

# **The Design Of A Virtual Learning Environment: From Practice Into Theory**

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## **Abstract**

The wording to this title is deliberate. For most practitioners a starting point for developments in their teaching is reflection on practice and not on any theoretical constructs that inform practice. This is also probably true of early 'innovators' in the use of learning technology. Nevertheless, despite a burgeoning plethora of example, descriptive case studies will not of themselves extend our understanding of best practice nor offer the promise of future development.

Enhancement in the use of e-learning is an iterative journey. It starts and ends with the teacher's context and purpose but, along the way, engagement with research-based inquiry into effective learning can help to place the use of e-learning on a more secure footing.

However, many academics who have expressed an interest in e-learning and have built some form of e-learning provision into their teaching, still have a tenuous grasp of educational principles and of appropriate pedagogic tools that can inform more effective ways of learning.

This paper provides an overview of how on particular VLE has been constructed and have evolved. It will demonstrate the ways in which learning models have influenced and been used to 'map' and refine the design features and structure of a VLE. In particular, it will address several key issues:

- a) the identification of appropriate learning models.
- b) the application of learning models to e-learning design.
- c) the symbiotic relationship between practitioner experience and features to effective learning design.

## **The Background**

A recent survey of Australian academics (Maor, 2004), which concerned their teaching and pedagogic practices and attitudes towards the adoption and application of learning technologies, revealed that university teachers were positioned on a wide continuum of experience and pedagogic awareness. Some snatched at every technological device that appeared over the horizon; others were well versed in employing a range of pedagogic methods within their separate disciplines but found it difficult to integrate technology into existing practice. But, notably, there was a conspicuous lack of theoretical and conceptual awareness that might energise the synergy between technology and enhanced learning.

Higher order learning can be described as conceptually rich, coherently organised and exploratory (Entwistle and Ramsden, 1983; Biggs, 1987). At a theoretical level, too, there exists a general consensus that the value of e-learning does not lie with faster access to information but in its capacity to

facilitate thinking and to construct meaning and knowledge, and that it does so through its capacity to connect learners and their thinking within an intellectually challenging environment (Garrison & Anderson, 2003). However, between practice and the theoretical constructs to e-learning design there exists a pedagogic bridge but it is one which many teachers in higher education do not recognise or are reluctant to cross.

Teachers will only be persuaded of the benefits of learning technology if the technology can not only give access to a richer vein of resources but also capture genuine ways of thinking and working within their disciplinary domain and, further, immerse learners in the same intellectual processes. That clearly holds implications for the appropriate choice of technology in relation to the disciplinary context and for the design of the learning experience within a technological setting.

This paper takes the form of a personal narrative and a journey of exploration. It seeks to explain the 'triggers' to adopting technology-based, pedagogic strategies. It then identifies the chronological point at which theoretical constructs of learning design began to have a significant impact on modification and further development to the use of online learning tools.

### **A point of departure**

Engaging practitioners with learning technology does not start with the technology itself, learning design nor, least of all, with theoretical perspectives on the adoption of technological applications. Instead, it is an iterative journey whose departure point is the subject context and its intellectual or professional properties within which the practitioner resides. That defines the horizons to the work of most busy academics who are under increasingly pressure to produce research outputs in their own fields. They have very little time or inclination to indulge themselves in the burgeoning literature of educational research and theoretical constructs nor should they be expected to. Yet, at the same time, many are conscious of the drive to enhance the quality of learning among their students (Eley, 2003). Many too are aware of the limits to their own conventional teaching practices with a leaning towards didactic, transmission modes of delivery; and many too have been tempted to grasp after technological solutions only to find that technology only succeeds in replicating the deficiencies to current practice.

'Good' teaching draws from experience and open, critical reflection on practice and that must be the starting point of any readiness to explore alternative ways of enriching the learning experience of students. Arguably, a further stimulus is derived from forging a common ground between subject based research and subject specific pedagogic approaches (Jenkins, 2005) Personal experience, combined with a frustration with an artificial divide between research and teaching, marked the start of an exploratory journey into the potential benefits of using learning technology. Reflection had also identified a familiar set of shortcomings to students' learning of a kind that contributed to the shallowness of their experience :

- Weaknesses in building hypotheses and seeing ways of putting them to the test.
- Tentative efforts to volunteer ideas.

- An unwillingness to take risks.
- A reluctance to embrace collaborative endeavour.
- A caution about investing something of their own 'personality' into the academic venture.
- Methodological flaws in connecting disparate sets of information and extrapolating new knowledge.
- Stilted forms of written communication that paraded an acquaintance with argument and fact rather than demonstrated a personal sense of understanding and ownership of the subject matter.

