

Current play of e-learning in the construction and electrical trades

The table below lists some of the ways that e-learning is currently being used in teaching the construction and electrical trades.

Data projector	
Various	Most RTO's are using data projectors in the class room to project content – Power Points, CD or online material, videos and so on. A number of teachers have expressed that this technology is the single best thing that's happened to support teaching in the trades for a classroom context.
Video	
Plumbing	Ballarat University (TAFE) teachers have produced their own video resource showing how to commission a hot water service. This is a critical skill required for the Plumbing License exam. They used their own domestic level digital video camera and edited it themselves using <i>Movie Maker</i> . The video is used for both teaching and revision. The video is housed on the institute <i>Star Bak</i> video streaming system. Students can watch in class or outside at anytime, from anywhere. The video has saved considerable time on repetitious teaching instruction. Students have done better than the State average when taught this way. Especially applicable for students with low language and literacy skills.
Various	TAFE Tasmania is enabling teachers to develop video resources. Teachers capture short instructional events and demonstrations on video and motion capture software – activities which are often taught in small groups over and over again. These resources can be edited using <i>Pinnacle Studio</i> and <i>Adobe Captivate</i> for motion capture and can be reused. They intend to share these resources more widely by embedding them into the web authoring product <i>Exe</i> .
Carpentry and joinery	TAFESA (Marleson campus) provide their students with digital video cameras and video editing software <i>Movie Maker</i> to film themselves safely handling power tools. The videos are made in pairs (one filming, the other demonstrating) but every student creates a video. These are then shown at a special preview event which all students attend to appreciate the videos. Teachers find it an excellent and engaging way to teach students safe handling of power tools.
Video conferencing	
Electrical	Ballarat University use video conferencing to overcome the distances between campuses using <i>Polycom</i> video conferencing technology. The video conferencing solution is very successful in increasing student participation levels. Students studying electrical licensing exam 'attend classes' at their local campus, significantly reducing their travel. Teaching is conducted at more

	than one campus simultaneously by a teacher in the central location. Documents can be transferred to remote locations via a document camera, computer or whiteboard (<i>SmartBoard</i>) linked to the video conferencing system. Students send their work to the teacher via the internal mail system.
Electrical	Central Queensland Institute of TAFE use Video Conferencing to deliver Restricted Electrical courses. The course is taught in Gladstone and they deliver to three other regions via the State's <i>Videolinq</i> service. Students come together for a two-day practical at either Mackay or Gladstone. The video link is used to teach theoretical aspects of the course. They hope to put the assessment online. Students are encouraged to communicate via email.
Moodle	
Building and construction	TAFE SA (Douglas Mawson) use <i>Moodle</i> to manage much of their theory content for their pre-vocational students and first and second year apprentices. Course material includes Power Point slides and video clips and all assessment is done online. The content is mapped out very clearly and students find it easy to use. The teachers find the online assessment time-saving as the scores for each student are recorded and tabulated automatically.
Building and construction	John Holland use <i>Moodle</i> for online generic and specific induction programs for employees about to commence work on-site. The programs are aimed at all levels to ensure compliance with occupational, health and safety regulations. Workers will only have to do the specific elements required instead of a full course which may include things they have already done. The online text resources will have optional audio for people with low literacy The text in safety illustration will be provided in several selected languages.
Carpentry and cabinet making	The Gold Coast Institute of Technology uses <i>Moodle</i> on an on-campus intranet to support self-directed learning. It's used to deliver self-paced content, student research, assessment and for progressive feedback to students. GCIT have developed their own resources, as well as using resources developed by others (for example material developed by Logan and selected Toolbox components). Resources were developed using Power Point (some with audio) and various other tools. Previously developed assessment resources developed in <i>Authorware</i> were converted for Moodle.
Power Point	
Electrical	The Dubbo campus of NSW Western Institute of Technology has developed a series of animated <i>Power Points</i> for display in classroom. These have been produced in cooperation with an external developer. The <i>Power Points</i> may have up to 100 slides in each, and cover the theory content of whole 36 hour course. They're shown in a classroom using a data projector - teacher driven. The teacher is not provided with notes – they are expected to have enough knowledge to follow the <i>Power Points</i> .

