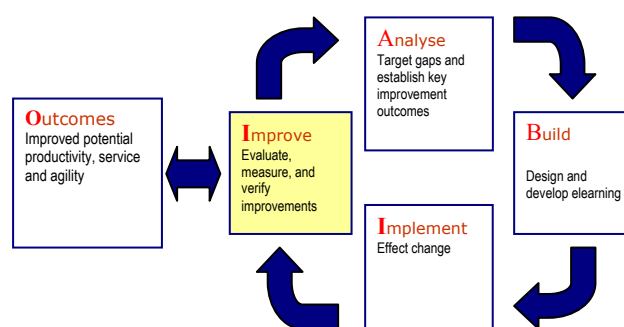
How to do it?

Collect formative and summative evaluation data. Kirkpatrick's model for Summative Evaluation — and its four levels — has become a classic:

- Level 1: Reaction
- Level 2: Learning
- Level 3: Behaviour
- Level 4: Results

Level 1: Students' Reaction

In this first level, students are asked to evaluate the training after completing the program. The



aim is to assess the learner's satisfaction with the session, or program, of learning. While often reduced to simplistic surveys (so-called happy sheets) completed at the end of a session, this type of evaluation can survey individual responses on matters that can be compared across the student population. This survey or questionnaire could for instance investigate:

- The degree to which the learner felt in control of the learning process;
- Access and ease of progress through the course (modularised, timeliness, etc.);
- The relevance and portability of learning to life and/or work;
- The ease of navigation;
- Satisfaction with the learning experience; and
- Level of personalisation in both content and assessment.

Institutional educators have found reactions surveys and questionnaires on learner satisfaction especially useful complements to online elearning (Bonk, 2002b: 7). With the available technologies and simple configuration of existing learning content, educators operating in networked electronic environments have found this type of evaluation easy to adopt and foster.

Level 2: Learning Results

This level measures what participants have learnt from a learning program. It seeks to quantify the extent to which participants' knowledge, skills and other attributes have changed. The results emphasised by Kirkpatrick refer to the learning outcomes from structured modules, programs or courses. This form of evaluation may involve comparative test scores before and after a course, or across different classes (learning teams) and demographic groups. This type of evaluation is not as widely conducted as Level 1, but is still very common.

Improve

Level 3: Behaviour in the Workplace

Capability retention is an important attribute for the knowledge-based worker. Learners may score well on post-tests, but it is more important to determine whether they can transfer the new knowledge, skills and other attributes to immediate and longer-term job application (Horton, 2000). Level 3 involves follow-up evaluation over longer periods than Level 2 after the learning programs (training) has been completed. Over three to twelve months after completion of learning, evaluation attempts to answer whether students' *behaviours* actually change as a result of new learning.

This data is harder to collect and analyse but has real value in terms of planning future elearning strategies and investment. Surveys or behavioural analysis assessments may be reviewed to show how learning outcomes change behaviours in ways that can be evidenced through customer and business outcomes. This evaluation evidence may include how service training has impacted customer satisfaction or behaviour, or how training for government compliance has resulted in overall compliance of service with government requirements.

Level 4: Business Results

The fourth level seeks to evaluate the business impact that results from learning. The results may be organisation wide, or across populations of learners (i.e. an occupational group, team or business unit, or functional unit; for instance, those trained for a specific competency set such as help desk attendants). This level requires evaluation metrics to move beyond the individual learner and examine the contribution in learning to the organisation of the investment.

Various means of evaluating learning could be applied to elearning. While Kirkpatrick's approach is one such approach, it does have weaknesses. Direct and implicit criticisms include:

- It takes too long to get to Level 4 evaluation, which is the most important one for managers making investment decisions;
- There is no substantial research base to prove that a linear progression from Level 1 (learner reactions) to Level 4 (business outcomes) exists (i.e. if you complete one you can move on to the next level);

- The available electronic environments and requirements for knowledge work in the New Economy have progressed so far and are so dynamic that the original four Kirkpatrick levels bear little relevance to measurement of the transfer of knowledge in its many diverse forms;
- The model ignores the situation within which learning transfer occurs and focuses on the learning outcomes or immediate knowledge transfer (Holton, 1995);
- As an extension of the above, the evaluation approach needs to accommodate the learning so that it includes learning objects and evaluation of technology design; and
- Organisational learning or factors impacting learning capacity and knowledge transfer within organisations and communities are not accommodated or cannot fit within a linear, non-adaptive system model.

While surveys consistently show that more than 80 per cent of training managers use Level 1 forms of evaluations and up to 30 per cent Level 2 approaches, less than 20 per cent use Level 3 and less than 5 per cent deploy Level 4 forms of evaluation. Clearly Level 4 evaluation provides the best indication of the business benefits of an elearning design or intervention. Continuously improving elearning metrics at this level directly translates into improved integration into systems and overall organisational strategic success. Yet it is at this level that least evaluation is conducted.

Calculate ROI. Various methods have been used and supported to evaluate organisational effectiveness in terms of return on investment at Kirkpatrick's Level 4. While Kilpatrick suggests a cost-to-benefit ratio (CBR)

$$\text{CBR} = \frac{\text{Program benefits}}{\text{Program costs}}$$

others, such as Phillips (1997), argue for a return on investment (ROI) approach and its addition as an extra level of evaluation. Phillips adds an ROI step and identifies ten strategies to convert data to monetary values depending on the type of data and the particular approach being used. The ten strategies follow:

1. Output data is converted to profit contribution or cost savings;
2. Cost of quality is calculated;
3. Wages and benefits are used as value for time;
4. Historical costs are examined;
5. Internal and external experts are sourced;
6. External databases are used;
7. Participants provide estimates;
8. Participants' supervisors provide estimates;
9. Senior management provides estimates; and
10. HRD staff provide estimates.

Kirkpatrick's is, at best, an indicative model for elearning to accommodate many levels within the evaluation metrics. It also emphasises the need to evaluate beyond reaction and individual learning. The capture, analysis and reporting of information must enable a picture to be formed of how well elearning is effected at different organisational levels. These levels include:

- The company;
- Major functional or occupational areas (e.g. finance department or clerical work);
- Job-specific requirements (e.g. clerical or accounting);
- The operational unit (e.g. department, team, division); and
- The individual.

Apply metrics to measure capabilities. The overall advancement in building capabilities (competencies such as skills and knowledge, and identity attributes such as behaviours, roles, culture) at individual, group or organisation levels should be reported. This will provide a gauge of overall elearning efficiency.

Compare actual against planned capability outcomes. To determine effectiveness of elearning, the outcomes targeted and planned in the Analyse stage should be assessed against actual outcomes achieved.

Confirm overall knowledge capital asset improvement. As established in the Build stage, the overall value-add of elearning can be related not just to improved productivity and performance, but also to the knowledge capital (or intellectual capital) possessed by the

company. This value-add can be reported on the bottom line and actually used to illustrate not only current potential to perform, but also agility and the ability to meet future opportunities.

Report and suggest improvements.

