

# Towards a New Tradition of Online Instruction: Using Situated Learning Theory to Design Web-Based Units

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## **Abstract**

*'Traditional instruction', when defined as teacher-centred, hierarchically organised and individually assessed, is a pedagogical approach held in contempt by many in the educational community. In spite of this, traditional instruction has not only sustained its existence in educational institutions but more recently relocated to the World Wide Web and is adapting comfortably to the new technology. A quick perusal of online units will reveal the extent of its pervasiveness on the web. This paper contends that recent research and learning theory have provided the basis for a more informed and appropriate approach to the design of online learning units. An alternative design framework is offered, based on the theory of situated learning and constructivist philosophy. Both approaches are examined in terms of operational definitions and characteristics, and contrasted in the manner in which they translate to web-based units. Design guidelines, based on situated learning theory, are presented for teachers and designers as a framework for their instructional approach to course units on the web.*

## **Keywords**

*Traditional instruction, Situated learning, Online learning, World wide web*



## **Introduction**

For decades, teachers and researchers have sought to prove that the latest technology, innovation or strategy used in the classroom significantly enhances learning. Myriads of studies have been performed to prove that each new pedagogical tool or method has enabled a learning environment that is more effective than 'traditional instruction'. The wholehearted adoption of the Internet as an educational tool has unleashed a new round of research studies to help prove that the use of this technology, for the delivery of units of study, is again better than the traditional approach. This paper will argue, however, that the technology per se has less to do with the quality of learning than the pedagogical approach adopted by the designers of the unit or course. And sadly, the pedagogy of 'traditional instruction' has successfully made the transition to the information age and is alive and well and living on the Internet. Recent research and learning theory has provided enough evidence to suggest that innovative and immersive environments can be offered via the World Wide Web, and they can provide valuable features and affordances not available in the traditional face to face classroom.

## **Traditional Instruction**

A popular research design in instructional technology is to compare the adoption of a new innovation with the same material taught in a traditional manner. The problem with this design is the difficulty in determining the 'traditional' approach. Many of these studies make a considerable effort to define the innovation, but not the 'traditional' method. The Cognition and Technology Group at Vanderbilt (1993) discuss the inadequacy of this research design: 'If the 'traditional approach' that is provided is of especially poor quality, and if tests are more aligned with instruction in one's experimental group than one's control group, it is often less than illuminating to show that one group of students performed better than the control group' (p. 59).

Several writers (e.g., Clark, 1989; Russell, 1997) have been critical of the prevalence of this design: 'Such comparisons generally have produced useless information ... The outcome is well known in advance and nothing of importance is learned' (Clark, 1989, pp. 58-59). House (1991) has also noted that 'specifying the treatment in an experimental design may be misleading because it may lead one to believe that the program is either necessary or sufficient for the outcome to occur when it is not ... a realistic conception of causation might see events as being produced by the interaction of a multitude of underlying causal entities operating at different levels' (p. 7). In the majority of these comparative research studies, however, where an innovation is compared to traditional

instruction, the findings show no significant difference (Russell, 1997). The *No-Significant-Difference* website (Russell, nd) lists hundreds of studies of this type.

The two interesting phenomena to emerge from this research and discussion, however, are the determined efforts of educators to improve learning, and the almost universal disdain for traditional instruction.

While many studies assume the reader knows what is meant by the term *traditional instruction* (many such research studies do not define it at all), some authors have attempted to specifically delineate the characteristics of the traditional approach. For example, Relan and Gillani (1997) provide specific characteristics of traditional instruction, drawing heavily on Cuban's (1993) analysis of teaching methods over more than a century. Their definition of traditional instruction includes these characteristics:

- Teacher talk exceeds student talk
- Instruction occurs frequently with the whole class
- Use of class time is largely determined by the teacher
- Teachers use a textbook to guide curriculum
- Classroom furniture is arranged into rows or chairs, facing a blackboard
- Learning is compartmentalised by discipline
- Physical presence of both teacher and student in same room is required (pp. 41-42)

