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*Online Teaching and Learning:
Critical Design Elements
&
Considerations*

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This document has been prepared by Shirley Reushle, a lecturer in flexible learning with the Department of Further Education and Training, Faculty of Education, USQ.

(Please note: It is acknowledged that you will face a variety of learning environments and that some of this advice will not apply to your situation.)

Acknowledgements

Reushle, S., Dorman, M., Evans, P., Kirkwood, J., McDonald, J. & Worden, J. 1999, 'Critical elements: Designing for online teaching', *Proceedings of ASCILITE99 Responding to Diversity: 16th Annual Conference*, QUT, Brisbane, 5-8 December.

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1 Critical elements of web design

The University of Southern Queensland has offered online units via the Internet since 1997. The instructional design team at the Distance Education Centre has developed a framework of teaching/learning elements critical for the successful design and delivery of online courses (Reushle et al. 1999). However, we are working with a limited knowledge base when we attempt to explain the guiding principles underlying teaching and learning online because it is a relatively new field and is poorly researched (Postle 1999). The content of this document is based on current literature and the professional and personal experiences and opinions of online teachers at USQ. We also recognise that the issues which have emerged are a result of only 'scratching the surface' of teaching and learning online. Your experiences within your context will add to this body of knowledge.

2 What is meant by critical elements?

We have determined that a number of elements are essential for effective web courseware design as it relates to teaching and learning:

1. **Content structure**
2. **Learner centredness**
3. **Meaningful activities (situated learning) and learner motivation**
4. **Ease of use: navigation and interface design**
5. **Use of cognitive strategies**
6. **Embedded activities**
7. **Interaction**
8. **Collaborative learning**
9. **Authentic, valid assessment**
10. **Feedback**
11. **Social presence**
12. **Study skills for online learning**
13. **Online evaluation**

CRITICAL ELEMENT	DEFINITION/ PRINCIPLE/S UNDERLYING ITS IMPORTANCE	OPERATIONAL ACTIVITIES
1 Content structure	In structuring content for web design, it is necessary to organise the materials into manageable sized 'chunks'.	Use of concept maps and graphic organisers Make explicit the relationships and hierarchy of module/topic/sub-topic, etc Help learners navigate around materials and see relationships between concepts. Can analyse differences between the ways novices and levels of experts complete cognitive tasks to understand levels of expertise that can be learned and the sequence in which they are to be learned Different experts use different pathways to complete a task and this information may assist construction of various pathways within online programs
2 Learner centredness	Conditions in which students are empowered to seek self-directed, authentic and challenging learning tasks suitable to their needs.	Ascertain student needs and goals early in course. Identify possible support required from teacher. Provide opportunities, tasks for student exploration, which is personally relevant. Provide feedback, comments, observations, etc., when and if required. Provide open-ended assessment tasks. Learning tasks are authentic i.e. of importance to the learner within the social and physical world, and personally relevant and

		<p>interesting.</p> <p>Learning tasks are challenging, and include typically complex multi-disciplinary problem solving and built on an individual's previous experience.</p> <p>Students are responsible for their own learning and are involved in the negotiation of goal setting, task selection and completion, assessment and standards.</p> <p>The teacher's role and technology are driven by student needs.</p>
3 Meaningful activities and learner motivation	<p>The concept of 'situated learning' is based on the idea that if knowledge is learned in a meaningful and relevant context of use, it will be used in that and similar contexts.</p>	<p>Activities which enable students to apply the learning to their own practice</p> <p>A need to expose students to instruction that produces feelings of competence and self-efficacy, increases perceptions of personal control, enhances feelings of personal relevance</p>
<p><i>IDEAS:</i></p> <ul style="list-style-type: none"> • <i>Reflections on practice</i> • <i>Journals and analysis of workplace strategy</i> 		
4 Ease of use: navigation and interface design	<p>Major issue for designers of web documents is to use the power of hypertext to create large and complex documents containing many links without overwhelming the user.</p> <p>Need to hide the complexity from the user</p>	<p>Web systems should contain tools which inform users:</p> <ul style="list-style-type: none"> • where they are within the site; • what information they can get to; and • how they can get to it. <p>Site structure should include:</p> <p>a linear sequence allowing the user to page backwards and forwards;</p> <p>a hierarchy allowing the user to move between sections and subsections; and</p> <p>a fully connected network allowing the user to follow links to relevant information.</p> <p>Navigation buttons should be placed in logical positions such as either at the top of the displayed screen or at the bottom.</p> <p>One problems with materials presented on the web is the user can become disorientated ('lost in hyperspace' issue)</p> <p>The user must be presented with friendly, self evident and predictable pathways through the site content.</p> <p>The provision of 'clickable links or buttons' provides a powerful gateway to related topics that may range from interactive multimedia displays to URLs for associated materials.</p> <p>Currently, design emphasis has changed from highly coloured displays to the use of more subdued colours that do not distract from the core purpose of engagement and knowledge transmission</p> <p>There is still debate on whether users should navigate by means of links, icon groups or by clickable images comprising sections of the screen display.</p> <p>Always consider time taken for downloading large images and animations from the Internet</p>
5 Use of cognitive strategies	<p>Mental processes/activities by which learners perceive, learn, remember and think about information,</p>	<p>Sequence learning opportunities from simple to complex.</p> <p>Ensure tasks are within a variety of real-life contexts - need to be practised in realistic environments</p> <p>Model and explain processes/target skills.</p> <p>Provide comments, suggestions, feedback and observations.</p>