	They have completed 4 courses so far: Circuit Development1, Magnetism, Electro-magnetism and Alternators & Generators. Students find the high level animations very appealing as they do not like reading text.
AutoCAD 3D	
Carpentry and joinery	TAFE SA (Douglas Mawson) use <i>AutoCAD</i> to teach VET in Schools carpentry and joinery students visualization and plan drawing techniques. The students create a basic plan of a component and then create a 3 dimensional model of it. They then use this plan and model as a guide to physically build the component.
Learning Management Systems (LMS)	
Building and carpentry	Chisholm Institute support their teaching with online delivery. Carpentry use computer aided drafting <i>AutoCAD</i> . They use online test banks in <i>WebCT</i> which they are in the process of converting because of a recent upgrade to VISTA. They have online examples of work to teach <i>Excel</i> for quoting. The students use the Internet to research information for quote preparation. They are just beginning to explore the use of <i>e-Portfolio</i> (part of WebCT) for portfolios using photos taken by the students and videos edited using <i>Movie Maker</i> .
Carpentry	Swinburne is using LMS <i>WebCT</i> for 3rd Year Certificate III in General Construction (Carpentry). They are developing learning resources and assessment modules themselves and are supplementing this with assessment material obtained from Queensland Logan Institute. The first two modules on building external stairs and wet areas (bathroom fit out) were trialed in April. The LMS houses quizzes, tests and formative assessment, PDF workbooks, web-based resources and <i>Power Point</i> slides. Students complete their JSA Job Safety Analysis Sheet online and print this out for endorsement. The JSA sheets are bar-coded , which enables the results to be readily processed and fed back into the <i>WebCT</i> .
Carpentry and joinery	Goulbourn Ovens Institute are doing online assessment using <i>Respondus</i> and incorporating these into <i>WebCT</i> . Students access the assessment on campus. The building teachers are currently making a video to teach the construction of door frames.
Electrical	Central Queensland Institute of TAFE (CQIT) is using <i>Janison</i> in their 'Test and Tag' short course. Online content is presented in modularised units developed in HTML, very basic to begin with, but they will gradually build in more interactivity over time. There are review questions at the end of each section and online assessment. Students receive a CD ROM with additional resources, including a video demonstrations of 'testing'. The system is linked to their Student Administration System which enables online enrolment.


	The online material was developed in conjunction with Central Queensland Institute of TAFE, Barrier Reef Institute of TAFE, Southern Queensland Institute of TAFE, and the Open Learning Institute and these materials are available to other Institutes.
Painting and decorating	<p>Southern Queensland Institute of TAFE is using <i>FlexiLearn</i> (a re-badged version of <i>iLearn</i>). Painting and decorating have developed online resources to support the flexible delivery of all units. Students can access the material from the FlexiLearn Centre or off-campus.</p> <p>Using a constructivist approach in their course design, the content has been developed in HTML with lots of interactivity, links, and testing built in. Video clips are accompanied by quizzes, which students complete whilst watching them. Most of the resources were developed in-house using readily available programs like Word, <i>Power Point</i>, <i>Media Player</i> and <i>Hot Potatoes</i>. They have incorporated links to external resources and activities also – for example to interactive resources available on the Dulux and Haymes websites. They are gradually building in sound overlays to help low-literacy students. Some of their early developments have had to be redeveloped since moving to the <i>FlexiLearn</i> system.</p>
Plumbing	Chisholm is using the <i>TAFE VC</i> online question banks. Students also use the Internet to get product information and prices for quotes and information on current regulations.
Plumbing	Tropical North Queensland Institute (TNQI) has Construction Blue Card and Occupational Health and Safety General Certificate fully online in <i>Janison</i> , the later piloted with Certificate III plumbing. They are now adding literacy and numeracy elements, and drawing from a range of Toolboxes (including the Toolboxes developed as part of the Equity Series) to support specific cohorts of students), developing <i>Flash</i> resources and adding video and photos . Some of the teachers, initially resistant and not familiar with computers, are now comfortable using the system. They plan to expand the developments to other trade areas.
Plumbing	Yeronga is using <i>Janison</i> to deliver their Diploma of Plumbing online. The system has web content, online tests/assessment, assignment submission, group communication and chat. Not a lot of high end graphics in their teaching resources as they believe they are not necessary at this level. They have been running the course for about two years with good feedback: students want more. They also use screen capture with audio to teach computer tools like <i>Auto CAD</i> and spreadsheet used by plumbing students.
Stonemasonry	<p>The Brisbane North campus of the Trade and Technician Skills Institute (TTSI) are using <i>WebCT</i> to support ‘blended’ teaching in their Stonemasonry courses. The system incorporates web-based learning resources, photos and video, measurement calculators, practical projects, web links, and selected learning objects from Toolboxes. Online units currently operational include Stage 1 Occupational, Health and Safety.</p> <p>Podcasting was trialed and dismissed as a viable medium for delivery, as students said they preferred visuals to audio. They are currently exploring the use of video casting and photo casting. Not all students have access to the required technologies, so this</p>