Evaluating the impact of elearning on organisations provides management with a critical means to assess current investments in elearning (including selecting vendors) and to monitor their capacity to conduct elearning. Figure 5 illustrates how advances in elearning's sophistication and the organisation's capacity to effectively deploy elearning are directly proportional to strategic business impact. Evaluation not only can determine current progress, it also can analyse and report an organisation's capacity to achieve improved results.

Overall progress and improvement may be mapped as depicted in Figure 5 to illustrate the overall integration of elearning with business systems. This will also provide tangible proof of the organisation's readiness to advance to higher level elearning initiatives and gain the resulting strategic benefits.

Deliverables

- Evaluation report and recommendations for continuous improvement
- Report on ROI and knowledge capital including human capital growth and overall business impact (productivity capacity increase)
- Valid, reliable and authentic content and learning support resources

Useful Tools

Tool 1

Elearning Transformation and Business Integration Capability Benchmarking Index

Tool 2

Elearning Capability ROI Benchmarking Calculator

Tool 9

Type of Learning

Tool 11

Selecting Instructional Strategies (Design and Treatment)

Tool 12

Course Structure/Content

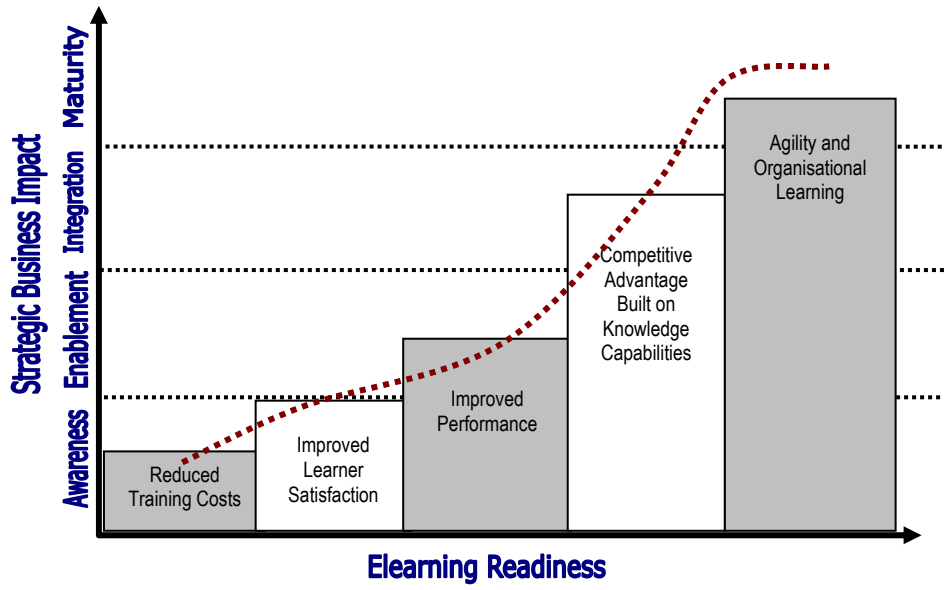
Tool 16

Provide Learning Support

Tool 17

Evaluating Elearning— Some Links

Figure 5: Integrating Elearning Readiness with Possible Business Gains



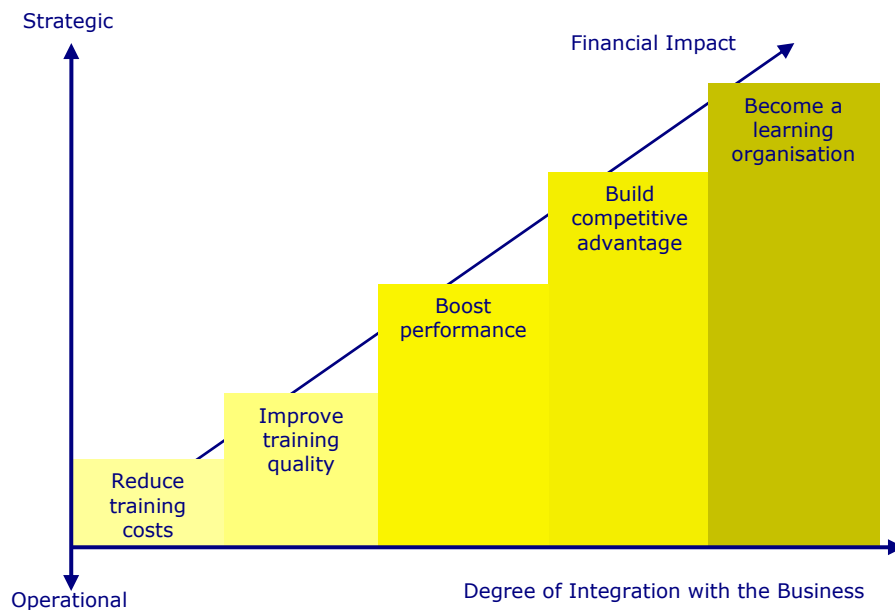
Tools

All tools are available for completion online from www.portal.unityas.com.au. Some of the following 'print' versions vary for ease of presentation and because the online versions in some cases have more interactive features.

Analysing business benefits

To accept and invest in elearning, management needs to incorporate elearning in the theory and logic used to explain and understand the organisation. This development is not something that tends to happen quickly. New concepts achieve acceptance only when they prove themselves, so it can take time for these concepts and their results to achieve progressively higher degrees of organisational utilisation and benefit. Accordingly, the progress of elearning within an organisation may follow a pathway of emphasis and impact as in the following graph (Academy Internet, 2001:6).

Figure 6: Evolving Elearning and its Impact on Business



Training and human resource management functions tend to operate as an organisation's support functions rather than core value-generating functions. As a consequence, beyond established HR functions, most of these training and HR groups have not traditionally been required to devise, propose, 'sell' and deliver strategically important investments to senior decision-makers. Given the high investment costs and opportunities of elearning, this situation is changing.

For bottom-up elearning initiatives, proponents need to frame elearning proposals in terms of financial and strategic benefits in order to have the significant investment approved. The alternative, top-down elearning initiatives, is also likely to result in training and human resource staff being called upon to contribute to proposals in terms of financial and strategic benefits. In both cases there is a need to establish a common basis of understanding between an organisation's senior managers and training/HR professionals, yielding a need for learning practitioners to comprehend 'C-Speak' and talk to executives in a language that the CEO, CFO, COO or CIO understands.

It would seem that the language and experience gap between training/HR professionals and senior decision-makers could make launching an elearning initiative difficult. Following on from this, it can also be reasonably anticipated that any difficulties will be exponentially compounded when the scale and complexity of technology investments and development issues are taken into account.

Tool 1. Elearning Transformation and Business Integration Capability Benchmarking Index

This is a comprehensive tool and only available in electronic form at www.portal.unitas.com.au.