It is not argued that these deficiencies could not be addressed within the context of conventional, face-to-face teaching settings; rather that learning technology, and the customised virtual learning environment (VLE) in particular, suggested more dynamic ways of enabling students to develop an awareness of what were largely cognitive shortcomings to their intellectual engagement with the discipline of history.

The immediate features to a WebCT 'platform' – its hypertext format and its communication tools - offered the prospect of using technology to 'map' or structure an intellectual journey whose destination was uncertain. From the author's perspective it was first and foremost an *intuitive* response to technological opportunity and prompted by a dissatisfaction with aspects of students' engagement with the subject; in short, that the design to a VLE could mirror legitimate and challenging ways of thinking and working in the discipline and, further, that it could capture a learning experience that was more 'research-like' in the activities it engendered by steering learners through a morass of original materials in search of both individual and collective solutions to a given problem.

Hence, a first experience of using learning technology derived from an epistemological view of a discipline. It had a pedagogic concern with more student-centred approaches to learning and it emerged from an instinctive sense that a particular technology had features that could be utilised to give students a more challenging and more legitimate experience of the subject, and might possibly enhance their own academic and personal growth.

A starting point was also determined by the availability of a rich seam of source materials that had shaped a research paper; but, as a learning tool, the paper constituted an output which the inexperienced learner might have read but to which the learner may not have related in the sense of perceiving and, on a personal level, appropriating the academic processes that underpinned its production. Yet research, as an integral part of teaching, can be pedagogically managed as a powerful learning tool.

### **A journey of discovery**

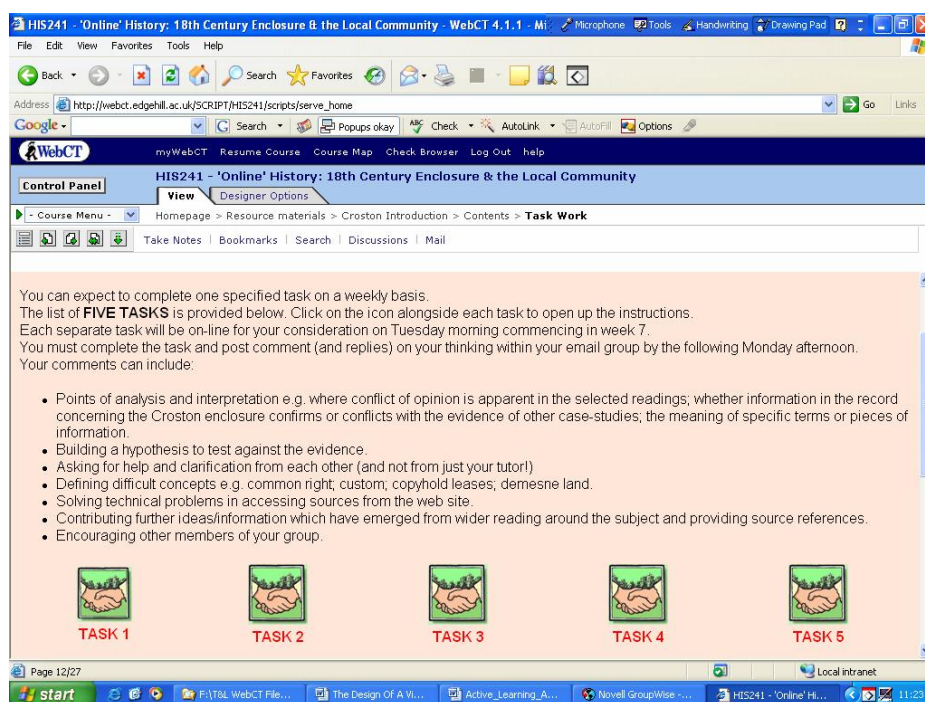
A first experience of using learning technology commenced in 2000 with a WebCT-based undergraduate history module which subsequently operated over a four-year period.

The subject matter and content of the project was the product of earlier published research (Rogers, 1993) and took the form of a local case-study investigation into the social and economic impact of the eighteenth-century enclosure movement. The record is a very full one and it opened up the

possibility of engaging students with a subject steeped in historical debate and controversy, whilst immersing them in the same processes of interrogating evidence and verifying judgements as confronted the researcher. At this point research and teaching find common ground insofar as teaching should have the same critical focus as research (Brew, 1999; Rowland, 2000). Web-based technology offered students, as researchers, the opportunity of building similar but more meaningful knowledge claims for themselves (Ramsden, 1992) and a customised VLE can simulate that process.