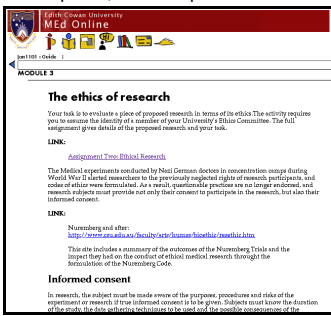
Other observations about traditional instruction include: it promotes generalised, theoretical principles and skills rather than the situation-specific capabilities (Resnick, 1987); it is disembedded from ordinary experience (Sternberg, Wagner, & Okagaki, 1993); dialogue is controlled by the teacher (Schlager, Poirier, & Means, 1996); it largely promotes individual endeavour and cognition (Resnick, 1987); and it involves competitive relations and individual assessment (Lebow & Wager, 1994).

The majority of these comments relate to the traditional bricks and mortar classroom environment rather than to learning environments designed for delivery with new technologies. And one could argue that the opportunities and affordances offered by the Internet would ensure that the contentious elements of traditional instruction would never re-emerge in a new incarnation online. However, scrutiny of many of the course units offered online will show, to the contrary, that traditional instruction is alive and well and adapting excellently to its new environment.

How does traditional instruction translate to the web? Traditional instruction places most emphasis on the content of the unit. Content drives the organisation of the unit on the web, from the interface design to the role of the teacher. The interface is generally text-based, and divided according to the scope and sequence of the content to be covered. The content is hierarchically organised and may follow the same sequence as the set textbook. The teacher creates the content and ensures that it is logical and understandable. The teacher's role is to teach and the student's role is to learn, so the teacher controls the learning situation and endeavours to ensure that students are on the right track by correcting any misconceptions or wrong answers. Weekly tasks may be set to enable students to practice what they are learning, but assessment is set as separate assignments apart from any activities that students may do throughout the unit.

Table 1 gives a summary of characteristics of traditional instruction derived from the literature, grouped according to elements valued within constructivist learning environments, *learning context*, *activities* and *support* (Oliver & Herrington, 2000) to challenge the robustness of the traditional model through a 'constructivist lens'. The third

column provides an example of the manifestation of the traditional characteristics, as they would appear in online learning units. In defining traditional instruction from a modern perspective in this way, there is a danger of failing to take account of the changing goals of education, or failing to acknowledge the link between teaching and the economic, social and political context of schooling (Cuban, 1993). And many have argued that in the hands of a skilled and expert teacher, even today, the traditional approach can be extremely successful. A traditional approach does not stop people from constructing knowledge. Many people can remember teachers from their own childhood whose teaching has had lasting and positive effects.

