Overview The Knowledge Exchange Testbed:

An Open Standards Testbed for a Third Party E-learning Supply Chain (3PEL)

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(Revised 25 January 2005)
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Vision

To provide a testbed to showcase third–generation open standards technologies capable of spanning an end-to-end, knowledge and learning object management supply chain.

Aspiration

Institute for Working Futures' will work with corporate clients, partnering content developers, technology engineers, instructional designers, learning providers and research partners to:

- Move beyond the noise, hype and expenses to foster deep understanding on how the technologies and processes can value add to learning and knowledge systems.
- Provide proof of product and market for a complete B2B learning object knowledge exchange business model (so called 3PEL, third party e-learning model).
- Prove a fee-for-use model is possible whereby third parties can access all the e-learning technologies and associated very low per student, per course, per annum license charge.
- Integrate workflows for production of content into IMS (packaging, sequencing and QTI) and SCORM while maintaining accessibility and mobility requirements.
- Liberate assessment objects from being embedded within a learning management system or a learning object/ resource/activity.
- Uncouple content (object) and data access and reporting from proprietorial LMS technologies.
- Integrate reporting of learning and knowledge acquisition across LMS and enterprise applications.
- Test technology and authenticate use of podcasting for educational purposes (especially with regards use in mobile and accessible learning).
- Automate the production, conversion and publishing of content from desktops to SCORM, QTI and thence to web or any compliant learning management.
- Integrate content packaging, branding, labelling and recognition (qualifications) processes under appropriate quality and compliance regimes (IMS, VETADATA, SCORM and Human Capital vocabularies, ISO, AQTF and University).
- Conduct, report and publish all projects through rigorous university-based processes (Unitas Knowledge Centre).
- Provoke curiosity insight and acumen sufficient to accelerate enterprise adoption.

What will The Knowledge Exchange do?

Working Futures seeks to test the operational and financial viability of a supply chain solution that can complete the following activities.

Components	Description
Authoring and conversion Tools	• Support the assembly and authoring of content using agreed templates to specified compliance standards (ie. SCORM/QTI/AICC compliant) • Maximise multiple modes of delivery/publishing (Print, CD ROM, online, etc) • Conversion and repackaging of legacy content under SCORM regime/repository • Automate conversion of Microsoft Office files, especially Word and PowerPoint into SCOs and thence into an online format
Assessment engine	• Generate QTI V2 assessment tools • Author and publish assessment tools • IMS QTI compliant and IMS and SCORM LOM compliance (integrated packaging and labelling; explore sequencing integration) • Tie learning objects (multiple or single) to assessment (objects) • Import or export assessment objects • Tie assessment outcomes to recognition points (qualifications)
Learning Management System	• Administer Training • Defining training courses and programs • Plan and report development and learning paths and resources • Deliver, track, assess, store and report capability, competency and compliance related results for courses/content • Setting up training costs • Defining training requirements • Planning Training budgets for your organisation • Administering course sessions • Enrolling and waitlisting students • Tracking student training • Tracking training costs • Career, succession and development planning • Individual learning and development plans • Compliance auditing and reporting • Data analysis and reporting
Learning Content Management System/ Digital Object Repository	• Direct link to content /courses • Store, source, manage rights and track learning objects/content, provide object usage reporting • Deliver track, measure, store and report usage of learning objects/materials • Manage digital/ learning object assets • Improve the consistency of taxonomy, classification and knowledge management • Maximise access to third-party content • Establish, manage and report digital rights, rules and requirements for learning objects/ content being sourced and deployed • Manage examination and test banks • Enhance deployment of content across multiple modes (print, online, CD ROM, etc.) • Reporting digital rights and intellectual property value. • Deliver objects direct to students not via LMS
Hosted online environment	• Chat • Forums • Support one-way and 2-way staff, communication • Permit virtual classrooms • Support learning communities • Provide help and search functions • Integrated reporting
Content	• Pre-packaged content in strategic points of the learning pathways • Integration of IMS and SCORM requirements in packaging, labelling and sequencing (especially for objects relating to assessment, mobile learning and to meet accessibility requirements) • Use of automated templates and style sheets. • Publishing of content to LMS and Web as an integrated, automated activity. • Mobile learning and exploration of players for podding and QTI assessments.
E-commerce	• Pay, banking and processing facilities. • Service and administration layer for end-to-end activities.

Technology selection

Working Futures decided very early on that this testbed must use internationally recognised solutions developed by Australian companies.

The LCMS solution came down to a choice between The Learning Edge from Dytech, and the Hive™ Learning Object Repository from Harvest Road. Because of its international track record and extensive testing in a commercial setting The Hive® was chosen (www.harvestroad.com.au).