	<p>has to be taken into consideration when employing the various resources.</p> <p>Stonemasonry has been using e-learning methods for many years, starting before <i>WebCT</i>, using freely available discussion sites, hotmail and developing online material in simple accessible applications.</p>
Various	<p>Blue Dog, a private RTO specialise in online delivery for the building and construction industry and use their own in-house system. The training is mostly for apprentices. Examples of courses include Safety Induction (Blue Card) and also Carpentry Skills Assessments: a sample is viewable online. The system has language and literacy tool built in, which enables audio as well as text, 3D modeling, simulation, testing, video, and has photo upload ability. Resources developed are <i>Flash</i> based. This is an example of a fully systemized approach using advanced tools for delivery.</p>
Various	<p>Silver Trowel, a private RTO in WA, use online extensively. They developed their own in-house system and have about 25% of each trade course are online. They use a blended delivery model and teach both on- and off campus. They use interactive resources (some Toolbox modules, some from industry and some they developed themselves), online assessment, online communication including group communication. Online has been very successful especially with low literacy and indigenous students, and has improved retention rates.</p>
Online assessment	
Carpentry	<p>Holmesglen TAFE use an online assessment database currently and are in the process of putting it into <i>TAFE VC</i>. The first test bank is now online. The online assessment tasks are used to supplement face-to-face teaching. The YOLA add-on tool, a Framework product designed to be used in conjunction with the Building and Construction Toolbox or as a stand-alone tool is used as a complimentary resource for students with low literacy and numeracy.</p>
Carpentry	<p>Charles Darwin University (TAFE) is using computer testing via the University server to support teaching programs in Years 1 to 3. They hope sometime in the future to incorporate video and other learning resources, but this may require a bigger capacity server.</p>
Carpentry	<p>Logan Institute in Queensland use a flexible learning model based on self-paced study. Teachers are available on campus in teaching rooms to support and teach students as required. Certificate III Carpentry students have individualized study programs supported by online learning resources, activities, and assessment. They also use video. The assessment banks developed by them are now used widely throughout Australia by others.</p>
Furniture manufacturing	<p>Holmesglen Furniture Manufacturing have developed resources in Photo Story 3, using a progressive series of photos of practical tasks on things like machine setting, joints, tools, and so forth. The resources are to be used in self-paced apprentice and pre-apprentice courses. The first trials with these resources have been very positive.</p>