Element	Traditional instruction characteristics	Traditional instruction online
Learning context	<ul style="list-style-type: none"> <li>✚ Context is disembedded from ordinary experience (Sternberg et al., 1993)</li> <li>✚ Textbooks guide curriculum and context (Cuban, 1993)</li> <li>✚ Generalised, theoretical principles and skills are taught rather than the situation-specific capabilities (Resnick, 1987)</li> </ul>	<p>Context is abstract and theoretical and does not relate to real-world situations.</p> <p>Subject matter is divided into modules and presented in either text on screen, or as PowerPoint or video lectures.</p> <p>Textbooks, websites and other resources may be linked to the modules.</p> <p>The interface is text-based, with buttons or text hyperlinks rather than objects or metaphors, for example*:</p>  <p>*Not a real unit, exists as example only</p>
	<ul style="list-style-type: none"> <li>✚ Lack of modelling of processes by experts (Brown et al., 1989).</li> </ul>	<p>Students are given no examples of experts performing tasks, or of expert comment, to enable them to model real-world practice.</p>
	<ul style="list-style-type: none"> <li>✚ Learning is compartmentalised by discipline (Relan &amp; Gillani, 1997)</li> </ul>	<p>Students' learning is generally contained within discipline specific materials, reflected in the modules and sections of content presented on the web.</p>
Learner activities	<ul style="list-style-type: none"> <li>✚ Problems are largely abstract and decontextualised (Lebow &amp; Wager, 1994)</li> <li>✚ Activities resemble 'school activities' rather than that of actual practitioners (Brown, Collins, &amp; Duguid, 1989)</li> <li>✚ Activities are formulated by others, complete in scope, well-defined (Sternberg et al., 1993)</li> <li>✚ Activities lead to enculturation into practices of classrooms rather than real-world transfer (Clayden, Desforges, Mills, &amp; Rawson, 1994)</li> </ul>	<p>Activities do not resemble the tasks of real practitioners, but shorter abstract essays and exercises.</p> <p>Student activities as they complete the unit are frequently in the form of readings from texts and links to other relevant websites, quizzes, multiple choice tests and short exercises.</p> <p>Student activities are not assessed seamlessly —separate assignments and examinations are assessed.</p>
	<ul style="list-style-type: none"> <li>✚ Reflection not encouraged (under the influence of learning models which were based on behaviourism) (von Wright, 1992).</li> </ul>	<p>Few opportunities to reflect because of emphasis on pre-determined content that needs to be learned.</p>
	<ul style="list-style-type: none"> <li>✚ Experience is seen as a 'substitute for thought' (Norman, 1993, p. 15).</li> </ul>	<p>Lack of collaboration means students cannot reflect socially.</p>
	<ul style="list-style-type: none"> <li>✚ Teacher talk exceeds student talk (Cuban, 1993)</li> </ul>	<p>Little use of discussion boards and email; when used they are controlled by teacher.</p>
	<ul style="list-style-type: none"> <li>✚ Dialogue is controlled by the teacher (Schlager et al., 1996)</li> </ul>	<p>Students are not required to articulate and defend their work to their peers.</p>
	<ul style="list-style-type: none"> <li>✚ Involves competitive relations and individual assessment (Lebow &amp; Wager, 1994)</li> </ul>	<p>Students are assessed individually.</p>
	<ul style="list-style-type: none"> <li>✚ Reveals only whether students can recognise, recall or 'plug in' what was learned out of context (Wiggins, 1990)</li> </ul>	<p>Assessment is separate from activities completed in the unit.</p> <p>Students are frequently assessed with multiple choice or other tests that are easily marked on the computer.</p>

Element	Traditional instruction characteristics	Traditional instruction online
Learning support	<ul style="list-style-type: none"> <li>✚ Instruction occurs frequently with the whole class rather than group work (Cuban, 1993)</li> <li>✚ Classroom furniture is arranged in rows facing a chalkboard (Cuban, 1993)</li> <li>✚ School learning largely promotes individual endeavour and cognition (Resnick, 1987)</li> </ul>	<ul style="list-style-type: none"> <li>Students' activities are solitary.</li> <li>Students are given little opportunity to collaborate online, despite the affordances of the technology to enable it.</li> <li>Student focus on content rather than collaborative opportunities to learn.</li> </ul>
	<ul style="list-style-type: none"> <li>✚ Teacher's role is the transmission of information (Reeves &amp; Reeves, 1997)</li> <li>✚ The teacher controls learning situation (Berge, Collins, &amp; Dougherty, 2000)</li> </ul>	<ul style="list-style-type: none"> <li>The teacher's role is a didactic one, 'telling' students what they need to know rather than a coaching role.</li> <li>The teacher organises content, activities and assessment.</li> </ul>

*Table 1: Characteristics of traditional instruction and its online manifestation*

However, the nature of the Internet challenges this type of pedagogy. As summarised by Hannum and Briggs (1982): 'The limitation of traditional approaches ... is not that they never work, but rather that the quality of instruction developed by traditional approaches varies widely, is usually unpredictable, and is often never determined at all' (p. 9). A new tradition of web-based instruction is needed, one based not upon a century or more of practice, but on the findings of recent theory and research.