- Ready access to a range of learning resources is a central feature of VLEs. In this case a bank of resources consisted of documentary, cartographic, statistical and photographic materials, together with an introductory core text and extracts from secondary sources, all of which, as resource types, can be viewed separately and independently by students should they choose to navigate their own route.
- Central to students' learning activity was the Task Work - a linear series of five linked tasks undertaken over a twelve-week period, each of which was self-contained as a set of web pages, hyperlinked to relevant resources and each provided a building block for the next stage. Each of these tasks was structured around a set of instructional tools: concepts, hypotheses and questions. Together they constituted a learning experience which immersed students deeply in the processes of interrogating evidence and in finding a solution to the serious and highly complex historical problem of measuring the significance that could be attached to the events they were studying.

Figure 1



- In this respect, a successful outcome to the course in terms of promoting deeper learning was predicated on providing a high level of structure and

very specific foci to this series of learning tasks and, as an approach, has been endorsed elsewhere (Orsini-Jones, 1999; Hartley, 1999; Lloyd-Jones and Lewis, 2001; Rosie, 2000). In summary, students gain confidence in constructing interpretations if they have a solid basis on which to place their findings and have awareness of how knowledge can be constructed, managed and applied.

- Engagement in the academic discourse of the subject (both online and face-to face) was seen as axiomatic to any successful outcome. It lies at the heart of a technologically intensive learning environment (Laurillard, 1993; Salomon, 2000; McAlister, 2001; Morris, 2002) and WebCT's discussion board channelled and archived students' comments, questions, problems and summaries as the course unfolded.

In a focus-group feedback meeting at the close the history course, one history undergraduate commented favourably on the outcome and on the ways she had benefitted from the experience. It had been a lot of hard work but there seemed to have been real purpose to it all:

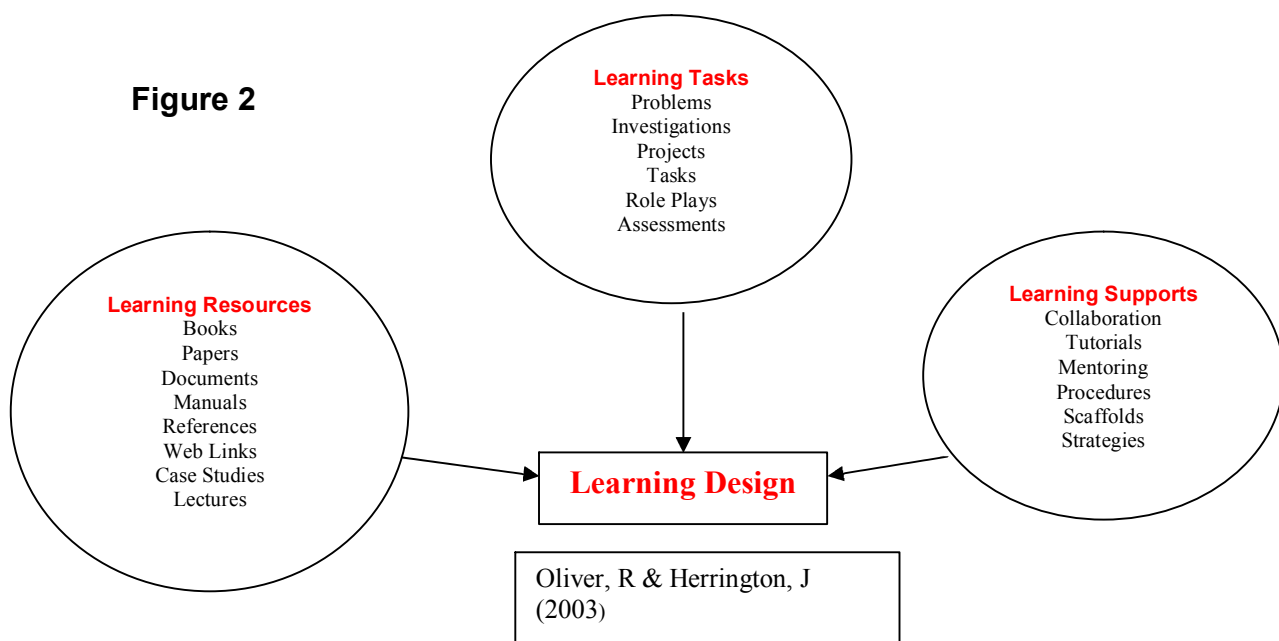
“You question everything, you actually look at resources and ask where it (sic) comes from, is it accurate and are there big gaps, and does it satisfy what I want in answering the question? And, because it is on-line some students supply answers you have never even thought about....”

At one level, that and similar comment by other students were reassuring. Instinct had proved productive.

### The onward journey: practice into theory

This first venture into the application of learning technology demonstrated now familiar features that figure in the design of an online learning environment.

**Figure 2**



By itself, however, Figure 2 does not express the continuing and formative journey that gradually encompassed an emerging theoretical landscape. The

features to a landscape, grounded in more theoretical propositions, pointed in new directions and other ways of reconfiguring the component parts of an online environment. But there are dangers along the way.