Tool 2. Elearning Capability ROI Benchmarking Calculator

Many websites demonstrate how to calculate traditional Return on Investment (ROI) or scorecards for training and elearning. Examples include:

1. http://www.e-learningguru.com/knowledge_roi.htm (multiple links for analytics and e-learning ROI papers and calculators)
2. Instructor led training costs ROI <http://knowledgeanywhere.com/ROICalc.aspx>
3. <http://www.training.com.au/portal/site/public/menuitem.c9a7df17b369a390f9fa5a1017a62dbc/>
4. http://training.cuna.org/trainers/roi_calc.html
5. www.elearningguru.com (Kruse's e-Learning Guru website with MS Excel ROI calculators)
6. http://www.sumtotalsystems.com/success/login_global.html?id=29
7. <http://www.horton.com/html/roihandouts.aspx>
8. fastrak-consulting.co.uk/tactix/Features/tngroi/tngroi.htm#Calculating%20return%20on%20investment
9. <http://learnativity.com/roi-learning.html>
10. <http://www.bizlibrary.com/NewsandEvents/ArticlesofInterest/TrainingROICalculator/tabid/270/Default.aspx>
11. www.marksteinerinc.com/Resources/Cost_Estimators/cost_estimators.html (Requires Authorware web player plug-in)

Some elearning vendors offer built-in cost calculators or provide ROI metrics and reporting with certain applications. However, research suggests that while these vendors may be well intentioned, their equations may not be valid given the broader issues identified in this report relating to the contribution of elearning to an organisation's potential productive capacity and agility. Indeed, there may be issues beyond the obvious conflict of interest. One of the most important issues of online calculators is the additional cost and difficulty for the buyer to establish the correct metrics and the configuration of technology (Nucleus Research, 2003: 9).

Tool 3. Analysis of Elearning Needs (Actual and Future)

To avoid a sole focus on learning outcomes the following tool promotes early recording of the performance or knowledge and overall indicators of a successful intervention. This means we have to examine the audience, the learner's situation, the learning process, and the resulting application of learning prior to framing the pedagogy. Simply list the outcomes for the audience, including where individual differences may exist.

Target Audience (Elearning Customer)	Outcomes Required to Meet Audience Needs			Outcome Performance Metric(s) (Factors that evidence outcomes and provide measures to evaluate learning intervention/design)
	Learning Outcomes (Specific outputs that will satisfy learning requirements)	Performance/Knowledge Outcomes (Specific outputs that will satisfy application of learning)		
e.g. individuals, jobs, groups, organisation	e.g. learning outcomes, criteria, curriculum outcomes	e.g. competencies, behaviours, values, standards		e.g. links to quality plans, job description, compliance standards, budgets
Notes:				

Tool 4. Profile the Audience/Learner(s)

The following general checklist is provided to confirm critical understanding by the learners involved prior to implementing an elearning design or intervention.

Criteria	Examples Online	Known	Unknown
1. An individual's learning styles profiles and inventories	http://www.ncsu.edu/felder-public/L/Sdir/lisweb.html http://www.howtolearn.com/personal.html http://learn.humanesources.com/ http://www.engr.ncsu.edu/learningstyles/lisweb.html http://www.lgpride.net/learning_style.html	<input type="radio"/>	<input type="radio"/>
2. An individual's prior learning profile (qualification and personality factors)	Provided by learning providers. Multiple approaches. http://www.od-online.com/app/profiler-intro.asp http://www.queendom.com/tests/index.html http://www.ccde.usask.ca/ExtensionDivision/credit/Certificate/teslontarioplar.html http://www.agf.edu.au/rplnatri.htm (RPL pathways in Australia)	<input type="radio"/>	<input type="radio"/>
3. An individual's intelligences profile (i.e. multiple and emotional intelligence, thinking styles)	www.byzedium.com.au http://www.peterhoney.com/ http://www.ldrc.ca/projects/miinventory/miinventory.php http://www.jamesgang.com/jamesgang/room/roommind.html	<input type="radio"/>	<input type="radio"/>
4. Level of expertise/anxiety using electronic learning technologies (self-efficacy, anxiety, self-esteem, techno-personality, etc.)	http://www.peterhoney.com/ http://www.2h.com/personality-tests.html http://www.advisorsteam.com/temperament_sorter/register.asp?partid=1 http://www.skypoint.com/~mfinley/test.htm	<input type="radio"/>	<input type="radio"/>
5. Group learning preferences based on collective learning profiles	http://www.nobleednews.com/group_learning_styles.htm	<input type="radio"/>	<input type="radio"/>

Tool 5. Implementation Plan

The implementation plan is a required document to assist those responsible for managing the design and development of elearning content or an intervention. The plan permits tasks and responsibilities to be allocated.

Elearning Project Title:				
What (Description of task)	How (Description of strategy to complete)	Who (Allocated person responsible)	Timeline	
			Start	Finish
Overall Project Manager Responsible:	Core Project Team Personnel:		Overall Project Start	Overall Project Finish

Tool 6. Taxonomy of Learning Objectives

This tool ensures that the cognitive aspects to the elearning intervention consider knowledge acquisition and application, including underpinning understanding, thinking/creativity and intellectual attributes.

Instructions: *Align and check the learning objectives that address different levels of cognitive outcomes. Note: one learning objective could require more than one level of cognitive outcome.*

Title: {Title of module/short course this strategy covers}		Code: {Unique identifier or national code}				
Title of qualification: {Title of qualification this module/course will credit towards/achieve}		Nominal Duration: {Estimated total duration for completion}				
Learning Outcomes	Bloom's Taxonomy of Cognitive Learning Objectives					
	Level 1 Knowledge (capacity to recall or remember previously learned material. This may involve the recall of a wide range of material from facts to theories)	Level 2 Comprehension (the capacity to translate, interpret or grasp the meaning of material)	Level 3 Application (capacity to use abstractions, e.g., rules, in particular, and concrete situations)	Level 4 Analysis (capacity to break down material into the component parts so that its organisational structure may be understood)	Level 5 Synthesis (capacity to put together elements or ideas to create a new communication)	Level 6 Evaluation (the capacity to judge the value of ideas, solutions and communications)
1.						
2.						
3.						
4.						
5.						

Tool 7. Type of Knowledge

Affects how to sort, protect or capture knowledge or expertise; for instance, whether this can be done during the process of learning or has to be recognised with specific strategies such as building a learning community. All these inform later knowledge management activities.

Title: {Title of module/short course this strategy covers}		Code: {Unique identifier or national code}	
Title of qualification: {Title of qualification this module/course will credit towards/achieve}			
Learning Outcomes	Type and Structure of the Knowledge Being Transferred		Embedded/ Undiffuse
	Explicit	Tacit Mobile/ Diffuse	
1.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Tool 10. Mapping Elearning Approach to Prevalent Attributes

The following matrix matches the different forms of elearning to encourage the attributes listed in the first column. This list should be considered indicative and does not cross-reference the type of learning objects/content or the context. Shade the relevant area for later reference. To complete the tool it is necessary to nominate if the attributes listed (the left hand column) are either asynchronous or synchronous virtual (Internet-based) or if they are either single platform or networked computer based training. It is possible learning may be all of the responses. However, the aim of this exercise is to challenge the user to determine which approach of the four options is MOST appropriate for the desired attribute. This report is best completed online. In the electronic version the user will have their response mapped against the 'optimal' response. The 'optimal' scoring is very subjective. Based on research and expert analysis the indicator of optimal outcomes is purely a guide to help identify where sub-optimal approaches are being taken for a given attribute. This is to encourage reflection and to examine where improved design may overcome weaknesses in the chosen technology. Every elearning intervention will have a requirement for a different mix of attributes. A response that is considered less than optimal in the final scoring is not necessarily bad. It is purely a basis for considering if the option chosen is the best for the user's given approach to delivering attributes within their learning process.