### **Using Recent Research and Learning Theory to Guide Design**

While no definitive model of web-based instruction has emerged, there is a great deal of research and theory devoted to the subject. Much of this work has been prompted by the inadequacies of the traditional systems models of instructional design (e.g., Dick & Carey, 1990) to adapt to the capabilities of the new technologies. Many designers, overwhelmed by the possibilities the technologies offer, revert to the comfortable theories and models that can be habitually applied. Park and Hannafin (1993) have noted that technological capacity and the intuition of designers are driving the design of multimedia rather than research and theory.

The model used at Edith Cowan University for the development of new online course units draws widely on the extensive literature base on the theory of situated learning and upon the philosophy of constructivism. It comprises a practical framework for teachers and designers to implement as they begin to work on their online unit. The model has been used extensively for the design of multimedia (Herrington & Oliver, 2000), but it is also appropriate to other learning modes, in particular, online learning environments (Oliver & Herrington, 2000; Pennell, Durham, Ozog, & Spark, 1997). The model comprises nine critical characteristics that can be

used to guide the development of online learning environments for course units. The key elements of the model are presented below.

### **1. Authentic context that reflects the way the knowledge will be used**

In designing online learning environments with authentic contexts, the context needs to be all-embracing, to provide the purpose and motivation for learning, and to provide a sustained and complex learning environment that can be explored at length. It needs to encompass a physical environment which reflects the way the knowledge will be used, and sufficient resources to enable sustained examination from different perspectives (Brown et al., 1989; Reeves & Reeves, 1997).

### **2. Authentic activities**

The learning environment needs to provide ill-defined activities which have real-world relevance, and which present a single complex task to be completed over a sustained period of time, rather than a series of shorter disconnected examples (Brown et al., 1989; Reeves & Reeves, 1997).

### **3. Access to expert performances and the modelling of processes**

In order to provide expert performances, the online learning environment needs to provide access to expert thinking and the modelling of processes, access to learners in various levels of expertise, and access to the social periphery or the observation of real-life episodes as they occur (Brown et al., 1989; Collins et al., 1989; Lave & Wenger, 1991). The facility of the World Wide Web to create global communities of learners who can interact readily via email, enables many opportunities for sharing narratives and stories.

### **4. Multiple roles and perspectives**

In order for students to be able to investigate the learning environment from more than a single perspective, it is important to enable and encourage students to explore different perspectives on the topics from various points of view, and to 'criss cross' the learning environment repeatedly (Collins et al., 1989; Spiro, Feltovich, Jacobson, & Coulson, 1991).

### **5. Collaborative construction of knowledge**

The opportunity for users to collaborate is an important design element, particularly for students who may be learning at a distance. Consequently, tasks need to be addressed to a group rather than an individual, and appropriate means of communication need to be established. Collaboration can be encouraged through appropriate tasks and communication technology (Brown et al., 1989).

### **6. Reflection**

In order to provide opportunities for students to reflect, the online environment needs to provide authentic contexts and tasks, as described earlier, to enable meaningful reflection. It needs to provide non linear organisation to enable students to return to any element of the site if desired, and the opportunity to compare themselves with experts and others in varying stages of accomplishment (Boud, Keogh, & Walker, 1985).

### **7. Articulation**

In order to provide opportunities for articulation, the tasks need to incorporate inherent—as opposed to constructed—opportunities to articulate, collaborative groups to




enable articulation, and the public presentation of argument to enable defence of the position (Collins et al., 1989; Lave & Wenger, 1991).

### 8. Coaching and scaffolding

In order to accommodate a coaching and scaffolding role principally by the teacher (but also provided by other students), the online learning environments needs to provide collaborative learning, where more able partners can assist with scaffolding and coaching, as well as the means for the teacher to support learning via appropriate communication technologies (Collins et al., 1989).