In itself the experience of using technology did not offer complete solutions to questions and problems that were first raised at the outset of this journey. On the other hand, recourse to theoretical perspectives risks 'post-hoc' rationalisation for a particular teaching strategy rather than as a catalyst for fundamental redesign. Furthermore, there is a bewildering array of learning models and design frameworks buried within a burgeoning case-study and research literature which academics, outside the field of education, would find alien and overwhelming.

The concluding part of this journey therefore concerns the experience of distilling more theoretical perspectives that had personally meaningful application in refining and developing practice. Currently, there seems to be very little evidence of how models or theories of learning have applied to effective, pedagogically driven, e-learning strategies.

In particular, the experience of learning design using technological tools within a specific discipline identified a set of imperatives but also exposed a number of conflicting tensions:

- The design of an e-learning environment, and the formulation of what learners will actually do, will determine whether any transformative value will materialise. But where does the interested practitioner actually start? Is it viable to take a specific theory of learning and its attendant characteristics of learning, on the basis they have inherently persuasive properties, and then 'map' relevant resources and e-learning 'tools' onto these features? Conole's framework for design (Conole, et al, 2004), starts with a review of learning theories with a view to connecting theory and practice and prompting the non-specialist to shape an appropriate course of action. Similarly, Nichols (2003) argues that e-learning practice is unlikely to evolve unless the theoretical basis to e-learning is engaged and explored.
- Is the starting point primarily shaped by the epistemological make-up of the discipline and/or by the object of an inquiry into a professional field of activity? Garrison and Anderson (2003) draw attention to the centrality of building coherent knowledge structures into an e-learning design and, to that extent, reinforce the core principles and responsibilities of the traditional educational transaction. But does coherence in design integrate instructional elements with resources or, as Oliver and Herrington (2002) have argued, should these two functions be separated out?
- Should a starting point embrace the learning experience and preferences of students such that e-learning design would make a conscious effort to accommodate a range of aptitudes and preferences? (Sabry & Baldwin, 2003) Or might this be an impediment to innovative practice and learning enhancement given that many students adopt a risk-aversion approach to their learning; they prefer the safety-net of the familiar and conventional which they are reluctant to surrender. (Kewell & Beeby, 2003). Conversely, can the environment of e-learning be truly transformative in relation to learners'

perceptions of the purposes to learning and, therefore, of their learning behaviour itself?

- Persuading and enabling learners to engage with and appropriate the discourse of a discipline is seen as the keystone to maximizing the learning potential of e-learning (Laurillard, 2002). A number of learning design systems including integrated learning environments like WebCT, LAMS or Moodle lend themselves to social constructivist approaches by providing facilities for the communication and collaborative sharing of ideas and information. Many practitioners are also aware that discussion boards or 'conversational frameworks' promise much in the way of promoting learners' deeper, cognitive engagement with subject matter but produce disappointing returns. Any educational benefit turns on the online roles and relationship within the community of learners and teacher (Salmon, 2004). A successful outcome would seem to hinge on the participating role and guidance of the online tutor and on striking a balance between an overbearing instructivist approach and an open-ended transfer of responsibility to the learner. Does design help to foreground that problem and facilitate a critical and constructive learning process in which learners can discern clear purpose and a real and legitimate role for themselves? (Garrison and Anderson, 2003)

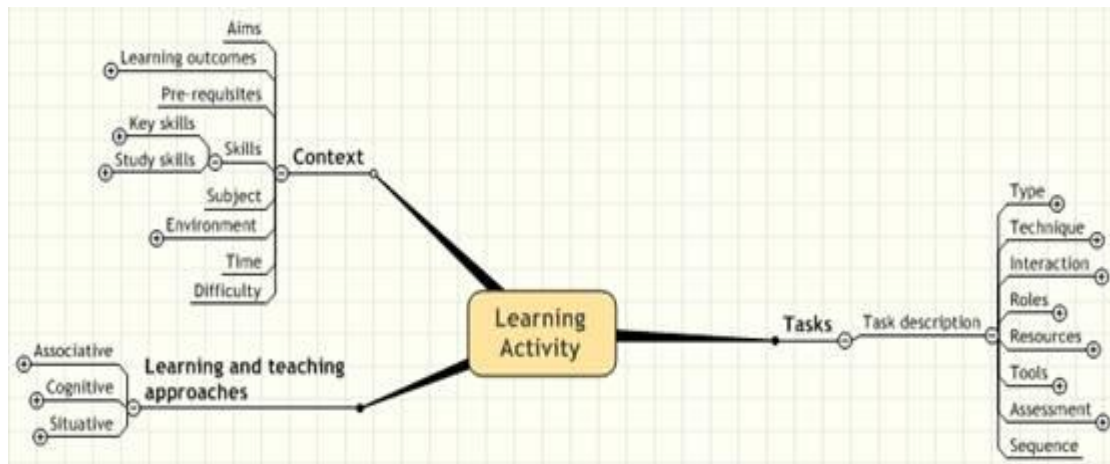
All of these questions and issues initially arose out of reflection on practice. Does learning design assist in addressing these concerns as a 'post hoc' evaluative tool or can design help to bring these concerns effectively to the fore in the planning stage? The full potential of design self-evidently lies with the latter but it cannot sit outside of what is intuitive for the teacher otherwise it becomes an instrument for mechanistic and formulaic procedures and of a kind that would meet resistance.