● = Optimal

Attribute	Asynchronous Virtual Classroom (Web-based Intranet/ Internet)	Synchronous Web-Based Virtual Classroom (Intranet/ Internet)	Single-Platform Computer (CD-ROM, CBT)	Networked Computer (LAN/WAN-enabled CBT)
Learning Location (Make elearning appropriate to context and individuals involved)				
Individuals (self-directed)	○	○	○	○
Groups (same location)	○	○	○	○
Same organisation (individuals and groups)	○	○	○	○

Community (different organisations/groups)	○	○	○	○
Attribute	Asynchronous Virtual Classroom (Web-based Intranet/ Internet)	Synchronous Web-Based Virtual Classroom (Intranet/ Internet)	Single-Platform Computer (CD-ROM, CBT)	Networked Computer (LAN/WAN-enabled CBT)
Learning Retention (Make elearning memorable)				
Reading	○	○	○	○
Seeing	○	○	○	○
Hearing	○	○	○	○

Seeing and hearing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Request and receive feedback (in real time)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collaboration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Attribute	Asynchronous Virtual Classroom (Web-based Intranet/Internet)	Synchronous Web-Based Virtual Classroom (Intranet/Internet)	Single-Platform Computer (CD-ROM, CBT)	Networked Computer (LAN/WAN-enabled CBT)
Learning styles (Ensure elearning is sensitive to individual differences)				
Concrete — Experiential	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Reflective — Observational	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Abstract — Conceptual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Active — Experimental	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Attribute	Asynchronous Virtual Classroom	Synchronous Web-Based Virtual	Single-Platform Computer	Networked Computer (LAN/WAN-)
------------------	---------------------------------------	--------------------------------------	---------------------------------	--------------------------------------

	(Web-based Intranet/Internet)	Classroom (Intranet/Internet)	(CD-ROM, CBT)	enabled CBT)
Multiple Intelligences (Make elearning problems and activities relevant)				
Verbal Linguistic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Body/Kinaesthetic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Musical/Rhythmic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Logical/Mathematical	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visual/Spatial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Interpersonal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Intrapersonal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Attribute	Asynchronous Virtual Classroom (Web-based Intranet/Internet)	Synchronous Web-Based Virtual Classroom (Intranet/Internet)	Single-Platform Computer (CD-ROM, CBT)	Networked Computer (LAN/WAN-enabled CBT)
Emotional Intelligences (Make elearning an emotional activity)				
Impulse Control	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Self-esteem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Assess your response. Is it the approach likely to achieve optimal learning for the attribute in question? This is subjective and provided only to encourage discussion and reflection.

● = Optimal

Attribute	Asynchronous Virtual Classroom (Web-based Intranet/ Internet)	Synchronous Web-Based Virtual Classroom (Intranet/ Internet)	Single-Platform Computer (CD-ROM, CBT)	Networked Computer (LAN/WAN-enabled CBT)
Learning Location (Make elearning appropriate to context and individuals involved)				
Individuals (self-directed)	●	●	●	●
Groups (same location)	◐	●	●	●
Same organisation (individuals and groups)	◐	◐	◐	◐
Community (different organisations/groups)	◐	◐	◐	◐

Attribute	Asynchronous Virtual Classroom (Web-based Intranet/ Internet)	Synchronous Web-Based Virtual Classroom (Intranet/ Internet)	Single-Platform Computer (CD-ROM, CBT)	Networked Computer (LAN/WAN-enabled CBT)
Learning Retention (Make elearning memorable)				
Reading	◐	◐	●	◐
Seeing	●	●	◐	●
Hearing	◐	◐	◐	◐
Seeing and hearing	◐	◐	◐	◐
Request and receive feedback (in real time)	◐	◐	○	◐
Collaboration	◐	●	○	◐
Doing	◐	◐	◐	◐

Attribute	Asynchronous Virtual Classroom (Web-based Intranet/ Internet)	Synchronous Web-Based Virtual Classroom (Intranet/ Internet)	Single-Platform Computer (CD-ROM, CBT)	Networked Computer (LAN/WAN-enabled CBT)
Learning styles (Ensure elearning is sensitive to individual differences)				
Concrete — Experiential	☐	◐	◑	◑
Reflective — Observational	◑	●	◑	●
Abstract — Conceptual	●	◐	●	◐
Active — Experimental	◑	◐	◑	◑

Attribute	Asynchronous Virtual Classroom (Web-based Intranet/ Internet)	Synchronous Web-Based Virtual Classroom (Intranet/ Internet)	Single-Platform Computer (CD-ROM, CBT)	Networked Computer (LAN/WAN-enabled CBT)
Multiple Intelligences (Make elearning problems and activities relevant)				
Verbal Linguistic	◑	●	○	●
Body/Kinaesthetic	◑	◑	◑	◑
Musical/Rhythmic	◑	◐	◑	◐
Logical/Mathematical	◑	◐	◐	◐
Visual/Spatial	◑	◐	◑	◐
Interpersonal	◐	●	○	●
Intrapersonal	●	◑	◐	◑

Attribute	Asynchronous Virtual Classroom (Web-based Intranet/ Internet)	Synchronous Web-Based Virtual Classroom (Intranet/ Internet)	Single-Platform Computer (CD-ROM, CBT)	Networked Computer (LAN/WAN-enabled CBT)
Emotional Intelligences (Make elearning an emotional activity)				
Impulse Control	●	○	◐	◑
Self-esteem	●	○	◐	◑
Self-motivation	●	○	◐	◑
Mood Management	●	○	◐	◑
People Skills	◐	●	○	●

Tool 12. Course Structure/Content

This tool is consistent with many tools in use for instructor-led training. It simply requires the user to segment a session into given stages and identify if the relevant content is already available. This provides a simple content and resource audit tool for a given session.

	Availability of Appropriate Content/ Learning Objects	
	Known	Unknown
1.	<input type="radio"/>	<input type="radio"/>
2.	<input type="radio"/>	<input type="radio"/>
3.	<input type="radio"/>	<input type="radio"/>
4.	<input type="radio"/>	<input type="radio"/>
5.	<input type="radio"/>	<input type="radio"/>
6.	<input type="radio"/>	<input type="radio"/>
7.	<input type="radio"/>	<input type="radio"/>
8.	<input type="radio"/>	<input type="radio"/>

Tool 13. Selecting Media to Be Used in the Course

One of the more difficult exercises for the novice designing or delivering elearning is to determine the nature of the content or the medium to be used. This questionnaire provides some of the more important questions for reflection and resolution. They are not exhaustive so add your own for later reference.