### 9. Authentic assessment

In order to provide integrated and authentic assessment of student learning, the online learning environment needs to provide: the opportunity for students to be effective performers with acquired knowledge, and to craft polished, performances or products in collaboration with others. It also requires the assessment to be seamlessly integrated with the activity, and to provide appropriate criteria for scoring varied products (Duchastel, 1997; Herrington & Herrington, 1998; Reeves & Okey, 1996). Table 2 provides more detailed design characteristics, together with the practical application of those guidelines on the web.

Element	A new framework for online learning	Example of online manifestation
Learning context	<p>Provide <b>authentic context</b> that reflects the way the knowledge will be used in real-life:</p> <ul style="list-style-type: none"> <li>■ a physical environment which reflects the way the knowledge will ultimately be used</li> <li>■ a non-linear design to preserve the complexity of the real-life setting</li> <li>■ a large number of resources to enable sustained examination from a number of different perspectives</li> </ul>	<p>A physical context that enables the student to move freely among resources as required, rather than in linear manner.</p> <p>A web interface comprising metaphors representing the elements of the unit. For example, in the sketch below, the computer can represent communication, access to outside URLs, email, etc, the TV can represent video clips, the drawers can represent documents. Any relevant metaphors can be used depending on the design of the unit and the subject matter, such as calculators, personal journals, instruments, digital assistants. A particular function or group of resources can be accessed readily with a single click.</p> 
	<p>Provide access to <b>expert performances</b> and the modelling of processes:</p> <ul style="list-style-type: none"> <li>■ access to experts and learners in various levels of expertise</li> <li>■ opportunity for the sharing of narratives and stories</li> <li>■ access to the social periphery or the observation of real-life episodes as they occur</li> </ul>	<p>The required skill should be modelled if possible within a real life context, eg, if a scientific report is the required product, a similar report could be on the bookcase.</p> <p>Video excerpts can show interviews with experts, or short clips of experts acting within their real environments. These allow students to observe the 'social periphery' of tasks as they happen in real life.</p> <p>Encouraging students to subscribe to list-serves gives them access to experts and others at varying levels of expertise.</p>

Element	A new framework for online learning	Example of online manifestation
	Provide <b>multiple roles and perspectives</b> : <ul style="list-style-type: none"> <li>✚ different perspectives on the topics</li> <li>✚ the opportunity to hear different points of view through collaboration</li> <li>✚ the opportunity to criss-cross the learning environment</li> </ul>	Provide a variety of perspectives (either on the site or through the web, or both) to enable students to examine problems from the point of view of a variety of stakeholders. Collaborative groups enable the sharing of different perspectives.
Learner activities	Provide <b>authentic activities</b> : <ul style="list-style-type: none"> <li>✚ ill-defined complex tasks which have real-world relevance</li> <li>✚ students define tasks and sub-tasks required to complete the activity</li> <li>✚ a sustained period of time for investigation</li> <li>✚ the opportunity for the detection of relevant versus irrelevant information</li> </ul>	Authentic activities that create the focus for the whole unit – the activity does not supplement the unit, it can be the unit. Activities are composed in realistic ways, such as in memos, email messages, documents etc. They can be accessed through metaphors on the interface such as an urgent email message, an envelope on the desk, an in-tray, a telephone, etc. Activities are complex and ill-defined. A large number of resources are available (through the site, the web, or both). Resources are used to complete the activity, rather than the activity testing whether students have learnt the content.
Learning activities (continued)	Promote <b>reflection</b> : <ul style="list-style-type: none"> <li>✚ authentic context and task</li> <li>✚ non linear organisation to enable students to return to any element and to act upon reflection</li> <li>✚ the opportunity for learners to compare themselves with experts</li> <li>✚ collaboration enables reflection</li> </ul>	Authentic and meaningful activities promote reflection, and a simple metaphorical interface enables easy access to any source of information at any time. Collaborative groupings enable students to reflect socially, and to engage in discussions on issues presented. Access to expert performance and opinion enables students to compare themselves to experts.
	Promote <b>articulation</b> to enable tacit knowledge to be made explicit: <ul style="list-style-type: none"> <li>✚ a complex task incorporating inherent, not constructed, opportunities to articulate</li> <li>✚ groups to enable articulation</li> <li>✚ public presentation to enable articulation and defence of learning</li> </ul> Provide for integrated assessment of learning within the tasks <ul style="list-style-type: none"> <li>✚ the opportunity for students to be effective performers with acquired knowledge, and to craft polished, performances or products</li> <li>✚ significant student time and effort in collaboration with others</li> <li>✚ the assessment to be seamlessly integrated with the activity</li> <li>✚ multiple indicators of learning</li> </ul>	Authentic tasks require articulation of ideas in one form or another. Students are required to present and defend their arguments in appropriate forums, such as bulletin boards, discussion groups etc. Collaborative groups ensure students articulate their thoughts to each other either face-to-face or with communication technologies. Assessment is totally integrated with the unit activities, where groups of students present their polished products (as opposed to first draft essays or multiple choice tests). Assessment is made from different angles, for example, from the planning process the presentation, and the documentation. Peer assessment can be used in authentic ways, for example, each group presents to the board, the judging panel, the editorial review panel or the staff, and a decision is made on the quality of the work.
Learning support	Support <b>collaboration</b> : <ul style="list-style-type: none"> <li>✚ tasks which are addressed to a group rather than an individual</li> <li>✚ organisation into pairs or groups</li> <li>✚ appropriate incentive structure for whole group achievement</li> </ul>	Activities and problems are addressed to a group such as a board of directors, committee, interest group, department etc. Students work together using communication technologies, usually asynchronously Discussion boards encourage sharing and joint problem solving within and among groups