Authoring tools for learning design such as DialogPlus (Conole and Fill, 2005) are a bold initiative in helping teachers to think through the component parts of planning a learning experience (**Figure 3**). It uses a concept map as a 'tool kit' at the heart of which is the notion of a learning activity informed by context, the adoption of preferred learning theories and models and the identification and selection of appropriate tasks and assessment practices within an unfolding taxonomy of possibilities. It has the potential to evolve into a general purpose authoring tool for learning design because it is non-prescriptive and adaptable (Griffiths and Blat, 2005).

In a broadly similar manner the Australian University Teaching Committee (AUTC 2002) project aimed to produce generic/reusable learning design resources to assist academics to create high quality, flexible learning experiences for students.

### **Figure 3**

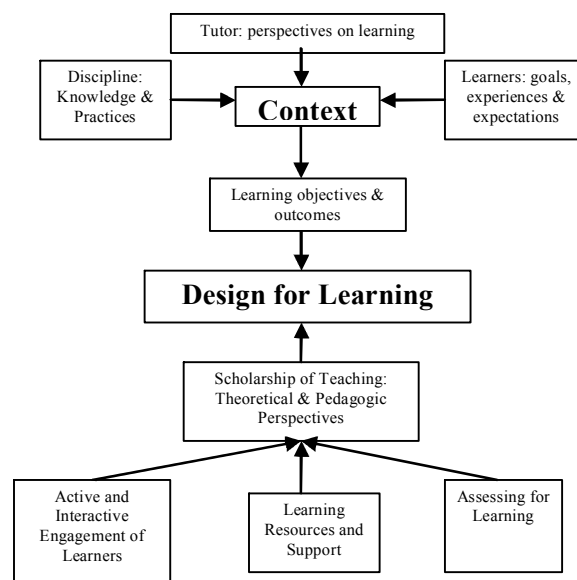
#### **DialogPlus Learning Design Toolkit**



DialogPlus offers users different starting points for the planning process but it was helpful to reconfigure the features of this framework for the purpose of articulating the characteristics of a specific academic context and its translation into a design for learning mediated through comparative theoretical and pedagogic perspectives (Figure 4)

**Figure 4**

### Learning Design: a Framework



In this framework context is deliberately highlighted. In doing so it recognises that no one model can guide designs, especially those of a constructivist setting, since knowledge construction is so context specific. It therefore places due emphasis on the expertise of the teacher in having clear sight of the conceptual, problematic or experiential composition of the context and a

pedagogic sense of how the context might be formatted and presented to learners in such a way that the learners could model and internalise the processes of knowledge construction for themselves.