Consideration	Known	Unknown
Will designers and users (learners and facilitators) be using the same platforms to publish and use the content (e.g. Windows vs. Mac, CD vs. Web)?	<input type="radio"/>	<input type="radio"/>
Will the media have automated programming or will aspects such as scripting, tagging and HTML coding have to be outsourced?	<input type="radio"/>	<input type="radio"/>
Can the content use generic templates (i.e. is it a standardised approach that permits all the types of questions, format required)?	<input type="radio"/>	<input type="radio"/>
Will existing content or media and documents created by others have to be incorporated?	<input type="radio"/>	<input type="radio"/>
Can the final product operate on the required (individual, company and any others involved) infrastructure and networks?	<input type="radio"/>	<input type="radio"/>
Can the media/course be updated regularly (i.e. the issue of future-proofing and customising for specific outcomes)?	<input type="radio"/>	<input type="radio"/>
Will the media have to accommodate or adapt to individual learner's preferences and needs (i.e. generate variations or navigate to suit learning styles)?	<input type="radio"/>	<input type="radio"/>
How 'media rich' will the design have to be (i.e. will it require streaming video, animations and interactive graphics, or will it be just text with graphics?)?	<input type="radio"/>	<input type="radio"/>
Does the media, tool or product require any plug-ins or are they available/able to be downloaded?	<input type="radio"/>	<input type="radio"/>
Will the media place unnecessary stress on infrastructure (i.e. bandwidth) or desired pedagogy?	<input type="radio"/>	<input type="radio"/>
Are compliance and other requirements necessary (i.e. AICC and SCORM conformance; 508-compliant in the U.S.)?	<input type="radio"/>	<input type="radio"/>
Are the media reusable and able to work with other content/learning objects?	<input type="radio"/>	<input type="radio"/>
Is the ultimate solution affordable and a sound investment (i.e. for individuals, the organisation and any others involved)?	<input type="radio"/>	<input type="radio"/>

Tool 14. Confirm Source of Course Materials

The following checklist assumes content (all learning materials) will cover learning materials and support resources (teacher's notes, assessment tools, support documentation, etc.) sufficient to run the nominated course/program.

Criteria	Known	Unknown
1. Elearning content exists that is appropriate to learning strategy	<input type="radio"/>	<input type="radio"/>
2. Elearning content exists that is appropriate to both technology requirements and the mode of access for individuals or groups	<input type="radio"/>	<input type="radio"/>
3. Learning content is available for the required mode of delivery	<input type="radio"/>	<input type="radio"/>
4. Existing content is reusable	<input type="radio"/>	<input type="radio"/>
5. Suitable content can be purchased off-the-shelf	<input type="radio"/>	<input type="radio"/>
6. Additional content will/will not have to be developed	<input type="radio"/>	<input type="radio"/>
7. Content incorporates all the media treatments desired (audio, visual, etc.)	<input type="radio"/>	<input type="radio"/>
8. The content is easy to use	<input type="radio"/>	<input type="radio"/>
9. Available content is scalable to future needs (learning process and business needs)	<input type="radio"/>	<input type="radio"/>
10. Content can be packaged to required learning structure	<input type="radio"/>	<input type="radio"/>
11. Content can be implemented with existing staff expertise (instructional design, training, management, general staff)	<input type="radio"/>	<input type="radio"/>
12. Any new or modified content can be customised or reused in part or full (i.e. one area or object can be modified without having to change the whole course and changes to one object or program/course can be done and still be sufficiently interoperable and robust to work with all other courses/objects)	<input type="radio"/>	<input type="radio"/>
13. Content will be/has relevant approvals and is rigorous to lead to the desired level of recognition (i.e. it can credit towards a qualification or other unrecognised requirements such as legal compliance)	<input type="radio"/>	<input type="radio"/>
14. Content can be analysed, evaluated and monitored to ascertain the ongoing success of the learning intervention(s)	<input type="radio"/>	<input type="radio"/>

Tool 15. Pre-Session Checklist

This tool is to be used as a checklist of key criteria prior to delivery. Once again the list is not exhaustive so add your own for later reference.

Criteria	Known	Unknown
1. All the sessions' delivery locations have been planned and resources required for delivery obtained	<input type="radio"/>	<input type="radio"/>
2. The information, handouts or visual aids all have been organised	<input type="radio"/>	<input type="radio"/>
3. The trainee is aware how the activity/task is part of a wider competency framework	<input type="radio"/>	<input type="radio"/>
4. The learning 'climate' is conducive to the trainee's needs (no interruptions, needs are met, sufficient resources, etc.)	<input type="radio"/>	<input type="radio"/>
5. The session purpose is clearly communicated in a manner understood by the trainee	<input type="radio"/>	<input type="radio"/>
6. Reinforcement has been provided and understanding of what the session is to cover has been communicated to the trainee(s)	<input type="radio"/>	<input type="radio"/>
7. Encouragement and motivation are provided	<input type="radio"/>	<input type="radio"/>
8. Distinct skills, knowledge and attitudes to be transferred are isolated from related competencies (i.e. focus of learning is clear and not vague)	<input type="radio"/>	<input type="radio"/>
9. Performance is focused on the required performance standards (competency) and not an imposed or irrelevant requirement	<input type="radio"/>	<input type="radio"/>

Tool 17. Evaluating Elearning – Some Links

There are few good online reference sites that feature the tools required to complete different elearning evaluation activities. In the absence of one site the following useful links are offered:

- METTLEWeb a set of resources from to support teaching with technology at Melbourne University <http://mettleweb.unimelb.edu.au/guide/evaluate.html>
- The Centre for Learning and Teaching at University of Technology Sydney has advice and some templates for completing evaluation <http://www.clt.uts.edu.au/contentssfs.html>
- Samples for evaluating the use of technology in schools and classrooms <http://www.ed.gov/pubs/EdTechGuide/>
- Online book *E-Learning Concepts and Techniques* and podcasts http://iit.bloomu.edu/Spring2006_eBook_files/chapter9.htm
- The online Encyclopaedia of Educational Technology contains an outline of different methods for evaluation including evaluation of online resources and Kirkpatrick's (Kirkpatrick, 1994) four levels of evaluation: reactions, learning, transfer and results <http://coe.sdsu.edu/eet/Admin/TOC/index.htm>
- E-Learning Centre library on evaluating e-learning effectiveness <http://www.e-learningcentre.co.uk/eclipse/Resources/effective.htm>
- Centre for Academic and Professional Development has resources and guidelines developed specifically for evaluating e-Learning <http://www2.warwick.ac.uk/services/cap/landt/evaluation/elearning/>
- For educators the <http://ericae.net/> provides a clearing house on assessment and evaluation resources.
- San Diego State University provides some useful links and resources on evaluation of web-based sites and resources at <http://infodome.sdsu.edu/research/evaluate/evaluate.shtml#resources>
- The ANRECS Center for Evaluative Studies has an online manual on *How to Conduct Evaluation* at <http://www.canr.msu.edu/evaluate/AllTextMaterial/evaluation%20manual%202000.html>

Useful Resources

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Glossary of Terms for Elearning

Analog (Analogue) — signal that is received in the same form as it is transmitted, while the amplitude and frequency may lose quality with each generation.

Application Service Provider (ASP) — company that provides access to applications on a subscription basis. MediaSeek and LearningStation.com are examples of ASPs.

Application sharing — allows more than one person to use a software application. Multiple users can add and delete items from the document. The application is launched from one person's computer and that person is the gatekeeper who can determine which users can make changes to the document and which ones can only view it.