	Holmesglen is involved in the development of a Furniture Toolbox soon to be released, and will incorporate this into their teaching when available.
Furnishing and offsite construction	<p>Logan Institute in Queensland use computer-based self-marking tests from a server in all Certificate III Furnishing subjects and in Offsite (Construction) to teach things like stairs, joinery and shop fitting.</p> <p>They also use videos from a server, and <i>Flash</i> resources developed to support specific learning elements. Students complete bar-coded task sheets online then print these for processing. The Internet is used by the students to access material and information from the Health and Safety website, also to research product and design information.</p>
General construction	East Gippsland Institute of TAFE are using Toolboxes in Cert III General Construction to support a blended delivery approach. Toolboxes are ideal for them because the Institute still only has dial-up Internet access in some campuses.
Plumbing	Bendigo Regional Institute of TAFE (BRIT) provide resources for students apprentice and pre-apprentice groups on CD-ROM (mainly <i>Power Point</i> resources and web-content, some interactive). Apprentices currently complete their training plans on computer, and will soon have their work diaries online also. Literacy and numeracy material on the <i>TAFE VC</i> is used with pre-apprentices. Students can submit their assignment via email, and use the Internet for research on products and standards.
Mobile devices	
Plumbing	Great Southern Institute in WA is using mobile phones and PDA s in Plumbing (6 out of 17 students). They are used as a tool in field work and assessment. Students take pictures of what they are doing, add text and send this to their lecturer via memory stick or email. They have been doing this for a number of years. Plumbing teachers are just beginning to use digital storytelling which involves collating a series of pictures to tell a story with text or voice overlays and using special effects enabled by the software to add appeal.
Electrical	<p>Swan TAFE in WA is using PDAs in electrical teaching with pre-apprentice groups. Students access catalogue entries in a database on the PDA, prepare quotes, and annotate photos of sites visited. In the trials they found best use of the PDAs were when students were able to use them in situations external to the classroom. Once on the worksite they were able to make use of the full range of the devices for recording and manipulating information.</p> <p>Details of their trial are at: http://www.groups.edna.edu.au/file.php/97/Spark-ELY/Spark_ELY_Final_Report.doc</p>
Plumbing	Ballarat University (TAFE) is using <i>Telstra SMS online text message</i> service to communicate information and reminders to apprentice students. Once contact names and phone numbers are added to the system messages can be sent readily to individuals,

	groups, or employers via phone or computer keyboard: The teacher chooses where reply messages are received. Student attendance has improved markedly which in turn has positively affected pass rates.
Classroom response tools	
Electrical	<p>RMIT Electrical is using <i>KEEpad</i> in their compliance training. <i>KEEpad</i> is an electronic (wireless) device students use to respond to questions anonymously in class. <i>KEEpad</i> uses <i>Power Point</i> in which to present lessons, pose questions and display the calibrated total. The system is used because of the potential legal ramifications and students not wanting to put employers in to compliance authorities inadvertently through their response to questions which are often based on their own and their employer's work practice. Anonymity allows much more open discussion.</p> <p>They are currently developing <i>Power Points</i> with animation to supplement their existing resources and converting these to <i>Flash</i> to put online along with other resources.</p>
Various	<p>Ballarat University (TAFE) use an interactive whiteboard <i>Smart Board</i> in combination with a data projector in a number of trade courses. The whiteboard has touch screen capabilities, a range of inbuilt tools and programs that come with the system, and data are displayed via a connected computer. Online resources, using the data projector, are displayed on the whiteboard.</p> <p>An example of its use is in plumbing. The teacher prepares one or more slide (for example, a drawing of a building plan) and projects this onto the interactive whiteboard. Then using its interactive capabilities the teacher draws and adds things to the diagram with student input. This can then be saved as a PDF, and distributed to the students. Both the teachers and the students love it.</p>
CISCO	
Electrical	Box Hill TAFE courses are designed for flexible delivery. Stages 1 to 4 incorporate online learning. They use CISCO the system, a commercial system they have entered into partnership with to use. Box Hill entered into a partnership with Cisco to develop Cisco Learning Institute for IT Network training. ¹ From this arrangement, they entered into a consortium to develop electrical resources and now use the system for electrical training also. The feature of the system is the high quality interactive resources that are embedded within a learning framework. Resources contain images, simulations, and very visual interactive

¹ The Cisco Systems Networking Academy program began in the USA and is now arguably the largest e-learning program in the world. The program helps to develop the resources where industry demand for skilled IT professionals with critical networking knowledge is particularly acute.