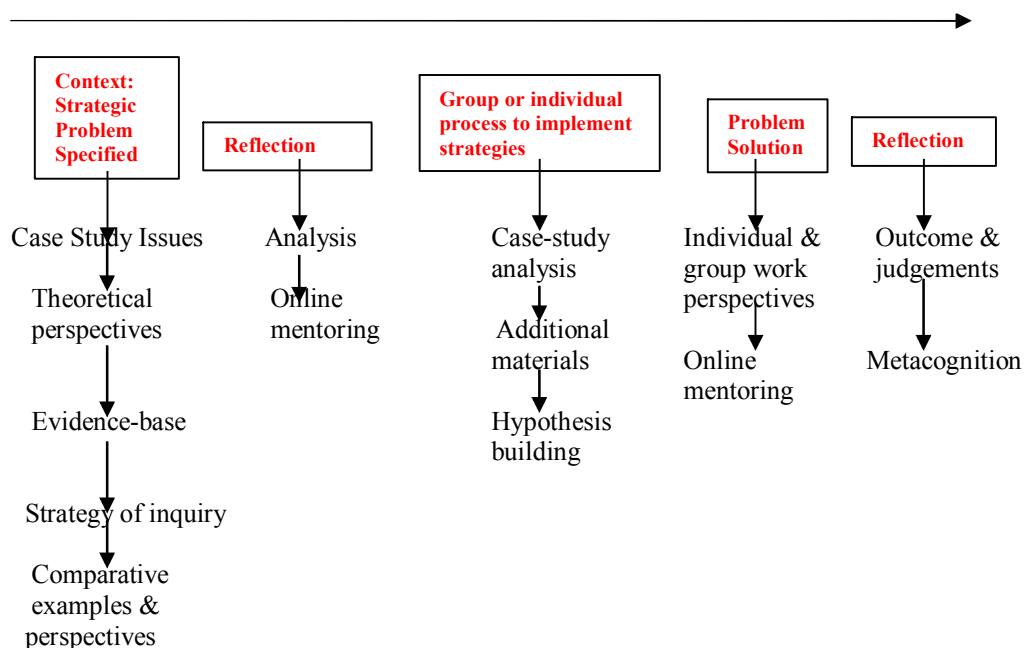
If **Figure 4** helped to conceptualise the relationship between component parts of the learning design, **Figure 5** captured the journey itself as a means of planning the learning experience and revisiting concerns along the way. It draws on Oliver’s (2002) exploration of generic descriptions of learning designs that foster knowledge construction and problem solving. His review identified several discrete learning designs ranging across a continuum that included a number of what would be described as constructivist approaches to particular learning foci – the experiential ‘incident focus’ that invites exposure and participation in events or incidents of an authentic and real nature; a ‘role focus’ that involves participation in settings which model ‘real’ world dilemmas and application; and a ‘strategy focus’ that has a strong cognitive and social constructivist presence. The design to this environment requires authentic resources that support multiple perspectives on a given problem, provide expert elaborations and contextualise the wider theoretical setting. Typically, learners are provided with tasks, tactics, strategies, case studies and pathways to a solution. Teacher intervention and collaborative endeavour provide meaningful opportunities and contexts for articulating ideas within the discourse of the discipline.

Figure 5 is an adaptation of Oliver’s sequence to a strategy-based design and provided a tool for the evaluation and reworking of the design features and content of the online history course in Figure 1.

**Figure 5**

**Temporal sequence to strategy-based learning design: a history project**

(Adapted from R Oliver, 2002, *Formalising the description of learning designs, HERDSA*)



The outcome of this process resulted in a review of the course, and a sharper focus on the more troublesome aspects already outlined. It was both the product of reflection and productive engagement with theoretical constructs, and it occasioned significant adjustments to the design of learning tasks and assessment methods in particular. Herrington and Standen (2000) had already travelled this road in demonstrating how and why they were persuaded to transform a multimedia, business studies programme from an 'instructivist' model into a more 'constructivist' form by drawing on reflection and a theory of situated learning as a framework for instructional design.

### **Journey's End?**

This journey began by raising general concerns about students' engagement with learning. Intuitively it was felt that the hypertext tools of an integrated learning environment would synchronise with the intellectual pursuits of history and invite learners into a 'research-like' process of learning. In a review and evaluation of online provision conceptions of learning design helped and lessons were learned.

Learning design made explicit which components of theory or set of theories are legitimately grounded in learning activities (Conole, 2004); Tam, 2000). To that extent, teachers have points of reference to make informed decisions about adopting new technology-based approaches or in making changes to existing practice in order to profile more effective learning opportunities. In relation to the disciplinary properties and focus of the history course described in this paper and personal experience of learning design, problem-based learning best suits online education, and it is crucial that a productive synergy is built between the two.

There is a need to have a clearly articulated 'triggering' event that provides not just content but offers a sharp and challenging definition to an experiential or cognitive encounter. There also has to be a structured phase to that encounter steered by a cohesive sequence of tasks, shaped by the teacher but internalised by learners through framing issues, questions and ideas. The 'guide-on-the-side' approach is inadequate at least in the early stage of online delivery. The teacher's gentle nudge can be a disabling experience for students trying to build complex connections between ideas and evidence. Learning design cannot be independent of specific contexts and properties. There must be an umbilical relationship between the ways in which a body of knowledge is constructed by the 'expert', the peculiar affordances of the technology and what learners bring to the encounter with the specific instructional activity. By implication, there must also be low confidence in the current interest in 'learning objects' as products for digital storage, retrieval and reapplication (Boud and Prosser, 2002; Friesen, 2003)

Many designs in the domains of the humanities and social sciences have a linear structure to them expressed by a series of related tasks that steer in a restrictive direction. Consequently, they can invite more of a behaviourist and didactic response rather than embody the principles of constructivist learning (Conole, (2004). Higher order thinking requires conditions that are coherently

organised but persistently exploratory; that make available conflicting perspectives; that make possible competing solutions and outcomes (Reeves); and that strike a blend between cognitive independence, creativity, and an interdependence between teacher and participants. Structure or 'scaffolding' to design has to be divergent as well as convergent. As a set of planning tools Boud and Prosser (2002) identified key areas, reformulated as a set of questions, that would usefully inform learning design – learning engagement and the balance between support and autonomy; acknowledging the learning context in its conceptual and contextual make-up; challenging learners to become critical knowledge builders; providing practice in order to deepen learners' understanding.