Element	A new framework for online learning	Example of online manifestation
	Provide coaching and scaffolding by the teacher at critical times: • the teacher is available for coaching and scaffolding assistance • collaborative learning, where more able partners can assist with scaffolding and coaching	The role of the teacher is fundamentally that of coach, providing metacognitive support where possible. The teacher assists students via bulletin boards, discussion groups and by direct communication and email as appropriate. Other students also provide support where they are able through the same communication means, and through collaborative groups.

*Table 2: Characteristics of a situated learning framework and its online manifestation*

Using these characteristics as guidelines for design of online units, a more contemporary approach can be adopted to produce student-centred, collaborative and immersive learning environments. How might such a framework translate to the web? The unit's design is focussed not upon the content of the unit but upon the activity that students complete. The unit may comprise just one or two complex and sustained problem-based activities that give meaning to all the learning students do in the unit. In this sense, the activity does not supplement the unit—it *is* the unit (Herrington, Sparrow, & Herrington, 2000). Resources (which may include the unit text-based content) are accessed according to their usefulness in solving the problem. Expert opinion can be referenced where needed, and students work collaboratively using communication technologies to consult via bulletin boards, discussion groups and email.

The interface is generally based on a metaphor appropriate to the instructional design and the subject matter of the unit, and students can access a range of resources available to them in an environment that quickly becomes as familiar to them as their own home workspace. The teacher's role becomes one of coach rather than instructor, but a rich network of supports is put in place to ensure students are not overwhelmed by the nature of the task. They learn to draw less on the teacher as the 'fountain of all knowledge', and to distribute their cognition amongst a range of supports including their physical resources, computer-based tools and each other. Assessment is integrated with the activities completed in the unit, not as separate assignments, where students present and defend polished products for evaluation and comment. The World Wide Web has the potential to change the way education is not only delivered, but also the way it is conceived. The framework described above attempts to utilise the rich affordances of the web, together with the findings of recent research and theory, to assist writers of units to create effective and immersive learning environments for their students. It is important for educators to acknowledge the strengths and weaknesses of the new

medium, and to grasp the opportunity to introduce a new and innovative pedagogical approach. To rise to this challenge may help to create a new tradition in instruction, a tradition that is worth preserving.

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