Asynchronous — communication in which interaction between parties does not take place at the same time.

Asynchronous Collaborative ELearning (ACELE) — term coined to indicate asynchronous, but also collaborative, experience. The collaboration does not occur in real time, however.

Asynchronous learning — learning, in which interaction between teachers and students occurs intermittently with a time delay (as opposed to synchronous). Examples are self-paced courses taken via the Internet or CD-ROM, Q&A mentoring, email, listservs, audiocassette courses, videotaped courses, correspondence courses and Internet courses.

Authoring software/tools — allow users to create and adapt content for the Web for use in an online course. Assists in creating elearning courses. High-level computer programs designed for creating computer-based training, interactive presentations and multimedia. Commands are often presented as simple terms, concepts and icons. Authoring software translates these commands into programming code (e.g. Authorware, WebCT, Director).

Authoring systems — the software specially designed to let people create online learning modules that include all of the key learning elements: text presentations, graphics, questions (links to appropriate learning material based on learners' responses) and tracking of student performance. See authoring software/tools.

Bandwidth — information-carrying capacity of a communication channel. The greater the bandwidth, the greater the carrying capacity. Often used in reference to Internet access.

Bluetooth — short-range 10–100 metres low-power radio technology available for a range of mobile and fixed devices: enables devices to communicate with each other via local area networks for small offices, etc. wirelessly.

Broadband — high-speed data transmission. The specific speed used to define broadband is subjective; the word often implies any speed above what is commonly used at the time.

Browser — application program that provides a way to look at and interact with all the information on the World Wide Web, for example, Mosaic, Internet Explorer, Netscape Navigator. See also search engine.

Capability — combination of knowledge assets in the form of competence attributes (skills and knowledge) plus identity attributes (culture, roles, behaviours and traits) that support individual and collective performance.

Certificate or certification — form of recognition of achievement for a defined set of learning outcomes (for a module/program or a course) by a credential not linked to formal qualifications (i.e. vendor- or company-endorsed credential).

Channel — aggregation of content with a common theme, made available by a content provider.

Chat (Internet Relay Chat or IRC) — real-time, interactive online conversations on the Internet, allowing Internet users to join theme discussions or post comments on their screen at the same time as other participants. Chatting can also include communication in virtual reality environments using avatars (the virtual representation of the user by a 2D or 3D character).

Chat room — real-time text-based conversation with other learners over the Internet. Whatever a user types is displayed on the other users' screens as it is being typed.

C-learning — classroom learning; the traditional form of learning in which learners attend class at a specific location, at a set time and with a learning advisor.

Competencies — specification of the knowledge and skills and the application of that knowledge and skill to the standard of performance required in a level of employment.

Computer-Assisted Instruction (CAI) — teaching process in which a computer is used to enhance the learning environment by assisting students to gain mastery over a specific skill.

Computer-Based Training (CBT) — umbrella term for the use of computers in both instruction and management of the teaching and learning process. CAI (computer-assisted instruction) and CMI (computer-managed instruction) are included under the heading of CBT. Some people use the terms CBT and CAI interchangeably. Both involve training materials and content delivered via software applications that are installed on the learner's computer.

Computer-Managed Instruction — see computer-based training.

Content — see learning content.

Content Service Provider (CSP) — company that provides data and information for inclusion on the Web. Encyclopaedia Britannica, McGraw Hill and Oz New Media are examples of CSPs.

Convergence — increased unity of service across TV, computer, Internet, telephony, video and other media.

Course — sequence of modules that leads to a credential being issued to provide formal recognition through a qualification or professional accreditation.

Credit transfer — establishes the value or credit a person may receive in recognition of prior experience, current competence or completed training or education when seeking to transfer into a formally recognised course or program of learning. This credit can be applied towards a qualification.

Curriculum — formal document that structures and packages criteria, learning outcomes or competencies into a learning 'package' such as a course, module or program.

Data — the basis for forming information.

Delivery — any method of transferring offerings to learners. Variants are instructor-led training, web-based distance learning, online laboratory, CD-ROM and books.

Digital — electrical signal that varies in discrete steps in voltage, frequency, amplitude, location, etc. Digital signals can be transmitted faster and more accurately than analog signals. Digital does not lose quality in duplication or quality over distance.

Discussion list — discussion board/threaded discussions — online conversation in which one person sends a question or comment to a list of people who have signed up for discussions on that topic (hence the name discussion list). Respondents view the messages at their convenience and send replies to everyone on the discussion list. A form of asynchronous online communication. (Users can also send private messages.) See asynchronous.

Distance education — learning situation in which the instructor and students are separated by time, location, or both. The interaction between a learner who strives to acquire knowledge or skill by instruction or study with a remote knowledge source: one that is physically separated from the learner. Education or training courses are delivered to remote locations via synchronous or asynchronous means of instruction, including written correspondence, text, graphics, audio- and videotape, CD-ROM, online learning, audio- and videoconferencing, interactive TV, radio and facsimile. Distance learning does not preclude the use of the traditional classroom. The definition of distance education is broader than and encompasses elearning. Elearning is a subset of distance education and training.

Distance learning — the desired outcome of distance education.

E-business — conducting business on the Internet.

E-business services — services comprising consulting, design, integration, support, management and outsourcing, associated with the development, deployment and management of Internet sites.

E-commerce — electronic commerce or the conduct of transactions over the Internet.

Elearning — covers a wide set of applications and processes such as web-based learning, computer-based learning, virtual classrooms and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audio- and videotape, satellite broadcast, interactive TV and CD-ROM.

Electronic mail (email) — messages sent from one computer user to another.

E-library — wealth of digital resources for learners to use for learning purposes. E-library companies help find, organise and mine the content for learners.

Email — see electronic mail.

E-test — ability to provide assessment and evaluation over the Internet.

Experiential learning — learning through short, structured and targeted exercises where individuals learn through performance and investigation. Unlike action learning the tasks may not necessarily be related to the workplace but learning opportunities are structured to combine competency, cognitive and emotional aspects of an individual or team's experience in a manner that promotes learning.

Extranet — World Wide Web-like network available only to people chosen by the organisation, including people outside of it (hence, the term 'extra').

File Transfer Protocol (FTP) — protocol that allows files to be moved from a distant computer to a local computer using a network such as the Internet.

Firewall — security barrier between a company intranet and the larger Internet to protect systems from viruses and other unwanted digital intrusions.

Flash — multimedia technology developed by Macromedia to allow much interactivity to fit into a relatively small file size.

Floor control — feature in a synchronous learning environment that allows one person to know what is going on with all the participants. The person with floor control can look at other learners' screens, control the whiteboard and run the class. The learning advisor is typically the one with floor control, but control can be transferred to other learners. The term is probably taken from television directing, floor director.

Formal (national) qualification — consistent and portable credential recognising an individual's attainment of all the competency units nominated as requirements for

competency to be recognised at a given level on the Australian Qualifications Framework. This may be through the completion of a course, direct assessment or a combination.

Fully interactive video — two sites interact with audio and video as if they were located in the same place (two-way interactive video).