Design considerations of this sort held several implications for the management and content of task work in this history module. For instance, in their first task (Figure 1) students were guided towards building and verifying the concept of a 'peasantry' within a particular temporal and spatial context using a body of complex evidence. Arguably, this invited an overly convergent approach to their thinking. In a later review, the inclusion of additional material confronted students with a diametrically competing thesis that caused them to re-examine and, for some to modify their earlier judgements. More divergent thinking was promoted at this strategic point and strengthened the contextual components in Figure 5. The same considerations of convergence and divergence and autonomy and direction in learning shaped the decision to review and then separate out instructional tools from the resource base in order to encourage a more independent exploration of the evidence.

Facilitating discourse goes to the heart of the e-learning experience built on social constructivist principles. The interventionist role of the online tutor in promoting high quality discourse among participants has attracted competing views (Mazzolini and Maddison, 2003). The 'guide on the side' may have a constructivist ring to it but offers an inadequate model and insufficient support for learners trying to build complex ideas. The modelling of discourse in the discipline is crucial. Further, research has provided tools which can be readily deployed to evaluate cognitive levels of engagement demonstrated by learners in their written responses to 'discussion board' communication and tutor intervention. The SOLO Taxonomy of Biggs and Collis can provide insight into the level, quality and progression to students' thinking (Biggs and Collis, 1982; Rogers, 2004). Further, Garrison and Anderson (2003) provide an effective taxonomy of instructional indicators as a guide to the efficacy of tutor intervention.

Learning design also called for the need to revisit assessment practices such that they resonate with the robust cognitive processes that describe the discipline of history and with the learning tasks that captured a problematic way of thinking. The conventional essay did not align with that objective whereas giving greater weight to students' online responses served the outcome of autonomous, critical reflection and judgement-making.

Developmental research in e-learning design requires a pragmatic epistemology that regards theory as being collaboratively shaped by practitioners and researchers (Reeves, 2002). Experience in the first instance

did not derive from theory. Yet there also exists the need for guidance on how to judge whether a body of teaching and learning processes will achieve the intended learning outcomes. Therefore, for the purposes of more fully effective pedagogic design, adopting and verifying a theory of learning and incorporated into a design setting becomes inescapable. Research in these terms was entirely descriptive of this personal journey.

## References

- AUTC Project on ICT-Based Learning Designs (2002)  
<http://www.learningdesigns.uow.edu.au/project/index.htm>
- BIGGS, J.B. (1987) *Student approaches to learning and studying*, Melbourne, Australia: Australian Council for Educational Research
- BIGGS, J & COLLIS, K (1982) *Evaluating the Quality of Learning: The SOLO Taxonomy*, London: Academic Press
- BOUD, D and PROSSER, M, (2002) 'Appraising New Technologies for Learning: A Framework for Development', *Educational Media International*, 39 (3/4): 237-245
- BREW, A. (1999) 'Research and Teaching: changing relationships in a changing context', *Studies in Higher Education*, 24(3): 291-302.
- CONOLE, G and FILL, K. (2005) 'A learning design toolkit to create pedagogically effective learning activities',  
<http://www.jime.open.ac.uk/2005/08/conole-2005-08-paper.html>. [accessed 13 March 2006]
- CONOLE, G et al, (2004) 'Mapping pedagogy and tools for effective learning design', *Computers and Education*, 43: 17-33
- ELY, M.G. (2003) 'Teacher thinking during detailed planning, EARLI Symposium <http://www.celts.monash.edu.au/assets/other/earli03-eley-paper.pdf> [accessed 18 November 2005]
- ENTWISTLE, N.J. & RAMSDEN, P (1983) *Understanding student learning*, London: Croom Helm
- FRIESEN, N (2003) 'Three objections to learning objects and e-learning standards', <http://www.learningspaces.org/n/papers/objections> [accessed 16 November 2005]
- GARRISON, R & ANDERSON, T, (2003) *E-Learning in the 21<sup>st</sup> Century: a framework for research and practice*, London: Routledge Falmer
- GRIFFITHS, D and BLAT, J, (forthcoming), 'The Role of Teachers in Editing and Authoring Units of Learning Using IMS Learning Design', *International Journal on Advanced Technology in Learning, ALT, Special Issue on Designing Learning Activities: From Content-based to Context-based Learning Services*, Vol.2(3).
- HARTLEY, JR. (1999) 'Effective Pedagogies for Managing Collaborative Learning in On-Line Learning Environments', *Educational Technology and Society*, 2(2): 12-19.
- HERRINGTON, J & STANDEN, P (2000), 'Moving from an Instructivist to a Constructivist Multimedia Learning Environment', *Journal of Educational Multimedia and Hypermedia*, 9(3): 195-205
- JENKINS, A (2005) 'Strategies for linking teaching and research', *HEA Academic Exchange*, 2: 12-14