Working Futures had undertaken extensive work with many LMS' for its clients. Open source solutions such as Moddle (http://moodle.org/) and Atutor (http://www.atutor.ca/) were extensively reviewed for inclusion in the testbed. Three different Australia LMS'; including - in priority order - the Compliance and Competency Management System (http://www.nci.com.au/ccm/default.htm), The Toolbox from Janison (http://www.janison.com.au), and FourPoint™ from the EtechGroup (http://www.fourpointlearning.com/), were also considered. As only one LMS was considered appropriate FourPoint™ was chosen. The chose was made because it is:

- Open architecture;
- Multi-platform and language;
- Compliant Windows 2000 Server or Mac OS-X 10.x Server
- Scaleable;
- Global track record and international help desk;
- Being considered by a major client of Working Futures in conjunction with The Hive for an e-learning installation that will cover more than 100,000 users; and
- While proven in a schools-context as StudyWiz® FourPoint has plenty of scope to be customised to raise its corporate functionality.

Why open architecture?

Open architecture has been chosen over similar open source or shareware options (i.e. Moodle, Atutor) because all solutions must be able to be implemented within a corporate environment. Risk mitigation suggests open source options could not be managed in terms of:

- Scalability.
- Costs (it may be 'free' but hidden costs are extensive).
- Reliability.
- Standards compliance.
- Acceptance testing in commercial environments.
- Workflows.
- Technical support and maintenance.
- On going development pathways and timetables.

Working Futures is committed to ensuring all e-learning technology can support or enable:

- Individual learners'/users' (design, developer and facilitator) needs and preferences drive processes, not the technology.
- Accessibility.
- Generation and transfer of knowledge for learning or on-demand needs across a full range of information and communications technologies (ICTs).
- Focus beyond e-training and individual skills to build capabilities and a culture of collaboration.
- An investment that has real strategic value by enhancing knowledge capital resident in both codified, explicit knowledge and uncodified, tacit knowledge.
- Pedagogies appropriate to the individual learner in a given situation.
- Interoperability and maximum integration with backend systems.
- Collaboration and knowledge sharing.
- Quality business processes and instructional design systems.

Research projects

The Knowledge Exchange 2005 Research Projects	Description-Focus	Research partners to Working Futures
TKE05.1. Streamlined workflows for instructional design and content authoring or reuse	The workflow to streamline instructional design and authoring relating to producing content from desktop applications into SCORM compliant content ready for delivery off an LMS or online environment. The research will test how to control repackaging, rebranding and reuse while preserving links to assessment and qualifications. This includes integrating production of content so it can be distributed in multiple blended forms of delivery (including classroom; self-paced flexible and distance learning packages based on print and CD ROM; online; and mobile learning). Content to be developed for courses includes two short courses, Certificate 3 in Multimedia, Certificate 4 in Records Management, Diploma of Business (Frontline Management), Diploma of Training and Assessment, Graduate Certificate of Management, Graduate Certificate of Education (unit only).	• Esset Australia • Salamanca Training Centre* • Australian Training Management • Aptitude Media • Australian Maritime College* • Unitas Knowledge Centre*
TKE05.2. Redoit™ packager and converter – Microsoft Office conversion and IMS QTI/SCORM packaging application	Streamlining the authoring of content from standard Microsoft desktop applications into compliant SCORM and IMS packaging, sequencing or QTI regimes and thence to LMS or Internet-ready (XHTML) formats. This project will also report on issues relating to the transfer of 'legacy' content and objects from multiple previous sources, into standards-compliant objects that can be accessed, stored, discovered, harvested and transferred under a federated repository of learning objects or metadata describing such objects. Key research will include links to TKE05.3 project and use of LOM to integrated IMS, SCORM, VETADATA and Working Futures' Human Capital vocabulary and classification schemes. This project should produce a more feature rich application able to replace the Reload™ application and test content delivery under Australian VETADATA and VLORN project requirements.	• Intelitec Pacific • Aptitude Media • Esset Australia
TKE05.3. Development of assessment tools QTI Creator™ and QTI Player™	To develop a user-friendly application able to author 20 standard typologies of assessment tools. The QTI Creator™ will author tools to QTI 2 compliance, play them on mobile or other technologies and report data. The research will also test how to manage assessment objects under both IMS, SCORM and VETADATA schedules, within a compliant repository and across multiple compliant LMS' or reporting databases. Critical to this project will be confirmation of how to manage QTI assessments as an object able to be packaged at a SCO, resource/component, activity and stand-alone assessment object level within an LMS. The QTI Player for mobile devices will provide a means to play, synchronise and report QTI reports.	• Intelitec Pacific (technical lead) • Aptitude Media (accessibility issues) • Esset (User issues) • ATM (User issues) • TAFE Tasmania (QTI Player)* • ANTA (QTI Player)* • Department of Health and Housing (QTI Player)*
TKE05.4. Promoting accessibility and personalisation of e-learning	Personalisation of learning to maximise individual access (accessibility), testing of useability and accessibility for content and all technologies, and customisation of the learning environment (intelligent agents)	• Aptitude Media (accessibility) • Edumedia (Intelligent Agents)*
TKE05.5. Promoting M-learning accessibility	Examining the extension of content design, storage, delivery, assessment and reporting across multiple mobile devices, global locations and networks	• Aptitude Media (accessibility) • Unitas Knowledge Centre • AMC
TKE05.6. Quality and compliance management systems for a Knowledge Exchange	Development of overall procedure and quality systems to cover complete Knowledge Exchange. Systems to encompass ISO 9002, university and Australian Quality Training Framework compliance.	• UXels • Esset Australia • QMS Australia (through Esset)*
TKE05.7. The Real Value – Measuring the management of learning objects and content as part of corporate knowledge capital management systems	Set benchmarks and systems to measure how learning and knowledge interventions enhance service, brand value, performance, and HR activities	• Unitas Knowledge Centre • Others TBC
TKE05.8. The Knowledge Exchange	An end-to-end model or framework to guide the implementation of integrated learning and knowledge strategies. This model will establish the commercial value of	• UXels