	<p>material to teach electrical concepts to pre-apprentice, apprentice and VCE. The system has been piloted with a pre-apprentice group.</p> <p>This is a high cost development enabled through the Institute already having a partnership with CISCO. Course content could be made available to other Institutes through a license to use arrangement, but through the Box Hill host.</p> <p>The electrical department also use resources delivered on their own Intranet. This is not quite as sophisticated as the CISCO material - html, links, course notes, assessment -- but still very effective.</p>
Electro-technology	Northern Metro Institute of TAFE electro-technology are using CISCO resources via an Intranet.
NIDA	
Electrical	<p>Barrier Reef Institute of TAFE (BRIT) is using a system called NIDA developed by USA navy, to support the teaching of their electrical units, and self-paced delivery. The system includes a physical console plugged into PC for lab exercises. The system contains learning material in the form of theory and practical exercises, and uses multimedia simulations. It is best described as a practical lab tool for teaching electronic circuitry. It can be used with a whiteboard interfaced to the computer also. Results for individual students are recorded in the learning management component of the system. The Institute is currently using NIDA via CD-ROM but next year hope to deliver learning modules to remote locations via the web. NIDA also has a homework CD-ROM which can be sent to students prior to class.</p>  <p>They are currently using NIDA for Certificate III electrical in units undertaken by plumbers, boilermakers and sheet metal workers. Feedback from users has been 100% positive. BRIT has been using the system around 8 months.</p>
Applications to aid literacy	
Various	Ballarat University (TAFE) use WYNN literacy software as an aid for teaching low literacy students. The software is loaded on laptops for students to use. Documents are converted into digital format then put them into WYNN . The software enables students to hear what they have written. It also has predictive text. WYNN helps students with understanding and literacy. The system will accept either PDF or Word files.
Trade wide services	

Assessment online for people in industry	<p>The VETASSES project is developing an online assessment system aimed at assessing qualifications for people in industry. This has assessment online in some learning resources within <i>TAFE VC</i>. Students can view training plan and progress online also.</p> <p>The system is currently being developed by Holmesglen Institute with and for the Master Builders Association and will eventually assess any trade area in the Building and Construction industry, beginning first with Certificate 3 Building and Construction (Painting).</p>
Online plumbing course post-trade	<p>MPMSAA in conjunction with Holmesglen Institute have developed an online course for Gas Service Type A Appliances for post trade training.</p> <p>The course is delivered from TAFE VC and consists of highly interactive learning resources, and series of questions and scenarios are presented before assessment. Students also use the real time chat and discussion board features of the system.</p>
Electro-technology pre-vocational online tests	<p>EE-OZ Training Standards Ltd which is the ElectroComms & Energy Utilities Industry Skills Council (formerly Quality Standards Body of Australia Ltd) has an online pre-apprentice self-assessment tool for people wanting to check their current knowledge against the prerequisite skills regard to numeracy, literacy and other required skills. The modules provide constructive feedback to the system user so they can address areas of weakness. http://www.ee-oz.com.au/e-test</p>
CENTRAL DEVELOPMENTS	
Electrical	<p>The Trade and Technicians Skills Institute (TTSI), part of the new trade teaching structure in Queensland, have produced a CD/DVD of teaching resources for electrical teachers, and are working on a student resource disk - in electrical. Putting assessment online currently for electrical trade areas.</p> <p>They are in the process of implementing Learning Content System (LCS) Learning Edge, and a Learning Management System (LMS) <i>Janison</i>, to facilitate a standard framework in trade delivery.</p>
General construction	<p>The Centre for Innovation NSW has developed a collection of e-learning material covering 25 units of competency for BSEG03 General Construction. It covers such things as Erect Scaffolding, Carpentry, Painting and Decorating. The resources are provided on 5 CDs and can be used from CD or Janison and are ONLY available to TAFE teachers in NSW. The resources are heavily illustrated – with photos, readings, video demonstrations, interactive activities, discussion starters, etc.</p>