	including internalising new information and performing higher level thinking operations.	Provide reflective opportunities. Provide opportunities/ tasks, which require students to become the 'teacher'. Provide tasks within multiple contexts, and generalise ideas across these contexts. Incorporate graphic organisers, concept maps/mind maps in course materials Use cognitive tools (e.g. databases, spreadsheets, computer conferencing).
<p>IDEAS:</p> <ul style="list-style-type: none"> • <i>Reflective practice activities</i> • <i>Use of summarisers and synthesisers</i> • <i>Use of variety of maps of the content throughout the site</i> 		
6 Embedded activities	Interactivity is seen as a necessary and fundamental mechanism for knowledge acquisition	interactive educational objects can be embedded into static web pages - can be simply text-based through to complex simulations A student may interact with either objects or information (e.g. a book, computer program) or other people (e.g. students or teachers).
<p>IDEAS:</p> <ul style="list-style-type: none"> • See COOL tools http://www.usq.edu.au/dec/imm/ct/ • Wisdomtools at http://wisdomtools.com 		
7 Interaction	The engagement of a learner with content, teacher, other learners and technological interfaces.	Establish learner needs and goals early in course. Provide personal constructive comments, suggestions, feedback, observations etc. Maintain a 'co-learner' relationship with students. Ensure students are able to access course materials. Ensure students have access to technical support if and when required. Ensure that technological interface is capable of data exchange among diverse formats and technologies. Learner-instructor interaction is one of cognitive-apprenticeship. Learner-learner interaction promotes collaborative learning. Learner-interface interaction requires operability, ability to engage, ease of use and functionality.
8 Collaborative learning	Tasks or opportunities in which a group or learning community share skills and understandings while providing social support and acknowledgment of members' contributions. This enables the 'expertise base' to be distributed amongst the members of the learning community.	Provide opportunities/tasks where completion is dependent on learner collaboration. Provide opportunities for learners to form collaborative groups, both homogenous (e.g. interest/need) and heterogenous. Monitor and mediate group collaboration. Maintain a 'co-learner' role in communication throughout the course. More equitable learning conditions are created as community has access to aggregated knowledge. Both teacher and student are a part of the learning community. Learning is both social and intellectual. Negotiation enables learners to construct knowledge and modify existing knowledge structures.
9 Authentic, valid assessment	With opportunities for assessment which have relevance and purpose, it is possible for students to 'own' the set	When contributions to online discussion are assessable, learners will tend to contribute meaningfully to group discussions Traditional assessment items such as essays, multiple choice tests and examinations can be included as items in a range of assessment items. Electronic quizzes, including multiple choice questions, can be