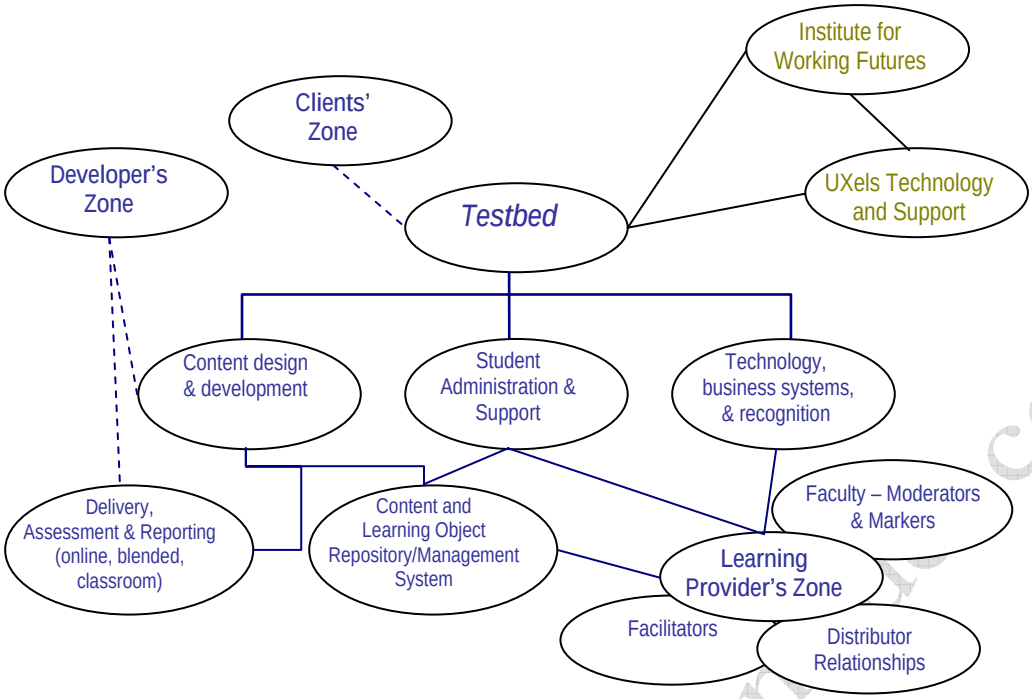
commercial model and service layer	a B2B learning object and knowledge exchange business model (a third party e-learning provider solution or **3PEL).** Includes developing service layer with e-commerce and integrated database for overall system.	