Graphical User Interface (GUI) — interface that incorporates a variety of media, especially text and graphics. Often graphical user interfaces have icons that represent actions that the system can perform and that make extensive use of visuals. Windows and the Mac Operating System (OS) are examples of programs that have a graphical user interface.

Groupware — software that promotes synchronous and asynchronous online collaboration by letting users send email, share work files, conduct online chats, and similar activities. See application sharing.

Host — (from whatis.com) in Internet protocol specifications, any computer that has full two-way access to other computers on the Internet. A host has a specific ‘local or host number’ that, together with the network number, forms its unique **IP address**. If you use **Point-to-Point Protocol** to get access to your access provider, you have a unique IP address for the duration of any connection you make to the Internet and your computer is a host for that period. In this context, a ‘host’ is a **node** in a network.

Hot link — see Hyperlink.

Hyperlink — on the Web or other hypertext systems, hyperlink is a synonym for both link and hypertext link. Possibly, the term originated because ‘link’ was not felt to be specific enough. And it's shorter than ‘hypertext link’.

Hypermedia — derived from hypertext, extends the notion of the hypertext link to include links among any set of multimedia objects, including sound, motion video and virtual reality. It can also connote a higher level of user/network interactivity than the interactivity already implicit in hypertext.

Hypertext — any text that can be chosen by a reader and which allows another document to be retrieved and displayed.

Hypertext Transfer Protocol (HTTP) — set of rules for exchanging files (text, graphic images, sound, video and other multimedia files) on the World Wide Web. Relative to the TCP/IP suite of protocols (which are the basis for information exchange on the Internet), HTTP is an application protocol.

Identity — the sum of cultural attributes, roles, traits and behaviours. It involves the sense of past experiences, current capabilities and a trajectory towards a desired future.

Individualised Education Plans (IEP) — learners can design how, when and what they want to learn. The Internet simplifies this process by offering a variety of choices and learning options.

Information — data + meaning.

Information object — any digital resource that can be used to support a learning object (see Knowledge Nugget; Learning Object).

Instructor-Led Training (ILT) — training in which learners are taught by an actual person, or instructor, usually in a classroom setting, synchronously or asynchronously.

Intellectual capital — See knowledge capital.

Interactive communication — interactive communication brings people together, speeds up information dissemination and learning processes, and enables users to interact in real time without distance being an obstacle. Today, two people can develop a product from opposite

ends of a continent, benefit from another person's expertise even though they are thousands of kilometres away, use multimedia elements such as sound, video or fixed image and text, share software and much more.

Internet — system of linked computer networks that facilitates communication and transfers information among users.

Internet Service Provider (ISP) — company that provides the facilities necessary for individuals or organisations to access the Internet via dial-up or dedicated lines.

Intranet — private network that links a group of computers, usually within a company. Functions like the Internet but is not available to the public. It involves a Local Area Network (LAN) or Wide Area Network (WAN) that can transport information. See also WAN.

IP address — multi-digit number that relates to a website.

IP multicast — transmission of information from services to clients where the information is broadcast to clients who have subscribed to the service.

IP telephony — use of IP networks such as the Internet to provide telephony services. Known as Voice Over IP (VOIP).

Knowledge — data + meaning + purpose (also embedded and migratory, tacit and explicit, embrained and encultured, focal, etc.).

Knowledge assets — capabilities and knowledge or information components accessible by an individual group or organisations.

Knowledge capital — total capabilities available to an organisation in pools of knowledge resources including social capital, human capital and infrastructural capital. Together the pools of capital resources determine knowledge capital, which has a value through the potential for productive capacity and agility. The term is also used to encompass intellectual capital.

Knowledge management — capturing, organising, and storing knowledge and experiences of individual workers and groups within an organisation and making it available to others in the organisation. The information is stored in a special database called a knowledge base.

Knowledge nugget — can be used to delineate a 'chunk' that is an original knowledge asset, information object or learning object that is a component of a more extensive learning program but no longer maintains its formal relationship to a learning outcome or a course or short course.

Learning content — best thought of as knowledge assets packaged into materials, activities and supporting resources to support learning components. They enable a learner to complete learning to the outcomes attached to a learning component. They may include case studies, challenges, assessment tools, experiments and so on.

Learning Management Systems — software that tracks student progress in a course and indicates completion. At minimum, learning management systems track individual student progress, record scores of quizzes and tests within an online learning program, and track course completion. Learning management systems may also transfer this information to other record management software, such as PeopleSoft, so that permanent educational records reflect progress in online learning. Although originally sold as separate software that worked in conjunction with authoring tools, many authoring tools now include learning.

Learning nugget — can be used to delineate a 'chunk' that is an original knowledge asset or learning object; this chunk maintains its ability to credit transfer an individual's learning towards an agreed outcome that is linked to a course or short course.

Learning object — these have been defined as modular digital resources, uniquely identified and meta-tagged, which can be used to support learning. Learning objects have the potential to provide learning customised for each specific learner at a specific time, taking into account their learning styles, experience, knowledge and learning goals. In addition they can be disaggregated to permit the same objects to be used for different courses, or be reusable in how different individuals access the same content.

Learning organisation — under a learning organisation approach the individual within the organisation, and the organisation as a whole, has to commit to learn, to continually seek to change existing practices through knowledge acquired by learning, and to respond to the sources of information that stimulate new knowledge and learning.

Learning portal — any website that offers learners or organisations consolidated access to learning and training resources from multiple sources. Operators of learning portals are also called content aggregators, distributors or hosts.

Learning Service Provider (LSP) — specialised ASP offering learning management and training delivery software on a hosted or rental basis.

Link — electronic connection between two websites (also called ‘hot link’, hotlink or hyperlink).

Listserv — email program that automatically sends messages to all subscribers, creating an online discussion.

Message boards and discussion threads — asynchronous communication tool that allows learners to post comments and questions to a common location on the Internet. Learners and learning advisors can read the messages and post responses at their leisure.

Metadata — method to organise data into ‘nuggets’ so that the user can locate, evaluate, access and manage online information.

Meta-tag — tags affixed to learning objects to explain what's inside: its content, objectives, author, language, date, version, level, assessment, and more.

Modem — equipment that allows computers to interact with one another via telephone lines by converting digital signals to analog for transmission along analog lines.

Module — stand-alone unit of learning that offers credit transfer into a program or formally recognised course.

Multimedia — any document that uses multiple forms of communication such as interactive text, images, sound and colour. Multimedia can be anything from a simple PowerPoint slideshow to a complex interactive simulation.

Multipoint — communication configuration in which several terminals or stations are connected. This differs from point-to-point, where communication is between two stations only.

Network — series of points in different locations connected by communication channels.

Nugget (of information) — delineates a ‘bite-sized’ component of learning that is a component of a module or program of learning but no longer maintains its formal relationship to a learning outcome that is linked to a formal course.

Nugget (of learning) — delineates a ‘bite-sized’ component of learning that is a component of a module and maintains its ability to credit transfer an individual’s learning towards an agreed outcome that is linked to a formal course or certificated short course.