KEWELL, B & BEEBY, M (2003) 'Student and Lecturer Responses to the Introduction of Computer Assisted Learning (CAL) in a University Business School', *Teaching in Higher Education*, 8, 3: 413-430

LAURILLARD, D. (2002) *Rethinking University: a conversational framework for the effective use of learning technologies*, London: Routledge

LLOYD-JONES R. & LEWIS, M. (2000) 'Integrating information technology into the history curriculum', in Booth, A. & Hyland, P. (eds.), *The Practice of University History Teaching*, Manchester: Manchester University Press

McALISTER, SR. (2001) 'Argumentation and a Design for Learning', Open University, Institute of Educational Technology, December:  
<http://iet.open.ac.uk/research/calrg/> [accessed 16 January 2002]

MAOR, D. (2004) 'Pushing beyond the comfort zone: Bridging the gap between technology and pedagogy', ASCILATE:  
[www.http://ascilate.org.au/conferences/perth04/procs/maor.html](http://www.ascilate.org.au/conferences/perth04/procs/maor.html): [accessed 19 Jan. 2006]

MAZZOLINI, M & MADDISON, S (2003) 'Sage, guide or ghost? The effect of instructor intervention on student participation in online discussion forums', *Computers and Education*, 40: 237-253

MORRIS, E. (2002) 'A review of Web-based learning resources in higher education', Open University, Institute of Educational Technology, April:  
<http://iet.open.ac.uk/research/calg> [accessed 27 May 2002]

NICHOLS, M (2003) 'A Theory for e-Learning', *Educational Technology and Society*, 6(2): 1-10

OLIVER, R & HERRINGTON, J (2002) 'Online Learning Design for Dummies: Professional Development Strategies for Beginning Online Designers', Proceedings of EDMEDIA,  
<http://elrond.scam.ecu.edu.au/oliver/2002/edmedia1.pdf>. [accessed 21 March 2006]

OLIVER, R & HERRINGTON, J (2000), 'An Instructional Design Framework for Authentic Learning Environments', *Educational Technology Research and Development*, 48(3): 23-48

OLIVER, R & HERRINGTON, J (2003) 'Exploring Technology-Mediated Learning From a Pedagogical Perspective', *Interactive Learning Environments*, 11(2): 111-126

OLIVER, R et al (2002) 'Formalising the description of learning designs', HERDSA:496-504  
<http://www.cowan.edu.au/conferences/herdsa/main/papers/ref/pdf/Oliver.pdf>. [accessed 4 December 2005]

ORSINI-JONES, M. (1999) 'From reflective learners to reflective lecturers via WebCT', *Active Learning*, 10 (July): 32-43.

RAMSDEN, P. (1992) *Learning to Teach in Higher Education*, London: Routledge

REEVES, T.C. (2002), 'Storm Clouds on the Digital Education Horizon', ASCILITE Conference, New Zealand  
[http://ascilite.org.au/conferences/auckland02/proceedings/papers/key\\_reeves.pdf](http://ascilite.org.au/conferences/auckland02/proceedings/papers/key_reeves.pdf). [accessed 10 January 2006]

ROGERS, G (1993) 'Custom and Common Right: Waste Land Enclosure and Social Change in West Lancashire', *Agricultural History Review*, 41(2): 137-54

ROGERS, G (2004) 'History, Learning technology and student achievement: making the difference?', *Active Learning in Higher Education*, 5(2): 232-247

- ROSIE, A. (2000) "Deep Learning": a dialectical approach drawing on tutored Web resources', *Active Learning in Higher Education*, 1(1): 45-59.
- ROWLAND, S. (2000) *The Enquiring University Teacher*, Buckingham: Open University Press.
- SABRY, K & BALDWIN, L, (2003) 'Web-based learning interaction and learning styles', *British Journal of Educational Technology*, 34(4): 443-454
- SALOMON, G. (2000) 'It's not just the tool, but the educational rationale that counts', Keynote address at the 2000-Ed-Media Meeting, Montreal: <http://www.aace.org/conf/emedial00/salomonkeynote.htm> [accessed 4 November 2000]
- SALMON, G (2004) *E-Moderating: The Key to Teaching and Learning Online*, London: Routledge
- TAM, M (2000), 'Constructivism, Instructional Design and Technology: Implications for Transforming Distance Education', *Educational Technology and Society*, 3(2)