	<p>assessment tasks.</p> <p>Importance of task ownership in 'situated cognition', where learning is linked closely to the environments where the learning will be used. (Brown, Collins & Duguid 1989)</p>	<p>automatically marked with immediate feedback to the student. Such tests are useful in providing formative assessment throughout the course and have particular value in classes with large numbers of students. Computer Managed Assessments (CMA) can offer these opportunities. Authentic assessment tasks, e.g. forming a simulated company and carrying out specific tasks such as designing a product or producing a marketing campaign</p> <p>Electronic discussion group activities can also be used as assessment instruments, with students participating in set discussion tasks e.g. adding constructive comments to a discussion on a set topic, critiquing other students' work, participating in reflection activities - Need to consider different cohort groups and different modes of delivery</p>
10 Feedback	<p>Comments, responses etc. on student assessment which enable student to initiate corrective action, reinforces the positives and focuses on how performance can be improved in the future</p>	<p>With animations and computer models, the learner can obtain immediate feedback on his/her responses and incorrect answers can be changed as part of the acquisition of new knowledge - facilitates problem-based learning and learner independence.</p> <p>Quizzes can lead back to unit material to provide feedback/revision. Computer Managed Assessment (CMA) formative tests can be included to give immediate feedback, and guide students toward correct responses.</p> <p>Should be given frequently during instruction for small steps rather than large chunks of learning</p>
11 Social presence	<p>Degree to which the participants (teacher and learners) are perceived as 'real' persons through online 'encounters' and interactions.</p> <p>Degree to which a person is intellectually and emotionally regarded within the learning community. Social skills of learners and instructors contribute to the building of a learning community where each person and their contributions are accepted and valued</p> <p>Helps reduce the feeling of isolation in the learner</p>	<p>Ensure students have gained access to course materials</p> <p>Ensure students introduce themselves to the learning community - Student Profile</p> <p>Provide opportunities for formal and informal communication, both synchronous and asynchronous</p> <p>Respond promptly to students' queries</p> <p>Maintain a 'visible' presence on-line, through frequent communication</p> <p>Model appropriate means of communication i.e. 'netiquette'</p> <p>Encourage participation in on-line discussions and tasks</p> <p>Provide timely feedback on submitted work</p> <p>Provide summative syntheses of discussions</p> <p>Conduct periodic progress checks on students individually (by email)</p> <p>Provide warmth and friendliness when communicating with students</p>
12 Study skills for online learning	<p>Support for students to help ease them into the new environment</p>	<p>Online study aids in terms of tips, shortcuts, examples, opportunities for practice through interactive exercises</p>

13 Online evaluation	Evaluation should be an essential design consideration and an integral part of all aspects and levels of any educational design and development process	The ability to complete and submit an evaluation online: - inserted in Study Schedule - Ready access for decision makers (program co-ordinators, teachers) to data in a readable, interpretable format
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Appendix 1 Annotated table of web sites

→ **PLEASE NOTE:**

These web sites are listed under general headings. The sites are current as at **July 2002.**

<i>TOPIC</i>	<i>DESCRIPTION</i>	<i>ADDRESS</i>
Courses/ resources/ experts - online teaching and learning	Curtis Jay Bonk, Indiana University, USA - guru in teaching and learning online Resources for Moderators and Facilitators of Online Discussion Academic Technologies for Learning Education-line - Electronic texts in education and training Distance Education: Theory and Practice (Distance Education Resources Online) - great links to other distance ed resources International Society for Technology in Education	http://php.indiana.edu/~cjbbonk http://www.emoderators.com/ http://www.atl.ualberta.ca/ http://www.leeds.ac.uk/educol/ http://seamonkey.ed.asu.edu/~mcisaac/disted/internet.html http://www.iste.org
Organisations	EdNA - Education Network Australia - provides access to quality Internet sites for the education and training community. QSITE - Queensland Society for Information Technology in Education ASET - Australian Society for Educational Technology	http://www.edna.edu.au/EdNA/ http://www.qsite.edu.au/ http://cleo.murdoch.edu.au/gen/aset/
What is the Internet?	Learn the Net - covers Internet Basics, World Wide Web, E-mail, Newsgroups, Digging for Data, Web Publishing, Multimedia, etc. Tim Berners-Lee - in 1989 he invented the World Wide Web, an internet-based hypermedia initiative for global information sharing.	http://www.learnthenet.com/english/index.html http://www.w3.org/People/Berners-Lee-Bio.html/
Reviewing & Evaluating Software	The Review Zone - reviews on edutainment software for kids and the family, CD-ROMs, hardware, computer books etc. for parents and teachers	http://www.thereviewzone.com/

General	Education Mailing Lists for Educators (Australian)	http://www.gu.edu.au/gint/ozlists/education.html
Designing Web Pages	<p>A Beginner's Guide to HTML</p> <p>Home Page Generator</p> <p>Yale Style Guide for Web Pages - VERY USEFUL FOR LOOKING AT INTERFACE DESIGN, ETC.</p> <p>Jakob Nielsen's Website - a recognised guru in web design and web usability - backed by research (Articles like History of Print Standards; End of Web Design)</p>	<p>http://www.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimer.html</p> <p>http://www.teachers.net/sampler/</p> <p>http://info.med.yale.edu/caim/manual/contents.html</p> <p>http://www.useit.com/</p>