Off-the-job training — training, education and development that is structured and conducted outside the ‘normal’ workplace situation and performance of tasks related to job

completion. This may include lectures, classroom activities, case studies, self-paced learning, games, simulations, programmed instruction and special training sessions within a workplace context structured outside normal job/task completion.

On-the-job training — training, education and development that is structured and conducted in the workplace and based on activities completed as part of a student's normal workplace activities and job. This usually includes learning by 'doing', coaching, skills tests and learning completed as part of normal job/task completion.

Organisational learning—while organisations are not usually built to learn they do organise functions and processes to complete transactions between individuals within and outside their structure. Such transactions stimulate relationships that can be deliberately managed to encourage organisational learning through the capture, transfer and generation of knowledge. This knowledge has the potential to advance individual, group and organisational outcomes.

Page — all websites are a collection of electronic 'pages'. Each web page is a document formatted in HTML (HyperText Markup Language) that contains text, images or media objects such as RealAudio player files, QuickTime videos or Java applets. The 'home page' is typically a visitor's first point of entry and usually features a site index. Pages can be static or dynamically generated. All frames and frame parent documents are counted as pages.

Performance — application or deployment of capabilities to achieve an outcome. It may also include the composite outcomes or end results which emerge when an individual, group or organisation pursues actions that may be measured to determine if they are optimal (minimised or maximised).

Point-to-Point — see Host.

Portal — location on the Web that serves as a central source for information and content targeted to a specific group. Serves as a gateway to information and elearning from a variety of different sources. Although the term was initially used to refer to general purpose sites, it is increasingly being used to refer to vertical market sites that offer the same services, but only to a particular industry such as banking, insurance or computers.

Program — sequence of modules that does not result in a qualification but offers credit transfer into a course (i.e. multiple modules but less than a course).

Qualification (formal, national) — consistent and portable credential recognising an individual's attainment of all the criteria, learning outcomes or capabilities nominated as requirements for recognition at a given level of accreditation (i.e. the Australian Qualifications Framework). This may be through the completion of a course, direct assessment or a combination.

Real time — processing of information that returns a result so rapidly that the interaction appears to be instantaneous. Telephone calls and videoconferencing are examples of real-time applications. Real-time information not only needs to be processed almost instantaneously, but also needs to arrive in the exact order it is sent. A delay between parts of a word, or the transmission of video frames out of sequence, makes the communication unintelligible. See Synchronous.

Recognition of Current Competency (RCC) — the formal process of mapping competencies held by an individual against benchmark competency standards, or competencies that compose formal qualifications. RCC is closely related with RPL, but distinct, especially when associated with determining actual performance capacity as opposed to learning held; i.e. as in performance reviews.

Recognition of Prior Learning (RPL) — the formal process and means by which workers can gain formal recognition for skills and competencies they already possess, through life experiences, or learning elsewhere, without having to undertake further training.

Repository — a database of learning objects. An LCMS can deliver these as required by a specific situation.

Search engine — (from whatis.com) on the Internet, a search engine is a coordinated set of programs that includes:

- A spider (also called a ‘crawler’ or a ‘bot’) that goes to every page or representative pages on every website that wants to be searchable and reads it, using hypertext links on each page to discover and read a site's other pages
- A program that creates a huge index (sometimes called a ‘catalog’) from the pages that have been read
- A program that receives your search request, compares it to the entries in the index, and returns results to you.

Self-directed learning — process of learning where the individual takes full responsibility for diagnosing their needs, priorities, learning goals, the structuring and completion of study to meet learning needs, and follow-up evaluation of the progress they have made through study.

Self-paced learning — offering in which the learner determines the pace and timing of content delivery.

Server — machine that makes services available on a network to client programs. A file server makes files available.

Sharable Content Object Reference Model (SCORM) — set of standards that, when applied to course content, produces small, reusable learning objects. A result of the U.S. Department of Defense's Advance Distributed Learning (ADL) initiative, SCORM-compliant courseware elements can be easily merged with other compliant elements to produce a highly modular repository of training materials.

Short course or session — refers to a stand-alone module or sequence of training that does not offer credit transfer into a course but may result in certification.

Streaming — live radio, audio and video — this ‘continuous’ broadcast mode, called streaming, can be found on the Internet and intranets to process data (display images or video, or play sounds or music) before it is fully downloaded or uploaded. The information is compressed at the source, usually in MPEG format, and then decompressed by the user. Several users can simultaneously view or listen to the posted files. Streaming technology allows the user to listen to, view and even interact with (while viewing or listening) multimedia files. The streaming mode is essential for listening to conferences and radio or television programs live or in delayed broadcast, although the video broadcast quality is entirely dependent on the telecommunication network and the user’s hardware (modem, processor, etc.).

Synchronous — through modern technology, the learners log into class at a regularly scheduled time and date and engage in real time with the learning advisor and other learners, much like a real classroom. Assignments are given, questions are asked and answered, and exams and pop quizzes are taken.

Synchronous Collaborative ELearning (SCEL) — term coined to indicate that the experience was synchronous — two-way — but also collaborative. Common forms of

synchronous learning include video teleconferencing, audio conferencing and computer conferencing and/or chats.

Teleconferencing — two-way electronic communications between two or more groups in separate locations via audio, video and/or computer systems.

Videoconferencing and desktop videoconferencing — using video and audio signals to link participants at different and remote locations. There are two kinds of videoconferencing: personal (or face-to-face) via personal computers, and group (person or persons talking to a group of persons) using a dedicated videoconference system via monitors or televisions. Desktop occurs through use of a personal computer.

Video teleconferencing — teleconference including two-way video.

Virtual classroom — online learning space where students and instructors interact.

Voice Over IP — see IP telephony.

WAN — Wide Area Network — (from whatis) geographically dispersed telecommunications network. The term distinguishes a broader telecommunication structure from a local area network. A wide area network may be privately owned or rented, but the term usually connotes the inclusion of public (shared user) networks.

Web-Based Training (WBT) — training that occurs using the Internet. Learners must connect to an intranet or Internet to access the information.

Web page — file written in a programming language that enables it be read on the World Wide Web. See also Page.

Website — collection of one or more web pages linked together.

Whiteboard — application that allows documents and content materials to be posted on the screen for all learners to see. The learning advisor can then make changes to the document or post additional information just like with a traditional blackboard. It is used in a synchronous learning situation. The learners see the information being changed on their screens in real time.

Whiteboarding — term used to describe the placement of shared documents or material on an on-screen ‘shared notebook’ or ‘whiteboard’. Desktop videoconferencing software includes ‘snapshot’ tools that enable one to capture entire windows or portions of windows and place them on the whiteboard. The user works with familiar tools to mark up the electronic whiteboard much like with a traditional wall-mounted board.

World Wide Web (WWW) — hypermedia system (digital data, audio, video and other media used as hypertext elements) that facilitates searches for information on the Internet. The information available on the Web is presented as web pages; a set of web pages constitutes a website. A web page can contain text and still-frame images, animations, video, sounds, etc., and links to other pages. Those links allow users to explore information in a specific order (or randomly) and to interact with the contents of the web page. Documents on the WWW are published in HTML (hypertext markup language) and other protocols (dynamic HTML, stream, Java, etc.). See also HTML, hypermedia, hyperlinks, etc.