** Partners involved in activities but subject to final agreement.*

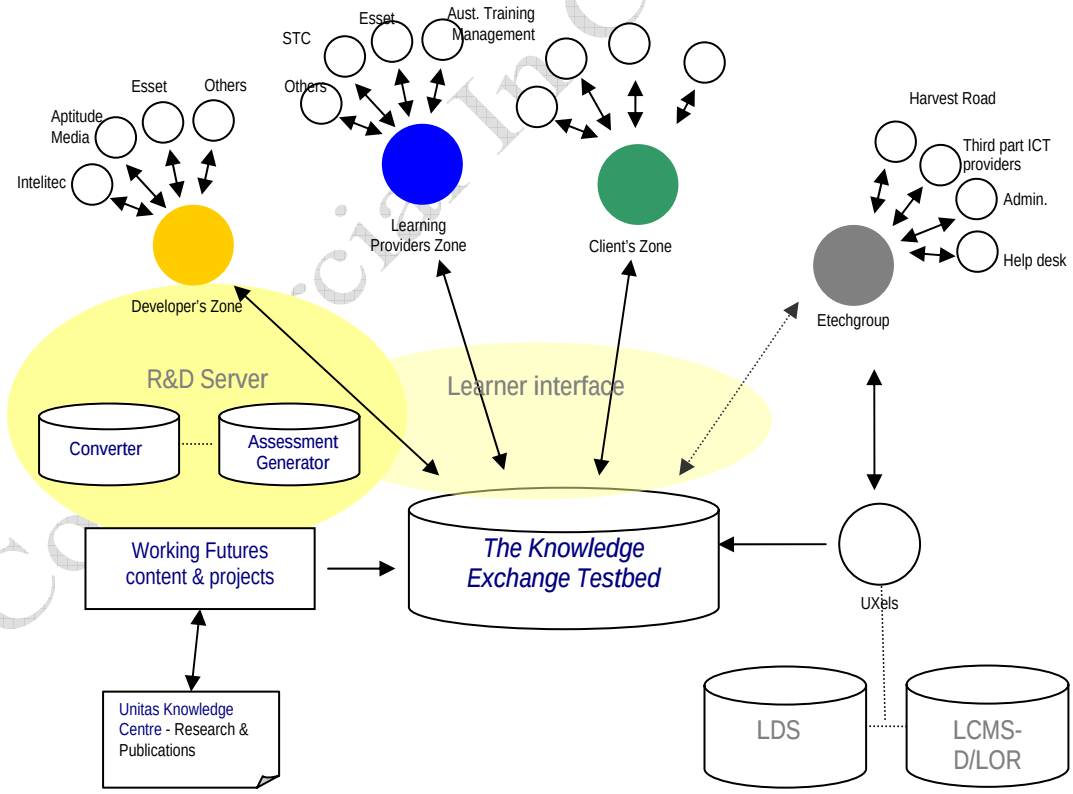
Critical Actions – Start Up

No.	Critical Action	By When
1.	Consolidate web servers, infrastructure requirements and support relationships	November 04
2.	Capacity to author, convert and edit or update or digitise standard content (Microsoft Office files) into SCORM compliant materials able to be distributed in multiple digital forms.	November 04
3.	Availability of LMS to back content delivery to an initial population of 300 students	Nov. 04
4.	Commence publishing online modules for a graduate unit (13 chapters) and a Diploma level course (13 units).	Nov/Dec. 04
5.	Establish user's Zones with security controls to permit up to 15 users access to Working Futures Testbed as 'teachers/authors' to author, edit, or convert content or assessment tools.	Dec. 04/Jan. 05
6.	Design and deploy full Working Futures branded web presence able to be reskinned and customised to multiple partners and individual users (including e-commerce functionality)	Jan. 05
7.	Availability of LCMS/ Object Repository to back content delivery to an initial population of 300 students	Jan. 05
8.	Formally commence all research projects.	Feb. 05
9.	Secure access to an online assessment generator/engine	Feb. 05
10.	Capacity to reskin Working Futures capacity under agreement with UXels.	Feb. 05
11.	Load all FLM materials and at least two full Graduate Units, assessment tools and conduct acceptance testing of site	Feb. 05
12.	Load full Diploma, three short courses, and one unit of a Graduate Certificate of Management (GCM) level course.	March 05
13.	Commence formal relationships and 'turn on test bed' for public access and trials. (Includes download page for Beta QTI Creator™ and Redoit™ applications)	11 April 05
14.	Load at least three other vocational qualifications, four units of a Grad. Cert. level course and one unit of a GCE.	April 05
15.	Scale system solution to commence testing of end-to-end aspects of UXels third-part elearning solution.	July. 05
16.	Scale system solution to encompass student population of 1000 with up to 150 concurrent users	Nov. 05
17.	Write up findings and wind up testbed	March 06

Structure

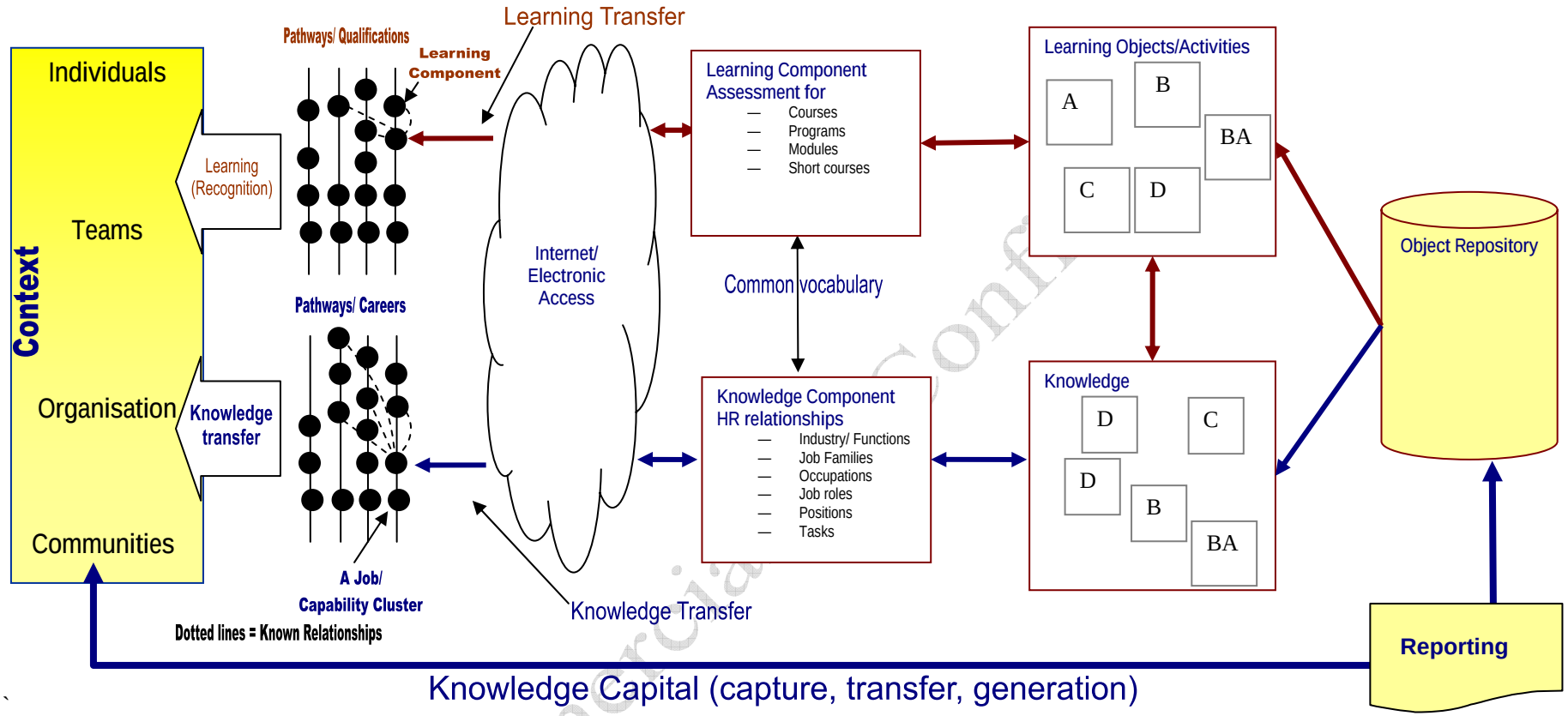


Testbed Architecture



UXels = Unknown e-learning solution (License holding and technology services company)
ICT = Information and communication technology
LDS = Learning Delivery System
LCMS-D/LOR = Learning Content Management System; Digital/Learning Object Repository

Working Futures Open Architecture Testbed for A B2B Knowledge and Learning Objects Exchange



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Blue lines represent knowledge transfer – No assessment, but immediate transfer of required knowledge to meet performance capabilities. Measured transfer by human capital management system = growth in Knowledge/Intellectual Capital of people and the organisation.

Brown lines represent the learning transfer process. Assessment is essential to tie learning objects to a learning component associated with a course and qualification. Objects can be repackaged, converted or customised and still be attached to a qualification.

Net result is UXels is the first disintermediation organisation in the global learning and knowledge transfer space. Corporations, learning institutions and individuals can download the objects they want for learning or knowledge purposes (see iTune, Napster or eBay as B2Bs in different media e-markets). UXels also can become an aggregation point for objects that developers cannot sell because they lack a marketplace or an ability to aggregate against higher value propositions to the customer (qualifications or careers).

